MODEL AIRCRAFT

1/-

JULY, 1946
Vol. V No. 7

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

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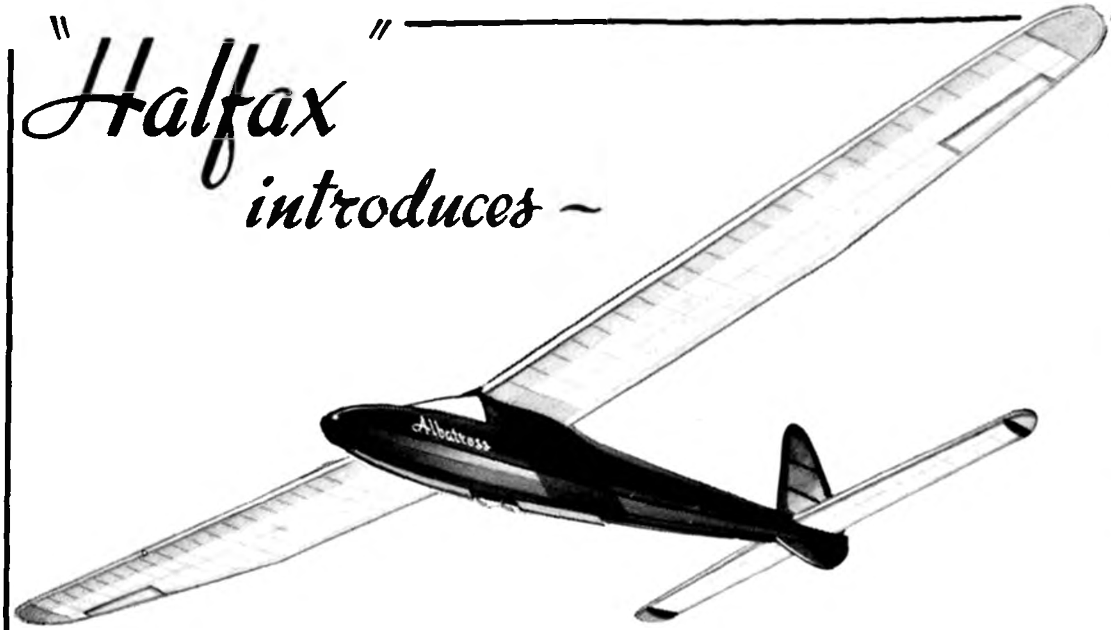

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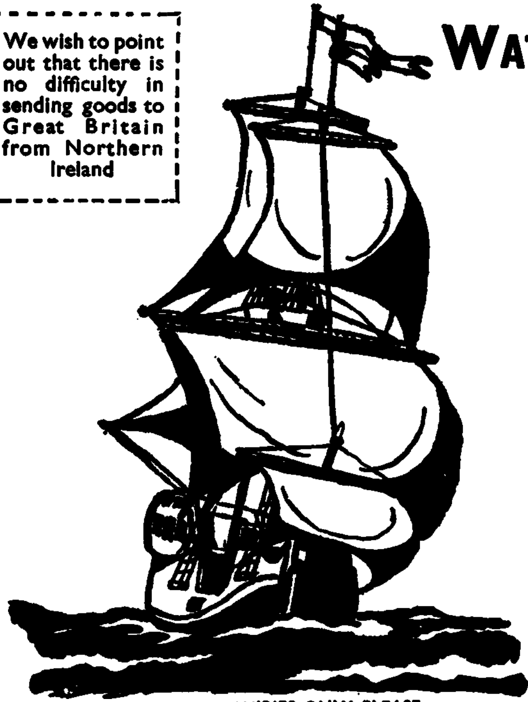

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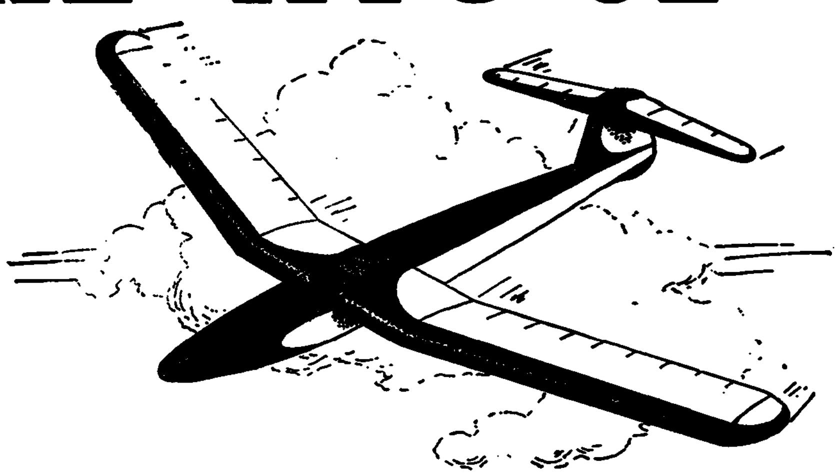

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MODEL AIRCRAFT

The Journal of the Society of Model Aeronautical Engineers

JULY 1946
Volume 5. No. 7

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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

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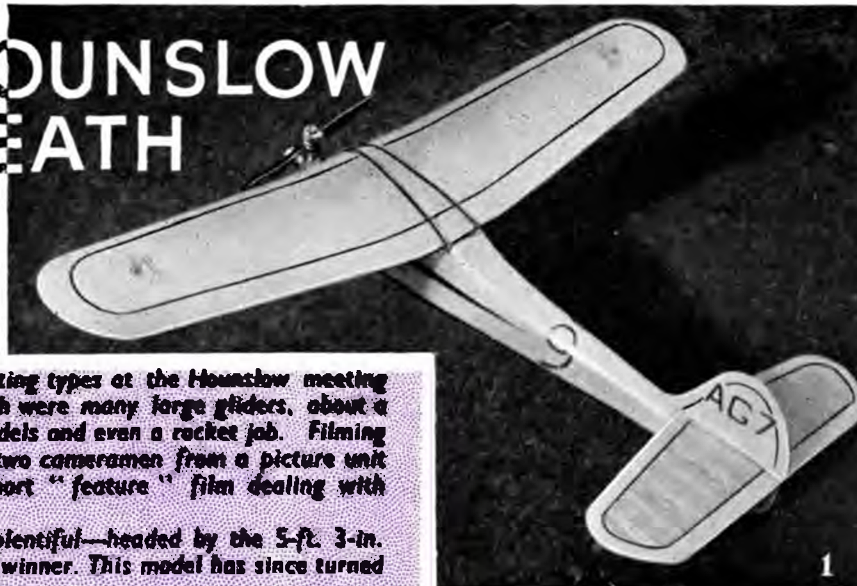
ON HOUNSLOW HEATH



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AMONG the interesting types at the Hounslow meeting on February 10th were many large gliders, about a dozen petrol models and even a rocket job. Filming the proceedings were two cameramen from a picture unit who are making a short "feature" film dealing with aeromodelling.

Flying wings were plentiful—headed by the 5-ft. 3-in. Handley-Page tail-less winner. This model has since turned in a flight of 2 min. 15 sec.

Eddie Keil turned up with his "Junior 60" and 7-ft. "Falcon," which both flew very well.

Other notable petrol jobs were K. W. Batten's 8½ c.c. high-wing cabin model; G. A. Paul's 6-ft. 8-in. "Maestro."

Ron Warring was also there, with a helicopter, a plug-in wing slabsider (best official time 10 min. 8 sec.) and a promising new polyhedral gas job.

As usual, Bob Copland turned up with a duration model.

The Bushy Park Club had a fine show of large gliders, nearly all being 1945 contest winners including M. A. Wright's 7-ft. 6-in. "Zenith Supreme."

Photo No. 1 shows K. M. Tansley's "T.9" petrol model, plans of which were given in the February, 1946, issue of "Model Aircraft" and which has since won the Hounslow Rally and Shelley Cup petrol contests. No. 2 depicts "Tail-first Chad," a 4-ft. 6-in. span model, by D. Ethridge. No. 3 is Spence Geddies' "Moonraker," the builder is a Zombie Club member. In No. 4 Eddie Keil holds up his "Junior 60" for inspection and No. 5 shows one of the many successful flying-wing gliders.

2

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5

4

News Review

Cover Story

Our cover picture this month shows J. S. Davall with his "Vanguard" sailplane, full working drawings of which are included in this issue.

Of the "heavy-weight" type, this machine has proved itself a reliable and consistent performer under all conditions of weather, and it has built up an envied reputation under contest conditions.

Apart from its performance abilities, the machine possesses sleek and attractive lines and all the features which recent experiments have shown to be desirable and advantageous in model sailplanes.

This model is also exceptionally robust in construction and capable of withstanding the hardest usage and can be recommended to those who are making their first incursion into high performance sailplaning.

The picture was taken by your Editor at Hounslow Heath on the occasion of the Northern Area *versus* London Area contest, last year.

Treasurer's New Address

Will readers please note that the Treasurer of the S.M.A.E. has found it necessary to change his address again, and that he is now back at 21, Palace Court, London, W.2? Telephone number : BAYswater 3738.

All communications relating to matters of finance, insurance, badges, and membership cards, should be sent to this address.

A British Continental Win

As we go to press we learn that a few British enthusiasts with tailless models made the journey to Lyon to compete in the French Tailless Model Competition organised on the lines of our own Handley-Page Contest.

Amongst these was Howard Boys, who succeeded in winning the reaction-propelled section with one of his now famous rocket-propelled models, without opposition. Good work!

The only entry in the petrol-driven section was again a British one—E. W. Hargreaves, of the Bury and District M.A.C.—who, unfortunately, was unable to record any official flights.

The glider section was won by a Swiss entry and we hope to be able to give more complete details of this contest in our next issue.

Jet Developments

It is gratifying to learn that steps are being taken to place Great Britain in the forefront of the world with jet propelled civil aircraft, and thus maintain the advantageous position which this country has attained with military aircraft of this type.

Eleven jet driven machines are scheduled for development, five of which are conversions of existing types to jet propulsion, including the Avro "Tudor," Airspeed "Ambassador," Vickers "Viking," Miles "Marathon," and De Havilland "Dove." The other projects are entirely new ones of advanced conception, consisting of a four-engined propeller-jet machine to be developed by Messrs. A. V. Roe & Co., with a cruising speed in the region of 375 m.p.h., for use on Empire trade routes ; a high speed jet propelled machine with a cruising speed of 550 miles per hour to be built by De Havillands for transatlantic traffic ; a 180 seater project by Bristol's employing no less than eight jet units, grouped in pairs ; a flying boat by Saunders-Roe using six jet units ; and a twin unit machine under production by Vickers Ltd., which British Overseas Airways hope to have in commission in a very short time.

This indicates that a very useful development programme is under way.

Design Developments

With the advent of improved conditions and better transport facilities, we can look forward to the reintroduction of international model aircraft meetings in the near future, including a resumption of the Wakefield Cup Contest. It is, therefore, of particular importance that British modellers should begin to turn their attention to the question of designing suitable models for these contests and not leave their efforts to the last moment.

It is also of the utmost importance to start designing in a logical manner by making a thorough survey of past and present designs, keeping the good points in mind and discarding the bad or doubtful ones. This eliminates wasteful duplication of experiment and avoids spending valuable time exploring ground which has already been thoroughly covered by previous experimenters. The best way to improve on existing designs is to begin where others have left off and forge ahead with their experience as the background for your developments.

This principle holds good in all cases, and Wakefield models are no exception. Too much time is wasted in this world covering ground already well trodden, and we cannot afford to waste one instant if we are to regain the Wakefield Cup for this country.

As there are many now interested in model aircraft who have no experience with Wakefield models and their design peculiarities, we have decided that the time is ripe to place before our readers the views and experience of some of the more successful designers of Wakefield models in the past, so that newcomers(and even some old-timers) may have the benefit of their work to build upon, when designing their super Wakefield.

The first to contribute to this series is Mr. R. N. Bullock, who won the cup in 1929 and who has always finished well up in the contest on the occasions when he has competed. It is appropriate that Mr. Bullock should open this series, as he has undoubtedly contributed more to the design and evolution of the Wakefield model than any other individual; and many of the design features to be found on the present-day Wakefield machines owe their origin to his fertile and progressive brain.

For the benefit of those not familiar with the earlier history of Wakefield models, we would point out that he was the first British entrant of an all-balsa model and that in the last contest in which he competed—the 1938 contest at Paris—his model disappeared o.o.s. *vertically* and was not recovered until four months later at the top of a fir-tree in a forest 23 kilometres (14½ miles) away.

We think our readers will find much of interest in his articles.

The Model Engineer Exhibition

Model aircraft builders are reminded that the closing date for entries for the Model Engineer Exhibition is July 14th and that they should send in their entries without delay.

Entry forms and full particulars are obtainable from the Manager, Model Engineer Exhibition Offices, 23, Gt. Queen Street, London, W.C.2. Don't delay your entries to the last moment.

A certain number of stewards will be required to man the aircraft competition stands during the exhibition period and we shall be glad if those who are able to devote some time to this important task will inform us of the days they can attend and the hours they can cover.

There is also a certain amount of space for loan exhibits and the exhibition managers are prepared to consider the display of any models which have a historic, scientific or craftsmanship appeal.

An arena for R.T.P. flying is being provided and we shall be pleased to hear from any aero modeller who is prepared to demonstrate his model during the exhibition. Provision will be made for running both rubber and electrically driven models.

This exhibition provides model aircraft builders with an excellent opportunity of demonstrating their craftsmanship and abilities to the public and full use should be made of this occasion.

The exhibition opening date is August 22nd and it will remain open to the public until August 31st.

The Irish Nationals

At the recent extra-ordinary general meeting of the S.M.A.E. it was agreed to send four members to compete in the Irish National Contests at Dublin, held on June 23rd.

The following were selected on the basis of the consistency of performance they have displayed in recent contests :—R. Copland (Wakefield model), R. Warring (Wakefield model), K. Tansley (petrol model), F. Hempsall (petrol model).

Truth in Advertising

While on the subject of the Irish National Contests, it has been noted that a section of the model aircraft movement has been trying to gull aeromodellers into the belief that this was an international contest for which they were sponsoring a British team.

This, of course, was not the case. The title of the contest clearly indicated this, and the contests staged were for *individual* entries, no team events being catered for.

English modellers were generously invited to take part, and we are pleased to see that a number of them have taken advantage of this individually and through the medium of the societies to which they belong.

Such a distortion of facts does not help in creating a strong and healthy movement and is to be deplored.

WAKEFIELD MODELS

by R. N. BULLOCK

THE subject of Wakefield Models will once more be prominent in the minds of most active aeromodellists, now that the war is over.

To answer all the questions that will want answering with regard to design problems, is very difficult, and, therefore, I intend just to go over the components of a Wakefield model and give my opinion for what it is worth, pointing out any improvement that I can think of.

The suggestions put forward will only be those which can be carried out with some hope of producing improvements to the model's climb, glide and general air-worthiness.

The more recent Wakefield models have reached a very high standard of model efficiency, and just what can now be attained in the way of duration with these designs should be fully realised before starting on anything new.

During my flying experiences I have been able to see the class of performance other international model flyers could put up, and I feel that up to the time of the 1938 contest, my own machines were at least equal to those produced by others.

Having finished my 1939 model in 1940, I am using its performance as a basis for the development of a modern machine; and I will also consider the performance of the 1938 machine up to the time of its loss in France.

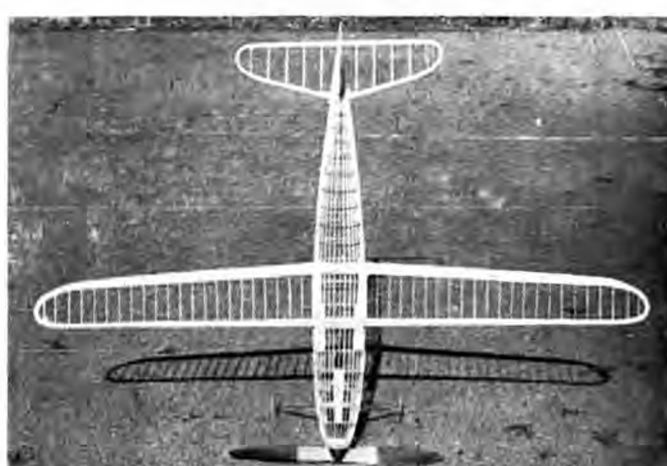
The photographs included in this article are of the 1939-40 model, which was designed with the hope of improving on the performance of the 1938 machine.

From these photographs you will see that the model is quite normal in appearance.

The main dimensions are: 48-in. span, 36-in. overall length, with an 18-in. diameter propeller of 24-in. pitch and ratchet free-wheel. The motive power was a single skein of 18-in. strands of American brown, 5/32 in. × 30 in., arranged into a braided motor 46¾ in. long before braiding and 31 in. afterwards; this motor weighed approximately 2⅜ oz. dry.

The maximum number of turns this motor would safely accept was 1,150, but another 50 might have been used in extreme cases.

The fuselage is very nearly circular in section, having been built-up with thirty-two 1/16 in. × 1/16 in. stringers, on laminated formers, spaced from 1½ in. to 2 in. apart. The main planes had an upper surface profile of R.A.F. 32-section, the under-surface profile was modified, so that the completed aerofoil had lost approxi-



mately a quarter of its depth at the front. Mr. Philip's entry was re-shaped, and the after two-thirds faired into it, so as to give a rather greater concavity to the under-surface than is obtained by keeping strictly to the R.A.F. 32 surface ordinates. These main planes fitted into boxes in the fuselage, as this had been found to be a sound scheme.

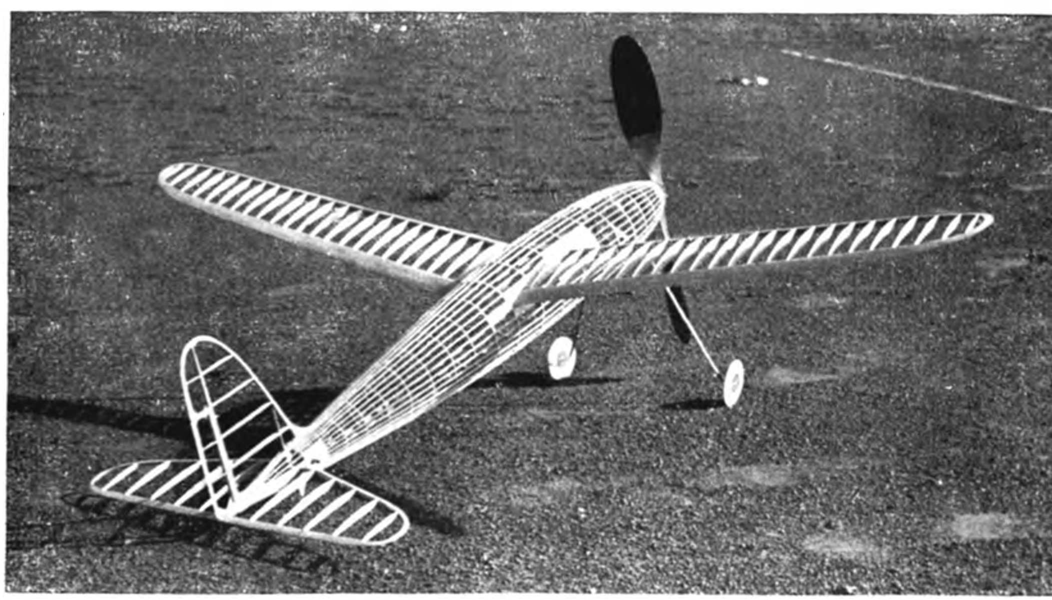
The under-carriage was a simple pair of cane legs pushed into paper tubes, well braced internally. The wheels are thin and of 2¼ in. diameter, carried on 19-s.w.g. wire axles, bent round in a longish sweep to form the stub axle, so avoiding as far as possible interference between the wheel and the leg.

The tail-skid is very minute and light, being 22-s.w.g. piano wire, with a small root fairing.

The tail-surfaces are of Clark Y section with approximately 50% ordinates, and up to the full 33 per cent. regulation allowance for area. The was 850, and when hand-launched, this model flew for 177 sec.

Nothing to brag about, except that it was eight o'clock in the morning, calm and cool enough to know that this was actually flying capability. Knowing that there was still another 300 turns that I might have used, and knowing that these 300 turns would contain very nearly half of the total energy available, I believe that this model was superior to my 1938 machine, which had made several evening flights of 115 sec. r.o.g. on 600 turns.

These flights are quite short as compared with those that can be obtained in the early afternoon of a fine warm day, but this sort of flying is not really the measure of a machine's capabilities, as much of the duration obtained is derived from the condition of the atmosphere, and could not be repeated with certainty when cold or windy, or without sun.



fin, with a small trimming tab, is of just sufficient area to set the centre of side area on the trailing edge of the main planes, and about half-an-inch above it.

The tail-surface has a negative angle of attack of about 1 degree with the main planes set at 3½ degrees positive. The dihedral is about 1½ in. per foot run of half span.

Now this model has never been flown at full turns, because, like other people, I have had to conserve my rubber during the war.

The greatest number of turns ever used

So, from the foregoing, I would suggest that, in the light of present knowledge, a good Wakefield model should be able to fly for 200 to 250 sec. without thermal assistance.

Any designer/builder/flyer whose model can attain or exceed these figures under evening or bad day-time conditions, can be well satisfied with his work, and know, that should he get into a Wakefield team, his model is well up to the standard necessary to represent his country fairly.

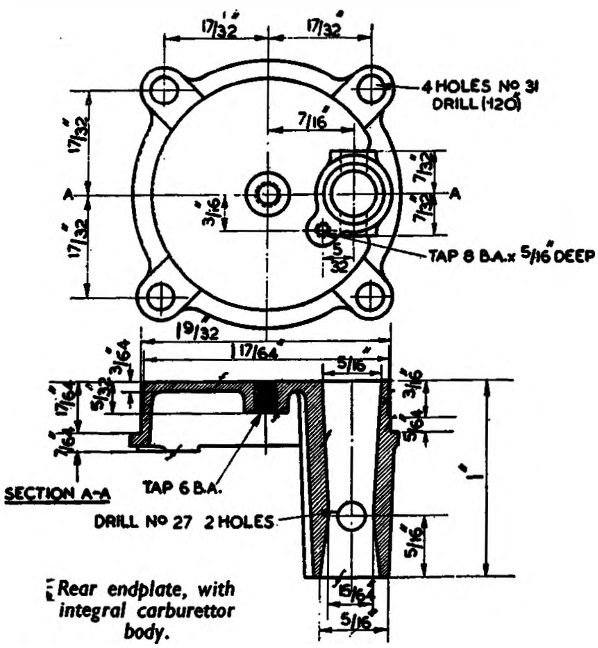
(To be continued)

Edgar T. Westbury

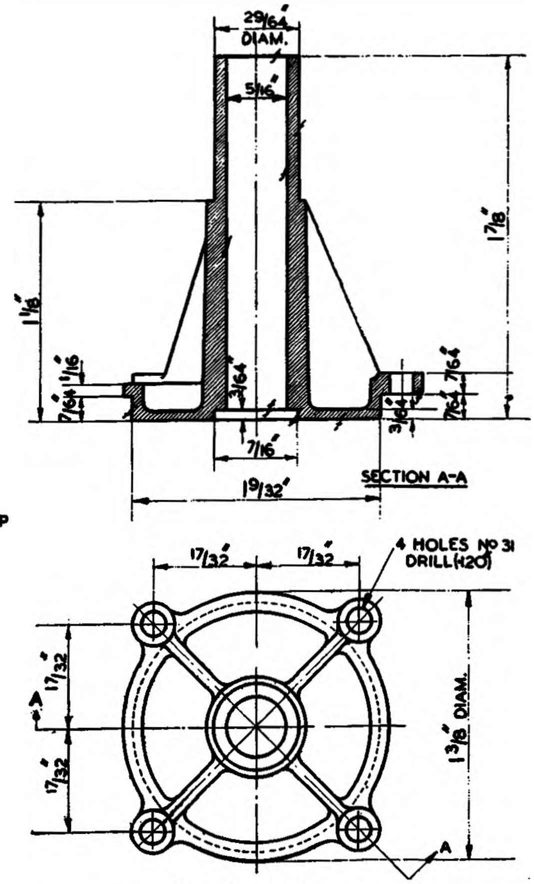
"ATOM MINOR" MARK III 6 c.c. Engine

THE casting for the main bearing housing may be machined in two or three different ways, the essential thing being to ensure that the register spigot of the flange, the central hole, and the turned seating for the contact-breaker are all concentrically true with each other. One of the best and safest methods is to bore the central hole first and then mount the casting on a true-running mandrel, between centres, for the remaining operations. The casting may be held in the three-jaw chuck, gripping it over the register spigot, for drilling ; but first the surface of the spigot should be examined to see that it is free from rough lumps which might throw the casting badly out of truth when held in this way. Before fully tightening the chuck, the nose end of the casting should be set to run as truly as possible by tapping it gently with a mallet, using a piece of chalk, held in the fingers with the hand steadied against the tool post, to check the accuracy while running the lathe at high speed. If the nose is out of truth, the chalk will touch the high spot and indicate where it should be tapped to correct the error.

After tightening the chuck, a light facing cut should be taken over the end of the nose,



Rear endplate, with integral carburettor body.



Main bearing housing.

and it should then be centred by means of a centre-drill held in the tailstock. It is most important that the centre should be exactly true, and in this respect, holding the centre-drill in a tailstock drill chuck does not always provide sufficient rigidity to avoid wobble. A much better method of holding the centre-drill is to turn a short piece of steel to fit the tailstock socket, and bore it centrally a push fit for the drill, which may be secured by a grub screw. If the centre-drilling is not absolutely true, it is hopeless to expect that the drilled hole will be true either ; in fact, the error will multiply in proportion to the depth of hole drilled.

Do not attempt to drill the hole to its full size, or reamering size, right away, but start with a "pilot" hole, using a drill about $\frac{3}{16}$ in. diameter, which should be keen and well backed off. Run the work at high speed, and do not force the pace of feeding the drill, backing it out frequently to clear the chips. With due care, a perfectly true hole right through the casting should be produced, and may be followed by one or more larger drills to open up the bore to 19/64 in. diameter, finishing with a $\frac{5}{16}$ in. parallel reamer, held in the tailstock chuck, and fed by pushing the tailstock bodily along the bed of the lathe, running the spindle slowly or turning it by hand. A lubricant is generally desirable for reamering aluminium, thin soluble oil or paraffin being suitable, and frequent backing out of the reamer will avoid clogging.

Next centre a piece of $\frac{3}{8}$-in. mild-steel bar about $2\frac{1}{2}$ in. long, and turn it between centres to form a mounting mandrel, which should be very slightly tapered—not more than 1 or 2 thousandths of an inch in the length of the work—and fitted so that it can be pressed in fairly tightly. A dead smooth file may be used to finish the mandrel to size. When the work is thus mounted, it may be run between centres to turn the back face of the housing, the spigot and flange face, then reversed to turn the contact-breaker seating.

The endwise dimensions should be taken from the unmachined front face of the flange ; if this should be found to run slightly out of truth, take the measurement of $\frac{1}{16}$ in., shown on the detail drawing, as representing the thinnest point. Great care should be taken to fit the spigot to the crankcase barrel, as a well-fitted spigot counts for a good deal in the structural strength of the engine, relieving the crankcase studs of practically all stress. A sharp-angled right-hand side tool may be used for all the operations on the outside of the housing. While set-up for turning the contact-breaker seating, the tool may be used to skim the projecting faces of the bosses on the front of the flange.

Incidentally, a hammer should not be used in fitting or removing the mandrel ; in the absence of a mandrel press, the vice may be used, supplemented by pieces of tubing or odd bushes to act as distance pieces.

The recess in the flange end of the bore can best be formed by fitting the work on a stub mandrel held in the chuck, using a small boring tool. It is not absolutely essential that this recess should fit snugly over the rim of the bush, and if desired, it may be made slightly oversize to provide a clearance ; but the depth shown should be adhered to fairly closely.

After ascertaining that the bosses on the housing flange correspond fairly closely with those on the crankcase when the parts are assembled (note that there are four alternative positions), the stud holes may be marked out and drilled, keeping them all on the same pitch circle and as equidistant as possible. The tapping holes in the crankcase may then be "spotted" or jigged from these holes. It will be desirable to mark the position of the housing relative to the crankcase for guidance in subsequent assembly.

Rear Endplate

The projection of the carburettor boss from the back of the endplate makes it a little more difficult to set up than the front housing. It is intended to be held over the rim in the four-jaw chuck for machining the spigot and the inner face, but it has been found that some of the chucks used on small lathes have very shallow jaws, which will not accommodate the depth of the carburettor boss. In such cases it may be necessary to make a temporary "accommodation chuck" by turning an old bush, or other suitable piece of scrap, with a recess to fit over the bolt lugs of the casting, and having a large enough clearance hole to allow the carburettor boss to pass through. To ensure that the outside surfaces of the lugs are concentric, they may be skimmed up, holding the work by the spigot, before fitting to the recess, into which it should press sufficiently tightly to hold during the turning operations.

These are generally similar to those on the housing flange, and the same tool may be used, similar care being exercised in fitting the spigot. It will be seen that this is a good deal longer than that of the front housing (the object being to avoid unnecessary crankcase clearance), and a part of the surface is relieved so as to make assembly easier than would be the case if the full length were a tight fit. The centre-hole should be drilled and tapped while set up in the lathe, and should be truly central, using the centre-drill as before to locate the drill correctly. Hold the spigot in the three-jaw chuck for skimming the faces of the bolt-holes and the centre boss.

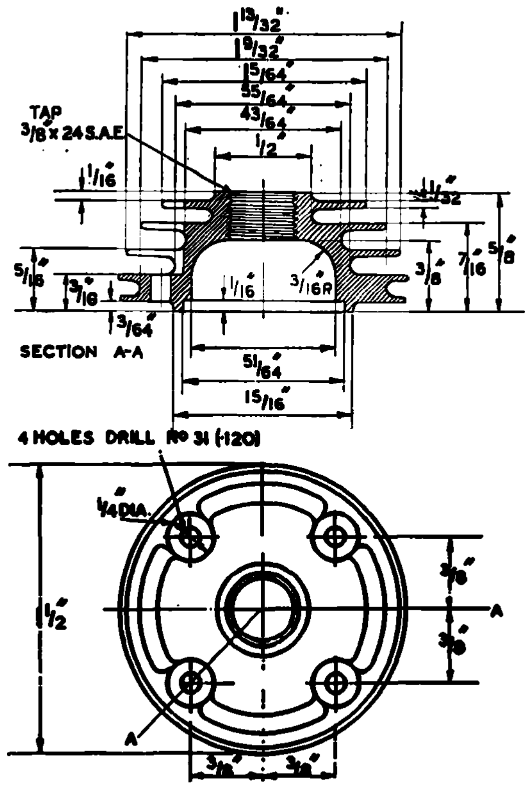
The hole which forms the carburettor passage may be drilled in a drilling machine if desired, but a better plan is to mount the work in the lathe, running eccentrically, and bore it out. As the small size of the job makes it difficult to secure to the lathe faceplate in the ordinary way, it may be clamped to a small disc of any convenient material, held in the reversed jaws of the four-jaw chuck. A recess may first be turned in the disc to fit the spigot of the end-plate, which can then be held quite firmly by a single clamp or strap, bearing on its centre boss with a packing piece in between. The radial and angular position of the bore should be marked out on the end face of the carburettor boss, and the disc set over until this runs truly.

Centre the boss fairly deeply and drill through to 15/64 in. diameter, then taper out the end of the hole with a reamer or D-bit, if available, or by means of a small boring tool. The exact angle of taper is not highly important, but it works out to an included angle of 15 degrees at the intake end and 7½ degrees at the discharge end. It is quite a simple matter to make D-bits from ⅛-in. silver-steel rod for carrying out jobs of this nature ; the rod is first turned to the angle required, then filed away to exactly half its diameter, hardened and tempered. These tools cut very cleanly, and without chatter, being, in many cases, preferable to reamers for occasional jobs.

The taper at the discharge end of the bore can be finished by holding the D-bit in the lathe chuck and supporting the casting against the tailstock barrel. Run the lathe at moderate speed, and feed the tailstock up very cautiously to avoid any tendency to snatch.

Marking-out and drilling the bolt-holes is carried out in the same way as for the front housing, and they can similarly be used to locate the tapping holes in the crankcase, but in this case there is only one possible position for the endplate ; that is, with the carburettor horizontally to the side of the centre-line, on the same side as the transfer passage, whichever direction of engine rotation is selected.

The flat inner face of the endplate forms the seating of the rotary admission valve, and must be perfectly smooth and true. It may be finished by lapping on a piece of plate-glass, but this process may be left until the valve is ready to be fitted, when both parts may be lapped and mated before final assembly.



Cylinder-head.

Cylinder-head

This component may be produced by turning all over from aluminium alloy bar. After facing the end, it is centred and drilled through to 21/64 in. diameter to tap out for the plug, then counterbored for the combustion chamber and recessed to fit the cylinder spigot. A round-nosed boring tool should be used for roughing out the shape of the combustion chamber, followed by a hand tool, similar to a round-nosed scraper, for finishing. A form tool may be made if desired, but when used on a small lathe it will be found rather prone to chatter, and will not usually give such a clean result as a hand tool.

(To be continued)

RTP SCALE & MODEL SPEED

WHILE R.T.P. models built for the purpose of obtaining the maximum duration of flight are an absorbing study, there are many other types of models which can be built for R.T.P. work and deserving of attention.

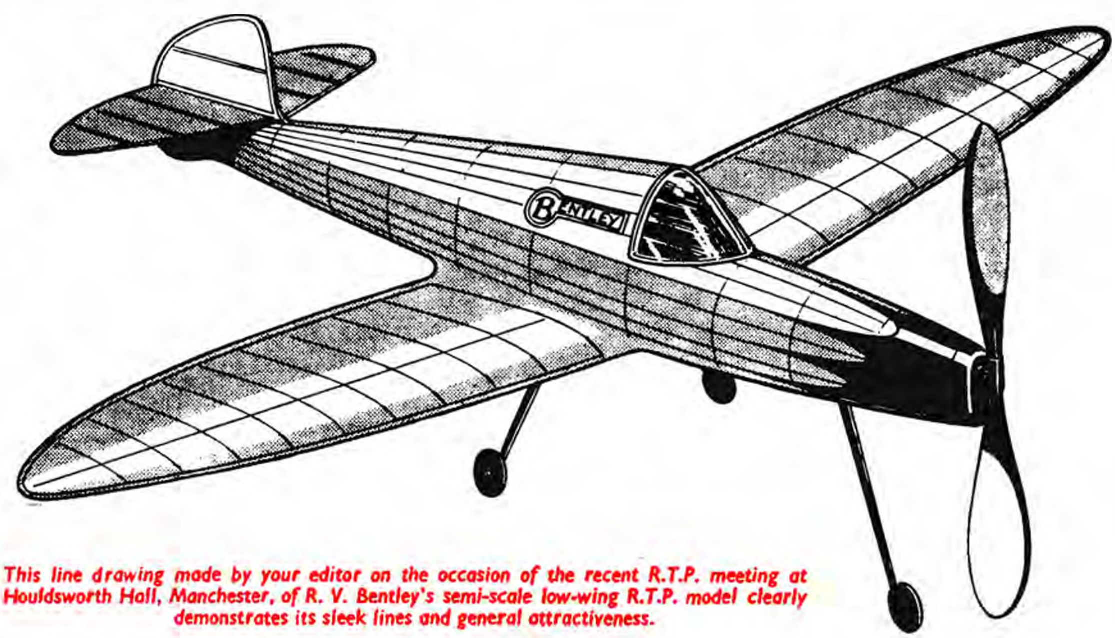
Amongst these are the scale or semi-scale types and when the models are replicas of such essentially fast machines as the "Spitfire," "Typhoon," etc., they can also aspire to the speed class and be realistic reproductions of their prototypes in performance as well as appearance.

One such machine was designed and built a little while ago by R. V. Bentley, of Blackpool, and is still flying successfully in the hands of D. Salloway, of Rochdale, at northern events.

This machine possesses attractive lines and is based on the popular low-wing cabin monoplane favoured by designers of full-sized light 'planes.

It gives a good account of itself as a speed model in spite of its "touring" design and its tricycle undercarriage.

The present owner of the model, D. Salloway, starts it off on one of its circular trips.



This line drawing made by your editor on the occasion of the recent R.T.P. meeting at Houldsworth Hall, Manchester, of R. V. Bentley's semi-scale low-wing R.T.P. model clearly demonstrates its sleek lines and general attractiveness.

J. S. Davall's Vanguard Sailplane

THE "Vanguard" has been developed from four sailplanes, all of which were over three square feet in wing area. It has the heaviest wing loading of any of them, and yet has the best performance. This is probably due to my efforts to keep the machine as streamlined as possible.

Anybody who builds and trims this machine with the necessary precision can be sure of flights of at least two minutes duration, when launched with a 300 ft. line, without the aid of thermals.

As the fuselage will take the longest time to make, and will form a basis for the work on subsequent components, start on this.

The formers numbered 1 to 10 are cut from ⅛-in. sheet basswood, and those numbered 11 to 23 are produced from $\frac{1}{16}$-in. sheet basswood. These formers should be mounted on a length of dowel ⅜ in. in diameter and of sufficient length to protrude well beyond the ends of the finished fuselage. The assembly of formers, dowel and skid is then mounted between centres on your workbench so that it can be rotated easily to facilitate planking with ¼-in. sq. soft balsa.

Each length of planking should be bevelled and tapered as shown and cemented to the formers and to the neighbouring plank, starting with the centre plank at the bottom of the fuselage. When you have got a few planks in position round the bottom to hold the formers firmly in position, build up the well for the wing hatch on the top side with ⅛-in. sheet basswood, making sure that the base of the well is parallel with the dowel used for building.

Continue planking the fuselage until at least half of the planking is in position. This will ensure that the fuselage shape is retained while the building dowel is cut in two, aft of the wing mounting, and the rear half pulled out from engagement with the formers. The front portion of the dowel is left in position and functions as a crash bar to take landing shocks.

When the rear half of the dowel is withdrawn the planking can be completed.

Everything is now ready for finishing, which is accomplished by building up the fin integral with the fuselage, making sure that the tail platform is at 0 deg. incidence.

The wing hatch should now be constructed, using the well, already constructed, as a jig.

The wing incidence is 2½ deg., and this is obtained by packing up the front wing tube as shown on the plan. The wing hatch can then be planked and faired into the fuselage.

Cut out the wing ribs, leading edge and trailing edge, and assemble both wings without applying any of the sheeting. Now cut the wings in half and rejoin them at the correct dihedral angle, using fishplates for this purpose.

When this is done the sheeting and capping strips can be fitted in position.

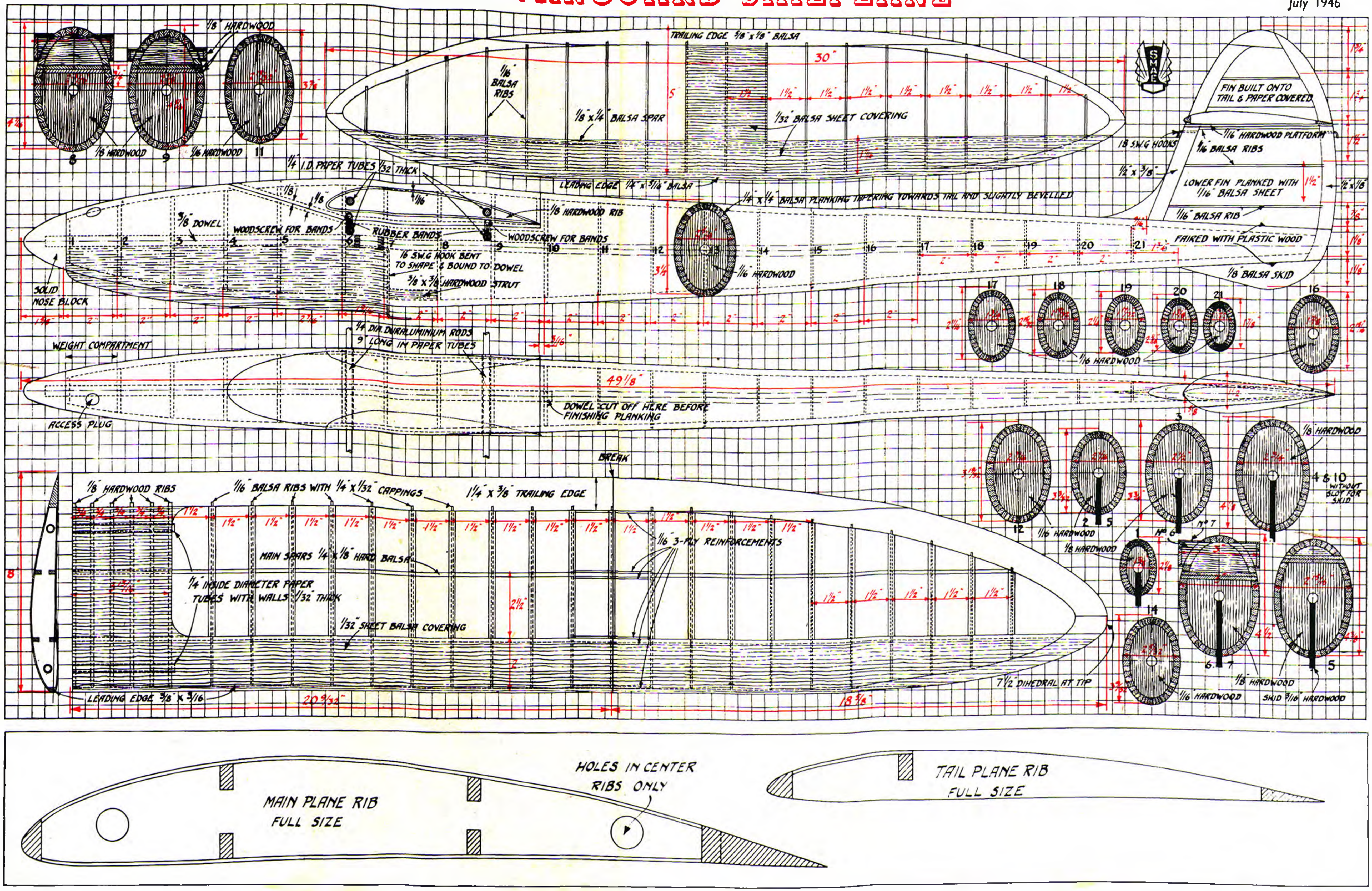
The fuselage must be sanded absolutely smooth and covered with a single layer of Jap tissue applied with banana oil. When this is absolutely dry it should be sanded with "flour" sand paper until quite smooth. The original model was then given six coats of red "Nu-brite," slightly thinned out to ensure flowing and sanded smooth between each coat.

The wings are covered in silk, applied damp and given two coats of glider dope when absolutely dry. The sheeting on the leading edge and wing root are given three coats of "Nu-Brite."

The tailplane and the top of the fin are covered with Jap tissue and given one coat of glider dope and one of banana oil, and the top surface is finished with two coats of "Nu-Brite."

The location of the centre of gravity should be one inch from the trailing edge of the wing and the original machine required 2½ ozs. of lead in the nose to obtain this trim. The fact that the fuselage planking was tapered at the rear by well sanding towards the tail doubtless helped to reduce the amount of trimming weight required.

THE VANGUARD SAILPLANE



Original

by Gordon

FORMERS "S" and "T" can now be firmly indicated. The distance these formers extend from the fuselage sides (dimension "Y" in the sketch) should, as a good guide, be no less than half the maximum fuselage diameter and no greater than the length required to accommodate the wing tongue.

After this, the longerons and formers are sharply defined. Next, the structure of the wing-stubs is indicated and includes the two ribs at each side of the fuselage *which are parallel* to the fuselage datum and are carried by the former extensions, and the small sections of leading and trailing edge, which are butted against the fuselage side longerons.

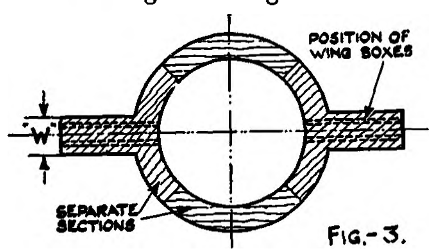


FIG.-3.

Incidentally, the position of the outer stub-ribs will determine the *true* extent of the former extensions. The inner stub-ribs are fastened to the formers and side longerons.

The fillets shown chain-dotted in Fig. 2, can also be indicated if desired. Wing-fillets will be dealt with in a later article.

Fig. 3 shows a typical detail of an extended former required for a mid-wing design. The sketch also suggests a method whereby the member can be built-up from separate sections of material, thus increasing the strength factor at this vital position.

The depth " W " of the stub booms will vary on the two formers incorporated in the fuselage according to the depth of the aerofoil section at the wing root and at the former positions This is indicated in the side view in Fig. 2.

Let us now see how a fuselage possessing an elliptical cross section can be drawn out.

As usual, it is necessary to find the dimensions of an ellipse the area of which will give us a satisfactory maximum fuselage cross section in accordance with S.M.A.E. and F.A.I. ruling. In our test case we know that a minimum area of $5\frac{1}{16}$ sq. in. is required.

To find the area of an ellipse a straightforward formula is used. This is $\frac{1}{4}\pi AB$, which for the benefit of the non-mathematically inclined, is merely a simple multiplication comprising $\frac{1}{4} \times \frac{22}{7} \times A \times B$ where A equals the major axis of the ellipse and B the minor axis.

The desired area is found by trial and error, so for a start we may try an ellipse having a major axis of $3\frac{1}{2}$ in. and a minor axis of 2 in. Using the above formula gives us :—

$\frac{1}{4} \times \frac{22}{7} \times \frac{7}{2} \times \frac{2}{1}$, which equals 5.5 sq. in.

This is rather too much, so let us try reducing the minor axis to $1\frac{3}{4}$ in., which gives us :—

$\frac{1}{4} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{4}$, which equals 4.8 sq. in.

This time our answer is too small, so we will take a midway dimension of $1\frac{7}{8}$ in. for the minor axis, which gives us :—$\frac{1}{4} \times \frac{22}{7} \times \frac{7}{2} \times \frac{15}{8}$, which equals 5.15 sq. in.

As our required area is $5\frac{1}{16}$ (5.062) sq. in., this last calculation puts us on the right side, so we now know that the elliptical cross-section of our fuselage must have a major axis of $3\frac{1}{2}$ in. and a minor axis of $1\frac{7}{8}$ in.

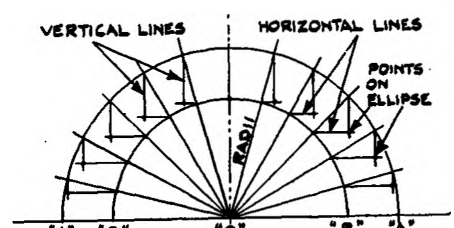


FIG. 4.

It should be noted that the *major* axis as well as (or instead of) the minor axis can be reduced or increased when searching for the right combination, but a ratio of approximately 2 to 1 is a good " balance."

Having dispensed with the preliminaries we can now turn our attention to the actual drawing of the side view—Stage 3.

With the exception of the " flat " on top of the fuselage and the ordinary nose, the drawing procedure follows that adapted for an orthodox slabsider.

The depth of the fuselage ($3\frac{1}{2}$ in.) is conveniently distributed about a datum line drawn from P.T. to E.R., keeping the datum line as

Designing

Allen

high as possible in relation to the top of the fuselage. Care must be taken to see that the rubber motor, the *centre* of which in this instance is represented by the datum, will not foul the formers at the top.

Points " E " and " F " are decided upon (as with a slabsider—Part 1 of this series) and the depth of the fuselage at the extreme rear.

By the "spline method" the fuselage curves are drawn in. The upper curve, in the case of a non-symmetrical fuselage such as this, will blend with the spinner and noseblock contour as with a circular-sectioned fuselage. The lower curve, however, being far more pronounced than the upper one, will have to terminate on the rear face of the airscrew-spinner, thus forming a break in the overall contour.

The dimensions positioning the formers in Stage 3 are only suggested ones, for they will be governed by the location of other units. They should not in any event, be exceeded.

" S " denotes the depth of the stringers to be employed on the fuselage.

The main longerons are drawn about the datum line, which will govern the position of the tailplane datum.

The plan view (Stage 4) is the next job and is to be drawn beneath the side view and about a horizontal datum.

The overall width of the fuselage ($1\frac{7}{8}$ in.) is set out equidistant about the datum.

The distance from " E " to " F " in Stage 3 is set out in plan view on the line representing the front face of the fuselage *and equidistant about the datum line*. This results in points " G " and " H."

The reason for this is that the fuselage gradually changes from an elliptical section to a circular section at the extreme front of the fuselage in order to line out with the circular spinner on the airscrew.

If an ordinary type of airscrew is to be used, that is, one without a spinner, then it is not imperative to have the same dimension on the front face of the fuselage in plan view as the corresponding depth in side view. In this case, by the way, both the top and bottom curves in Stage 3 will blend with an orthodox noseblock as with a slabside design.

The next step is to draw in the spinner shape in its appropriate place by tracing it from the side view. This is then followed by drawing in the fuselage contours to line out with the spinner. Finally, the outside stringers are indicated followed by the projection of the formers from the side view.

All formers have now to be detailed in a convenient position on the drawing (where they will not interfere with any other components to be subsequently drawn out).

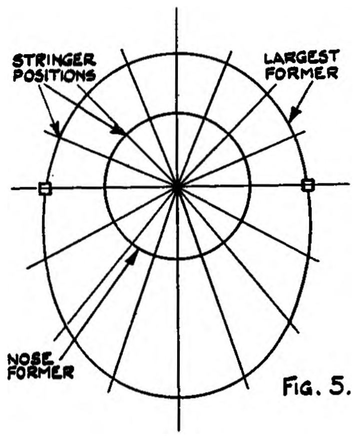


FIG. 5.

There are several ways of drawing out an ellipse, but the following method will be found to be both simple and accurate.

First of all a short base line is drawn and a point " O " marked on it approximately in the middle (see Fig. 4).

For an example we will take the fourth former from the nose.

The depth of the former in side view represented by "A"-"A," is measured very accurately and the dimension is then transferred to the previously drawn base line and denoted by two points (" A" " A ") *which must be equidistant* about centre " O."

A similar procedure is carried out with the *width* of the same former, obtained from plan view and indicated by " B "-" B."

This can be done accurately by the use of dividers or compasses, by placing the centre of the instrument at " O " and marking off *half of each dimension* on each side of " O."

By placing the compass point at " O " two semi-circles are scribed, the extremities of each being made to cut points " A "-" A " and " B "-" B " on the base line.

Numerous radii are drawn from " O " to intersect the semi-circles. The radii need not be evenly-spaced, but should be close together as shown.

Using the T-square and set-square, faint, *but very sharp* vertical lines are drawn from each intersection of the radii and *the outer semi-circle.*

Likewise, using the T-square alone, horizontal lines are drawn from each intersection of the radii and *the inner semi-circle.*

Where the horizontal lines meet the vertical lines, sharp points are made. All these points, including points " A "-" A," have been

(Continued on page 173)

PLASTICS

by J. C. CHAPLIN

RECENTLY, a series of simple experiments were undertaken to see if plastics would be able to replace the popular balsa wood. While results are, perhaps, generally inconclusive, several pointers have emerged which give an indication of possible lines of development for exploitation in the not-too-far-distant future. The equipment used throughout was simple, and can be made at home. All the moulds can be made from hard wood.

The first series of experiments were simply to discover whether or not it was worthwhile, from a weight, as well as a strength, point of view, impregnating balsa with a plastic.

The plastic used was an acrylic resin. This was dissolved in chloroform* and made up to a fairly thin solution. The wood to be treated was dipped in, left for 5 seconds, and then withdrawn. After being given time to dry, a support was placed under the exact centre of

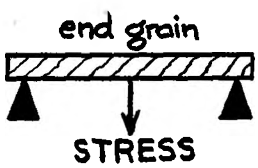


FIG. 1.)

the sample, and pressure applied equally at each end. The actual breaking strain in ounces was measured with a spring balance. As no accurate weighing machine was available, the relative weight was calculated as follows :—

Three samples were used.

(1) a specimen of soft balsa ;

(2) a similar specimen impregnated with resin ;

(3) a specimen of hard balsa.

All three were the same width, length, and depth.

A beam of hard wood was accurately balanced from its centre of gravity, so that it lay horizontal. The piece of soft balsa was placed on one end, and the other two specimens were balanced in turn on the other end, their position being varied until the beam again hung horizontal. The ratio of the distance from the centre of the soft, untreated specimen to the point of suspension, and the similar distance for the other two samples gives the ratio of their respective weights, which is enough for our needs.

Here are the results obtained :—

Specimen	Control	Treated	Hard
Weight	1	1.615	2.877
Breaking load (oz. per inch length ...	5 oz.	16 oz.	36.6 oz.

It will be seen, therefore, that the treated wood occupies an intermediate position, such as would medium hard balsa. It is seen that it is hardly worth while going to the trouble of impregnating the wood. There is one decided advantage however. The treated wood shows less tendency to split when stress is applied as in Fig. 1.

All the breaking loads given above are not applied in bending but are compressional.

A piece of $\frac{1}{8}$-in. × $\frac{1}{4}$-in. hard strip was then treated. A control break gave 80 ozs. breaking strain. The treated wood broke at 100 ozs. This gives an intermediate result between hard balsa and spruce or birch. It should be useful for undercarriage supports, etc.

The second, and in my view, more important series of experiments, made use of the plastic alone. The plastic was cellulose acetate sheet.

(FIG. 2A) (FIG 2C) (FIG. 2.B.)

Wing tips were the first item to come under consideration. The thickness of sheet was approximately 15 thou. For a wing-tip of the type shown in Fig. 2a a mould may be made. For one of the type shown in Fig. 2b, however, two outlines should be glued together, or it should be cut in one piece as shown in Fig. 2c.

This method gives a wing tip of ample strength. If it hits an object, it will crumple on impact, and immediately straighten out

* Chloroform is a poison. Also, it should be kept either in a dark bottle, or in a dark place, as it decomposes on exposure to light, giving off a very poisonous gas.

again, thus cushioning the shock. The tip may be doped, and if a small portion is left undoped, an excellent representation of a wing tip light is achieved without loss of strength.

These wing tips are very light and also easily made. Thus if one gets permanently creased as a result of a crash, a new one may be affixed quite easily.

The sheeting is excellent for u/c leg fairings, being stronger than wood, and lighter than aluminium.

The next experiment was to make undercarriage legs of the type shown in Fig. 3.

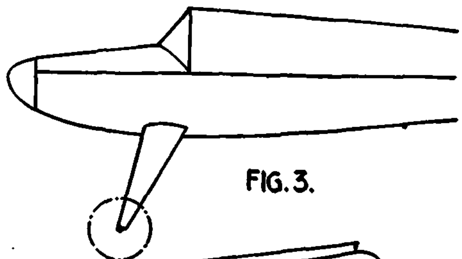


FIG. 3.

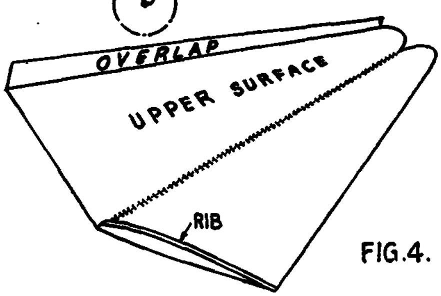


FIG. 4.

These are normally made from wood carved to shape, with wire let in along the L.E. A leg 3 in. long was made out of one piece of sheet cut to shape, and bent double along the L.E., giving a streamline section. The weight was perhaps 1/10th oz., certainly not more (1/32 sheet). A force of 4 lb. was applied to it. No signs of buckling were observed. I should say this leg would be strong enough for a model weighing anything up to 1 lb.

While it is not possible to mould one's own propellers without a considerable amount of equipment, these could be bought before the war. They do not break anything like as easily as wooden props. In fact, in the writer's experience, they *never* break! A 3-bladed plastic prop suitable for petrol engines is on sale in America. What about it, English manufacturers?

For some years now, experiments have been made to get an ultra strong, ultra-light wing from paper. The method finally adopted was as follows :—

Select a wing with a straight leading edge. Draw two of these on the paper selected, L.E. to L.E., touching. Allow ½ in. more on the upper surface for the camber. Cut a root rib from 1/10-in. balsa. Cut out the wing. Stick the undersurface of the rib on the paper, incorporating the necessary dihedral angle. Finally, paste the T.E., bend the upper surface over, and hold on a flat surface until dry (Fig. 4).

Wings up to 8-in. semi span can be made by this method without internal support. I am sure larger wings could be made from celluloid, preferably coloured, that would not need doping. Think of the perfectly smooth surface, of the exact airfoil section without dozens of wing ribs (all different!), of the lovely glossy finish! Coloured celluloid, please, in large sheets!

Fins and tail units could be made this way too. I wonder who will be the first to try it?

Original Designing

(Continued from page 171)

joined by a smooth curve, effected either by a small celluloid spline or french curve.

To complete the ellipse the same procedure can be carried out below the datum line, or the semi-ellipse can be accurately traced and duplicated in the manner described earlier.

The depth of the former walls is now indicated by plotting several points at the appropriate distance away from the line representing the *outside* of the former and joining them with a curve.

Stringer Pitching on Elliptical Formers

A good method is to draw out the nose former in front view in correct relation to the datum line. This is then divided by equally-spaced radii, as shown in Fig. 5. The radii are extended for several inches past the circumference.

A tracing of each former is made (required in any case to transfer the shapes to the material from which they are to be made) and is placed over the nose-former drawing *and in correct relation to the datum line and vertical centre line* (as obtained from the main drawing). Where the extended radii cut the outside of the former tracing, indicates stringer positions.

As shown in Fig. 5, care must be taken to see that the distance between each point thus obtained on the largest former is not too great (to cause sagging of the covering). If it is, the radii must be spaced more closely.

Purely Petrol

by R. V. BENTLEY

WHILE in Birmingham for the Sir John Shelley Cup contest, I had the opportunity of examining Alf Cripps' (Bradford) "Ohlsson 23"-powered pusher job, which embodies all the features I wrote about in January's "Purely Petrol" notes. The photograph here shows up its design admirably and Alf tells me its performance leaves little to be desired. He did not enter it in the contest, as he was experiencing difficulty with the motor, the gasket between cylinder and body having blown out and put it out of action. Although I have not experienced it myself, I have heard of other cases of this happening on "Ohlsson 23" motors, and the method of retaining the cylinder in position makes it difficult to effect a repair.

The Sir John Shelley Contest

In the contest proper, the published rules were adhered to very strictly, but in spite of this, not very many contestants were ruled out due to the three-minute starting rule—perhaps this is the beginning of an era of more efficient motor installation. The spectacle of the grim-faced starter, watch in hand, standing over the contestant with his now monotonous injunction to "Start now!" was amusing in quite a number of cases when motors roared into life on the first or second swing and the machine had actually completed its flight and was back in the enclosure almost before the three-minute limit was up. In other cases, a point which struck the observer was the incredibly long period of time three minutes appeared to be when waiting for a motor to start, though I fear the unfortunate owner, struggling to find signs of life, must have thought very differently! Credit is due to the organisers and to the contest director for a very well-run affair, under conditions which were not all they might have been.

Mr. Alf Cripps of Bradford M.A.C. with his Ohlsson-powered pusher.

American Performance Again

Of interest to all users of miniature I/C motors is the latest information on Race Car performances in America and recently covered in a special article in *The Motor*. I cannot personally vouch for the accuracy of the information, but pass it on for what it is worth, assuming that its inclusion in *The Motor* is good enough recommendation.

Details are given of motor, fuel, and car which set up the amazing speed of 118 m.p.h. The motor is set in the car horizontally, driving the front wheels and having the plug pointing forward. An amateur-built job, it has no normal cooling fins, but instead, the body of the car, an aluminium casting, is arranged to clamp round the cylinder barrel, and heat is dissipated by conduction through the body and radiation from its surface. The motor is a 10 c.c. two-stroke, turns at 29,000 r.p.m., and the fuel used consists of two parts ethyl alcohol, one part castor oil and a few drops of amyl acetate "to assist mixing." From the same source it is learned that the great majority of racing car enthusiasts are using commercial motors hotted up by increasing the compression ratios and using special fuels. This treatment of commercial motors naturally overloads their working parts and increases the rate of wear, and it is understood that the "Hornet," popular 10 c.c. racing motor will last approximately 80 miles in a car under average conditions.

It makes us envious to think that, having just worn out a motor, one merely has to stroll around to the local model shop and buy another—at a reasonable price!

SIR JOHN SHELLEY CUP 1946

Above : A "Super Buckaneer" gets away on a sharp bank.

Above (right): Leslie Prybyl with his superb cabin-type model, finished in cream with chocolate lining.

Right : Carrying out the now very essential engine test in the compound prior to facing the starter and the three-minute rule.

Some of the machines, with their owners intensely interested in the efforts of the other fellow. The strong wind was responsible for some spectacular performances and not a few crashes.

LONGITUDINAL STABILITY

P. R. PAYNE

MUCH has been written about longitudinal stability, and yet it still remains the one aspect of model aerodynamics about which no real conclusions have been reached, apart from generalisations. This being the case, I have given a large share of my attention to the subject, and in this article I hope to present some of my results.

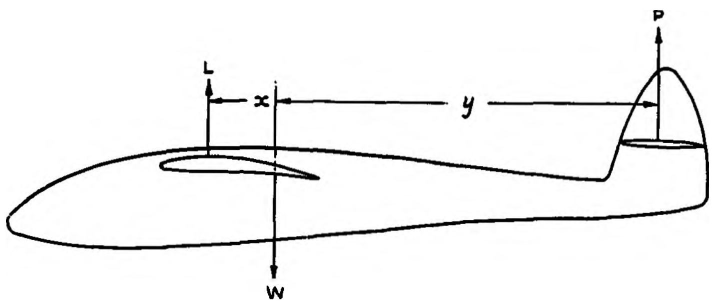


FIG 1. DRAG ACTS NEARLY THROUGH C.G. ON A SAILPLANE AND CAN THUS BE IGNORED

Firstly, by way of a reminder, those generalisations which are already known to us. For maximum stability the following conditions should be observed :—

(*a*) The C.G. of the machine should be close to the centre of pressure of the wing.

(*b*) The tailplane area should be as large as possible (under F.A.I. regulations it is limited to 33 per cent. of course).

(*c*) The moment arm (i.e. the distance between the C.G. and the centre of pressure of the tailplane) should be as long as possible.

(*d*) The angle of attack of the tailplane should be 2° to 6° less than that of the wing.

(*e*) The moment of inertia of the machine about its lateral axis should be as low as possible, consistent with reasonable structural strength. This is usually effected by keeping the tail as light as possible.

The result of observing all these when designing a model is inevitably a compromise, and in the past we have not been able to make it a very good compromise because of the absence of anything concrete to work upon. The solution lies in the simple equation for longitudinal balance.

This is derived from the forces shown in Fig. 1. The lift (L) acting on the wing at a distance x from the C.G. is obviously providing a moment tending to lift the nose of the machine. This is known as a positive moment, by the way. To counteract this, the tailplane must create a force such that its moment Py about the C.G. is equal and opposite to that of the wing. Thus for equilibrium we may say that

$Lx = -Py$...... ......Equation 1

—the tailplane moment being given a negative sign because it is tending to *depress* the nose.

When a machine is disturbed from its attitude for normal horizontal flight, as in part (*a*) of Fig. 2, it will return to its original path if it is stable, and for this to happen it is obvious that the correcting tailplane moment must be greater than the upsetting wing moment. There is the nucleus of the problem.

Another way of writing equation 1 is

$Lx + Py = O$....................Equation 2.

We have seen that when a machine is disturbed from its flight path, Py must exceed Lx, and thus it is fairly obvious that if we plot the total

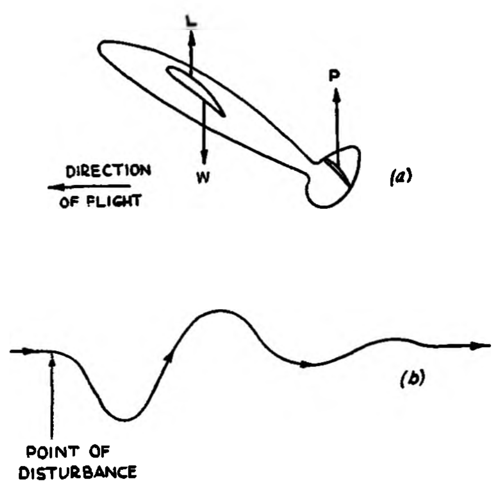


FIG 2. NATURE OF THE PATH TAKEN BY A STABLE MACHINE AFTER A DISTURBANCE

moment (Lx + Py) against angle of disturbance, we shall get a curve with a negative slope (Fig. 3). In other words, as we increase the disturbance in a positive sense, the total moment will diminish.

Provided that accurate data on the sections used are available, the computation of the total moment is a relatively simple matter. I have based my example on the work of F. W. Schmitz, who conducted a very thorough investigation of low speed (model) aerodynamics in Germany, just before the war. The data obtained and the conclusions drawn from his work he put forward in a book entitled "Aerodynamik des Flugmodells," a work which was awarded the Prantle Prize, by the way. If any reader is interested in this, he can obtain more information from an L.S.A.R.A. technical note I have written on the subject.

TABLE I.

1	2	3	4	5	6	7	8
Wing C_L	α (A.R. = Infinity)	α Induced	α (A.R. = 4)	C.P. (% of Chord)	C.P. (in. from L.E.)	x	C_L Wing $\times x$
0	$-6.3°$	0°	$-6.3°$	—	—	—	—
0.2	$-4.3°$	0.93°	$-3.37°$	75%	5.25″	-1.75″	-0.35
0.4	$-2.3°$	1.83°	$-1.47°$	53%	3.71″	-0.21″	-0.084
0.6	0°	2.8°	$+2.8°$	37%	2.59″	$+0.91$″	$+0.546$
0.8	$+2.2°$	3.7°	5.9°	34%	2.38″	1.12″	0.895
0.9	3.5°	4.2°	7.7°	32%	2.22″	1.28″	1.153
1.0	5.0°	4.6°	0.6°	31%	2.17″	1.33″	1.33

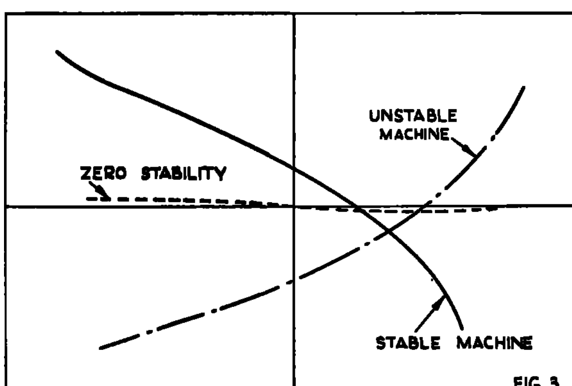


FIG 3

For ease of working, it is best to tabulate the Total Moment calculations as shown in my example. Take the wing moment first. The test data in this case were given corrected to an infinite aspect ratio, and thus the first four columns are concerned with determining the angle of attack for the aspect ratio in use, for various values of C . The position of the C.P. is determined from the experimental data, and this multiplied by the mean chord of the wing gives us its position from the L.E. in inches. The C.G. has already been arbitrarily fixed, at say 3.5 in. from the L.E. Thus we can determine "x" (Fig. 1) and tabulate it in column 7. Now all that remains is to multiply this to C_L, and we have the upsetting moment due to the wing.

The tailplane moment is obtained on similar lines. In this case the section was a flat plate and the data collected at an A.R. approximately equal to that of the tailplane, and no correction was necessary. (This is usually the case.) The C.P. is assumed to remain at 50 per cent. of the chord, as the error involved in this is negligible in relation to the long moment arm, and thus C is the only value to be calculated. This is complicated, however, by the downwash from the wing.

Until recently, the method for calculating this was extremely laborious, but an empirical formula has recently been brought to my notice by J. Halifax. This gives the downwash angle

$$\epsilon = \frac{35\ C_L}{A.R.}$$

where C_L and A.R. both refer to the wing.

For all reasonable values of A.R. this is really very accurate and provides a short cut for which I, for one, am grateful. When ϵ has been computed for the various angles of attack of the wing (obtained in turn from Table 1) the tailplane C_L can be read from the data graph, and the tailplane moment obtained. As it stands, however, it is not on any basis for comparison with the wing. This is rectified by introducing a correction factor K, where

$$K = \frac{\text{Tailplane area}}{\text{Wing area}}$$

The result is shown in column 7. Note that its sign is opposite to that of the C_L, as a positive lift tends to depress the nose of the machine, making the moment negative by convention, and vice versa.

(To be continued)

NEWS *from* FLERS

ONE of the most pleasing overseas events in pre-war days was the yearly social and flying visit made by members of the S.M.A.E. to Flers on the occasion of their model aircraft meeting.

Those who took part in these hectic visits will recall the forgathering at Victoria on the Saturday evening, the strenuous night journey to Dieppe, followed by the rattling journey to Flers by coach, which brought the party to the "Villa des Cedres" in the early hours of the morning, and the welcome breakfast awaiting them, presided over by Father Amiard, whose able attention to the visitors' welfare was much appreciated.

A good day's flying followed by an equally hectic return night-journey, would land the party back in London on the Monday morning just in time for breakfast and work—dog-tired, but happy in their thoughts of models, champagne and calvados.

We are pleased to be able to report that communications with Flers have been re-established and that Father Amiard is well and has again taken up his duties of educating young Frenchmen in the ways of the Church at the "Villa des Cedres." It is interesting to note that, up to the time of the German invasion of France, Father Amiard was a liaison officer attached to the British Army. It is also pleasing to note that model aircraft still finds its place in the everyday life of this institution and from a study of the upper photograph on this page, it would almost appear that mass production of model aircraft has been given a measure of attention at the Villa.

Some of the pupils at the "Villa des Cedres" with their models. One of the many fine cedar trees, which give the establishment its name, is in evidence in this picture.

While pre-war visits were of a semi-official nature and confined to a few hardy individuals who could stand the journey, the latest news received from Flers indicates that the event is likely to assume international status as the result of the presentation of an International Cup to the Aero Club de Basse Normandie, "Henery Goussin," by Madame Pierre Seigneur for motor-driven models to be competed for yearly at Flers on an Anglo-French basis.

Father Amiard on the steps of the "Villa" with some of his best modellers. He is holding his latest motor-driven model powered with an auto-ignition engine of 2 c.c.

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

Some members of the York Model Aircraft Society pose before the camera.

CONTEST RESULTS

RESULTS OF "THE MODEL ENGINEER" CUP No. 2 COMPETITION

1.	R. Copland	Northern Heights	821.3
2.	P. Hawkins	Rhyl & Prestatyn	806.5
3.	J. M. Hardman	Rhyl & Prestatyn	497.0
4.	J. Watkins (J)	Croydon	451.4
5.	F. D. Ward	Ashton	435.2
6.	W. G. Marcus	Croydon	426.5
7.	C. Wyatt	Ashton	425.7
8.	J. J. Hull	Croydon	425.5
9.	D. Twomey	Sale	338.2
10.	W. Geddie	Zombies	333.8
11.	B. V. Haisman	Merseyside	311.3
12.	R. Scott	St. Helens	310.6
13.	W. G. Heginbotham	Zombies	307.0
14.	W. Geddie	Zombies	298.3
15.	J. P. Taylor	Rhyl & Prestatyn	296.2
16.	R. Warring	Zombies	281.6
17.	J. North	Blackheath	270.4
18.	D. R. Hughes	Merseyside	267.9
19.	A. Jefferies	Northern Heights	263.0
20.	R. White	Northern Heights	252.6
21.	W. Blanchard	Merseyside	249.4
22.	M. Farthing	Croydon	243.1
23.	H. Leeming	Salford	242.2
24.	— Mulley	Croydon	232.1

There were 138 entries, of which 18 made no score. 118 seniors and 20 juniors.

THE SIR JOHN SHELLEY CUP COMPETITION RESULTS

Held at Hockley Heath Aerodrome on Sunday, May 5th, 1946

1.	K. M. Tansley	Northern Heights	115.5
2.	Mrs. D. G. Gunter	Bushy Park	93.5
3.	C. Earp	Bushy Park	58.2
4.	E. Keil	North London	54.9
5.	G. A. Paul	Bushy Park	50.0
6.	C. Doughty	Birmingham	44.75
7.	N. D. Howard	Cheadle	43.6
8.	W. S. Warne	Bushy Park	41.8
9.	L. Prybyl	Bushy Park	37.45
10.	N. Lees	Bradford	34.95
11.	W. Dallaway	Birmingham	26.7
12.	B. C. Gunter	Bushy Park	25.75
13.	F. Guest	Bushy Park	21.0
14.	H. Tickner	Hackney	20.2
15.	H. Green	Bushy Park	19.6
16.	Miss R. Baker	Bushy Park	16.1
17.	S. Lanfranchi	Bradford	15.5
18.	F. Chatwin	Birmingham	10.0
19.	F. Hempsall	(Proxy : A. G. Lees)	7.0
20.	J. T. London	Bradford	6.25
21.	R. Ginns	Coventry	2.75

Also entered : P. Calvert, Bradford ; A. C. Hemsley, J. Dunne, K. Priest, T. H. E. Warmington, D. E. Hemsley, Bushy Park ; G. F. Dunmore, Leicester ; L. Watt, Coventry ; H. J. Taplin, Birmingham ; R. H. Greaves, S. Birmingham ; E. S. Bassett, Fl./Lt. Long, Doncaster. A total of thirty-three entries.

PILCHER CUP CONTEST RESULTS

(Held on Sunday, May 26th, 1946)

1.	D. Butle (Surbiton)	582.5
2.	— Hobbs (Pharos)	567.7
3.	R. Yeabsley (Croydon)	534.8
4.	K. Sergent (Bristol)	492.3
5.	R. Warring (Zombies)	490.8
6.	N. Marcus (Croydon)	480.4

Plugge Points (*Including Pilcher Cup*)

1.	Croydon	579.76
2.	Northern Heights ...	530.17
3.	Birmingham	485.81
4.	Bushy Park	471.69
5.	Zombies...	459.99
6.	Blackheath	442.29
7.	Pharos	434.08
8.	Bristol	421.63

RESULTS OF THE HAMLEY TROPHY PETROL CONTEST

Held on Baildon Moor, on Sunday, June 9th (First six places)

Position	*Name*	*Error*
1st	... H. Austwick (Bradford) ...	18.5 points
2nd	... F. Hempsall (Bradford) ...	21.45 points
3rd	... H. E. Vauvelle	29.9 points
4th	... F. Chatwin (Birmingham) ...	44.6 points
5th	... R. Copland (Northern Hts.)	63.4 points
6th	... K. Tansley (Northern Hts.)	65.7 points

AREA NEWS

NORTHERN CLUB NEWS

By "NORTHERNER"

I hear that there is to be an S.M.A.E. Delegate Meeting in Manchester on July 7th. I hope all Northern Clubs will make a point of being represented at this meeting. Remember that at a Delegate Meeting each club has only *one vote*, so go to it chaps, let us see if we can have a record number of clubs represented.

There are not many club reports in this month so here we go with the first, which is from a new club known as the *Warrington Model Aircraft Club*. This club has a permanent club room in the headquarters of the local A.T.C., and by some means has managed to get the local education officer as Hon. Secretary, and an ex-R.A.F. Pilot as President. Meetings are held every Friday evening from 7 p.m., and although the address of the headquarters has not been supplied I am sure that Mr. J. C. Green, of 85, Northway, Orford, Warrington, Lancs., will be pleased to supply any interested reader with details. The present club glider record is held by K. Sharpe with a Beauglider 2 with a time of 3 min. 50 sec. The club's present flying ground is next to the famous R.A.F. recruiting centre at Padgate (who said it was famous?). The next bit of news comes from the *Bury and District Model Aero Club*, and the main news of the month from there appears to be a flight of 19 min. 30 sec. made by K. Toole's Mick Farthing lightweight glider, which broke the existing club record and won the April glider contest outright. C. Lee came second, flying a tail-first model, which clocked 2 min. 30 sec., thus creating a new record in this class. The club secretary, Mr. E. Hargreaves, travelled to France on May 19th for the French International tail-less contest, which was held at Lyons. He had built a 6-ft. petrol model for the occasion, and a notable feature of this model is the complete absence of any fins and rudders, full control being maintained by the ailerons alone. The *Whitefield Youth Movement Model Aircraft Club* still continues to be very active, in spite of the very bad weather conditions. "M.E." No. 1 day there was a very strong wind and only three members flew—F. F. Heaton, 244.5 sec. (one flight); A. Virco, 26 sec. (one flight), J. Cookson, 104.8 sec. (two flights). F. Heaton's flight was a low-powered thermal connected at 50 ft. The machine was last seen at about 800 ft. (he did get it back). This was the first flight the machine had made. It has a streamline circular fuselage with parallel-chord wings; section, Davis medium; span, 50 in. A. Virco's machine was 42-in. span, diamond fuselage, parasol wing, and J. Cookson's machine was streamline elliptical fuselage, parallel-chord wing, tapered tips; section, Gott 426, 6-ft. span. There is news that A. S. Heron, of this club, is building a twice full-size "Judy," which is to be fitted with dethermaliser, navigation lights, and, to quote the writer's words, "a load of other junk." In the *Doncaster and District Model Flying Club* Mr. F. Gearing has just completed a fine petrol model of the flying scale biplane, "Gypsy Moth." It has a 64-in. wing span and is powered by a 9-c.c. engine. Calm weather is now awaited. Mr. Cuttriss, of the Doncaster Model Shop, is reported as having some success with an autogyro (rubber-driven) of his own design. The probable A.T.C. model club mentioned last month has now been formed; it is the *Radcliffe and Whitefield A.T.C. Model Aircraft Club* and it meets every Wednesday at 7.30 p.m. in the A.T.C. headquarters, at Pioneer Mill, Radcliffe, Lancs. The club is not confined to members of the A.T.C. only.

I am completing these notes after attending the "Gilbert Trophies" contest. A strong wind was blowing the whole time, and heavy showers of rain about every half hour. Anyway, in spite of that the contest was held and clubs from Ashton, Sale, Farnworth, Cheadle, Oldham, Longsight, Salford, Stretford and Whitefield were amongst those represented. The contest was an "all-in" event and commenced at 11 a.m. and ended at 6 p.m.

Results

Senior Trophy—J. Cookson (Whitefield), 229 sec.
" *Second Prize*—C. Wyatt (Ashton), 194 sec.
" *Third Prize*—F. Heaton (Whitefield), 171 sec.

Junior Trophy—R. McCoye (Oldham), 124 sec.
" *Second Prize*—E. Lee (Cheadle), 105 sec.
" *Third Prize*—T. Dobson (Salford), 84 sec.

It is interesting to note that all the winners flew gliders except R. McCoye, who flew a rubber-powered model. Most of the timekeeping was done by H. Gilbert (who presented the trophies), assisted by a member of the Oldham Club, and the recording was done by R. Lawton, of the Whitefield Club.

May I once again remind you that reports should be sent to me on or before the 20th of each month, direct to 10, Dalton Avenue, Whitefield, near Manchester.

The illustration above is an excellent scraper-board effort by F. Wilkes, of the Birmingham Club, and was prepared as a heading for general comment appearing in the Midland Area Bulletin over the signature "The Griffon." It illustrates the Griffon himself in the semi-recumbent posture he usually adopts when ruminating on model aeronautical subjects in his well-known satirical manner.

S.M.A.E. 1946 COMPETITION CALENDAR

	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).
	"	15th—PETROL CONTEST (DURATION ON LIMITED RUN).
D	"	22nd—S.M.A.E. (OPEN RUBBER AND GLIDER).

D = *DECENTRALISED COMPETITIONS.*

CLUB NEWS

THE BRISTOL AND WEST M.A.C.

The Bristol and West Model Aero Club did not enjoy ideal weather on the two glider contests in May. The " M.E." No. 1 produced a dull day, with threatening rain and a strong wind. Under these conditions, T. C. C. Butler did well with his " Atalanta " to clock 4.14 and win the Club F.A.I. Glider Cup as well. The Pilcher weather was better ; dull, with a strong wind, which died down later on, to leave a nice day for test flying, but no thermals. R. K. Sergent flew his own design lightweight for 2 min. 54 sec. on his first flight, o.o.s. in the mist. His model was based broadly on the Mick Farthing lightweight, as were a number of other models flown by the Aces section, but Messrs. Lee, Smith, Moon, and Wilkins flew 6-foot heavyweights, and obtained very consistent and pleasing results, their average times being slightly higher than the lightweight class.

Captain Bartlett, Sales Director of the Bristol Aeroplane Company, has presented a trophy for inter-club co npetitions in the West of England. This contest is open to any club affiliated to the S.M.A.E. and in the West of England (west of Oxford) or South Wales. The contest is a centralised one for open rubber duration and open glider, the top four club times in each contest to count towards the trophy award. Further particulars may be obtained from K. W. Moon, of 42, North View, Westbury Park, Bristol 6. The contest will take place on Sunday, August 18th.

BROMLEY S.M.A.F.C.

After very little activity and very poor enthusiasm during the past winter months, the Club managed to get a team to enter for the Surbiton Glider Gala on March 24th, being placed seventh out of twenty-three clubs, with an aggregate of 1,638.5 ; other members then promised fuller support during the coming season.

Gamage day dawned with the prospects of good flying, which was marred by the low energy of synthetic rubber, H. Dawes being the only member to record times for this event. Our secretary, E. A. Walker, by then decided to try his much modified (brought up to F.A.I.) " Firefly " for a full flight trial. During this flight he made the time of 52 min. o.o.s., much to the interest of local and London news editors.

The same model having been found prior to the " M.E." No. 1, was repaired and flown in this event, clocking an aggregate of 663.9 sec. in bad flying conditions. The Club's team total was 1,768.1 sec.

The Club would like to hear from old and original members of the pre-war Bromley Club. A section has been formed for compression-ignition, petrol, rocket, and jet aircraft. Write—E. A. Walker, 43, Holbrook Way, Bromley, Kent.

CHELMSFORD M.A.C.

The Club, with the co-operation of the local sports shop, held a fine window display of models as an advertisement to the flying season, followed by a good report by the Press, so we got away with a good start for our first competition, which was on Gamage Cup day and attracted two hundred or so of the public. Wind, as usual, spoilt the times.

To keep the public interested, R. King gave an exhibition of aerobatics with a R.A.H. 37, and A. Archer with some slow and low flying over the people's heads with a Mick Farthing lightweight, put a final touch to the day.

CROYDON AND DISTRICT M.A.C.

On May 5th our Paterson Shield Contest for gliders was held at Epsom. The weather was windy, with bright periods, and the trophy was won by T. Davies, with a total of 438.6 sec., and the Thorpe Cup for the best junior went to E. Denyer, with 229.3 sec. On " M.E." No. 1 day, May 12th, the weather was again windy, and hence our totals were not high. The highest four were :— J. Edridge, 358.4 sec. ; R. Ladd, 287.0 sec. ; A. Anastasion, 230.2 sec., and E. Denyer, 173.2 sec. On the day of the London area trials our club gained three out of the four possible places ; these are N. Marcus, J. Hall and J. Pitcher (rubber). G. W. W. Harris is in the petrol team, and on the same day his father's machine flew for 20 min. on a two-min. motor run. This was definitely accidental.

EDINBURGH M.F.C.

The above club will hold their fifth annual rally on Sunday, August 11th, 1946.

Two events will be flown, open rubber and open glider. A number of special prizes will also be given. Full details can be obtained from the Secretary—H. A. Wardell, 18, Parkhead Terrace, Edinburgh 11.

A Merseyside Club member winds up his model at the Northern Area Meeting at Rhyl.

LEICESTER M.A.C.

At our recent local exhibition it was estimated that over 5,000 people passed through. There were 150-200 models exhibited, including twenty-five beautifully-constructed gas models.

The judges were Sir Lindsay Everard and Mr. Charles Stafford. Prizes were given in five sections :—petrol, sailplane, rubber, flying scale, and solid scale. There were also consolation prizes of a free flight in an Auster aircraft.

The exhibition has been widely published in local papers, and many new members have been gained.

THE NORTHERN HEIGHTS M.F.C.

The Northern Heights have had a very full spell of flying recently and have entered all the S.M.A.E. contests to date. In spite of almost incessant rain, members turned out in force for the " M.E." No. 2 Cup and it is gratifying to note that Bob Copland took first place in this event, chiefly due to a fine third flight (his first two were in rain) of 12 min. 10 sec., when he managed to pick one of the few patches of good weather. His aggregate was 821 sec.

On May 5th the Club participated in the Chingford Rally on Chingford Plain, and enjoyed quite a field day.

Mr. Wilson, flying a 6-ft. F.A.I. job, took first place in the glider contest. Mr. White was second in the open rubber, and Mr. Bond third in the same event. Mr. Bond also won the nomination contest, and this showing was sufficient to net the team prize for the Heights.

On the same day Mr. Tansley followed up his win in the Bushy Park Gala petrol event by bringing home the Sir John Shell y Cup from Birmingham. In both these events he flew his "T-9" model, which seems to thrive on wind, since both events took place in a minor gale!

The Club has revived its "league" system and we recommend this system to other clubs as a means of keeping alive competitive interest *inside* the Club. The three teams have each taken one of the Club colours (black, red and gold), and points are given for performances on the flying field (in somewhat the same manner as the Plugge Cup), the winning team at the end of the season to hold our president's trophy.

NORTH KENT M.A.S.

On April 22nd members assembled in Danson Park, Welling, to compete for the C. H. Roberts Cup for flying-boats. We were very disappointed to have no entries from other clubs, in spite of the publicity and the fact that the rules allow flying by proxy. Two "free-lance" flyers attended, but trials were unsatisfactory. This also applied to two of our members, whilst although Rainer made successful flights of 23.6 sec., 15.6 sec., 26.25 sec., his machine did not comply with the rules regarding wing area.

Final result was:—

1. A. D. Hall, 35.2 sec. and 33.4 sec.
2. H. Sayers, 14.85 sec., 28.3 sec. and 23.3 sec.

Hall was not required to make a third flight. H. Sayers was the last winner of the cup and still holds the British record.

One flight by Hall and one by Rainer were very spectacular, inasmuch as the machines re-alighted on the water successfully.

The Cup was presented by Mr. Deacon, of the *Kentish Independent*, amid cheers from members and spectators.

ST. HELENS MODEL AIRCRAFT CLUB

Some keen flying has taken place since the club started operations again in April. R. Scott has set up the club record, flying the Condor Clipper for 4 min. 19.8 sec.

On Sunday, June 9th, the club was visited by Warrington Model Flying Club. Two competitions were flown off.

In the first, for open gliders, E. L. Ball (St. Helens), H. Halpin (St. Helens), and G. Allen (St. Helens), took first, second and third places respectively.

In the second, for open rubber driven models, R. Scott (St. Helens), Mr. Jolley (Warrington), and G. Allen (St. Helens), placed first, second and third.

Other local clubs wishing to open into competition with us are asked to contact the secretary.

TWICKENHAM AND DISTRICT M.A.C.

On April 7th a glider flown by K. Brown timed at 4.50 min. o.o.s., landed at Islington, a distance of 21 miles, while on April 14th G. R. Turner flew a glider for 9.43 min. o.o.s., which is now the Club record.

On April 22nd R. V. C. Burby flew a Canard glider for 1.8 min. P. Mason flew his "Flying Pig" glider for 5 min. and landed in the Harrow and D.M.A.C. chairman's garden.

WALTHAMSTOW M.A.S.

In the "M.E." No. 1 A. W. Green's glider was lost twice and after extensive motor-cycle chases was recovered. The team total was 1,333.7 sec., which placed them sixth.

There were three entries for the Pilcher Cup; the best was E. H. Aylward, with an aggregate of 322.7 sec. Recently the Club H.L. record was raised to 17 min. 30 sec. by A. D. Mitchell flying his lightweight rubber job.

CHANGES OF ADDRESS AND NEW SECRETARYSHIP

Bury and District M.A.C.: Hon. Sec., D. Helm, 3, Ainsdale Avenue, Bury, Lancs.
Cheam M.A.C.: Hon. Sec., H. P. Costenbarder, 50, Wordsworth Drive, North Cheam, Surrey.
Hayes and District M.A.C.: Hon. Sec., J. Marshall, 43, Keith Road, Hayes, Middx.
Rogerstone M.A.C.: Hon. Sec., A. Lowery, 5, The Uplands, Rogerstone, Newport, Mon.

NEW CLUBS

Beckenham and District M.A.C.: Hon. Sec., C. Andrews, 20, Church Avenue, Beckenham, Kent.
Bournemouth M.A.S.: Hon. Sec., B. E. D. Beckett, 91a, Belle Vue Road, Southbourne, Bournemouth.
Bromsgrove M.F.C.: Hon. Sec., W. Lonch, 8, Hanover Street, Bromsgrove, Worcs.
Burnley Sky-Rangers M.F.C.: Hon. Sec., E. St. John, 387, Padiham Road, Burnley, Lancs.
Cambridge M.A.S.: Hon. Sec., A. C. Jordan, 23, Herbert Street, Cambridge.
Eston Area M.A.C.: Hon. Sec., L. N. Brunton, 3, Back South Street, Eston, Middlesbrough.
Exmouth and District M.A.C.: Hon. Sec., J. Thorn, "Brendene," Marpool Hill, Exmouth.
Fleet Vale M.F.C.: Hon. Sec., T. Andrews, 34, Grafton Road, London, N.W.5.
Gosport and District M.F.C.: Hon. Sec., C. Brazier, 118, Anns Hill Road, Gosport, Hants.
Greenfield M.A.C.: Hon. Sec., C. Jones, Nook Cottage, Greenfield, Oldham.
Hornchurch Model Engineering Club: Hon. Sec., P. R. Brister, 20, Walden Way, Hornchurch, Essex.
Macclesfield M.A.S.: Hon. Sec., C. Eifflaender, Field Bank, Chester Road, Macclesfield.
North Croydon M.F.C.: Hon. Sec., D. Garner, 15, Norbury Avenue, Thornton Heath, Surrey.
Park Model Aircraft League: Hon. Sec., L. J. Cashford, 213, London Road, Mitcham, Surrey.
Romford and District M.A.C.: Hon. Sec., J. Bell, 255, Dagenham Road, Romford, Essex.
St. Albans M.A.C.: Hon. Sec., R. C. Seabrook, 40, Church Crescent, St. Albans, Herts.
Surbiton County Model Aeroplane Club: Hon. Sec., J. F. Dyer, 13, St. Matthews Avenue, Surbiton, Surrey.
Southgate and District M.F.C.: Hon. Sec., Roy Toms, 84, Aldermans Hill, Palmers Green, N.13.
Southern Cross Aero Club: Hon. Sec., R. J. Honeycombe, 355, Portland Road, Hove 3, Sussex.
Stafford and District M.A.C.: Hon. Sec., J. R. White, 35, Salt Avenue, Stafford.

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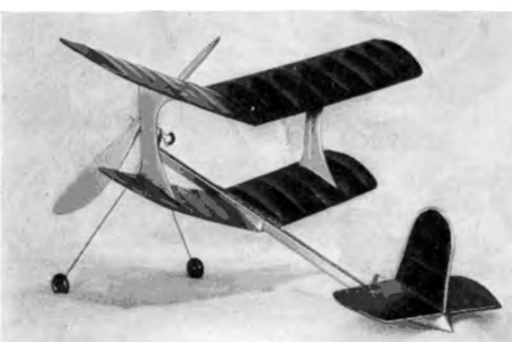

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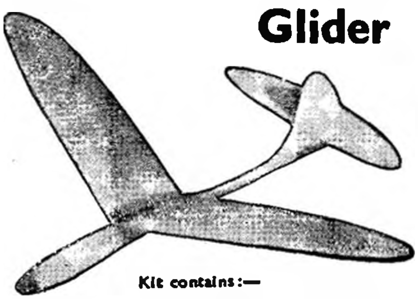

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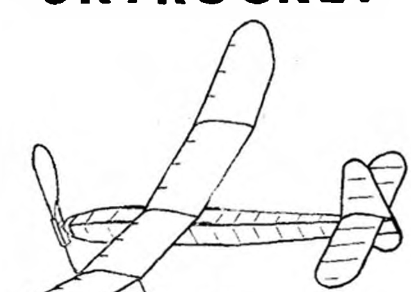

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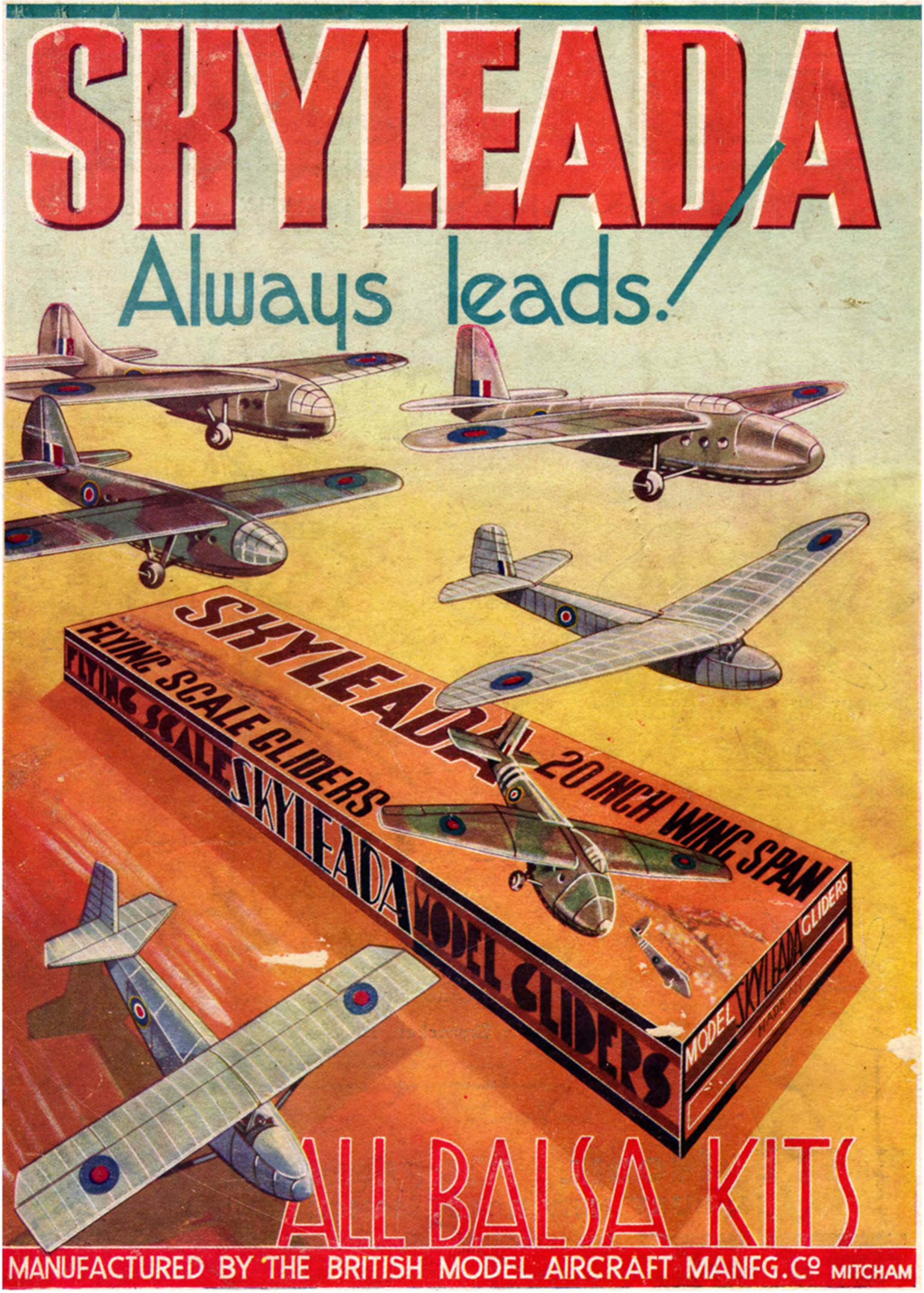
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