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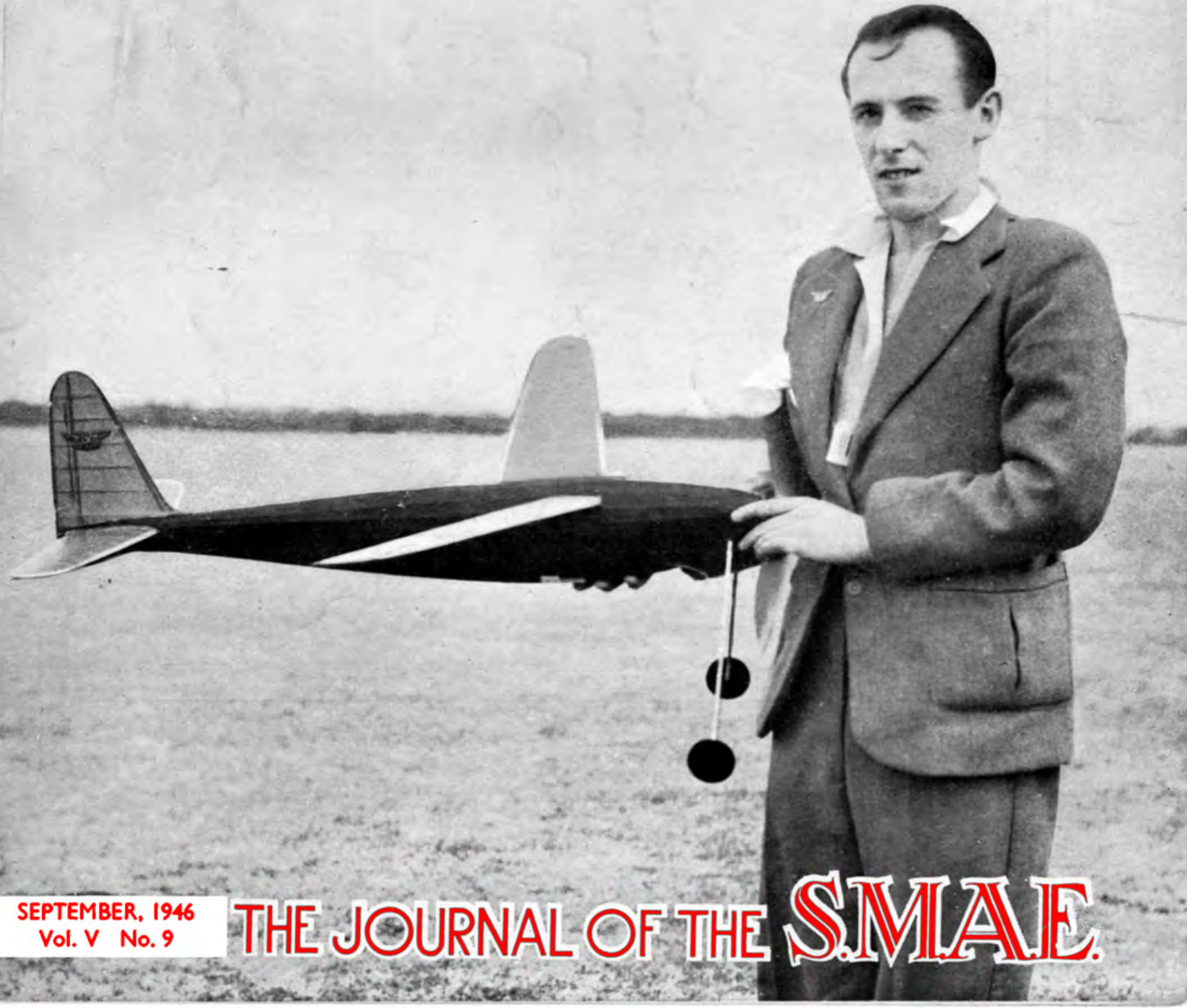

SEPTEMBER, 1946
Vol. V No. 9

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

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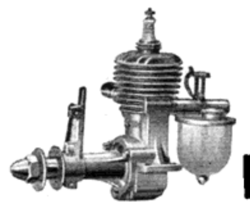

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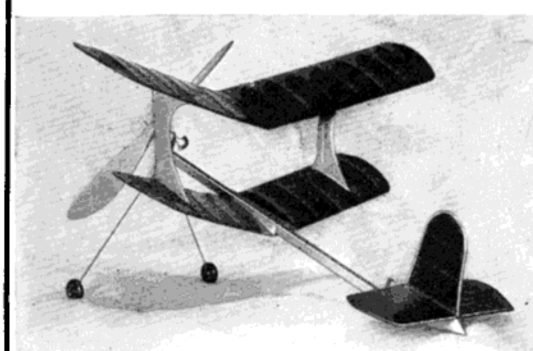

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Edited by
A. F. HOULBERG, A.F.R.Ae.S.

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The Editor presents

THE Bowden Trophy HESTON

Mr. A. Wilson, of the Hayes Club, holds up his winning machine at the termination of the contest. Mr. Wilson scored a well-deserved win by some very consistent flying with a nicely designed model.

Left: One of the two entrants from Holland. Both machines were extremely well built, sound in design and competently handled. They were amongst the few machines to take off successfully on each occasion.

The youngest competitor was Master Court, who entered one of the smallest machines in the contest. It was powered by one of his father's 1 c.c. auto-ignition engines.

Right: Competitors queuing up to check-in at the control. The record number of 67 machines which materialised revealed certain drawbacks in the present rules and organisation of the contest, which will have to be revised in the light of recent developments with power-driven model aircraft and the increased interest in models of this type.

News Review

Cover Story

This close-up of E. Chasteneuf with one of his pre-war Wakefield models, is interesting in showing the leading edge and trailing edge spar construction of the wings, of which he was one of the pioneers, and which has now achieved considerable popularity with other model aircraft constructors. The family resemblance of this model to the famous "20-minute" Glider by the same designer will also be noted.

Readers will be interested in analysing this machine in conjunction with the points raised in the series of articles dealing with the design of Wakefield Models contributed by Mr. R. N. Bullock, as it supports the views expressed in many respects.

Those who have known E. Chasteneuf in the past will be interested to observe that he has now linked up with that other Wakefield enthusiast, Len Stott, to start a model aeroplane supply shop at Westcliffe, Southend-on-Sea.

The Bowden International Trophy

The most important event since our last issue has been the contest for the Bowden International Trophy, which was held at Heston Airport by kind permission of the Fairey Aviation Co., the Ministry of Supply and the Ministry of Civil Aviation, on August 4th.

A record entry of 67 combined with excellent weather to make this contest the most interesting of the series. The organisation was taxed to the utmost, revealing certain drawbacks to the present regulations which will need some attention before the next contest, if it is to be run successfully.

The international atmosphere was provided by the participation of Dr. Hal. Charles, of Dublin, the winner of the Irish Nationals ; and our old friend, van Hattum, who accompanied two of his compatriots to the contest. The French entries expected failed to put in an appearance.

Dr. Charles, like the vast majority of the entries, was suffering from a tired engine, and his machine was not performing with the same vigour which brought it to triumph in the Irish Nationals. The two Dutch entries displayed nice workmanship, were well handled, and flew extremely well ; only lack of practice in keeping to a definite flying time limit spoilt their effort and they deserved a better placing than they actually achieved.

A light wind, which existed throughout the contest, made the take-off difficult and many machines failed to get away in spite of the large take-off eventually provided by the organisers at the request of the competitors. This question of a suitable take-off in power-driven contests is assuming important proportions and it would appear that where large entries are involved it will be necessary to hold contests for this type of model on aerodromes provided with runways, or else on golf courses with well-kept greens. A single take-off board with a large entry renders the running of the contest impossible even with the three-minute rule in strict operation.

In this particular contest the general standard of the engines or their handling was distinctly poor, with the result that the majority of the entries were making full use of their allotted three minutes. Now a brief calculation shows that with an entry of the size involved in this contest three hours is the minimum time for each round if every entry takes his full time on a single take-off strip.

The only answer to this is multiple take-off points and these cannot be produced at a moment's notice if natural take-off points do not exist on the flying field. This will undoubtedly guide the selection of future sites for power-driven model aircraft competitions.

It may even be necessary to institute eliminating trials when engines are more plentiful.

Take-off Technique

The Bowden Trophy contest again revealed poor take-off technique on the part of the majority of the competitors, most of whom failed to get away for the simple reason that their engines were either not in tune or their owners were not sufficiently patient to get the mixture set correctly.

Much too much aimless tap twiddling is still in evidence at important power contests and more experience is still needed by most competitors in the handling of their engines.

Observation of those who place amongst the first half-dozen in almost every power contest—such as Lanfranchi, Tansley and Copland—reveals a precision of operation which is well worth copying by other competitors. They get their engines started every time without difficulty and they get them running really well before they attempt to release the machine.

Too few competitors pay proper attention to the wind direction and fail to make use of it to counteract the torque of their engine during the take-off, with the result that the machine swings off to one side and starts ground looping—if nothing worse.

The Push or Follow-through

It is still necessary to disqualify competitors much too frequently for pushing their models.

A model which has an engine which is running properly should not be in need of assistance for the take-off and the habit of giving models a bit of manual assistance either by an actual push or a follow-through with the hands is a bad one to get into, as you are almost sure to forget yourself during a contest in the excitement of the moment.

If you are going in for contest work seriously *always* make a point of making a contest start by taking the hands cleanly away from the model and letting it get away under its own power and resources. Constant practice is an absolute essential for consistent results.

If your model needs assistance to take off there is something wrong with it, or with your method of handling it, needing methodical eradication.

Undercarriage Design

Take-off troubles are not confined to petrol models, since rubber models possess their fair share of difficulties in this direction. In this case, however, longer experience has shown the correct methods to use in order to overcome the troubles which arise.

There is one point which still needs attention even in the rubber model sphere, and that is the question of an adequate undercarriage. That this difficulty is not confined to this country is indicated by the modification recently introduced into the F.A.I. rules for rising off the ground, which now reads :—

> "The machine must be released without any push whatsoever. It must rest on the ground by at least three points and must be held by the competing modeller or representative modeller by the wing tip and the propeller blade."

The main feature of the amendment is the introduction of the "three points" of support and it would appear that this has been introduced as a result of the unsatisfactory methods of starting used by builders of machines with "single-leg" undercarriages.

F.A.I. Timing Regulations

While most of the modifications which have come into force in the F.A.I. regulations, as a result of the last F.A.I. meeting in 1939, are sound, there is one which will not find favour in the eyes of the British aeromodeller. This is the one dealing with the timing of models for duration record attempts which now allows the timekeepers to "*move to follow the model during its flight by all the means of locomotion available to them and also make use of optical instruments.*"

The introduction of this was strongly resisted by the S.M.A.E. delegates, who attended the F.A.I. meetings for some years before the war—and successfully, in spite of the efforts of some of the delegates from other countries, with no experience of model aircraft.

The Society has tabled a suitable amendment for the next F.A.I. meeting, scheduled to take place in September, in an attempt to reverse this decision and revert to the "stationary timekeeper" rule.

Representation on the F.A.I.

The reason unpractical rules such as the new F.A.I. timing regulation get through the F.A.I. conferences is mainly due to the fact that most countries belonging to the F.A.I. have not, in the past, gone to the trouble of sending an aeromodeller to attend the Model Commission, but have left this in the hands of one of their representatives for full-sized aircraft.

With the exception of Great Britain, who have been represented by the S.M.A.E. through delegation from the Royal Aero Club ; Holland, who have always delegated Van Hattum to represent them on the Model Commission ; and France, who were represented by Monsieur M. Guillet, by reason of his secretaryship of the Model Commission ; no practical aeromodellers have served on the commission and much time has been taken up in attempting to educate the representatives of the other countries in what is actually required and pointing out to them the difference between the conditions required by models as compared with full-sized aircraft.

S.M.A.E. Handbooks

We would draw your attention to the S.M.A.E. Handbook which is obtainable from the Secretary, Mr. L. M. Walker, 16, Conifers Close, Teddington, Middx. It contains all rules appertaining to model aircraft, and full details of all competitions. It should be in the hands of all modellers.

WAKEFIELD MODELS

by R. N. BULLOCK

Dick Korda, the present holder of the Wakefield Cup, taken with his winning model at Bendix Field, New Jersey.

NOW we come to the wings, which are, to me, the most important item of an aeroplane, as the potential possibilities of the aeroplane depend on whether the wings are good or bad. From what one can deduct from past results, wings should not be of either too high or too low an aspect ratio, because if they are of too high an A.R. the speed of our models is insufficient to produce good results, and if of too low an A.R. the wing does not deal with as much air as is advisable, and, in addition, produces longitudinal and lateral instability.

I take the liberty of advocating ten as likely to give good results, and from eight to twelve as being reasonable for the speeds we use them at; this means that the chord is round about 4½ in. to 8½ in., depending on the taper, tip shape, and amount of gap between the two planes produced by the fuselage.

Very severely tapered wings are inadvisable, because when the tip chord drops below 3 in., this 3 in. is, of course, not really right out at the tip, but at a point where the leading edge and trailing edge curves run into the leading edge and trailing edge respectively.

Pointed tips should be avoided, as they are a dead loss. The choice of aerofoil sections for a model is one that leaves us very little choice if we want results, as we have already had it well proved that such sections as R.A.F. 32, Eiffel 400, and Göttingen 601 are all about equally suited for the job.

It seems essential to use fairly thick high-lift sections, with some concavity of the under-surface profile, if we want results with soaring flight as one feature of performance.

The tip shape advocated is neither very blunt nor very pointed, just a happy medium based on two greater ellipses, see Figs, 3, 4 and 5.

The spar form and arrangement is very important, as these are the heaviest single members in the whole model, and if not well designed and placed, good results will not be obtained; thus the wings will either be too weak, too heavy, or unable to stand the shocks they will be submitted to. On the spar form and arrangement depends the success of the attachability of the wings, so it would appear that well-tried schemes will be best.

For years model aeroplane designers have been building wings with a solid leading edge cum front spar, and a solid trailing edge cum rear spar, and this arrangement has done good work, as it lends itself to pushing into boxes in the fuselage, it is very strong from the standpoint of shock, it is easy to build, as all it needs is butt-jointing to the front and rear ends of the ribs, but, alas, for all these advantages, this scheme is not economical from the weight-saving aspect.

When considering weight saving, a better arrangement would be one with two main spars of box or I section, and a small leading edge and a small trailing edge, see Fig. 4. This would undoubtedly produce a lighter wing and one equally well able to stand the flying loads, but it would not be so

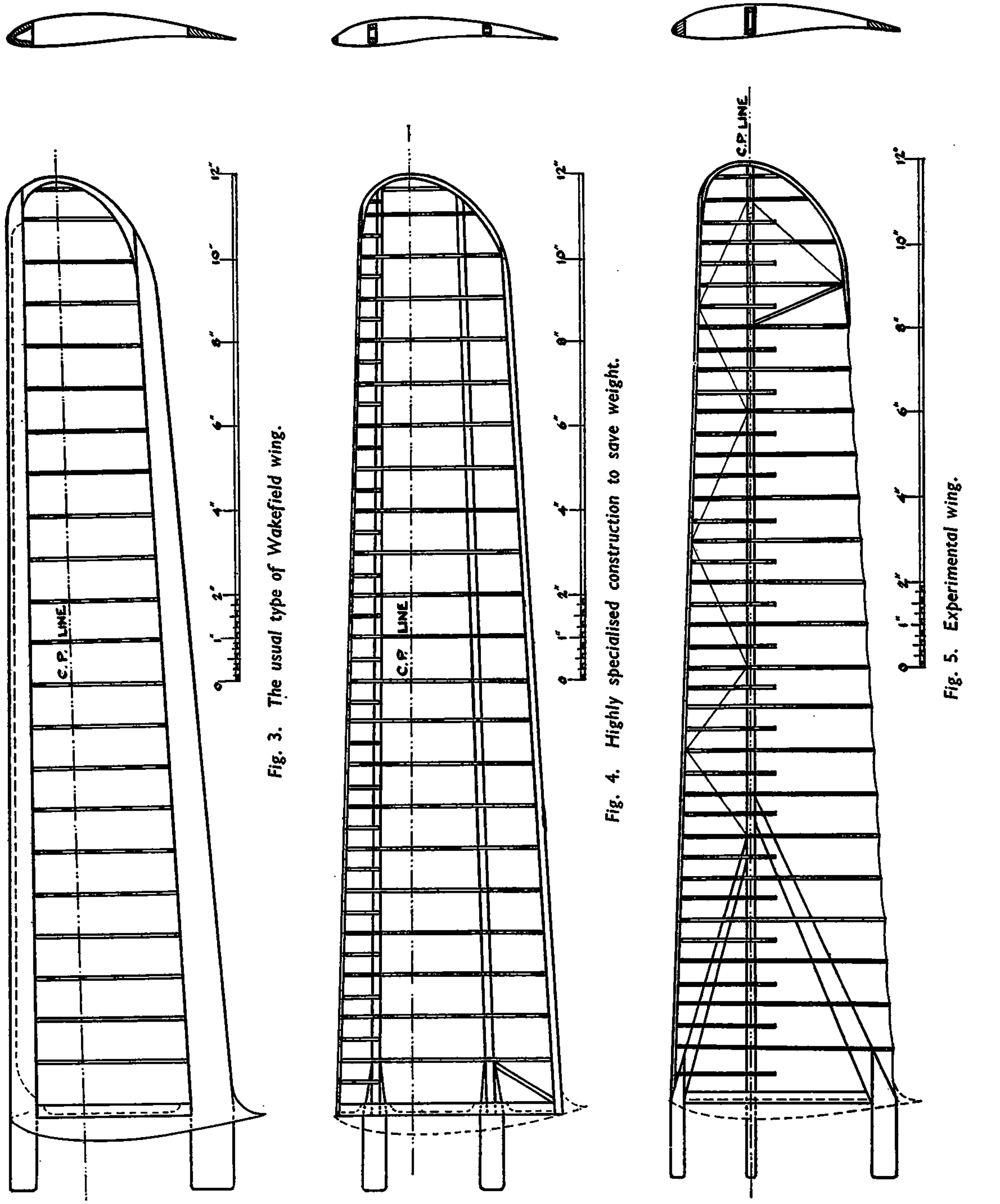


Fig. 3. The usual type of Wakefield wing.

Fig. 4. Highly specialised construction to save weight.

Fig. 5. Experimental wing.

shock-proof, or so easily attached to the fuselage, and besides, it would be very difficult to make. I should imagine that about 30 per cent. of the wing weight could be saved by this type of construction, so should you find difficulty in getting a design down to 8 ozs., here is one way to save a bit of weight.

Being well able to meet the weight specification for myself, I prefer the scheme as shown in Fig. 3.

There are many other possible spar arrangements, one of which I have illustrated in Fig. 4; this wing might be made even lighter than Fig. 3, as it is virtually a D spar at the leading edge, produced with the riblets both top and bottom.

The main spar is stabilised at the root and the tension set up in the trailing edge, when covering, looked after by internal thread and strut bracing.

The scheme illustrated in Fig. 4 should be recognised as experimental, as it might not be quite strong enough for a hard working machine, but is introduced merely to illustrate a possible line of development.

When constructing main planes, the possibility of wash-out from root to tip is worth considering on tapered wings, as it does tend to improve the lateral stability at low speeds, though it means that the effective angle of incidence is reduced. About 1 degree seems to be sufficient, and need not be built in, as it can be introduced in the process of covering. If wings have a forward rake, that is if the taper is on the tailing edge and the leading edge is kept square to the centre-line of the machine, wash-out is hardly necessary, as wings of this plan form stall at the roots earlier than at the tip, or so say the wool tufts on test.

On parallel chord wings wash-out is not of any practical value, as it leads to lots of complications, and besides, it looks bad.

Parallel chord wings are to all intents and purposes just as good as tapered wings. The only thing they need is a rather more elongated tip shape, and, of course, the rib problem is greatly reduced, as so many are identical.

While on the subject of wings, a fair spacing for ribs is 1 in., and leading edge riblets midway between them. Ribs can be $\frac{1}{16}$-in. very light balsa or 1/32-in. medium. Complicated built-up ribs do not pay on machines of this class, and lightening out with holes is not worth while; the tip member of the wings should be laminated, as tips cut from sheet are never strong enough, see Fig. 6.

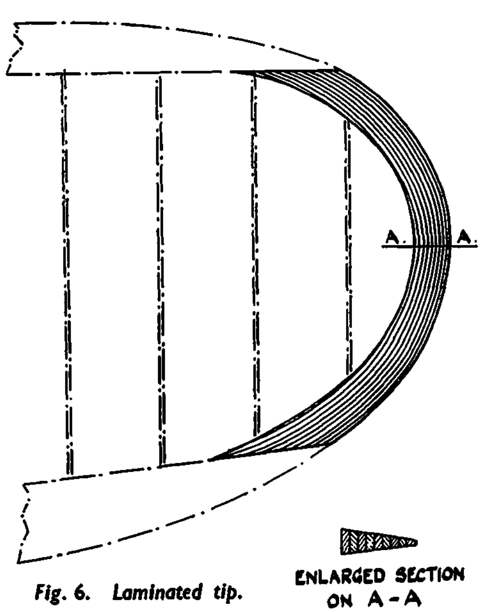


Fig. 6. Laminated tip.

It is fairly well known that dihedral in the form of a quarter of an ellipse with the flattest part of the curve near the fuselage, is the most effective; this can be approximated by a three-stage polyhedral, but both are unnecessary, complicated and difficult to build, so for ease of construction a plain straight dihedral of from 1 in. to 1½ in. to the foot run of half span is quite satisfactory.

Gull wings are seldom satisfactory, and a few otherwise good models have been spoilt by this feature. If, however, your fancy should run to a gull wing, see to it that the outer dihedral is still about 2½ degrees positive, and that the inboard portion is not less than one-eighth span, then you can still hope for some degree of lateral stability.

While on the subject of wings, it appears that covering the upper front third of the chord with balsa would improve the wing; this is rather doubtful and, in fact, should be avoided, because of the weight added and the difficulties of making a clean job.

From this it now appears that a gain can be had from improved spar construction, which should reduce the weight.

Slots might help if very well made and fitted; from my experience, it seems that these are quite easily made to open automatically before the stall is reached, and will hold the nose up for about another twenty degrees or so. The chord of slots should be at least twice as great as those applied to full-sized aircraft. The method of fitting is thin wire, attached to the slot at or near the ends; this wire is then bent backwards, so that it runs approximately parallel to the under surface for about three-quarters of the chord; each wire should be carried in two small metal-plate bearings. Stops are soldered to the rear end of the wires to limit the forward movement of the slot. Flaps do not at the moment appear to be a practical proposition and would require some considerable amount of experimental work to make them effective.

(To be continued)

Photonews *from* HOLLAND

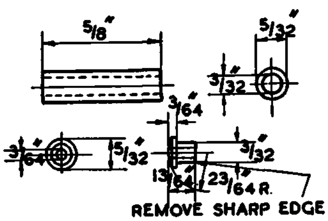
1. P. Vriend, a Dutch exponent of tail-less models, favours the simple " V " layout. 2. Another Dutch modeller, hailing from S'Hertogenbosch, who also favours tail-less models. 3. A. Ridder, of Hilversum, is also experimenting with tail-less models of the straightforward " V " type. 4. This attractive sailplane, hailing from Bussum, employs a fuselage nose fairing neatly into the wing, a scheme favoured in Holland. 5. Some excellent models belonging to members of the S'Hertogenbosch Club. 6. This example of a Dutch petrol model displays pronounced pylon tendencies, and is the work of J. Smits of the Hague. 7. The " Emu " sailplane designed by R. Dÿkman, of Bussum. 8. Another product from the Bussum Club which shows considerable grace of line. 9. A scene at one of the Dutch meetings. 10 and 11. The " Difoga 421 " shown in these pictures was the only aircraft built in Holland during the " occupation," and is a very creditable piece of work.

Edgar T. Westbury

"ATOM MINOR" MARK III 6 c.c. Engine

THE recommended procedure in machining the piston, the drawing of which was reproduced in the August issue, is perhaps a little unorthodox, but has been arrived at as the result of a good deal of experience in machining pistons from the solid. It avoids many of the difficulties which commonly arise in the machining operations, and facilitates accuracy in the finished product.

Turn the outside of the piston to within about 1/32 in. of finished size, and beyond the main cylindrical portion, the size may be reduced to form the sides of the deflector, but this should be left attached to the chucking piece. Next drill the centre, to a depth of 15/16 in., with a ⅜-in. drill, finishing the end of the hole with a flat

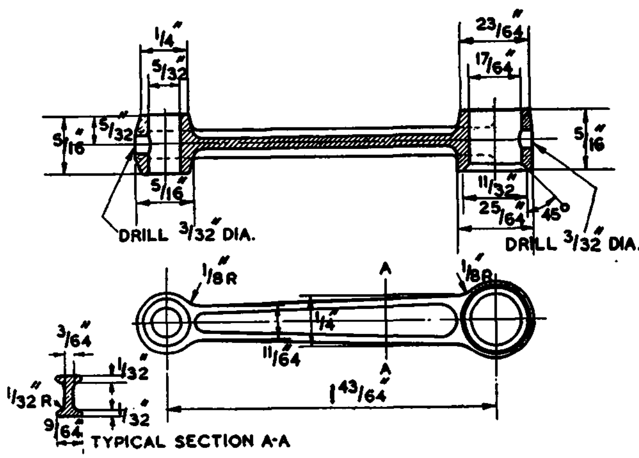


Gudgeon-pin and end pads.

cutter or end-mill. Bore out the mouth of the hole, to a depth of 31/64 in., to 21/32 in. diameter, and undercut the inner end of the hole with an internal recessing tool, to 19/32 in. diameter, for a width of 11/64 in., leaving a "land" or internal collar 9/32 in. wide to form the gudgeon-pin bosses.

The position of the gudgeon-pin is now marked off on the outside of the piston, using a point tool to mark the circumferential line ⅝ in. from the end, and setting a scribing block on the lathe bed to mark cross lines exactly across the centre of the diameter. The inter-sections of these lines should be carefully centre-punched, and drilled from either side with a small drill, after which they are opened out to reamering size (No. 24 drill) and reamered 5/32 in. diameter. It is most important that the gudgeon-pin should be quite square with the axis of the piston; a very slight divergence from the exact centre of the piston diameter is not a serious fault.

The slotting out of the inside of the piston to form the gudgeon-pin bosses is intended to be done by circular milling, but this may be difficult for readers who have no milling appliances available. A very close approximation to the shape shown in the drawings can, however, be produced without anything more elaborate than a simple vee packing block to hold the piston on the cross slide of the lathe, and a ⅜ in. end mill held in the chuck. The vee block should be packed up so that the piston is exactly at the level of the lathe centres, and its axis is also dead in line with them. Position the gudgeon-pin holes exactly vertically by inserting a length of 5/32-in. rod in them, and sighting against a square held on the lathe bed. It is necessary to clamp the piston down firmly on the vee block, and the reason for



Connecting-rod.

keeping it on the chucking piece will be evident, as the piston itself would be much too fragile to hold in this way. Adjust the cross slide to take a light cut on the side of the hole, and feed the saddle backwards and forwards each time a cut is applied, until the slot is about 19/32 in. wide, or a little more, the idea being to remove as much superfluous metal as possible.

Replace the piston in the lathe chuck and set it up to run truly for finishing the outside. It should not be turned to fit in the cylinder bore, but left on the tight side (about 0.001 in. oversize) and then lapped with a ring lap to a "squeaking fit," after which a final finishing with very fine abrasive, such as jewellers' rouge or metal polish, will produce a highly-polished and wear-resisting finish. As the exact clearance cannot be measured by any simple means, there is little point in quoting it, but the piston should just be capable of being pushed through the cylinder bore by hand, and no tight or loose spots should be apparent. All traces of abrasive should be removed from both piston and cylinder by prolonged soaking in paraffin, syringing out holes and crevices, and wiping with a clean rag.

The piston is now parted or sawn off from the chucking piece, and held in a wooden clamp (made by boring a hole in a piece of hardwood and sawing it in half) for shaping the deflector, which may be done by sawing and filing. Note that there is a slight radius at the root of the deflector to assist heat conduction, and the entire surface of the piston which is exposed to flame should be smoothly finished to retard the deposition of carbon. The deflector of this piston is higher than usual in these small engines, with the idea of ensuring good scavenging under all conditions, but should it be found desirable, for any reason, to increase the compression ratio, as when using special fuels, a high deflector would foul the cylinder head, and it would have to be reduced in height. On no account should the deflector touch the cylinder wall at the sides.

Gudgeon-Pin

This is simply a hollow mild-steel spindle, fitted fairly tightly to the piston bosses and case-hardened. Soft pads or ferrules of brass or aluminium are driven into the ends, so that in the event of the pin moving endwise, it cannot score the walls of the cylinder.

Connecting-Rod

A cast bronze rod has been found to give good results in this engine, but some difficulty has been experienced in obtaining sound, reliable castings in this size, and if there is the least doubt on this point, there is a risk of wrecking the engine by a connecting-rod breakage. On the whole, a rod machined from solid bronze or duralumin, preferably the latter, on account of its lighter weight, will be found safer. If a steel rod is used, the eyes will have to be bronze bushed. The machining of connecting-rods has been described several times in *The Model Engineer*, but it may be stated that, in any kind of rod, the point of vital importance is the exact parallel alignment of the two eyes, which may be assured in various ways. Perhaps the simplest is to clamp the cast or rough formed rod to a flat plate, taking care not to bend or distort it in doing so, and set up the plate on the faceplate of the lathe, so as to bring each of the eyes in turn into the central position for drilling and boring to size. The rest of the work on the rod may be carried out by any convenient method, so long as it does not involve straining the rod out of shape, and the fluting at the sides of the rod is not absolutely essential, though it is desirable in order to reduce weight as much as possible. It will be seen that one end of the big-end bearing is internally chamfered or flared to clear the internal radius or "fillet" on the crankpin, where it joins the crank web. This bearing should be a normal working fit, the gudgeon-pin being a little tighter. Do not forget to drill the oil holes in the ends of the rod, to admit oil mist to the bearings *at the point of lowest pressure.*

In the home construction of engines, slight errors of dimensions of the various parts may produce a cumulative discrepancy affecting the position of the piston in the cylinder, and therefore the port timing. To avoid any trouble from this cause, it is my invariable practice to check up by using a temporary or "dummy" connecting-rod, made by drilling two holes in an odd strip of material, before making the permanent rod. The piston should just uncover the exhaust port fully at bottom dead centre; if the trial with the dummy rod shows that it travels too far down, or not far enough, the difference can be noted, and the distance between the bearings altered to suit when making the rod. Other ways of correcting the discrepancy have been referred to, such as slight modifications to the length of the crankcase extension, or the position of the location flange on the cylinder barrel.

(To be continued)

The Yorkshire Pudding

D. Salloway winding up his "Yorkshire Pudding."

By J. OWEN

THE first "Yorkshire Pudding" was built in April of last year, the intention being to produce a contest model requiring very little rubber and also one that could easily be duplicated. Last summer I built and lost three of these machines at the cost of only 1 oz. of rubber. The average performance, using a 12-in. hardwood airscrew, is around 90-120 sec., but due to its slow flat glide the "Yorkshire Pudding" can take advantage of even the slightest "lift" in the air. Two of these models have held the Blackpool and Fylde M.A.S. Open Rubber record, the first being a flight of 6 min. 43.3 sec. o.o.s., the model last being seen at an altitude of about 1,500 ft. The second machine, flown by Mrs. Bentley, flew out of sight after 9 min. 18 sec., but was actually seen to land six miles away $1\frac{1}{2}$ hours later.

Fuselage

The fuselage is built in the usual way, with all longerons and spacers 3/32-in. × 3/32-in. medium hard balsa. The parasol wing mounting uprights are made from 20 s.w.g. piano-wire, bound and cemented to the spacers and longerons, as shown on the plan. Two $\frac{1}{16}$-in. round bamboo runners form the wing platform. The single-leg undercarriage is made from a length of 18 s.w.g. wire, bound and cemented to a bottom longeron and spacer.

The Wing

This is built in four pieces and then joined together. The dihedral breaks should be braced with 1 mm. ply. The leading and trailing edges are from $\frac{1}{4}$-in. × $\frac{3}{16}$-in. and $\frac{1}{2}$-in. × $\frac{1}{8}$-in. medium balsa respectively, and all ribs are cut from 1/32-in. medium hard sheet balsa and spaced as shown. The tips are made from $\frac{1}{16}$-in. square birch steamed to shape.

The tailplane is of a thin lifting section, the ribs being cut from 1/32-in. sheet balsa. The top of the centre section is covered with soft 1/32-in. sheet in order to make a good base for the fin, which is cemented to the tailplane.

The fin is built mainly of 3/32-in. × 3/32-in. balsa and then sanded to a symmetrical section.

Propeller and Noseblock

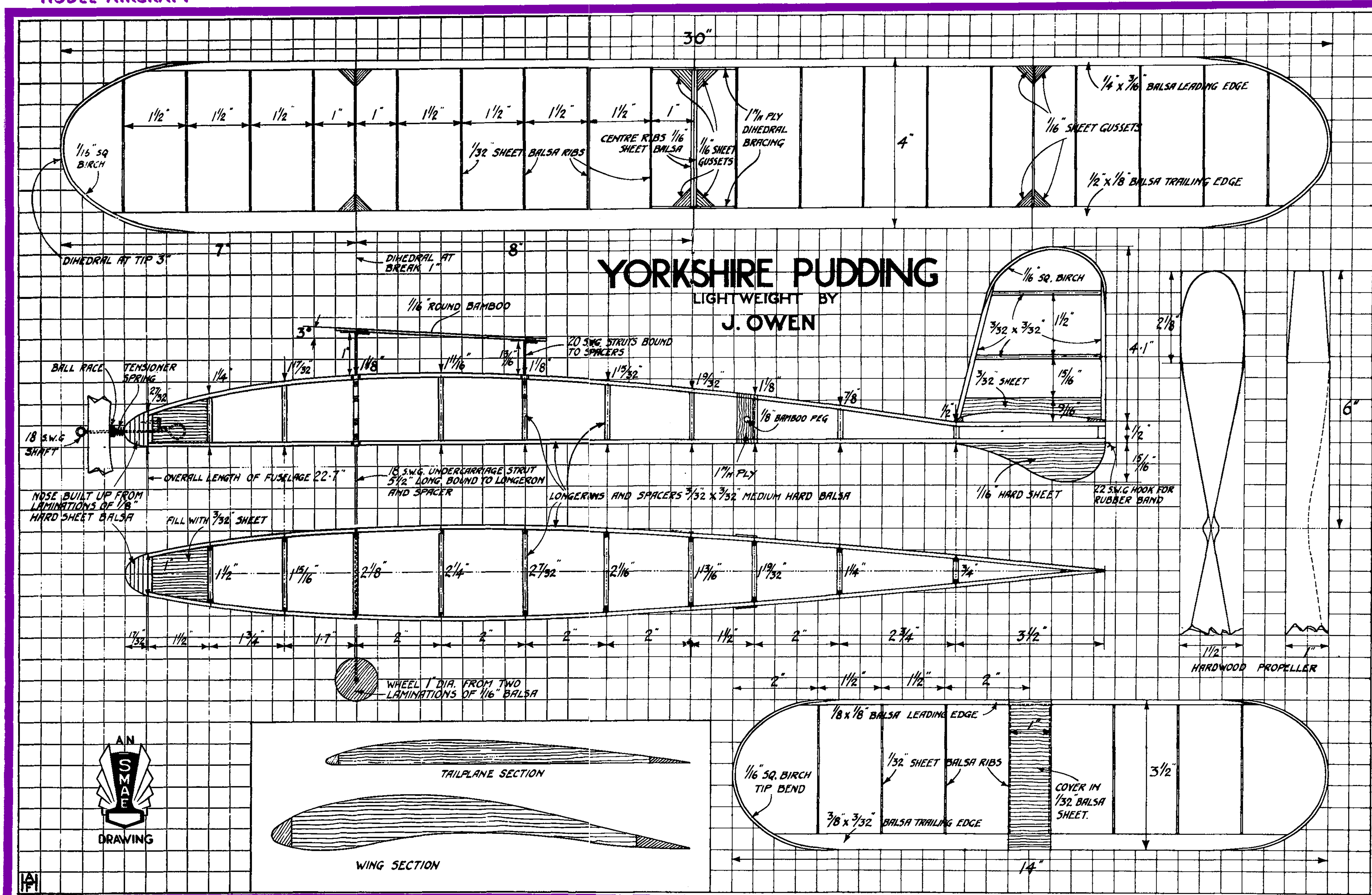
The noseblock is laminated from $\frac{1}{8}$-in. hard sheet and drilled to take an 18 s.w.g. brass bush. The propeller-shaft should be made from 18 s.w.g. wire and the tensioner spring from 26 s.w.g. wire. Make sure that the spring tensioner is working well, for unless it is, the rubber will be liable to bunch and spoil the glide. The 12-in. diameter propeller used is the hardwood commercial type cut away at the hub in order to reduce drag. The model is powered with six strands of $\frac{1}{4}$-in. × 1/30-in. black rubber, 27 in. long.

The model is covered with light-weight Jap tissue, given one coat of clear dope. Pin down the wings, tailplane and fin in order to prevent warping.

Flying

The model should be trimmed to fly in right-hand circles, off-setting the noseblock 1/32 in. and using 1/32-in. right rudder. I have never found downthrust necessary on this model.

The total weight of the model is about $2\frac{1}{2}$ ozs.


YORKSHIRE PUDDING
LIGHTWEIGHT BY
J. OWEN
30"
1/4" x 3/16" BALSA LEADING EDGE
1/16" SHEET GUSSETS
1/2" x 1/8" BALSA TRAILING EDGE
1/16" PLY DIHEDRAL BRACING
1/16 SHEET GUSSETS
CENTRE RIBS 1/16 SHEET BALSA
1/32" SHEET BALSA RIBS
1/16" SQ BIRCH
DIHEDRAL AT TIP 3"
DIHEDRAL AT BREAK 1"
1/16" ROUND BAMBOO
20 S.W.G. STRUTS BOUND TO SPACERS
BALL RACE
TENSIONER SPRING
18 S.W.G SHAFT
1/8" BAMBOO PEG
1/16" PLY
OVERALL LENGTH OF FUSELAGE 22·7"
18 S.W.G. UNDERCARRIAGE STRUT 5 1/2" LONG, BOUND TO LONGERON AND SPACER
LONGERONS AND SPACERS 3/32 x 3/32 MEDIUM HARD BALSA
NOSE BUILT UP FROM LAMINATIONS OF 1/8" HARD SHEET BALSA
FILL WITH 3/32" SHEET
1/16" SQ. BIRCH
3/32 x 3/32
3/32" SHEET
1/16" HARD SHEET
22 S.W.G HOOK FOR RUBBER BAND
HARDWOOD PROPELLER
WHEEL 1" DIA. FROM TWO LAMINATIONS OF 1/16" BALSA
1/8 x 1/8" BALSA LEADING EDGE
1/32" SHEET BALSA RIBS
1/16" SQ. BIRCH TIP BEND
3/8 x 3/32" BALSA TRAILING EDGE
COVER IN 1/32 BALSA SHEET.
14"
3 1/2"
TAILPLANE SECTION
WING SECTION
AN SMAE DRAWING
AFI

EXPERIMENTS WITH PETROL ENGINE CONTACT - BREAKERS

by

J. B. Allman

WE learn that many designers are producing new petrol engines, and, with the exception of the new diesel types, there appears to be nothing radically new in design. While one can say that there are really no bad designs on the market, it is a reasonable expectation that they will all suffer from some usual difficulties in starting, since no special provisions appear to have been made to overcome the main trouble—lack of protection for the contact-breaker.

One of the Main Troubles—Oil

It is safe to assume, provided that the mixture is correct and compression fairly good, there is no real reason why a petrol engine should not start almost first time when a good fat spark is present at the sparking-plug points. One of the main causes of a poor spark is a dirty contact-breaker, and it would be most annoying if each time we went to start our car it was necessary to clean the contact-breaker points.

Now oil is one of the best-known insulators, and to break down even the thinnest film of oil is more than a small dry battery can do.

Many years ago it occurred to the writer that if one could only get over the oil on the contact breaker trouble, then at least one of the main sources of trouble would be eliminated.

A number of experiments were then tried out, some were satisfactory, some were not, but as failures are as interesting as successes, the writer gives here all the tests he carried out.

Most of the tests were carried out on a Cyclone engine, which has a typical contact breaker. It matters little where the contact breaker is placed on the engine, if the points are exposed. Most engines envelop themselves in a mist of oil. Some makers fit a small case over the breaker, which collects the oil and makes matters worse than ever. Others fit the breaker to the back of the engine, but oil will still be forced out by crankcase compression past the shaft, the oil creeping and eventually finding its way on to the points, where only the thinnest film is required to cause trouble.

First Experiment

The first experiment was to round or point one of the points, so that it would tend to drive its way through the film of oil.

It was found that the oil on the points was turned to carbon, which does not form a good conductor. The engine would start when the points were clean and would run until it was stopped, but it was difficult to start again without the points being recleaned.

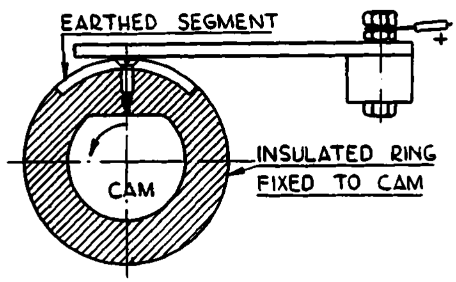


Fig. 1.

Second Experiment (Fig. 1)

Was an insulated ring fitted with an earthed segment in the place of the cam. The other contact took the form of an arm which wiped the earthed contact as it revolved. Oil worked its way between the wiping arm and the ring and segment, so the arrangement was quite unsatisfactory.

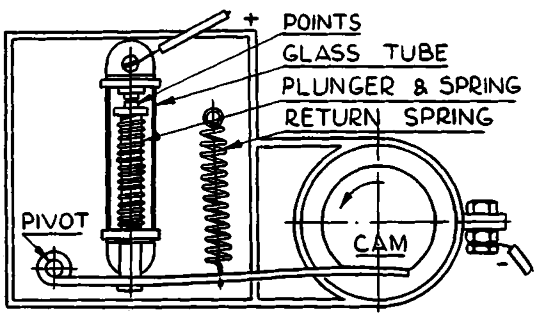


Fig. 2.

Third Experiment (Fig. 2)

The points were placed inside a small glass tube situated on a small bracket. The movable point was fitted to a plunger, which was operated by a lever from the cam. A spring on the plunger and a spring on the lever kept the points together.

The arrangement worked exceptionally well. It was fitted to the engine and for about two years the engine was run from time to time for test purposes, and the points were never cleaned, as there was always a good spark available. The writer found that because of the better contact the time the points were together could be shortened, and it was quite easy to start and run on an ordinary three-cell flash-lamp battery without the use of a booster battery or accumulator.

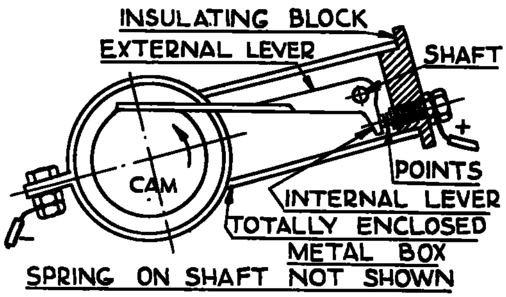


Fig. 3.

Fourth Experiment (Fig. 3)

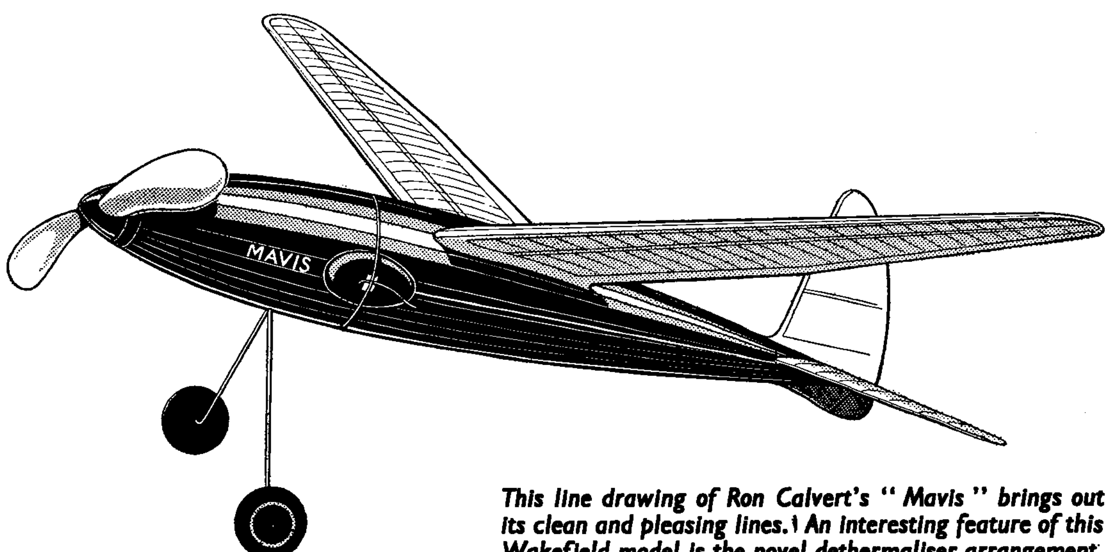
The last experiment was really a redesigning of the previous apparatus to make it more compact and less complicated. The points were encased in a small tin box soldered to a collar which clamped the whole affair to the engine bearing.

The arm, which rests on the cam, is external and operates a shaft which passes through the box and is fitted with felt washers to exclude any oil.

Fixed to the shaft is a second arm holding the movable point, the fixed point being bolted through the insulating block, which is cemented into the end of the box, and the box bent over to secure the block in position.

It is always advisable to solder all joints in the wiring, and to take a separate wire, soldered to the contact breaker box, back to the coil so as to eliminate any possibility of oil getting under the clamp or collar where it is attached to the engine.

Platinum should be used for the points—they need not be larger than a pin's head—and before assembly the interior of the box and the points should be brushed carefully with soap and water, and, generally speaking, you can then forget that the contact breaker points exist.



This line drawing of Ron Calvert's " Mavis " brings out its clean and pleasing lines. An interesting feature of this Wakefield model is the novel dethermaliser arrangement. The parachute is housed in a hollow balsa blister held to the side of the fuselage by a light rubber band, which is severed at the appropriate time by the burning fuse, which is tucked under it.

R. H. WARRING ON SPIRAL STABILITY

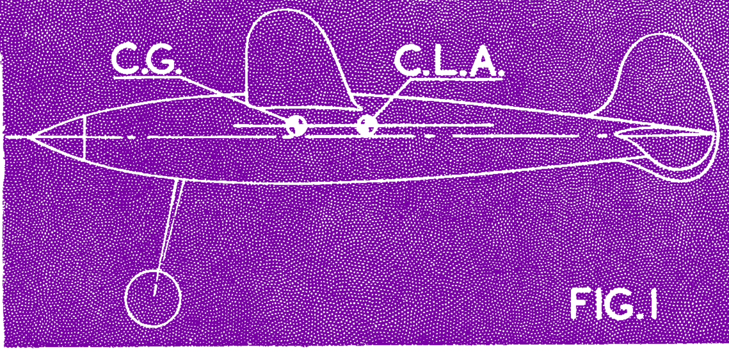


FIG. 1

A VERY large percentage of duration models—and almost all of pre-war design—are spirally unstable in some degree or another. Most os us have experienced the symptoms of spiral instability—the model diving in under power instead of circling evenly. This generally occurs after the model has been trimmed for a nice circle on relatively few turns (up to 50 per cent. maximum) and then really wound up. The subsequent spiral in is immediately put down to " too much rudder " or " too much sidethrust," when more often than not it is the design of the model which is at fault.

Some very inconsistent cases occur—and the writer has experienced this during the course of experiments throughout the past two years. The model will normally fly extremely well, but on one flight, for no apparent reason, will suddenly drop a wing tip and spin in.

The whole question of spiral stability is somewhat complex, but one of great importance. Theorising on the " whys and wherefores " does not give a complete answer, and so I set out to find some practical data on the subject by deliberately concentrating on tail-unit design and working down to limits of instability. These experiments resulted in working through a series of lightweight duration models over the course of two years and some very interesting facts have resulted applicable to *all* types of duration models.

One thing I have almost definitely decided is that this tendency to spin in under full turns is not necessarily " too much sidethrust " or " too much rudder." If the model is spirally stable it would more likely go into a fast vertical bank losing little or no altitude. The latter designs of the experimental series of models just mentioned do, in fact, behave just like this.

Now quite a lot of spirally unstable models are being flown today—and many win competitions in spite of such a defect. Much depends on how these models are flown. Several designs, for example, are excellent from the duration point of view when they are trimmed to fly in fairly wide circles under moderate power. They will not turn in small circles without danger of spinning. Neither will they fly under increased power without the use of a considerable amount of downthrust.

Ideally, one should eliminate downthrust,* killing the " power stall " by *tightening the turn*, but this cannot be done with safety unless the model has considerable spiral stability inherent in the design. Use of downthrust in trimming means that the model will not get as high as its maximum *potential* altitude on the power run. It is a quick and easy method of trimming and about the only method which can be adopted if spiral instability is present. Since everything is seldom " just right " on any model, a small amount of downthrust may be necessary at times—or it may be used to control a motor with unfavourable torque characteristics. But given a spirally stable model, and the necessary time for prolonged trimming tests, it is generally possible to practically eliminate downthrust from the line-up.

* " Downthrust " is a frequently mis-applied term and is, in any case, purely relative to a datum which can be fixed anywhere.

Closely allied to these troubles is "tip stalling"—a fault which petrol modellers in particular appear to suffer from, or take elaborate precautions against. This is most likely to occur on tapered wings, particularly if sweepback is present. The cure is washout towards the tips—outboard slots should not be necessary on small models, at least. But quite a number of suspected tip-stalling cases are really due to spiral instability, the cure being in *tail-unit design* and not in the wings at all.

I personally have never found the necessity for washout on taper wings which approach elliptic loading, but have used it. Main objections are : (i) it is more difficult to build wings true with the degree of washout remaining the same, and (ii) excess washout means loss of efficiency.

To return to the main problem. Spiral stability troubles came to a head with Bob Copland and myself when we both went over to shoulder-wing slabsider lightweight designs—or streamlined slabsiders, as they are more appropriately termed. My first streamlined slabsider, built in the summer of 1944, was a direct modification of my high-wing lightweight (1944 " Digest ") with the wings now plugging into the fuselage just below the top longerons. It was lost on its first flight (5½ mins.). The second was identical and proved to have too small a fin when test-flown. The tail literally " wagged " from side to side. Small sheet-balsa fins were cemented on the tailplane near the tips and the model was then lost on its first flight after this modification (time 17½ min.). Neither model had a long enough " life " to provide much useful data.

Copland meanwhile had produced his own streamlined slabsider and found it very inconsistent. When it did behave well, its performance was certainly better than the orthodox lightweight type, but it had a marked tendency to spin in at the beginning of the power flight.

My own re-designed streamlined slabsider, smaller in size than Copland's and departing from the two previous models in that it now had a wing plan form with taper on both leading and trailing edges and a symmetrical fuselage, also experienced similar troubles. Under anything up to half turns its performance was amazing. The climb was a rapid spiral to a good height. Under more turns the spiral inevitably became a wing-over and the model spun in. It was modified by increasing the dihedral and flown in wider turns (using downthrust). In this state it would average between 2½ and 3 min. in still air and flew away on several occasions.

Up to this time, Copland's and my own development of the streamlined slabsider had been entirely independent, but since we had both come up against the same trouble, we got together with a view to thrashing the matter out. It particularly concerned me, as my original high-wing prototype of the series had a certain tendency towards spiral instability, the which had been handed down and *become more marked in the development.*

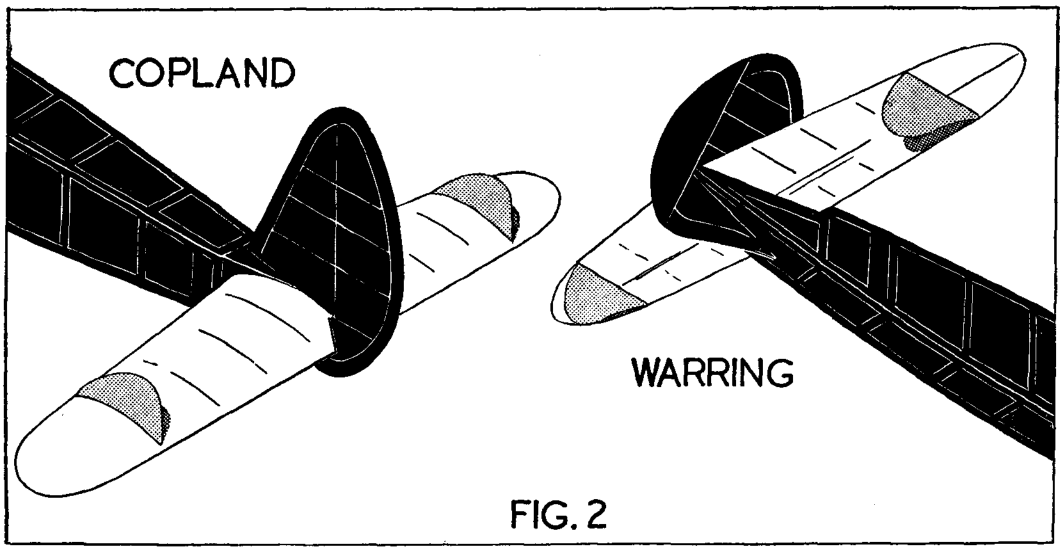


FIG. 2

This instability in the original, incidentally, was first put down to tip stalling, but subsequently proved to be spiral instability. In spite of this it flew extremely well in competition, winning several firsts and placing sixth in the 1944 Gamage.

Taking all things into consideration, we came to the conclusion that *the lowering of the centre of gravity* on the shoulder-wing layout (due to lowering of the wing) adversely affected spiral stability. To back this up was the fact that ultra-lightweight models seldom appear to suffer from spiral stability troubles—most of the breed can turn on a sixpence without any tendency to spin in. With excessive dihedral, light fuselage and practically non-existent undercarriage, the centre of gravity of such types is relatively high.

The outcome is that I can recommend a design procedure which gives exceedingly good spiral stability characteristics. From this it can conveniently be summarised as follows :—

For good spiral stability a model requires :—

(i) A relatively high centre of gravity.
(ii) Relatively low placement of aft side areas.

The two can be illustrated diagrammatically as in Fig. 1, referring to centre of side areas (C.L.A.). The C.G. should be above the centre line of the fuselage and the C.L.A. should be behind and *approximately horizontal* with the C.G.

This Copland and myself achieved on our lightweights by fitting sheet auxiliary fins (see Fig, 2), the which proved the complete answer to the problem. Note that whereas before, such auxiliary fins have been used, they have been fitted to make up for a deficiency of *total* fin area, but are now used as *anti-spin fins*, the original fin area in both cases being adequate.

Applying the rules above to a single fin, this would give a shape similar to Fig. 3, i.e. with a considerable proportion of underfin, but this is not entirely satisfactory for all models. At even moderate angles of attack the airflow tends to break away from the fuselage just aft of the wings so that the centre portion of the fins may become very ineffective just when it is most required. This does not apply so much on a stick model, but is ever present on fuselage models, however fine the fuselage lines.

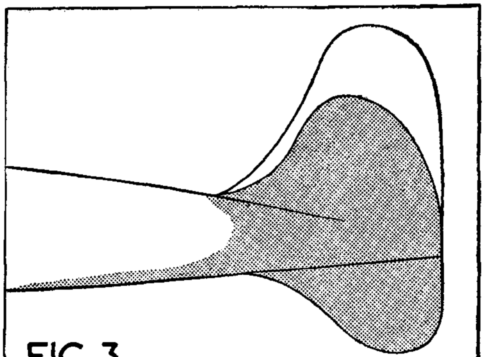


FIG. 3

Hence, in most cases, small anti-spin fins fitted to the tailplane are preferable, particularly on well-streamlined models where this breakaway may occur suddenly at some critical angle. I have fitted these anti-spin fins to several models with poor spiral stability and results in all cases have been excellent. So convincing have been these demonstrations, that I have incorporated them as a feature on new designs.

Note that in the application of these anti-spin fins Copland and myself differ ; this to get additional advantages from their use. Copland fits them *above* the tailplane with a view to smoothing the airflow over the tailplane and increasing tailplane efficiency ; I fit them *underneath* the tailplane to get greater effect on C.L. positioning where, although more vulnerable, they also form a two-point rear support, and my designs now incorporate a single-leg undercarriage to take advantage of this fact.

Continuing the development of these anti-spin fins, I have also found that they render the total fin area less critical—it can definitely be too large or too small with no undue effects. And since the correct fin area is indeterminable, except by lengthy flight tests after the model is built, this is a very valuable feature.

Summarising these notes, I can recommend anti-spin fins as an almost certain cure for spiral instability on models of all types (unless this instability is due to warps, etc., as opposed to being inherent in the design). Also, when designing a duration model to have a rapid spiral climb, aim to keep the C.G. *high*. A low C.G. is, in fact, bad in many ways. This will particularly apply to duration-type petrol models, where it might even pay to locate coil and batteries high up in the fuselage or pylon.

We now have a new light on such old design maxims as " avoid a very low thrust line as it tends to make a model spin." It is not the thrust line which is at fault here—rather the C.G. is too low and, in such a case, anti-spin fins are practically essential !

CLOUD-DOZER

by

R. V. BENTLEY

FLYING THE MODEL

IN one of my previous articles in MODEL AIRCRAFT, I admitted that when I had a model ready for flying, my urge was to fly it if conditions were anywhere near suitable, the degree of suitability varying according to the strength of the urge. On a windy day, therefore, the "Cloud-Dozer" was taken out for test, where, with all settings neutral, as built, and a motor run of 7 sec., a flight of about 30 sec. resulted, commencing with an almost vertical climb, turning slightly left, until the motor cut out, pulling out of the climb in a stalled position, and finishing with a swift glide down wind, the stall gradually decreasing in viciousness, but not disappearing before the machine landed. Result: broken propeller.

The second flight of its life was made on the occasion of the Midland Rally, at Hockley Heath, again in windy conditions, but this time, with slight right rudder trim, and a trace of right side thrust; it was hand launched —or, as the spectators would have it, hand-hurled—upwards at about 45 degrees, to turn in a flight of nearly 1 min. on the 7 sec. motor run. The stall had been removed by the addition of $\frac{1}{16}$-in. positive incidence packing at the tailplane and the glide was exceptionally flat and steady in a very wide right-hand circle.

With very slightly more right rudder trim, an official R.O.G. flight was attempted the same day, the wind having increased a little. Disaster was swift, the nose of the model refusing to lift immediately the wind came round to the port side and a right-banked dive into ground followed. Half an hour of repair work saw the model back on the field, but the shaking had apparently affected the motor installation in some way, as the motor refused to settle down to continued running that day.

The following week-end, May 5th, Shelley Cup day, saw me once more in Birmingham, and though I had no intention of entering the contest, I took the "Cloud-Dozer" along, hoping to get in some testing after the contest. The wind was even stronger than the previous week, and many well-tried jobs had already come to grief down wind, but I saw no reason at all in taking a model 130 miles for nothing, and so preparations were made for the fourth flight of its life, again in high wind.

With half the slight right thrust removed and half the amount of right rudder trim, taking off with the wind 45 degrees to starboard, the previous week's procedure was repeated—all of which shows that a model should not be test-flown except under good conditions.

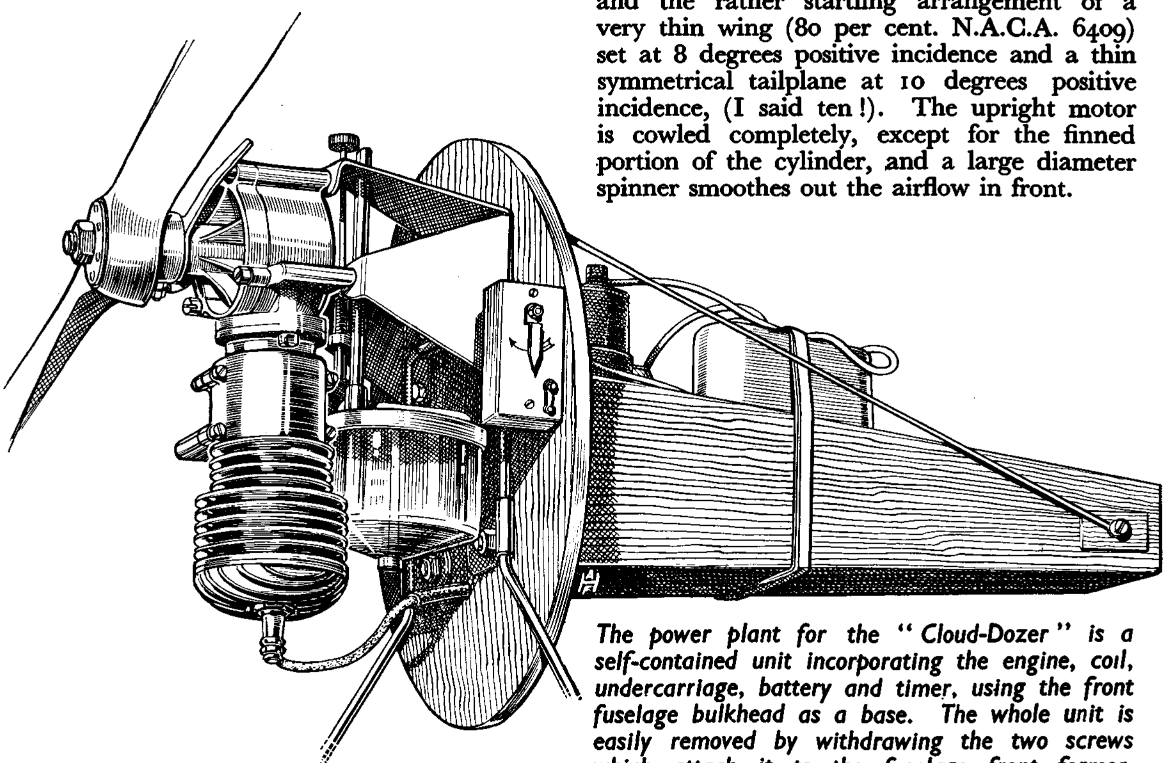
That doesn't mean to say I won't do it any more—I'm not made that way, but it is a warning to others who do not appreciate repair work as much as I do!

I am satisfied from its first and second flights, that it is capable of outstanding performance—all I have to do is develop the necessary patience to await ideal testing conditions.

Starting from scratch, under proper testing conditions, the machine should be trimmed very warily by means of a combination of right rudder trim and right thrust to climb steeply, spiralling to the right and with a very flat glide in moderate right-hand circles with little or no banking. It will be found that when this has been achieved, the motor can be given the gun and maximum rate of climb obtained with a roll-out into the glide at the end of the motor run. An increased rate of climb will probably be obtained by reduction in propeller diameter and an increase in pitch, but this has not yet been tried.

Power Duration Notes

From America, through *Air Trails*, comes news of faster and faster rates of climb. Most readers interested in power flying will have heard of Leon Shulman, who was a Yankee top-liner before the war, and a most interesting article by him gives details of the development behind his latest and most successful Class B duration job. His " Zomby " is already fairly well known, being one of the first models to use a folding propeller on a petrol motor, having a single-wheel retracting under-carriage and a somewhat blunt, " straight up and down " nose, inside which the upright motor was completely enclosed. This model had a thickish, high lift, wing section, a symmetrical tail section, moment arm 55 per cent. of wing span, aspect ratio of 5 to 1, and a rate of climb around the 2,000 ft. per minute mark, using an eight-inch pitch propeller. The further development based on the " Zomby," named " Banshee," was a machine of distinctly utility construction, complicated processes having been cut to the absolute minimum, the wing profile having changed from elliptical to straight taper, aspect ratio from 5 : 1 to 6 : 1, with a very thin wing section and low drag wing tips. Tailplane area was reduced from 35 per cent. to 30 per cent. of the wing area, but remained symmetrical in section, and the climb was increased to the 2,500 ft. per minute line. The third and latest model, the " Zoomer," is a clean-up of the " Banshee," with moment arm reduced to 50 per cent., and the rather startling arrangement of a very thin wing (80 per cent. N.A.C.A. 6409) set at 8 degrees positive incidence and a thin symmetrical tailplane at 10 degrees positive incidence, (I said ten !). The upright motor is cowled completely, except for the finned portion of the cylinder, and a large diameter spinner smoothes out the airflow in front.



The power plant for the " Cloud-Dozer " is a self-contained unit incorporating the engine, coil, undercarriage, battery and timer, using the front fuselage bulkhead as a base. The whole unit is easily removed by withdrawing the two screws which attach it to the fuselage front former.

No doubt, in setting the tailplane at 2 degrees positive to the wing, Shulman has found that there is considerable downwash effect from the high-mounted wing rigged at a high angle of incidence. Although I have not yet used high incidence on power models, I am in full agreement with it, having had success when using a Flight-Cup rubber-powered model, with 9½ degrees and a Wakefield with 10 degrees. Just now I am rushing through a class B power job (Ohlsson 23), of absolutely minimum weight and area allowed by A.M.A. rules, on which to try out this rigging set-up, and shall be able to report more fully in a later article.

A CASE FOR THE HIGH-SET TAILPLANE

by

I. S. Cameron

AN article appearing in the pages of the April, 1946, issue of MODEL AIRCRAFT has prompted me to say a few words in connection with the high-set tailplane. My reference is to Lt.-Col. C. E. Bowden's "This and That." I feel that, perhaps, only one reason for the high positioning of the tailplane has been generally considered, namely an increase in spiral stability, and also the thought of "getting the tailplane out of the downwash."

It will be agreed that when the tailplane is right on top of the fin, less junction interference exists, and there may be a very small gain in this respect.

C. E. Bowden states in his article, "The setting of the tailplane high on the other hand, does cause out-of-phase drag leverages unless one also *parasols* the wings." Since, in computing the drag centre we are concerned only with the lines of action of the various components' drag forces, and their perpendicular distance from the centre of gravity, the effect of raising the tailplane will raise the position of the centre of drag. *Raising* the wings will only raise the centre of drag still further! In fact, the only way to balance the "out-of-phase" force created by the high tailplane is to introduce an equal and opposite force such as would be obtained by *lowering* the wings.

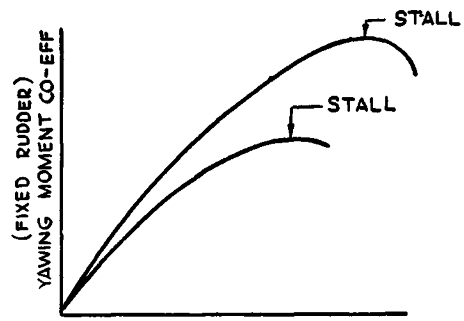
Let us now consider the structure.

A fin built integral with the fuselage without any cut-out, such as would ordinarily be necessary, can be built far more rigidly than can the fin of the more usual tail arrangement, and, provided a good seating has been made to accommodate the tailplane, the assembly can be relied upon to retain its setting. It also offers a greater resistance to moisture penetration, therefore the structure is more dimensionally stable, and the rear fuselage is not nearly so susceptible to bending or twisting. From the point of view of upward shock loads the absence of a tailplane cut-out improves the strength/weight ratio quite a lot. Modellers who have had some experience with F.A.I. sailplanes will no doubt have learned that one of the weakest points in a fuselage is at the rear, just ahead of the tail and fin, and fractures, when they do occur, show in this region underneath the fuselage where the wood is in tension (under load).

Another big point in favour of the high-set tailplane is that the rigging angle for the tailplane itself can be adjusted very easily without altering any of the structure.

It is for these latter reliability reasons, rather than aerodynamic, that I am inclined in favour of the high-set tailplane. Of course, one can still build an arrangement that possesses good moisture-resisting qualities and yet have the tailplane low down, but the arrangement usually entails having the tailplane in two pieces or on what appears to be an inadequate seating for rigidity.

With reference to full-size sailplane practice and the location of the tail, I understand that the important thing is to have the sternpost in



one piece, and by reason of the generous cut-out at the roots of the elevators, part of the fin and, more important, most of the rudder, is never blanketed during a normal steep climb. The "Olympia," "Weihe," etc., tail arrangements are fairly common on most full-size sailplanes, nevertheless, it can be shown that by the use of a dorsal extension to the fin quite an appreciable improvement in the fin's performance can be obtained, and if the angle of side-slip is plotted against the yawing moment co-efficient, its significance will be revealed.

The top curve shows the characteristics with a dorsal extension to the fin, while the lower curve represents an ordinary fin. It will be seen that a large increase in the angle of side-slip is required before the fin will stall. The yawing moment co-efficient, which is a measure of the stability, shows a small increase for moderate angles of side-slip, the stability increasing with the angle of side-slip until the stall is reached.

AROUND THE RALLIES

A scene at the S.M.A.E. Northern Area Rally, Rochdale, which was blessed with fine weather. Three of the competitors in the gliding section make a simultaneous hand-launch. (Photo by W. Titterington.)

Centre: One of the best made petrol models at the Irish National Contests.

Above: One of the petrol entries making a good get-away.

Bob Copland makes a nice clean get-away with his petrol model at the Northern Heights Rally at Lang ley

NEWS *from the* S.M.A.E. *and* CLUBS

PETROL DURATION CONTEST

Owing to the impossibility of obtaining a suitable aerodrome in the London area on September 15th for the Petrol Duration Contest, it has been found necessary to hold this on Stoughton Aerodrome, Leicester. This is reached from the main London-Leicester road by turning down Stoughton Lane two miles south of Leicester, or by 31 bus from Leicester L.M.S. Station to Evington Village, where the Leicester Club will do their best to arrange a car service to the aerodrome.

The Leicester club are holding a rally at this aerodrome on this date, to which they invite all interested.

COMPETITION RESULTS

THE WESTON CUP, June 16th

	Points	*Plugge*
1.—J. L. Pitcher (Croydon) ...	445.0	100.006
2.—D. M. Hardman (Rhyl and Prestatyn)	430.5	97,965
3.—N. Lees (Bradford)	429.0	95.924
4.—D. W. Harrison (Birmingham)	388.0	93.883
5.—N. G. Marcus (Croydon ...	365.2	91.842
6.—R. Calvert (Bradford)... ...	336.5	89.801
7.—B. V. Haisman (Merseyside)...	313.0	87.760
8.—H. Tubbs (Leeds)	305.0	85.719
9.—R. Copland (Northern Heights)	285.75	83.678
10.—W. Salt (Birmingham) ...	278.0	81.637
11.—R. Moon, junr. (Bristol) ...	273.95	79.596
12.—R. Warring (Zombies) ...	267.75	77.555
13.—D. A. Brockman (Zombies) ...	265.5	75.514
14.—M. Garrett (Bristol)	265.3	73.473
15.—P. Stringer (Country Member)	235.5	71.432
16.—A. H. Lee (Bristol)	227.8	69.391
17.—D. R. Hughes (Merseyside) ...	199.5	67.350
18.—J. S. Eckersley (Bradford) ...	186.0	65,309
19.—A. Glenny (Brentford) ...	184.6	63.268
20.—H. Leeming (Salford)... ...	183.0	61.227

55 entries.

THE NATIONAL CUP, June 30th

1.—Croydon	1,575.35
2.—Salford	1,087.0
3.—Merseyside	994.7
4.—Bristol & West	934.7
5.—Worcester	799.0
6.—Blackheath	722.3
7.—Wallasey	520.9
8.—Blackpool	442.05
9.—Mersey	435.4

35 entries. 9 clubs.

INDIVIDUAL CHAMPIONSHIP, 1946

	Points
1.—N. G. Marcus (Croydon)...	379.125
2.—R. H. Warring (Zombies)	360.077
3.—J. L. Pitcher (Croydon)	349.654
4.—D W. F. Harrison (Birmingham) ...	335.367
5.—R. Copland (Northern Heights)... ...	275.598
6.—W. Snow (Brentford)	268.996
7.—S. Mayo (Streatham)	251.165
8.—A. H. Lee (Bristol)	250.191
9.—D. Butler (Surbiton)	244.560
10.—W. A. S. Geddie (Zombies)	234.100
11.—K. Mood (Bristol)	219.196
12.—D. A. Brockman (Zombies)	213.770

THE THURSTON CUP, July 14th

	Points
1.— —. Teasell (Northern Heights)	911.2
2.—R. Yeagsley (Croydon)	604.05
3.—R. H. Waring (Zombies)...	600.7
4.—W. A. S. Geddie (Zombies)	489.2
5.—M. Woodwell (Streatham)	472.0
6.—N. G. Marcus (Croydon)...	404.7
7.—W. Snow (Brentford)	403.75
8.—F. E. Wilson (Northern Heights) ...	398.4
9.—A. Wilson (Hayes)...	337.0
10.—B. Chandler (Croydon)	336.35
11.—H. A. Taylor (Bushy Park)	286.0
12.—K. M. Tansley (Northern Heights) ...	271.45
13.—N. E. Winsley (Brentford)	258.7
14.—S. Mayo (Streatham)	247.6
15.—D. Brockman (Zombies)	229.0
16.—S. Lanfranchi (Bradford)	227.0
17.—D. Butler (Surbiton)	224.0
18.—D. Geddie (Zombies)	214.2
19.—J. Bond (Northern Heights)	213.0
20.—J. Thimidis, junr. (Zombies)	198.6

116 entries : Seniors, 97 ; Juniors, 19.

THE BOWDEN INTERNATIONAL TROPHY CONTEST RESULTS, August 4th

	Points
1.—A. H. Wilson (Hayes)	115.0
2.—R. Copland (Northern Heights)	105.0
3.—S. Lanfranchi (Bradford)	100.0
4.—C. Doughty (Birmingham)	75.0
5.—J. Brandwood (Cheadle)...	70.0
6.—F. H. E. Warmington (Bushy)	50.0
7.—S/Ldr. Watson (Northern Heights)... ...	45.0
8.—E. Keil (Zombies)	45.0
9.—W. F. Tansley (Willesden)	45.0

DELEGATE MEETING
(Held at Queen's Hotel, Manchester, July 7th)

At this delegate meeting the following clubs were represented: Ashton, Sale, Birmingham, East Birmingham, Wolverhampton, Coventry, Greenfield, Leicester, Rochdale, Cheadle, Whitfield, Blackheath, North Kent, Wythenshaw, Rhyl, Northern Heights, Wallasey, South Birmingham, Blackpool, and Macclesfield. Mr. A. F. Houlberg occupied the Chair.

The meeting opened with a discussion on matters arising out of the proposed affiliation to the Royal Aero Club.

The meeting considered the advisability of having a full or part-time typist; on the proposition of Mr. Barnes (Sale) the meeting decided that the Society employ a full-time typist on an economical basis. This proposition was seconded by Mr. Rushbrooke.

The meeting discussed Area representation on the Council, it was proposed that the Council should consist of the elected officers, i.e. chairman, secretary, treasurer, etc., and one member from each area, this member to be elected by the area. This proposal would call for an alteration of the constitution and Mr. S. W. Smith proposed that an Area Council meeting be called to discuss this proposition and also the financial aspect of the area scheme. The Area Council would also overhaul the constitution and have it vetted by a solicitor. The new constitution would then be placed before a delegate meeting, and then to a card vote by the clubs for ratification. This was seconded by Mr. Lawton and carried.

Mr. Rushbrooke proposed and Mr. Salloway seconded that the Area Council should arrange the country into proposed areas, so that the Society could define under which area new clubs are to function. Clubs would have the right of appeal to ease any transport difficulties. The proposition was carried.

Mr. Bentley referred to the E.G.M. held in London on May 12th; he called for a vote of no confidence in the Northern Heights M.F.C. for their action at that meeting, particularly for their proposal of a vote of no confidence in Mr. Rushbrooke. Several delegates spoke in favour of Mr. Rushbrooke and on the proposition of Mr. Lawton, which Mr. Wickens seconded, the meeting passed a vote of confidence in Mr. Rushbrooke and warmly thanked him for his work on the Society's behalf.

The meeting discussed Rule 15 of the constitution and Mr. Lawton proposed and Mr. Wickens seconded that: Any matter which has been adopted by card vote can only be rescinded by the same method. This was carried.

The meeting then discussed R.O.G. rules and suggested that these be tightened up to bring them into line with the F.A.I. regulations.

It was suggested that models must be capable of standing unaided on three points (such as wheels and tail skid), that the distance between the centre of the propeller and the ground must be greater than the radius of the propeller, and that the centre line of the model must not be inclined more than 30 deg. to the ground when the model is in the take-off position. It was decided that the Flying Council should meet to consider these points.

The delegates discussed glider launching, particularly the rules relating to the size of the pennant, and those dealing with launching from a height. They wished that the attention of the clubs be drawn to these rules, and passed the matter on to the Flying Council for consideration.

The meeting then perused the 1946 S.M.A.E. handbook, and passed a very hearty vote of thanks to Mr. Houlberg for the time and energy he had given to its production.

The meeting closed at 3.40 p.m.

REPORT ON THE E.G.M.
(Held at Waldorf Hotel, London, July 21st)

Mr. A. F. Houlberg occupied the Chair at the meeting, at which there were over 120 members of the Society present. Mr. L. M. Walker read the minutes of the meeting held on May 12th.

Arising from the minutes, Mr. Houlberg gave a short talk on the trip to Dublin. The meeting unanimously passed a vote of thanks and appreciation for the fine hospitality and magnificent reception which our team had received.

With regard to the affiliation of the S.M.A.E. to the Royal Aero Club, it appears that the scheme is progressing satisfactorily and it is hoped to have complete details towards the end of the year, when the new premises of the R.A.C. should be ready for occupation.

A proposition by Mr. Faulkner (Blackheath) seconded by Mr. R. Smith (North Kent) that the matter be discussed at a later date, was carried unanimously.

Item 3 on the Agenda was to clarify the position of the Council, and particularly the Chairman, in view of the statements made at the E.G.M. on May 12th.

Mr. Bell repeated and amplified his charges against the Chairman; the chief complaint appeared to be a contended misdirection from the Chair at the last annual general meeting. That meeting voted against accepting a Northern Heights nomination for president of the Society.

Mr. Taplin proposed and Mr. Crow seconded that a vote of confidence in Mr. Houlberg be passed.

Various members of the Society pointed out that this procedure would not give Mr. Houlberg an opportunity of openly refuting the charges. Mr. Houlberg then dealt with the charges one by one and disproved them.

Messrs. Wilson, Hain, Fitch, Copland, and Turner, of the Northern Heights, supported Mr. Bell.

Amongst those that supported Mr. Houlberg were Messrs. Smith and Wickens, of North Kent, Mr. Rushbrooke, Leicester, and Mr. Cosh, of Blackheath. Mr Cosh, a past hon. secretary of the S.M.A.E., recalled some of the history of the Society. He endorsed Mr. Houlberg's action, and called upon the meeting to make certain that the matter would not be raised again. (Applause.)

Several members asked that Mr. Taplin's proposition be put to the meeting. A card vote resulted in eighty-four votes in favour of Mr. Houlberg, twenty-seven against him, with eleven non-voters.

The meeting then considered Mr. S. W. Smith's proposal made at the delegate meeting held on July 7th that the constitution should be altered in order that the Council of the S.M.A.E. should include a delegate from each area. The meeting decided that the new constitution should operate from the next annual general meeting.

The meeting having been in continuous session since 11.15 a.m., closed at 3.45 p.m. with a vote of thanks to the Chair.

Will London clubs please note that the new competition secretary of the London area is Mr. A. R. Parker, 3, Eversley Gardens, Barnehurst, Kent. Telephone: Erith 3170.

S.M.A.E. NORTHERN AREA RALLY

This rally, which was held on Sunday, June 23rd, 1946, at Springfield Park Municipal Golf Course, Rochdale, by kind permission of the Rochdale Corporation, was organised by the Manchester & District Council of Model Aero Clubs.

Results.

Event No. 1. Open glider. Seniors: (1) D. Nuttall, Farnworth, 620 sec.; (2) E. D. Evans, Blackpool, 610 sec.; (3) E. Wainwright, Salford, 590 sec. Juniors: (1) E. Hewitt, Wythenshawe, 530.8 sec.; (2) W. Blanchard, Merseyside, 135 sec.; (3) W. B. Hetherington, Doncaster, 116.5 sec.

Event No. 2. Duration contest. R.O.G. Seniors : (1) R. Scott, St. Helens, 371.4 sec. ; (2) H. Gilbert, Whitefield, 291.5 sec. ; (3) Mrs. Bentley, Blackpool, 276 sec. Juniors : (1) O. Wright, Cheadle, 137 sec. ; (2) W. Blanchard, Merseyside, 111.5 sec. ; (3) R. Salloway, Rochdale, 106 sec.

Event No. 3. Restricted gliders. Seniors : (1) C. M. Holden, Farnworth, 276 sec. ; (2) A. Macbeth, Ashton, 224 sec. ; (3) M. A. Hetherington, Doncaster, 108.5 sec. Juniors : (1) T. Duckworth, Rochdale, 148 sec. ; (2) C. Rigg, Wallasey, 111.5 sec. ; (3) W. Blanchard, Merseyside, 94.5 sec.

Event No. 4. All in contest. Seniors : (1) M. A. Hetherington, Doncaster, 254.2 sec. ; (2) H. Leeming, Salford, 233.6 sec. ; (3) R. Scott, St. Helens, 225.6 sec. Juniors : (1) O. Wright, Cheadle, 165.3 sec. ; (2) W. B. Hetherington, Doncaster, 123.4 sec. ; (3) W. Blanchard, Merseyside, 92 sec.

Champion of Rally Cup Winner, M. A. Hetherington.

Best individual glider flight, D. Nuttall and E. Wainwright, both 590 secs. Duration, R.O.G., R. Scott, 262.4 sec. Restricted glider, C. M. Holden, 174 sec.

NEWS FROM THE CLUBS

We learn from the Brentford and Chiswick Club that they will be holding their Annual Rally at Hounslow Heath on September 8th, and they extend a hearty welcome to all interested.

The programme will include the usual popular events. Details from V. E. Winsley, 5, Berested Road, Hammersmith, W.6.

NORTHERN NEWS

By "Northerner"

Once again I must open the months notes with a grouse, for again there are only a few reports. I wonder what is happening, for several persons have recently told me that it is now taking quite a long time to get replies to correspondence from clubs, and the secretary tells me that he has not yet had all the questionnaires which he sent out many weeks ago returned to him completed. Come on you chaps, "pull up your socks" they are not all Northerners that are defaulters, but we are certainly backward. By the time you read these notes your club will probably have received full details of the grand National Model Aircraft Rally that is to be held on the Stanley Park Aerodrome, Blackpool, on Sunday, September 8th. This is certainly going to be the biggest and best model aircraft event yet held in the North, and from what I have seen and heard of the prizes, they will be well worth competing for.

From conversations at the last Northern Rally it would appear that there are quite a number of petrol models now being completed in the North, but one rarely hears anything about them. I wonder if a few local contests for petrol models would help these beginners to gain their confidence. (What about it, Northern Area Council ?)

I managed to spend about three hours during the past week-end at a small rally organised by the Wythenshawe Model Aircraft Club. It was quite an enterprising effort, yes, even light refreshments, tea, minerals, and sandwiches were "laid on." The main flaw in the whole affair appeared to be the lack of control over spectators and young boys, etc., who would persist in roaming amongst the competitors and getting tied up in the tow-lines, etc.; however, in spite of this, the club are to be congratulated on their enterprise.

Now here are the three main club reports. *Bury and District Model Aero Club*, which I am pleased to note was represented at the last E.G.M. in London by G. Ashworth. Their report says "members are building furiously in preparation for the second Northern Rally, at Baildon, notable models being C. Lee's large, tail-first glider, and A. Bennett's silk-covered sailplane with elliptical wings and tail-plane. At the *Whitefield Youth Movement Model Aircraft Club*, there is at the present moment a search going on to locate suitable premises to open a club workroom. Although the room at present used at the local school is excellent for meetings and R.T.P., etc., it cannot be used as a workroom. Another issue of this club's magazine has "come off the press." The next report comes from the *Doncaster and District Model Flying Club*, whose M. Hetherington is the proud holder this year of the Champion of the Rally. Sunday, July 5th, proved to be an excellent day for flying, and the juniors of the club had a real day out. Three models were lost, two of which have since been found. The longest *timed* flight of the day was by D. Donelly, who did 8¼ min. with his "Atlanta" glider. F. Gearing and D. Hellewell averaged 3 min., with their Wakefields, and J. Hobbs lost his glider from a 100-ft. line.

BRENTFORD AND CHISWICK M.F.C.

The club turned out in force on June 30th, when we hired a 'bus to take us to the Northern Heights Gala Day, where we were quite successful, Mrs. L. Close winning the ladies' prize, Messrs. W. Glennie and J. Day coming second to Croydon M.F.C. in the team event, losing by 1.2 sec., and Mr. D. A. Pavely coming second in the Nomination Competition.

St. George's Heights M.F.C. recently challenged us and the competition took place on Chobham Common, on July 21st, resulting in victory for us.

The results were: B. and C., rubber, 1,405.8 sec. ; B. and C., glider, 795.5 sec. ; total, 2,201.3 sec. St. George's Heights, rubber, 1,207.4 sec. ; St. George's Heights, glider, 769.9 sec. ; total, 1,977.3 sec.

Best flight of the day :—D. Vandeputt, 513.0 sec.

The club lost the first round of the London Inter-Challenge Cup to the Harrow M.F.C. by 198.5 sec.

CROYDON AND DISTRICT M.A.C.

Our team in the National Cup was Messrs. J. L. Pitcher, N. Standing, J. Hall, and B. P. Chandler, and these totalled 1,575.35 sec.

On July 21st we competed for the Clarke Trophy (open rubber) in warm, but windy, weather, which abounded with thermals. The winner was N. Marcus ; 2nd, N. Standing ; and 3rd, Bennett. All three models were lost. Our team, which flew against Northern Heights on July 28th, in the London Inter-Club Challenge Cup, comprised N. Marcus, J. L. Pitcher, B. Chandler, and N. Standing, the models being an F.A.I. glider, light-weight rubber model, light-weight glider, and a Wakefield respectively. Our total did not prove large enough to beat Northern Heights.

LUTON AND DISTRICT M.A.C.

On July 7th, the Holton Cup for juniors was held, this being an open sailplane event, and was won by R. Minney, who lost his model on his second flight. He was followed by E. King, who also lost his model.

August 4th saw us enjoying baking weather, and a nomination contest was held for rubber or glider, and it was most amusing to see the frantic attempts by members to keep the times of the last flights down in order to keep within their pre-determined aggregate (dethermalisers not allowed). This event was won by Smith, with an error of 16.5 sec., 2nd was D. Bateman with 18 sec. error.

MERSEYSIDE M.A.C.

Contingents from the club have attended rallies at Springfield and Baildon, recently, the transport for the Springfield journey being very kindly laid on by the Wallasey M.A.C. Arrangements are also being made for participation in the Flight Cup, at Baildon, and the *Daily Dispatch* Glider Trophy, at Squires' Gate Aerodrome, later on in the season.

On National Cup day, Mr. Haisman managed to "tree" his model, and it was some considerable time before the model was finally recovered.

Two specially chartered charabancs conveyed some sixty members of the Merseyside, Wallasey, and Liverpool clubs to the Clwyd Hills, North Wales, for a slope-soaring glider meeting, on July 28th.

All the prizes were cleaned up by the Wallasey M.A.C. S. Hinds, flying the "Kiwi," a sailplane of his own design, won the junior cup, F.A.I. class prize, and class "A" prize in one go, with the best time of the day, 126.6 sec. o.o.s. J. Baguley won the class "B" prize with a 96.4 sec. o.o.s. flight with his "King Falcon." A young lady visitor from Bradford, Miss Anne Race, put up a good performance, doing 67 sec. with a small glider.

NORWICH M.A.C.

The Norwich M.A.C. held a successful rally on July 7th, at Eaton, which was well attended. Three main events were scheduled for rubber models, gliders, and a nomination contest; and they were run off in excellent weather. The results were: open rubber, A. Raffle, 528 3/5 sec.; open glider, L. Claydon, 428 1/5 sec.; nomination, J. Palmer, error 3/10 sec.

The meeting was sufficiently successful to encourage the club to organise a similar rally later in the year.

READING AND DISTRICT M.A.C.

Since acquiring our new flying field at Theale, the enthusiasm of members has increased by leaps and bounds. Several competitions have been held, and, whilst times are not high, they are improving. Gliders are very much in evidence, but, with the rubber situation improving, the Wakefields are (somewhat diffidently) coming forth.

Mr. W. A. Smallcombe has been flying a canard pusher, and a Vampire *à la* Boys was seen at a recent meeting.

Two exhibitions have been held this season, to date, in the outskirts of Reading, with the intention of contacting those who would rather go to their village hall than to a more central place.

SURBITON AND DISTRICT M.F.C.

D. C. Butler won the Pilcher Cup with three flights of over 3 min. (Who said the lightweight was not consistent?) This model is a stick job with a pylon-cum-cabin wingmount, giving the required cross-section area. Appropriately named "Fugitive" it took two hours to find after a test flight in the mist.

In the same contest, T. W. Laming averaged 1½ min. with his F.A.I. glider, of 6-ft. span. R. Norris lost his "Ranger 1," after 3 min. 59 sec. P. Allaker, a new junior, folded his wings on the first flight, but turned in 1 min. 46 sec. on his next.

TORQUAY M.A.C.

The Club winch-launched glider record is at present 16 min. 8 sec., and held by L. Long, who flew a "Tern." This flight was made during the "Beavis" trophy contest and, needless to say, Les was the winner.

The Club hand-launched glider record now stands at 76.5 sec. and is held by a junior member, W. Wills, who also flew a "Tern." G. Wilde recently clocked 12 min. 4 sec. o.o.s. with his "Ivory Gull," while the latest long flight was 14 min. 40 sec. by G. Pearce's "Ivory Gull." D. Brown has just lifted the Peggy Ward Cup for gliders, with an aggregate for three flights of 222 sec. Denis is a junior member, an answer to some controversy in our Club that juniors can still build their own models and win.

TWICKENHAM AND DISTRICT M.A.C.

A cameraman from a well-known London film company was at Hounslow Heath taking "shots" of the Club flying their models, including R. V. C. Turner's "Canard" sailplane which was mentioned in last month's report.

On May 26th, the Club held a competition for gliders with the following results:—

	Name.	Total Sec.	Type of aircraft.
1st.	D. Reid	136	Vanda
2nd.	K. Brown	132.6	Own design.
3rd.	G. R. Turner	131	Ageas.

WALTHAMSTOW M.A.S.

Members had an enjoyable time at the Northern Heights Gala Day, F. E. Deudney winning the Concours d'Elegance, section 2, with his beautifully-made heavyweight glider. Recently S. Sutherland's streamlined F.A.I. sailplane made a flight of over 15 min., and it has not yet been recovered. A. W. Green has lost his lightweight rubber job, five times and each time it was returned relatively undamaged.

WILLESDEN AND DISTRICT M.A.C.

In our recent Duration Competition, Mr. Cunningham's machine which won the contest, was swooped upon by a bird, which, however, gave up the attack and left the model to continue its flight unharmed.

The Secretary's Cup, open only to members of the Club, will be flown for towards the end of July. It is for Wakefield models.

We have just been given notice to quit our clubroom and so, like many others in London, we shall be homeless soon (unless the Council would like to give us a prefab.).

The open rubber and Wakefield club record has been raised to 7 min. 30 sec. by A. Setchfield, flying a rather odd-looking Wakefield of his own design. Later the open glider record was raised to 5 min. 51 sec. by Stan Tydieman with a lightweight glider of his own design. Mr. Coombes has been flying a twin-rotor autogyro indoors, but as there is no way of attaching it to the line, he could not fly it R.T.P.

CHANGES OF ADDRESS AND NEW SECRETARYSHIPS

Brentwood School M.A.C.: Hon. Secretary, M. R. Davies, Littledene, Jacksons Lane, Billericay.

Cambridge M.A.S. P. Firman, 26, New Square, Cambridge.

Reading and District M.A.C.: Secretary, Mr. H. N. Jackson, 1A, Victoria Road, Tilehurst, Reading.

Walthamstow M.A.S.: E. H. Aylward, 71, Dunlace Road, Clapton, E.5.

Walsall M.F.C.: Secretary, Mr. G. H. E. Wood, 6, Cobden Street, Palfrey, Walsall.

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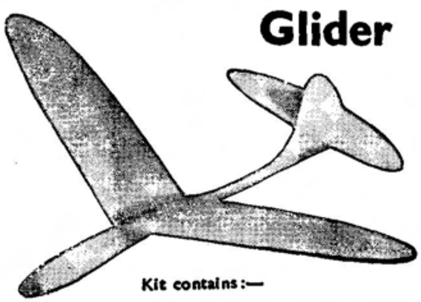

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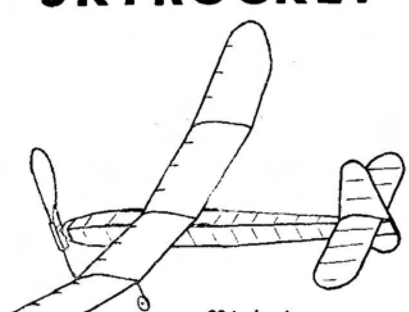

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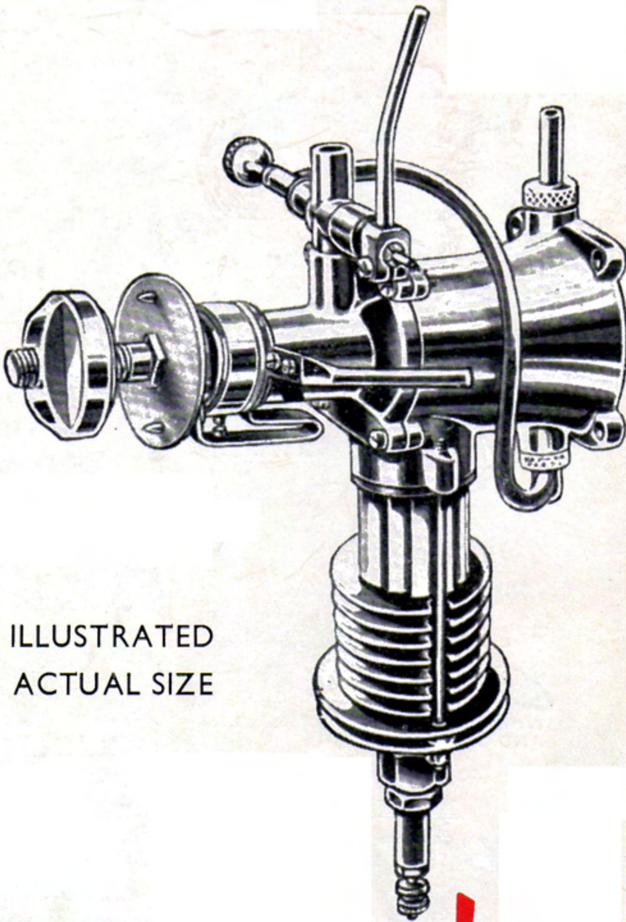
·75 lb. at max. revs.
4 Point Radial Mounting
Integral Fuel Tank
Upright or Inverted Running.
Hardened, Ground and Honed Cylinder
Ground and Lapped Piston



ILLUSTRATED ACTUAL SIZE

We are proud to announce that in these days of steadily rising costs, we have been able to reduce the price of this Engine ——

75/-

Including Coil, Condenser, Plug, and PLASTIC AIRSCREW

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