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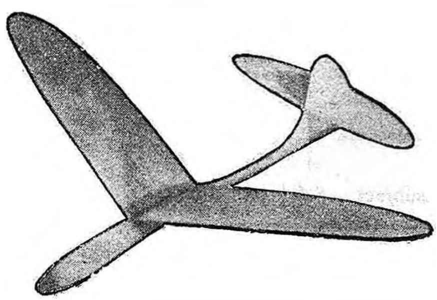

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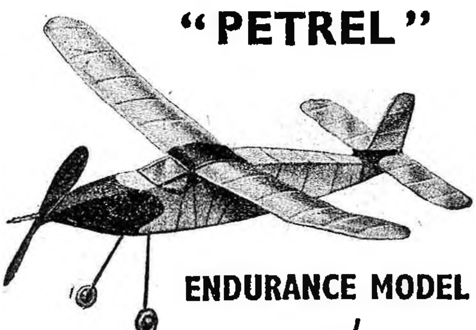

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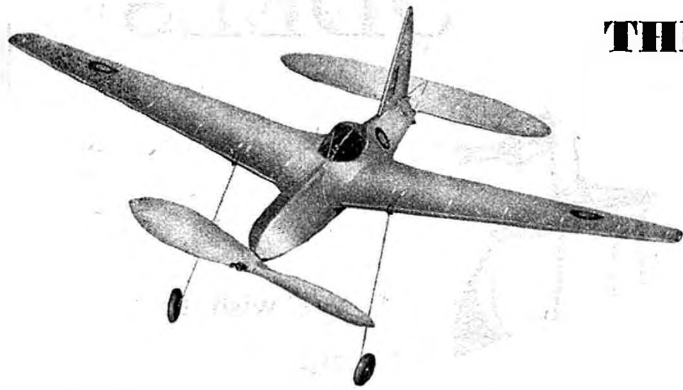

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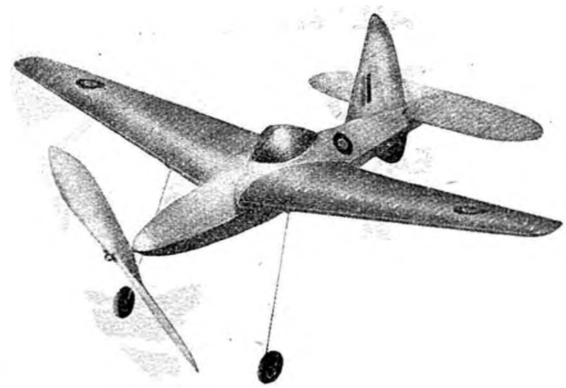

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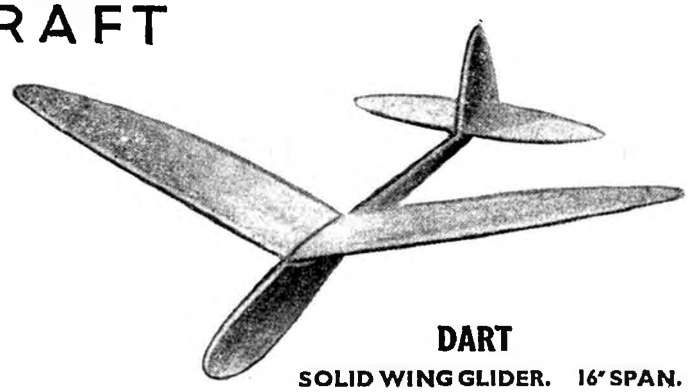

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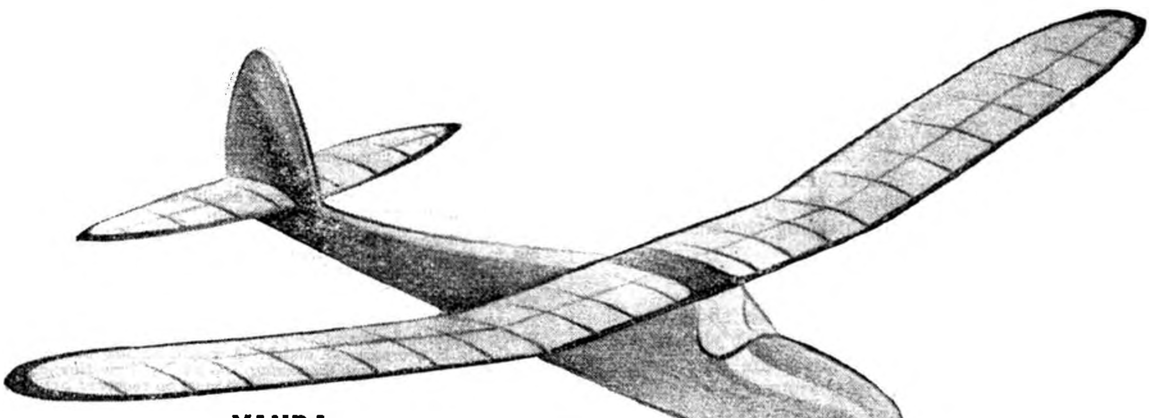

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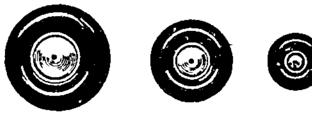

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ESTABLISHED 1935

VOL. XI No. 121 DECEMBER, 1945

The Model Aeronautical Journal of the British Empire

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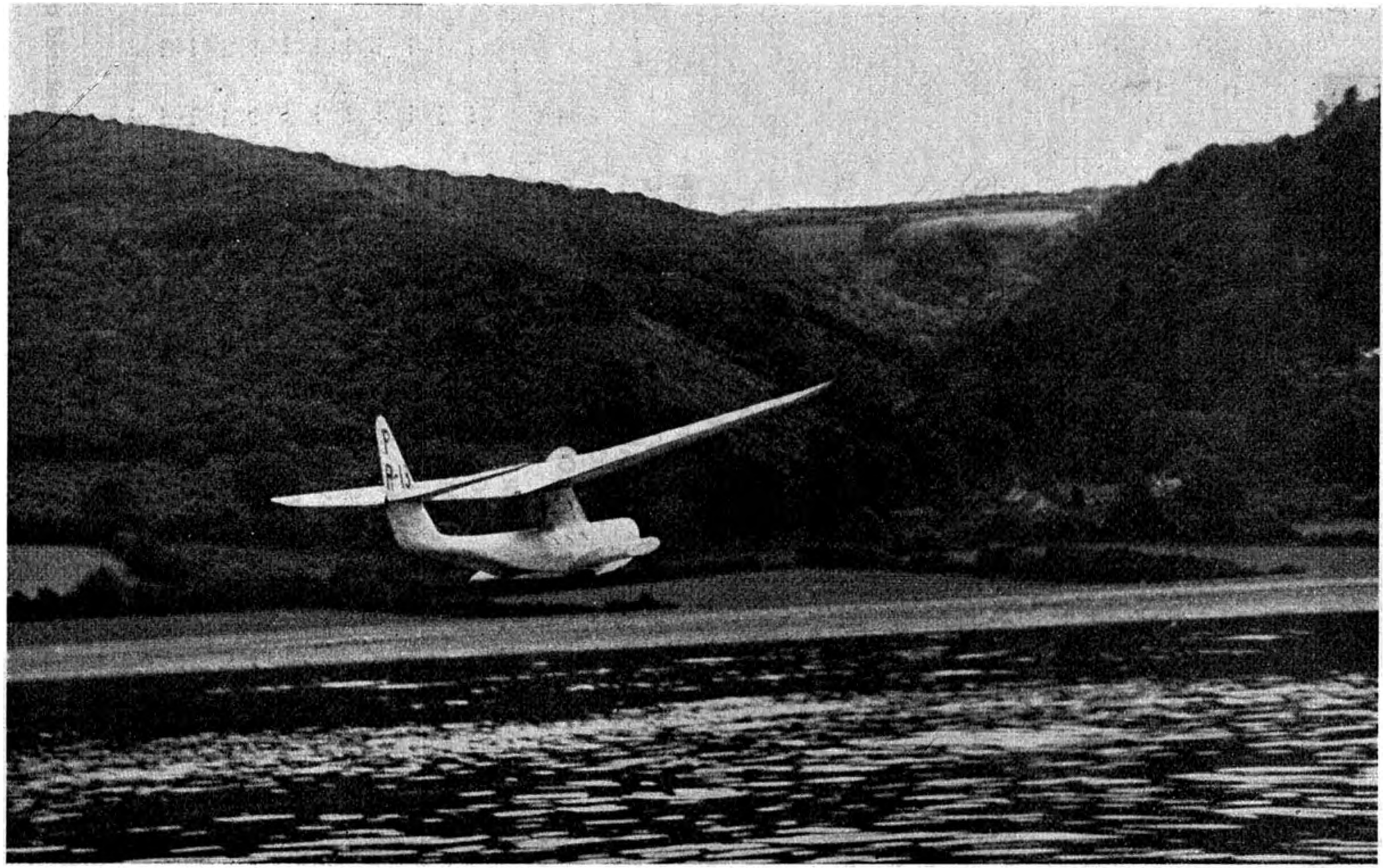


Photo by J. Burgoyne.

Peace and tranquility are shattered by a staccato engine note as Dr. Forster's "Neptune" leaves its natural element to climb steadily into the realm of Phoebus.

EDITORIAL

ALL SET FOR DORLAND HALL

FOR several months past we have been devoting a considerable proportion of our editorial space to the forthcoming second national model aircraft exhibition which the AEROMODELLER is holding at Dorland Hall, London, during December and January, and now this event is upon us. In a few days from now, Dorland Hall will open its doors to a public that we confidently anticipate will be numbered in tens of thousands and for no less a period than 23 days they will be able to enjoy the most extensive and comprehensive array of model aircraft that has yet been assembled.

In every way this exhibition should eclipse the one held a year ago. To begin with, model development has most certainly not stood still; in fact, in recent months very considerable progress has been made in a hobby that has succeeded in maintaining a vigorous life despite the restrictions of the war. From many parts of the country and from overseas we learn of intensive practical interest in miniature solid replicas of the famous planes of the war, high performance sailplanes, seaplanes and flying-boats, petrol-engined craft varying in size from the " vest-pocket " edition with a wing-span of some 35 inches to the radio-controlled " twelve-footer," helicopters, rocket and jet propelled types, and, of course, all manner of variations on the popular rubber-driven duration theme.

We have planned to secure a representation of modern model development, both in respect of sheer numbers and variety of types, that should make the collection of some 700 models at the first national exhibition last January pale into insignificance. This end we have, as already announced, tied up the submission of models for exhibition with a wide range of contests with some £300 worth of prizes to be won. There are no entrance fees, and particulars and entry forms can be obtained from the offices of the AEROMODELLER at Allen House, Newarke Street, Leicester.

We have done more than this. The forthcoming exhibition will represent an unexampled opportunity for the aeromodelling community to attract the interested attention of a vast public. And that public will not only provide many of the modellers of the future, but will include representatives of full-size aircraft manufacturing concerns, some of whom entered the aviation industry via the medium of model building, and will not be slow, therefore, to appreciate the fact that the ranks of skilled and intelligent modellers constitute a pool from which many of the full-scale designers and operatives of the future may well be obtained. To " put over " aeromodelling in a manner calculated to impress these worthwhile allies, as one may term them, we have secured the services of a first-class exhibition architect, Mr. John Lansdell, F.R.S.A., N.R.D., and the unqualified verdict of those who have seen what he has been preparing is that in the matter of the forthcoming exhibition he has surpassed himself.

The utmost ingenuity and artistry have been brought to bear. Entering the Exhibition, the attention of the visitor will first be arrested by a gargantuan representation of the AEROMODELLER, from the pages of which will be seen emerging an imposing array of models of various types. These will lead on to a section of the Exhibition devoted to small solid models and then to the flying-scale types; all, by the way, shown in a new and fascinating manner—fixed in orderly rows, like moths and butterflies, in large vertical showcases. Then come the duration types, gliders, etc., similarly arranged.

Upstairs, on the mezzanine floor, will be found " Petrol Corner," containing examples of all the popular miniature motors, plus some experimental types, and an impressive muster of the " big fellows " among the models, for which they provide the motive power. This section of the exhibition will undoubtedly prove of exceptional interest. We have always been particularly keen to encourage the development of models of this class, not only on account of their inherent interest, but because they are calculated to enhance the prestige of the aeromodelling movement and break down the all but ineradicable idea of the general public that model aircraft are nothing more than snappy " toys.". In this section of the exhibition, too, will be found a feature that proved extremely popular last time, an electrically-driven " round-the-pole " model. This time it is to be flown from a circular Perspex landing-strip elevated above the heads of the visitors.

Not only are individual modellers and several well-known traders exhibiting; we are also to have the enthusiastic co-operation of the Association of British Aeromodellers, the Air Training Corps, and the London County Council Evening Institutes, both affiliated to the A.B.A., in which aeromodelling has been taught for some years. There is one group, however, that is *not* exhibiting—the Society of Model Aeronautical Engineers. Last time the S.M.A.E. turned down our invitation to take exhibition space without charge on the plea that a prior arrangement made participation impracticable. In due course we sent an invitation to take part in the second exhibition. This invitation was couched in identical terms to those sent to the A.B.A., A.T.C. and L.C.C.; moreover, the Managing Editor of the AEROMODELLER took the trouble to ensure that all four invitations went out by precisely the same post by dropping them into the letter-box himself. The other three groups readily accepted the invitation, but the S.M.A.E. again declined, this time with no word of explanation other than that they could not see their way to participate. We should not trouble to refer to this matter were it not for the unhappy fact that it seems symptomatic of the outlook and dealings of the S.M.A.E., on which subject we shall have more to say a little further on.

To get back to the matter of the exhibition, we repeat that we have gone " all out " to attract that " best ever " show of models and to exhibit them under the most favourable conditions, but our efforts have not ended at that point. There remains the highly important matter of the care of the exhibits entrusted to us. Last time, as we have already mentioned, we sensed a certain hesitancy on the part of some who could have exhibited, they doubtless fearing—and not altogether unreasonably in view of some experiences of the past—that the journey to and from the exhibition and the period on display there would constitute a " rough-and-tumble " to which they did not feel disposed to submit models that represented a good deal in the way of materials none too easy to obtain during the war, not to mention time and effort that most probably could ill be spared for the business of construction. This time they should have no misgivings, for not only were damage and losses sustained in connection with the first exhibition phenomenally low, but this year the organisers are not only more experienced even than they were at that time, but will be much more numerous. Moreover, as last time, ample insurance cover has been provided for all exhibits, not only for the 23 days that the exhibition will remain open, but throughout the models' journey to Dorland Hall and home again.

The greatly extended period of the Exhibition should also contribute to its success. It opens on Friday, December 14th, and with the exception of December 23rd, 24th and 25th, will remain open throughout the entire school holidays, the closing date being Saturday, January 12th. Last year, with the exhibition open for one week only and with all the frustration afforded by flying-bombs, rockets and drastic shortage of transport, there were nearly 20,000 visitors. This year, with the Hall open for nearly five weeks, and with some measure of improvement in transport, and with many people released from wartime duties and service in the Forces, the attendance should show a vast increase. Thus the value of the exhibition to the aeromodeller should be very considerable.

There we must leave the matter, except for the reminder that by the time these pages are being read, it will be time for exhibits to be despatched to Dorland Hall. This time they should be sent—addressed to the AEROMODELLER—direct to Dorland Hall, Lower Regent Street, London, W.1. They should be timed to arrive *after Monday, December 3rd and before Monday, December 10th.* They will be unpacked, assembled and looked after with the utmost care by a staff of experts. Alternatively, exhibits can be delivered by hand between 10 a.m. and 7 p.m. So, " go to it," modellers all, let us have those exhibits in hundreds, and contribute your quota to the work of giving aeromodelling its biggest boost yet.

What is an Aeromodeller ?

We must now pass to a matter, the discussion of which affords us no satisfaction at all, except such as could accrue from what we deem to be a very necessary ventilation. This matter is the very unsatisfactory attitude of the S.M.A.E., an attitude which, we submit, is quite untenable in a body claiming not only to speak and act for the entire aeromodelling community, but to " govern " it under a mandate from the Royal Aero Club.

As to the latter claim, we feel bound by public duty to recall that last year we went into the matter very fully, and subsequently challenged the S.M.A.E., or the Royal Aero Club, for that matter, to produce any evidence in support of the claim made. No evidence has been forthcoming, but even if it had, it would still unfortunately be necessary to point out that the S.M.A.E. is very far from conducting its affairs in a manner befitting the status it claims.

This is only too clearly brought out by the handling of the recent model flying meeting at the Handley Page Aerodrome at Radlett, an occasion that witnessed the Handley Page contest for tail-less models and the petrol-model contest for the Bowden Trophy. At that meeting there was overheard a discussion between sundry members of the S.M.A.E., the tenor of which made it quite clear that the speakers, in common with others of their particular persuasion, thought of aeromodellers solely as persons interested in what is colloquially known as " pot-hunting " and in the building of models best suited to the attainment of that objective under the somewhat arbitrary conditions laid down by the S.M.A.E. Anyone outside that very limited range of vision, if vision it can be called, was quite clearly regarded with scarcely veiled contempt. This theme, expounded by juveniles who were still wrapped up in napkins when many of those whose outlook and activities they decry were already experienced modellers, is one that we have heard expressed all too frequently, and, most regrettably, by these members.

These people are still, apparently, blissfully unconscious of the fact that outside their membership there are literally hundreds of thousands of keen practical modellers. How, except on this assumption, can one explain the curious mentality of those who make a great play with the words " national " and " international " in describing their contests, and then on an occasion such as the one to which we have just referred, close the flying-ground where the contests are to be held to anyone who is not a member of their group ? Incidentally, we deplore the unsatisfactory running of the petrol flying meeting, a piece of work quite unworthy of a " governing " body, self-styled or otherwise.

Readers will recall that Dr. Forster had something to say on these matters in last month's " Petrol Topics." Having explained our attitude very fully some time ago and disposed of the absurd suggestion that we have any bias for against that or any other organisation, we do not feel that we can cover the same ground now. We would merely say that we have revived the matter of the Radlett meeting in this issue because we regard it as of sufficient importance as to necessitate editorial comment. In making that comment, we would venture to express the hope that the ventilating of it, with the discussion thereby induced, may sooner or later (sooner, we trust) lead to a change in attitude. Thereby there may accrue to the aeromodelling community a degree of National Service from the S.M.A.E. that is at present precluded by the restricted outlook of certain of its officials.

The Ban Lifted

The Air Ministry has agreed that the wartime restrictions on the flying of petrol-engined models and large models of other types need no longer be maintained. They are, therefore, no longer barred, from the point of view of national security, from any part of the country. But there remain, of course, the restrictions that normally apply under police regulations with the object of safeguarding people and property. Petrol models should never be flown indiscriminately over public land, or without the measure of security afforded by a time-switch for the motor or a third-party insurance on the part of the individual modeller or on his behalf by the club or other organisation to which he may happen to belong. Only by showing a sense of responsibility in this important matter can the aeromodelling community expect to remain free from restrictive regulations.

A ONE INCH TO ONE FOOT FLYING SCALE MODEL OF

The BRISTOL "BULLET"

SCOUT TYPE "D"

BY E · J · RIDING

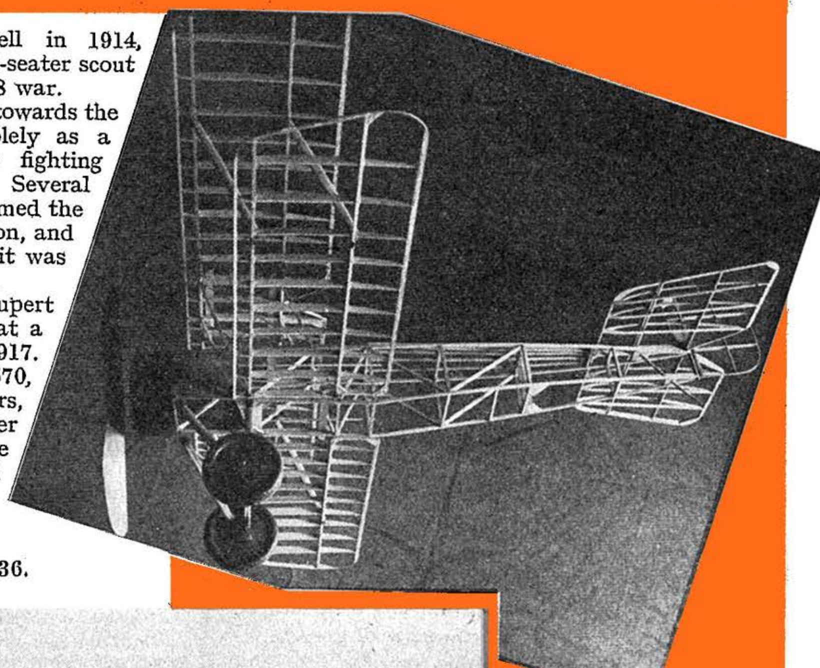
DESIGNED by Capt. Frank Barnwell in 1914, the Bristol Scout was the first single-seater scout to go into production during the 1914-18 war.

It went into service with the R.F.C. towards the latter end of 1914 and was used solely as a scouting reconnaissance machine—the fighting scout was a much later innovation. Several hundreds were built but they never formed the complete equipment of any one squadron, and after its active service days were over it was turned over to the training squadrons.

The cover painting this month by C. Rupert Moore, A.R.C.A., depicts an incident at a Home Establishment aerodrome during 1917.

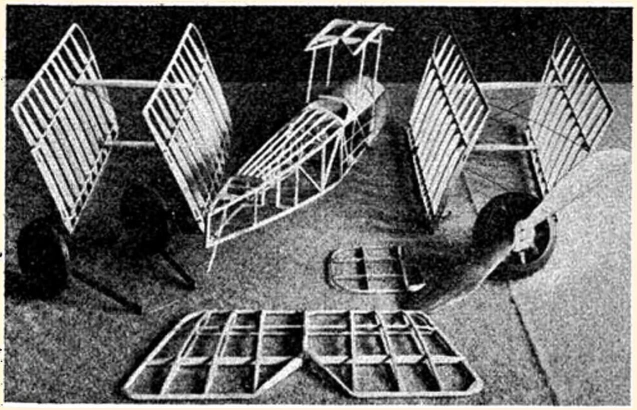
The machine shown on the cover, B.5570, outlived its contemporaries by many years, for it was bought by a private owner after the Armistice and became G-EAGR on the civil register. Ten years later it was still going strong, owned by a private owner at Sherburn-in-Elmet, Yorks.

It ended its days on a motor-car scrap-yard at Stainforth somewhere around 1936.



This latest effort by E. J. Riding is right up to his accustomed standard.

The model's remarkably accurate appearance is well demonstrated by comparing this photo with that of the full size machine at the top of the page. The centre photo, showing the model's uncovered structure, gives a good idea of its comparatively simple construction.



Two more views of the completed model. It would indeed be hard, without previous information, to tell that these photographs were of the model and not of the actual machine. For transportation the model dismantles into seven compact units as shown in the centre photograph.

The colouring of these machines was in accordance with the official camouflage schemes in use at that time. The early machines of 1914 were clear doped all over, with a serial number painted on the rudder.

The Model.

Simplicity of construction has been the keynote in the design of this machine, and it is therefore an ideal subject for the newcomer to the ranks of the scale flying biplane enthusiasts. The only parts which are likely to cause any difficulty are the engine cowling and dummy rotary engine, which, like the wheels, are built up from papier-mâché pressings. In any case, the builder can very soon substitute components made from balsa if he is unfamiliar with this method of construction.

Flying.

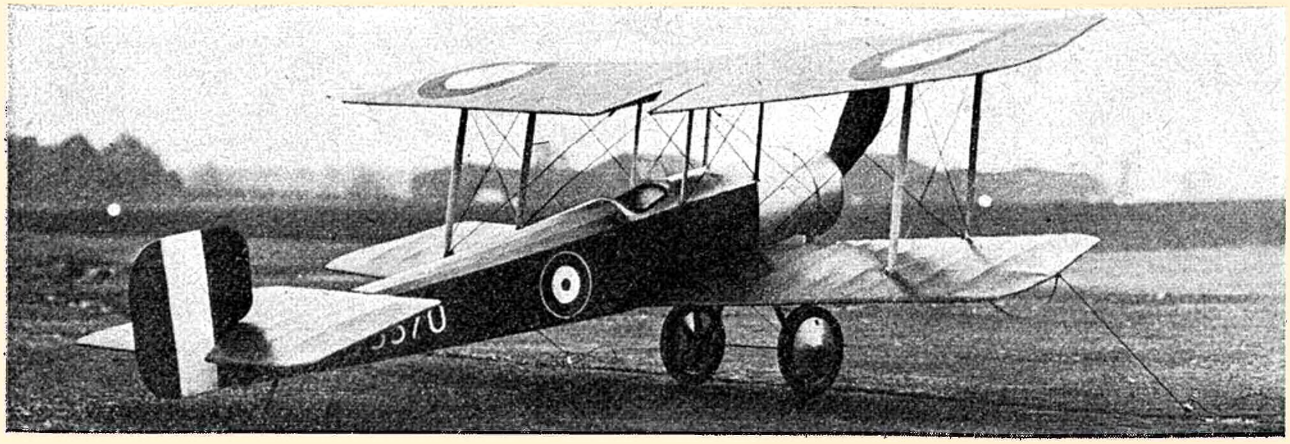
The weight of the model complete with an eight-strand motor 27 in. in length is $11\frac{1}{2}$ oz. I found by experiment that the centre of gravity should occur at a point 0·8 in. aft of the lower plane front spar, and in order to attain this it was found necessary to attach $1\frac{3}{4}$ oz. of ballast to the underside of the engine mounting structure.

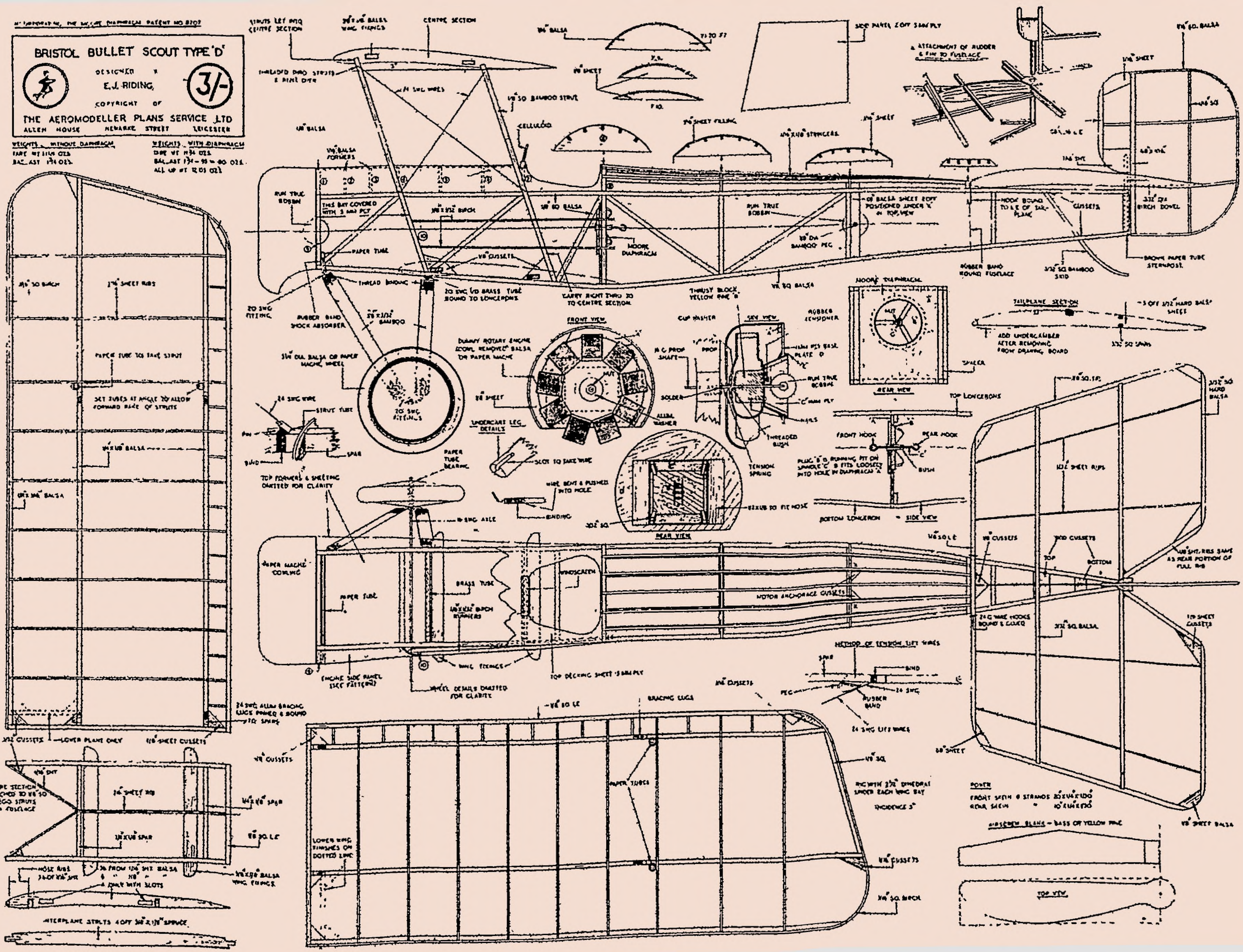
With two hundred turns on the airscrew the model was pushed off from a stretch of runway and became airborne after a 20 ft. run.

Rising to a height of about 18 in., it flew the length of a large hangar before touching down. For normal hand-launched flight I found that it was advisable to increase the tailplane incidence by $\frac{1}{8}$ in. at the leading edge.

In an attempt to reduce the amount of ballast required, I decided to fit a Moore Diaphragm with the following results: Using the same weight of rubber, front and rear skeins 20 in. and 10 in. long respectively, the weight of ballast was brought down to ·80 oz.

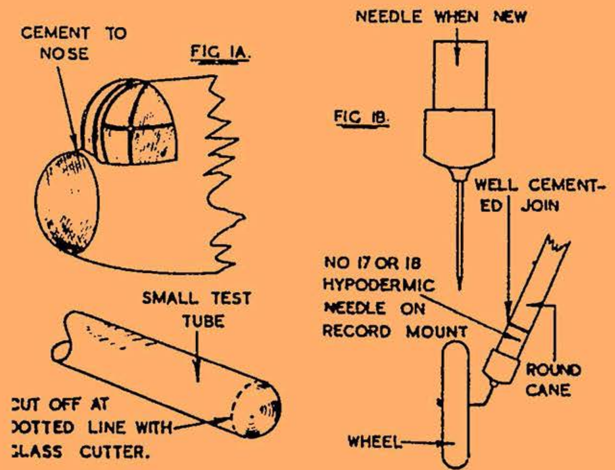
In a short-nosed machine of this nature it will be obvious that reduction in the weight of the tail surfaces even to the extent of a fraction of an ounce will alter considerably the position of the centre of gravity, and to do away with ballast altogether it would be necessary to bring the weight of the tail surfaces down to about 0·5 oz.—the minimum figure permissible for equilibrium about the present centre of gravity.

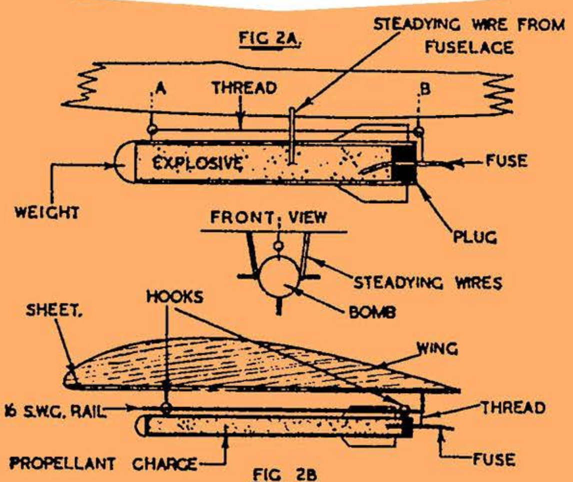


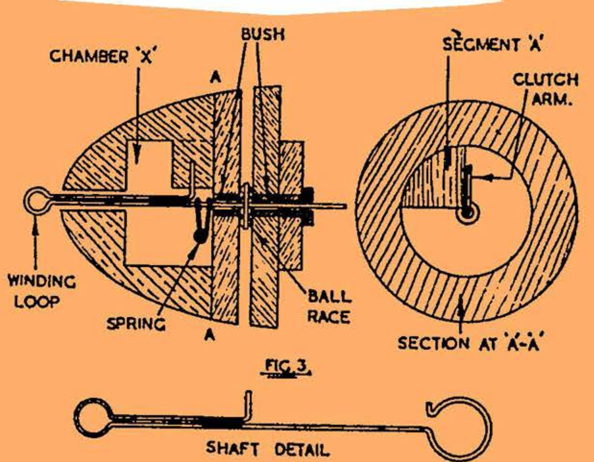

BRISTOL BULLET SCOUT TYPE 'D'
DESIGNED BY
E.J. RIDING
COPYRIGHT OF
THE AEROMODELLER PLANS SERVICE LTD
ALLEN HOUSE NEWARKE STREET LEICESTER
3/-
CENTRE SECTION
TAILPLANE SECTION
FRONT VIEW
SIDE VIEW
REAR VIEW
MOORE DIAPHRAGM
UNDERCART LEG DETAILS
METHOD OF TENSION LIFT WIRES
POWER
TOP VIEW
INTERPLANE STRUTS 4 OFF

GADGET REVIEW

By "Consus"







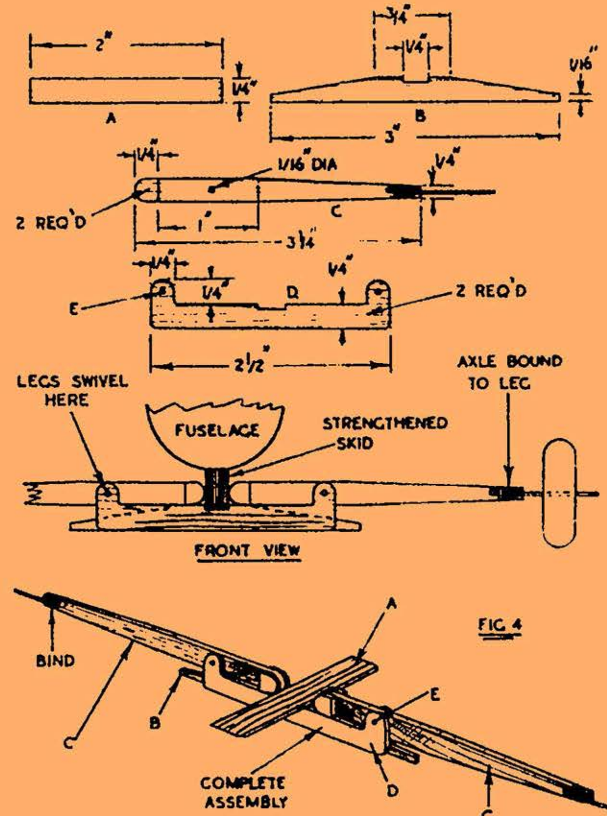
CHRISTMAS being close at hand, I offer my readers the compliments of the festive season and another selection of the weird and wonderful for my fellow addicts. When the beer's worn off, turn to the balsa !—get cracking and see what use you can make of the ideas described on these pages. I shall be with you in spirit ! (*Spirit's the word ! We remember that last year we came across Consus on Christmas Eve, after a convivial evening, trying to design an automatic and self-filling stocking !*—ED.)

First, we have two ideas from C. MONTAGUE of Bradford-on-Avon (Fig. 1). One, shown in diagram 1A is yet another way of making a transparent nose for 1/72nd solids. The other, diagram 1B, is an ingenious method of attaching model wheels to a bamboo undercart. The hypodermic needles used may be obtained from most chemists for a few pence. The cheap variety is the best for the purpose, as these may be more easily bent.

Anyone still possessed with warlike instincts will no doubt appreciate this bomb and rocket release system from B. RAVINE of Wellingborough. This idea is one of the most practical we have yet seen. Constructional details are given in the sketch (Fig. 2), and the method of working is as follows: The bomb is suspended from two small hooks A, and B, by means of a piece of cotton attached to the nose, threaded through them and tied to the fuse at the point where it enters the bomb. The fuse is lit and the 'plane immediately launched. When the cotton is burnt through the weight in the nose of the bomb pulls the thread through the hook and the bomb drops. The fuse continues burning and the bomb either explodes in the air or as it hits the ground. The principle of the rocket is practically identical and is shown in the second sketch.

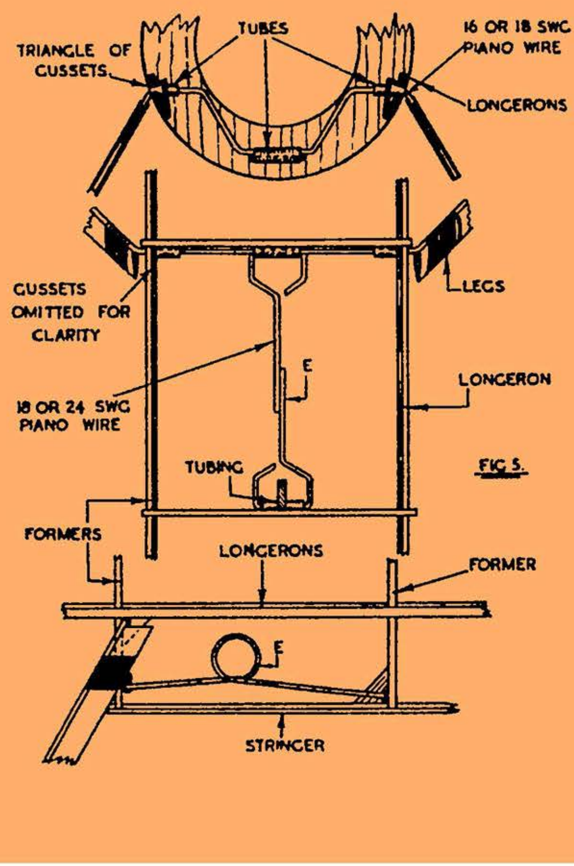
A variation on an ever-popular theme, a simple type of free wheel enclosed in a spinner is the idea of P. FAULKS of Manchester, and is shown in Fig. 3. The rubber tension pulls back the clutch arm against the spring pressure and it engages on segment A, which is strongly glued into the spinner recess. As power is expended, the spring exerts its pressure and the clutch arm clears segment A and enters the chamber X, thereby permitting the propeller to revolve freely.

The reader, who like myself, has often felt the urge for a spot of glider flying, only to find he is handicapped, often impossibly so, by the lack of an assistant for tow-launching, will appreciate a gadget designed to enable him to tow-launch a model without secondary aid. Designed by C. DUNN of Kelty, Fife, it consists of a simple wheeled carriage (Fig. 4) which automatically detaches and drops off as soon as the model is airborne. The sailplane's skid must be strengthened and the position of the carriage legs must be arranged so that when the legs are in position the distance between the two gripping ends must be exactly the same as the width of the skid. When the skid is placed on the rest A, the weight of the sailplane presses the whole centre section down, making the ends of the legs grip the skid. When the sailplane becomes airborne the weight of the wheels automatically releases the skid from the gripping ends of the legs. Note that the legs must swivel freely and that the gripping ends must not pass the horizontal when in position, or they will fail to release.

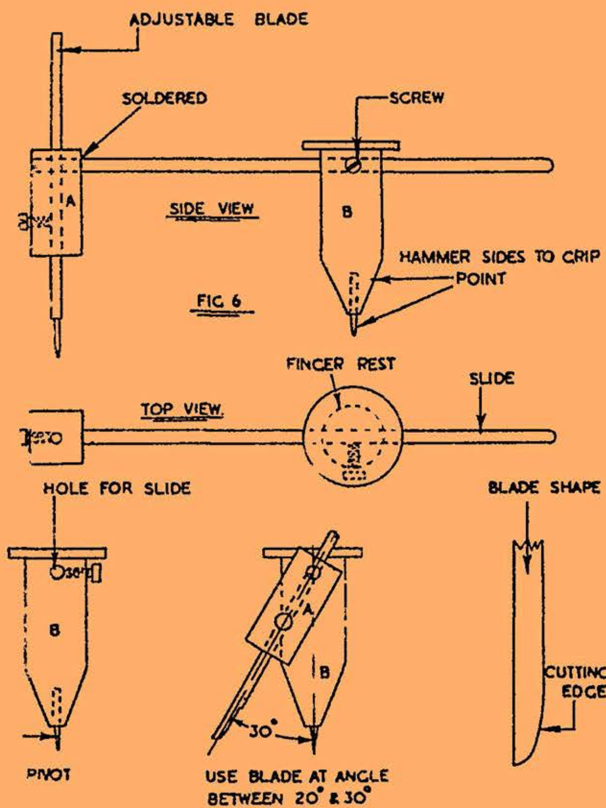


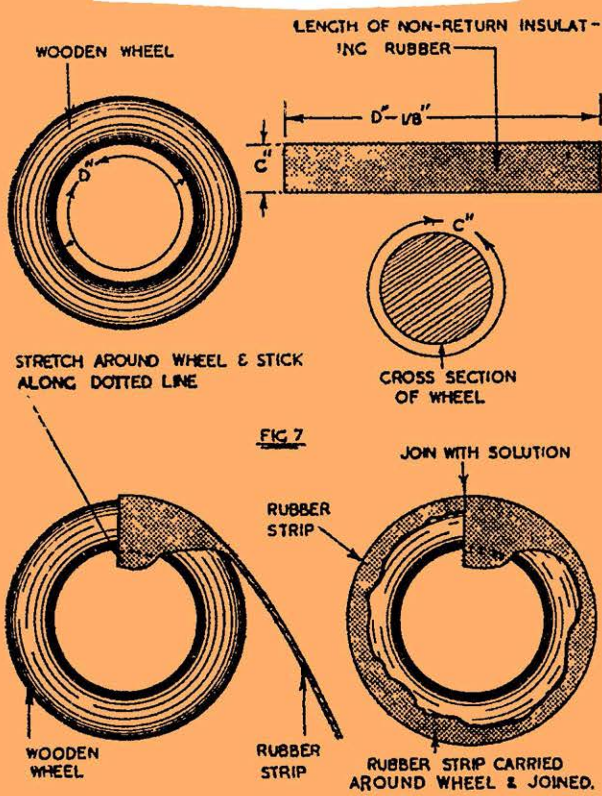
From C. J. INMAN of Isleworth comes a method of transferring profile shapes from a plan to the wood. Hectograph ink is used on sandwich wrapping paper for making a simple transfer of the kind used by ladies for embroidery work. Place the transfer face down on the wood and apply a warm iron. Each transfer will yield two or three clear prints. Be careful, however, not to draw the lines too thick, use an ordinary writing pen with a fairly fine nib.

It is a well-known fact that aeromodelling is international, and here is proof in the form of an internally sprung undercart sent to us by J. G. SIDON, a Czechoslovak refugee at present of Loughborough (Fig. 5). A piece of 16 or 18 gauge piano wire is bent to the shape shown in diagram A and the bamboo legs are bound on to it. Take care, however, to make sure the aluminium tubes (each about $\frac{1}{2}$ in. long) are already in position on the wire before you bend it. Bend a piece of 20 or 22 gauge piano wire to the shape shown at E and fix this to the main undercarriage unit by another length of aluminium tubing. Hinge the other end of E to a bulkhead behind the undercarriage position. One thing I would suggest, however, is that brass tube should be used in preference to aluminium, which is liable to tear.



Circular formers always prove a fiddly business, and an attempt to cut them really round and true is often a failure. W. A. HILL of Enfield sent us some examples cut by a simple tool he has developed, and they were really excellent. The tool (Fig. 6) is made from scrap, and the hour or so needed for the construction is more





than saved during the making of even one model. The cutting blade is made from silver steel filed to a knife edge, hardened by tempering in cold water, and touched up with an oil stone. To fix the swivelling point, hammer in the direction shown in the sketch. To use, set tool to radius required, noting the angle at which the cutter is used (see sketch). Hold cutting head between the thumb and second finger with index finger on finger rest, press point into centre of the material, using short cutting strokes to cut out disc. If the material is thick, cut through from both sides. For lightness the centre of the ring may be removed in the same way.

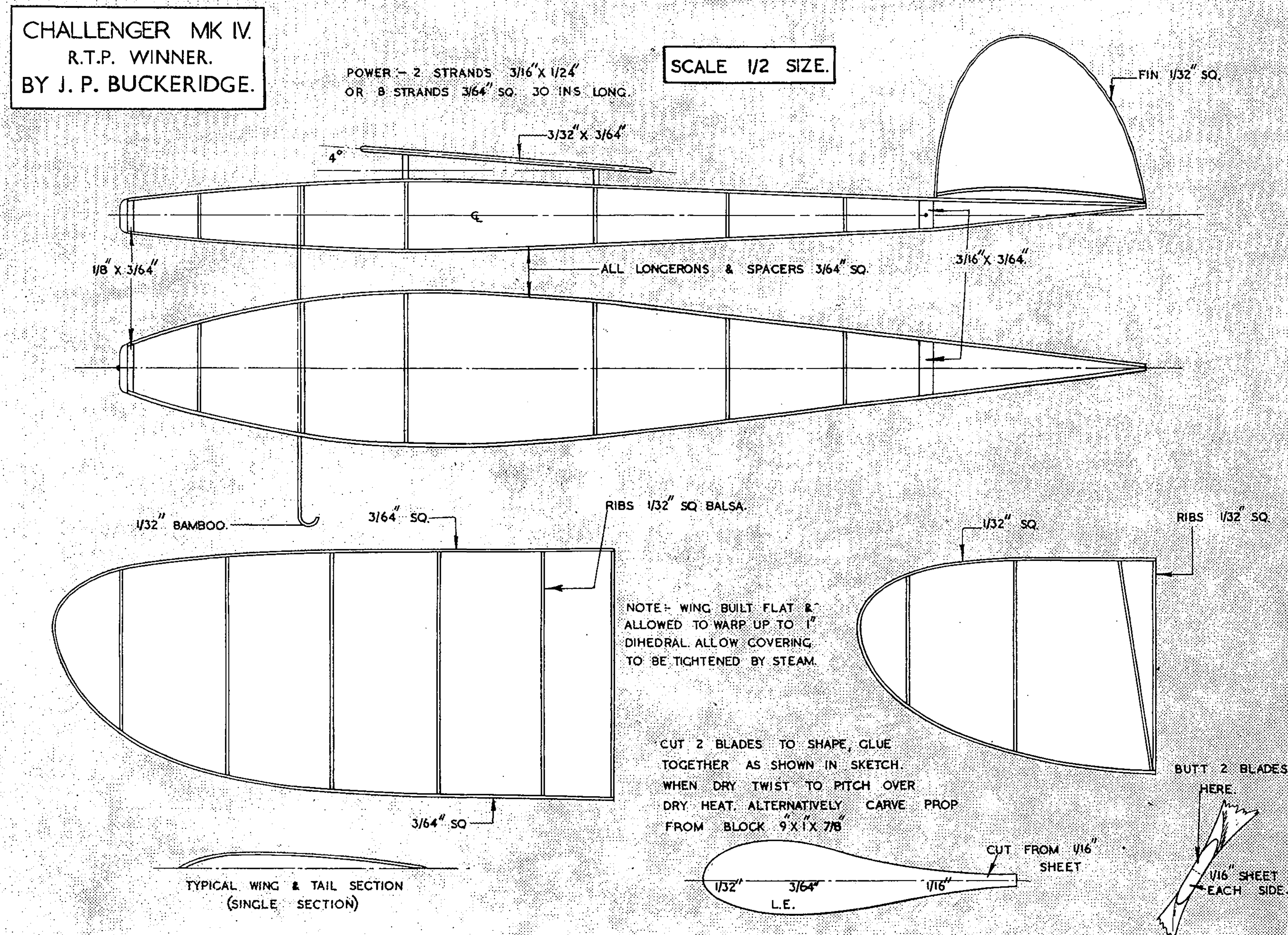
Nothing improves the appearance of solid models more than detail, and one of the hardest details to reproduce in a model is rubber-tyred wheels. Here is the method (Fig. 7) for 1/48th scale solids, discovered by P. G. COOKSLEY of Croydon. Take a strip of rubber of the non-returning elastic type as used by the heavy electrical industry for insulation. This can normally be begged, borrowed or bought from contractors to the said industry. Cut the strip to a width equal to the circumference of the cross section of a previously prepared centreless plastic or wooden " tyre "; the length should be about ½ in. less than the circumference of the core. Smear the edges of the rubber with rubber solution, which is allowed to become tacky. The core is now taken, and one end of the rubber strip is stretched round any point of the core, and joined in the centre hole, prepared side to prepared side. See diagrams.

The loose end of rubber is now stretched about the circumference of the core, and joined edge to edge, *not overlapping*. See diagrams.

During this process, the *utmost strain* must be imposed upon the elasticity of the rubber, so that it assumes the shape of the outer part of the wheel. The remaining edges are pulled to the centre, where they are joined in the hole to the lap of the other side; all bad creases being eliminated by straining. A pair of centres are turned and set on the outer part of the centre hole, with their axle holes joined by a length of brass tube, soldered into place, the axle being pushed through this, and the protruding ends soldered to the U/C. legs. Do not be disheartened if your first attempt is a mass of creases. Remove the rubber and try again, with a fresh piece. Take care not to mark rubber with finger nails during preparation. The addition of appropriate lettering makes the final product look much better when mounted than the old painted style, the maker's name giving a final touch of realism. Although a join results, if the work is properly carried out the join is practically invisible.

Lastly, B. AKENHEAD of Newcastle has a simple but effective balsa knife for cutting sheet balsa. He makes these from an old pen holder minus the nib with the metal end filed or ground down to a razor edge. An easy and inexpensive method.

Well, the best of luck for 1946; may you all find sixpences in your share of the pudding—and a few raisins to boot! Gadget Review returns in the January issue, so until then—Merry Christmas!


CHALLENGER MK IV.
R.T.P. WINNER.
BY J. P. BUCKERIDGE.
POWER – 2 STRANDS 3/16" X 1/24"
OR 8 STRANDS 3/64" SQ. 30 INS LONG.
SCALE 1/2 SIZE.
FIN 1/32" SQ.
3/32" X 3/64"
4°
℄
1/8" X 3/64"
ALL LONGERONS & SPACERS 3/64" SQ.
3/16" X 3/64"
1/32" BAMBOO.
3/64" SQ.
RIBS 1/32" SQ BALSA.
1/32" SQ.
RIBS 1/32" SQ.
NOTE:- WING BUILT FLAT & ALLOWED TO WARP UP TO 1" DIHEDRAL. ALLOW COVERING TO BE TIGHTENED BY STEAM.
3/64" SQ
CUT 2 BLADES TO SHAPE, GLUE TOGETHER AS SHOWN IN SKETCH. WHEN DRY TWIST TO PITCH OVER DRY HEAT. ALTERNATIVELY CARVE PROP FROM BLOCK 9" X 1" X 7/8"
BUTT 2 BLADES HERE.
CUT FROM 1/16" SHEET
1/16" SHEET EACH SIDE.
1/32"
3/64"
1/16"
L.E.
TYPICAL WING & TAIL SECTION
(SINGLE SECTION)

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— 1/72 Scale —

BEAUTIFULLY DETAILED JOBS • • • • •

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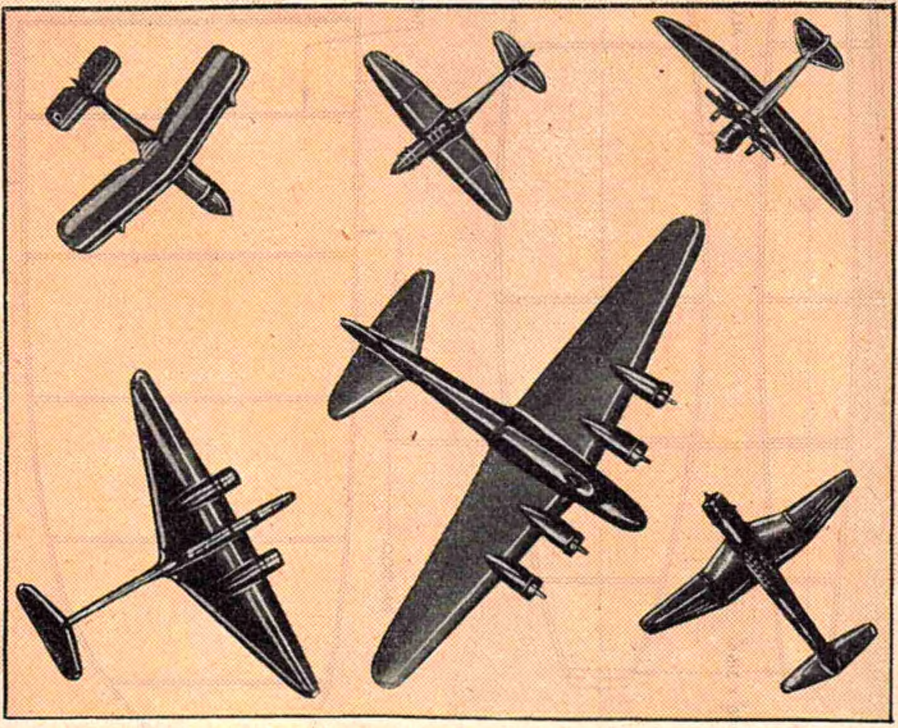


GET THEM NOW CANNOT REPEAT

ASTRAL AERO MODEL CO., DIXON LANE ROAD, LEEDS, 12.

PETROL POWERED FLYING BOATS

PRACTICAL CONSIDERATIONS IN DESIGN

BY DR. J · F · P · FORSTER

OWING to the dearth of good land flying facilities near my home, and the alternative scope and freedom of the sea, it has probably been my good fortune to amass more " flying hours " of experience (not always successful) with Petrol Flying Boats than most men in this country. In spite of these advantages, the solution of the many interesting and apparently irreconcilable problems of this most fascinating branch of model flying is still very far from final achievement, and the pursuit of this will o' the wisp will keep me—and I hope an increasing number of fellow petroleers—happily occupied for the rest of our aeromodelling days.

It may well be that with the coming of the diesel engine, and the consequent elimination of ignition problems, more than half the battle will be won, but until we know more about these engines and unless they are obtainable in non-corroding alloys suitable for use on sea water, it is too soon to speak with authority.

Hitherto, with the exception of Lt.-Col. Bowden, no one besides myself has ventured to publish any conclusions on the subject, although *some* contribution (not much of it applicable to petrol models, unfortunately) has certainly been made by Messrs. White and Sizer in recent years. My own efforts, except when designing my first experimental model, have therefore been almost entirely uninfluenced by anything I have been able to read on the subject, and any success I *have* had has been bought at the cost of many hours of practical experiment, not to mention the almost daily thought on the subject over several years (! !). Frequent disheartening discouragement, relieved on occasion by many perfect take-offs, flights and landings are, however, rewarded by a gradual but definite increase in consistency and decrease in accidents, and, recently, by the obtaining by my patient and skilful friend, J. Burgoyne, of some action photographs which I am sure will be acclaimed as first-class technical and artistic achievements.

Early Mistakes.

My first model, action photos of which (again by J. Burgoyne) appeared with an article in March,1940, AEROMODELLER, was in several respects a deliberate flouting of certain theoretical conclusions, or perhaps misinterpreted practical conclusions, made by my friend Lt.-Col. Bowden, with which I disagreed, and in these respects it was an attempt to disprove these conclusions in practice.

Although the model flew well on many occasions, and took off and landed well, while looking considerably more realistic, to my way of thinking, than did his extraordinary-looking record holder, nevertheless, he had the satisfaction of being able to *think*—even if he didn't say it in print (*vide* September, 1939 AEROMODELLER ! !) " I told you so," when it came to the question of aquatic stability.

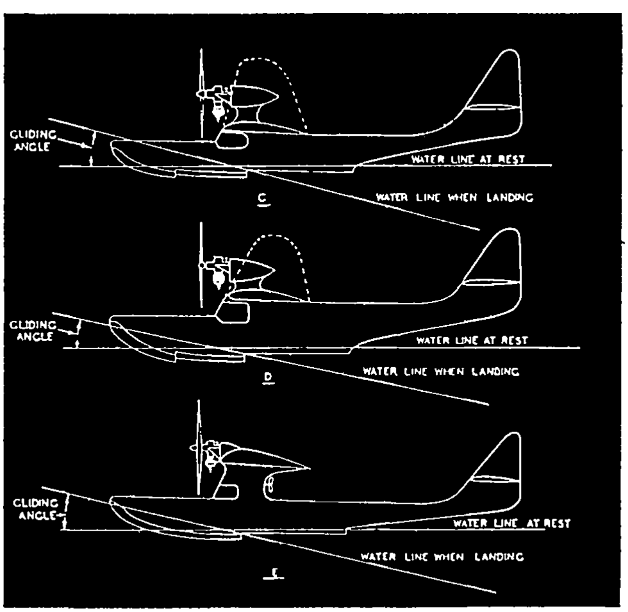
C. E. B. has laid considerable stress on this question of stability on the water under all reasonable conditions, and I agree with him entirely. The first and absolutely essential *sine qua non* of a successful petrol flying boat is its ability to sit on the water for minutes on end and to " weather-cock " into wind in spite of gusts and considerable waves. The hull must be watertight, and there must be sufficient lateral flotation to enable it to pick its

submerged wing-tip out of the water unassisted, if such misfortune occurs.

To attain this large margin of lateral flotation, wing-tip floats must be *ruled out as impossible*. Not only would they be too prone to damage themselves, or likely to crack wing spars in heavy landings and accidental cart-wheels, but a straight take-off into wind is practically impossible: with the slightest ripple one float inevitably digs in while the other is clear, and the whole machine slews round and skids to a very wet standstill, followed by an attempt to take off across or down-wind, if not completely capsizing.

In a fresh wind the latter accident is by no means a rare event, and the reason is not far to seek. Owing to the high thrust line and at full throttle, any sudden check to the boat's forward momentum tends to lift the tail; if this is suddenly slung round the wind gets under it and the whole machine is liable to nose over. This accident usually finishes all further activity for the day, as the whole engine, nacelle and electrical accessories are completely submerged, and it may be a full minute before one can hastily get to the oars and row to the scene of the disaster!! The wings are filled with water and the model must be dismantled *in the water* and fished out piecemeal for fear of breaking spars with the great weight of water in the wings.

While being a serious disaster from the point of view of probably finishing that particular day's flying, this is the only likely serious accident to be met with, and the risk of it can be much reduced by designing plenty of length to the hull in front of the C.G. Structural damage to wings, props and empennage is practically unknown with flying boats, provided they don't land or crash on dry land. At one time or another my models have met the sea at high speeds at almost every conceivable attitude of bank or dive, and apart from once springing a plank



in the hull, and once cracking a sponson spar, they have never yet suffered structural damage. This, at least, cannot be said of land planes!

Aquatic Stability.

The chief considerations for attaining perfect lateral stability on the water are:—

(1) Keeping the C.G. as low as possible;

(2) keeping the side area at a minimum and as low down as possible;

(3) making the planing area of the hull as wide as possible;

(4) keeping wing span to minimum;

(5) keeping greatest possible wing area near the hull and away from the wing-tips;

(6) keeping dihedral to minimum.

The above points are brought out in the diagrams, which contrast the extremely top heavy set-up (A) with the obviously more stable layout (B).

The tremendous side area offered by a big dihedral (some of it in front of the C.G.) necessitates an undesirably large fin area in order to ensure "weather-cocking" into wind when at rest on the water, which adds still further to the total side area and general liability to be blown over sideways on to a wing-tip.

Regarding (4) and (5) above, obviously a tapered wing is preferable to a constant chord wing, but for a given area the span must be greater. Therefore, the ideal wing plan is elliptical, which combines the peculiar properties of a low aspect ratio with almost the efficiency of a high aspect ratio wing.

Having thus reduced the liability to be *blown* over on to a wing-tip, the provision of a wide base and a low C.G. will help the model to "right" itself if one wing does drop, and the span of the sponson floats projecting from the sides of the hull can thus be kept to within quite reasonable limits.

Freeboard and C.G.

Bound up with this vital question of lateral area, however, are other considerations which, in the light of practical experience tend to undo all these good resolutions to keep it at a minimum. Whereas on a land machine the fact that models land at their guiding angle necessitates departure from full-scale practice in the location of the landing gear, so on flying boats the free-board at the bows must be very much greater than would be necessary if only they landed in the attitude of level flight.

Unfortunately, however careful we are over stream-lining, and reducing frontal area, the gliding angle is bound to be considerable, for in addition to wing and hull we have an engine nacelle, sponson floats set at a high angle of attack (and therefore drag) as well as the planing steps in the hull bottom, all of which cause drag and tend to increase the gliding angle.

Consequently, when the model comes in to land we need a great reserve of "flotation" well up in the bows, coupled with planing area, to prevent them plunging beneath the surface of the water at the moment of impact. None of this is needed when at rest or at take off, but attempts to sacrifice it lead to wet landings, soaked engines, and more often than not a tremendous splash, instead of a graceful swish or gentle bounce which characterise the landing of a good model flying boat, and which leave the engine perfectly dry and ready to start again without difficulty for another flight.

This mistake of designing too shallow a hull, *i.e.* with insufficient freeboard at the bows, is exaggeratedly depicted in diagram C. The diagonal line indicates the horizon or water line when landing and shows how the shallow bows are liable to "dig in," causing a tremendous splash and an abrupt stop.

If we build the whole hull higher so as to raise the bows sufficiently to avoid this digging in on landing, as in diagram D, we come seriously up against our old enemy *side area* Furthermore, raising the bows and top decking in front of the wing means raising the engine in order to get prop clearance. It involves a bigger and heavier model as a whole, which may need a more powerful engine swinging a still larger prop. The circle soon becomes very vicious, and we may have to resort to three or four-bladed props if we are to keep the C.G. reasonably low, and these are both inefficient and still further increase the drag and gliding angle !

Diagram E gives a rough indication of how I have attempted to deal with these problems when designing my latest flying boat, "Neptune," which is at present to be seen at the Dorland Hall Exhibition, and action photos of which accompany this article and adorn the frontispiece of the AEROMODELLER this month.

I have kept the hull light (especially the tail) and the total side area low down by continuing the foredeck level right back to the tail. The wing is now a "parasol" mounted on a centre pylon enclosing the cockpit and the timer mechanism, which is all brass and non-corroding, and is driven by the slip stream *via* a small "two-blader" projecting from the rear of the streamline section pylon.

The depth of the main wing spar tapers very considerably, so that the engine nacelle, which contains the whole electrical and ignition apparatus, is very nearly buried in the centre section. There are two other big departures from my former practice on this model which have both proved satisfactory.

Forward Step.

I was led to believe by C. E. B., who had had considerable experience with speed boats before he tackled flying boats, that at certain speeds when riding on the main step, there was a risk of rapid pitching oscillations developing, and in view of the high thrust-line he claimed that this was liable to result in the bows digging in, possibly ending in a somersault.

On my earlier models I therefore took his tip and made an extra forward step about halfway between the main step and extreme bows. At planing speed this was practically out of the water except on striking an extra big wave, or in the event of the models pitching—but I found that *they didn't pitch ! !*

I am now convinced that although this phenomenon may easily occur on a speed boat, it is most unlikely to happen on a flying boat. The sheer inertia of the long tail boom, and stabilising effect of the tailplane, make any rapid oscillation of the tail up and down impossible. The forward step was ugly, and caused much extra drag when airborne, and I therefore resolved to dispense with it on "Neptune" and follow full-size practice. Incidentally the hull bottom is interesting, as it is very like that of the Dornier D.O.18 in which the V bow gradually gives way to and merges into a projecting flat planing surface half the total width of the main step, and this has proved very satisfactory both for take-off and landing.

Detachable Nacelle.

The other departure from former practice is the location and concentration of all electrical accessories *high up* in the nacelle. For a long time I shied at this, fearing the raising of the C.G. and the loss of necessary weight in the nose. The advantage in electrical efficiency, and in the ability to remove the whole "works" and dry them off in the oven or airing cupboard after any unfortunate "incident" (!), however, finally overcame my prejudice, and I resolved to risk it, even if it meant carrying useless lead ballast in the nose. I therefore spared no weight in the construction of the trickily shaped bows when building the hull, and saved much labour and added greatly to their strength by carving them from solid hard balsa, at the same time keeping the tail boom as light as possible, and I have not regretted it !

However, I would not lead readers to imagine that the solution is anywhere near complete ! The parasol wing gives excellent lateral stability, and permits the safe use of very little dihedral. This in turn presents little side area, and gives first-rate stability when at rest on the water in gusty and variable winds. Unfortunately, there seems to be a fly in every ointment, and there is a very considerable downwash from the parasol wing, aggravated, no doubt, by the thickened centre section burying the engine nacelle. On a flying boat one cannot place the stabiliser low down to escape this downwash, yet the prospect of raising it any higher fills me with horror ! ! Unfortunately, the downwash is very much greater under power than on the glide, and the use of large amounts of downthrust makes very little difference.

Consistent longitudinal stability is thus not too easily obtained, since, if the tailplane incidence is correct for a steady glide, the increased downwash under power tends towards excessive climb or stall. Conversely, if one gives sufficient positive incidence to the tail to prevent stalling under power, the glide is apt to become very steep. The accompanying photographs, with their beautiful background, show the tail down attitude in which the model was flying that day, and I shall not be satisfied until I can get that tail up a little more, as it tends to persist during take-off and delays or prevents the model climbing on to the main step.

CIVIL AIRCRAFT No. 25 BY E·J·RIDING

The B.A.C. DRONE

Photo: E. J. Riding.

THE B.A.C. "Drone" was the outcome of a series of experiments carried out by the late C. H. Lowe-Wylde in order to investigate the possibilities of the powered glider. His firm, the British Aircraft Company of Maidstone, were constructors of gliders, and in 1932 one of these machines known as the B.A.C. VII was fitted with a 600 c.c. Douglas flat twin motor-cycle engine. The tests of this little machine proved quite satisfactory and it was flown at various air meetings up and down the country during 1932 and 1933. It was during one of these demonstrations—at West Malling, on May 13th, 1933, that Lowe-Wylde was killed. The "Drone," as it had been named, appeared to side-slip into the ground from a height of about 400 feet, the pilot being killed instantly. The accident was attributed to the pilot having been overcome by illness during the flight.

After Lowe-Wylde's death the firm was taken over by Robert Kronfeld, the celebrated German glider pilot, who opened a factory at Hanworth Park and put the Drone into production. About thirty assorted Drones were built, the majority of them being bought by private owners at home and abroad. The original design was modified from time to time, developing into the Super Drone and the Drone de Luxe. By this time the firm had been re-christened Kronfeld Ltd., and they went on turning machines out in small batches until the beginning of 1937.

In April, 1936, a remarkable flight was carried out in one of the first Series II models by Lord Sempill, who flew from London to Berlin—a distance of 570 miles—in just under eleven hours. Apart from the installation of a special sixteen-gallon fuel tank the machine was perfectly standard, and it was estimated that the cost of the return flight was only 25s.

The Drone was of spruce and plywood construction, the wings and tail surfaces being covered with Madapolam or glider fabric. The undercarriage was a very simple steel tubular affair, shocks being absorbed by the resilience of the low pressure air wheels with which it was equipped. A variety of engines were fitted including the Douglas Twin, Carden 32 h.p. water-cooled four-cylinder in-line, and the Ava Flat Four.

The machine was easy to fly—in fact Herr Kronfeld used to land it with both hands held above his head! Its consumption of 1¼ gallons per hour made it the cheapest aeroplane to run, and with wings folded it could be stored in a lock-up garage. Twenty Drones are still on the register, so it is quite probable that they will emerge from their hiding places when civil flying is de-restricted.

Colouring. A popular scheme, as applied to G-ADPJ in the photograph, was : Fuselage natural varnished wood, fabric covered surfaces clear doped, lettering dark brown.

Specification (Super Drone): Length, 21 ft. 2 in. Span, 39 ft. 8 in. Height, 7 ft. Wing area, 172 sq. ft. Max. speed, 73 m.p.h. Cruising, 65 m.p.h. Landing, 28 m.p.h. Tare weight, 390 lbs. Loaded weight, 640 lbs. Price, ex works. £352.

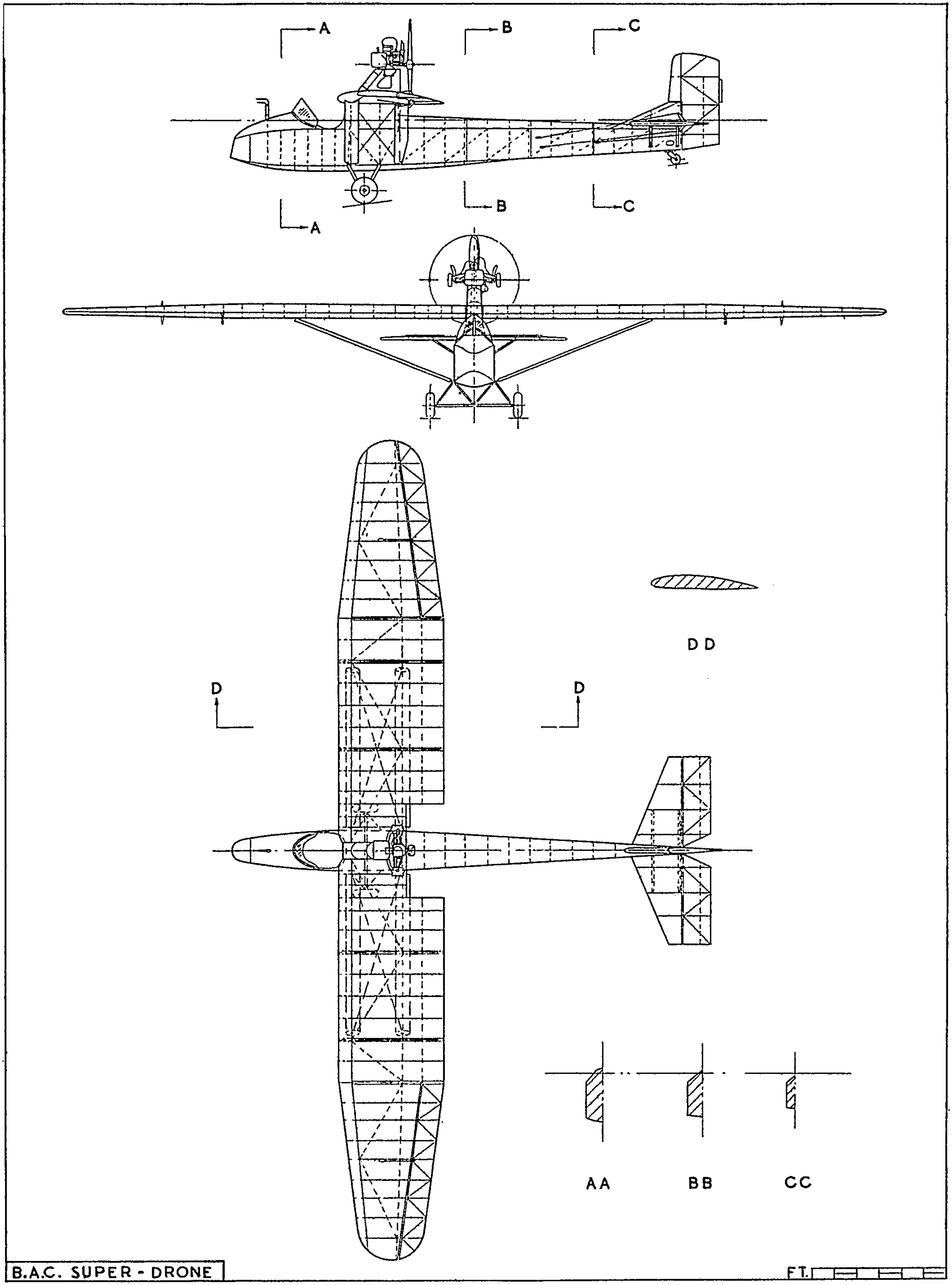
(Below.) Post Prototype. Following the crash of the first "Drone" Prototype, and the resultant death of its designer, a second was built by Robert Kronfeld. This machine is shown at the opening of Speke Airport, Liverpool in July, 1933.

(Above.) B.A.C. "Super Drone." Powered by a Douglas flat twin engine, this variant is the subject of the three-view drawing on the opposite page.

(Below.) Kronfeld "Drone". Developed by Robert Kronfeld, this 1936 model was powered by a Carden water-cooled four cylinder in-line engine of 32 h.p.

Photo: E. J. Riding.

Photo: A. J. Jackson.



B.A.C. SUPER - DRONE

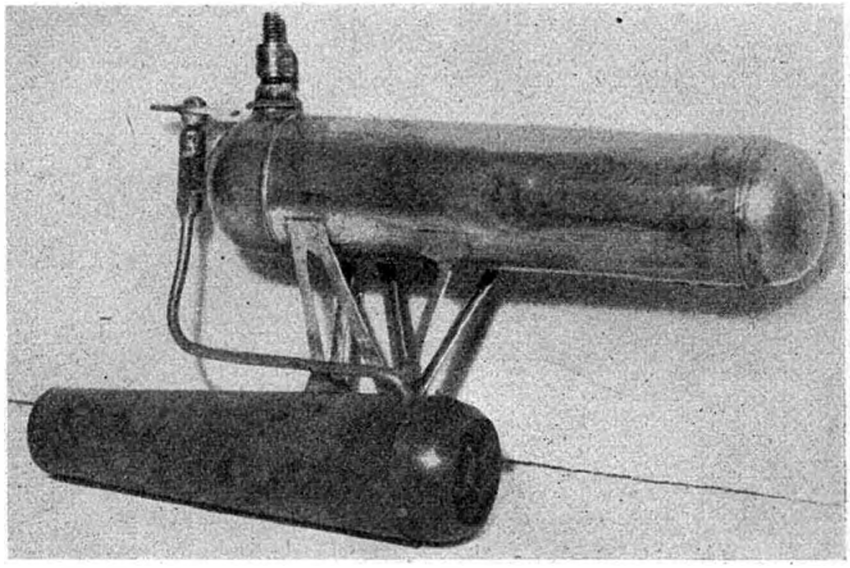
THE DEVELOPMENT OF A MODEL JET UNIT

BY G. A. HENWOOD

TEST REPORT.

By the co-operation of Sgt. Henwood, Mr. G.W.W. Harris of Farnborough was able to test one of his units. The performance far exceeded its designer's claims, appearing as just a glowing red streak on the revolving arm.

A slight modification made possible higher pressures in the tank, and this gave rise to the curious "Doodle-bug" behaviour mentioned by C. R. Tottle in the Nov. issue. A full report by Mr. Harris will be published next month.



WHEN I first commenced experimenting with model jet propulsion units, my object was the production of a unit that was both simple and easy to construct. Thus I was forced to discard the use of compressors driven by turbines or reciprocating engines in favour of something much more simple. This meant an entirely new angle of approach to the subject.

My first solution to the problem was unit A, shown in the accompanying drawing. In order to obtain a light and simple unit, I was prepared to sacrifice a good deal of efficiency, and so I concentrated on the system of plain jets shooting burning gases rearward through a specially shaped duct designed to increase the gas velocity. This successfully eliminated those snags that I had determined to avoid.

This first unit consisted of a pilot jet (*a*), which was in effect merely a small blowlamp intended to vaporise and ignite the fuel from the six rear facing jets in the main jet ring (*b*); the needle valves (*c*) and (*d*) control the amount of fuel supplied to the jets; (*e*) was a combined filler cap and air valve, and the necessary fuel pressure was obtained by means of compressed air in the fuel tank (*f*). The combustion chamber (*g*) was circular in cross section.

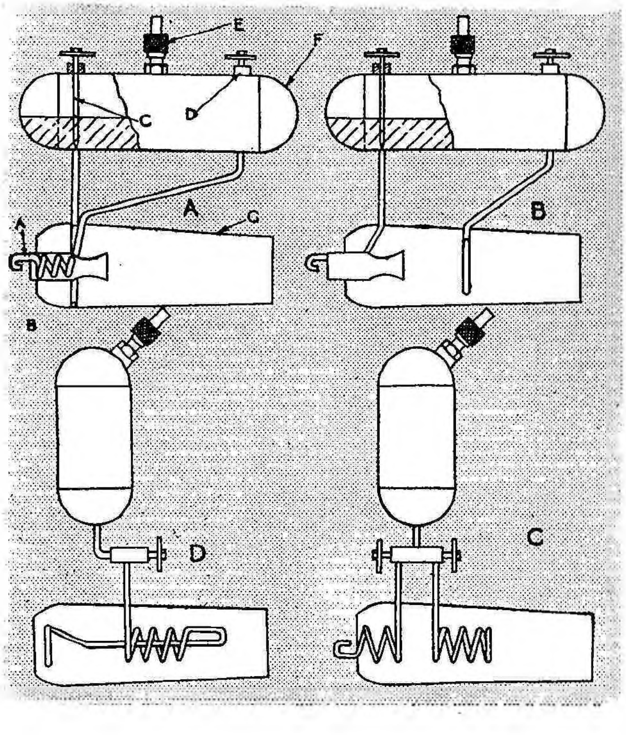
The *modus operandi* was (theoretically) as follows :—Both needle valves were closed, the tank was half filled with fuel, and air pressure was built up by means of a cycle pump. The pilot jet valve was then slowly opened and the fuel ignited. When the pilot jet was burning steadily, the main jets could be brought into operation as required. It all sounds quite simple and logical enough, but in actual practice the inevitable snags appeared. Because of its small size the various proportions are fairly critical, and at first I was unable to make the pilot jet burn steadily. The performance was generally much the same each time in spite of a lot of juggling with the needle valve and the air pressure. As the coils warmed up the desired blue flame would appear and then would abruptly cut out, and a jet of neat flaming fuel would shoot out a distance of several feet with detrimental consequences to anything which happened to be in the way! After a considerable amount of experiment, I finally produced a jet which would burn more or less evenly, and then I was all set to try out the main jets. It was here that major snag number two appeared. As the control valve was opened the fuel would commence to burn, and after a short interval there was a loud " woob," a burst of flame from the nozzle and a small pool of burning fuel would appear on the floor. Spectators usually regarded the whole show with a certain amount of apprehension and in all fairness it must be admitted that the operator was not too happy at times, either.

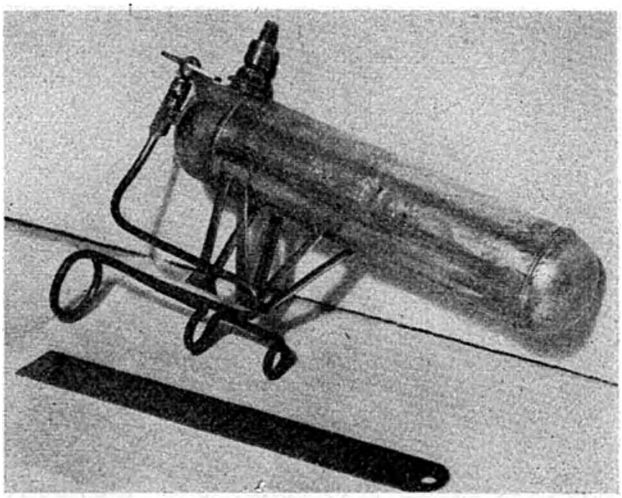
As the first unit was very much a shot in the dark, I was not unduly disappointed and I now had somewhere to work from. It did not require much consideration to see the obvious fault. The fuel was not being properly consumed before it left the combustion chamber, and the first answer to the problem was, of course, a supply of forced air fed into the air inlet. This entailed the very complications that I wanted to avoid, so I considered other ways and means and conceived the idea of preheating the fuel before it was ejected from the main jets, and so we arrive at unit " B."

It was actually a modification of the first unit, the chief differences being a smaller jet ring which would be completely within the cone of flame from the pilot jet, which was also placed further forward in order to assist in achieving this object. On tests a definite improvement could be seen, but further preheating was indicated. As after various alterations and trials it was showing signs of wear and tear, I decided to construct an entirely new unit embodying my newly won experience.

Unit " C " bore little or no resemblance to its predecessors. The tank was arranged vertically in order to ensure that the fuel would be used up to the last drop, and owing to leakage trouble with the needle valves previously employed, I made an independent dual valve assembly for this unit and it proved very satisfactory in use. The duct round the pilot jet was eliminated, as I thought a greater flame spread was desirable, and two additional heating coils were added to the main jet. On tests the unit was very promising, and for brief periods would operate with a healthy roar, but owing to the erratic running of the pilot jet it still tended to cut out and fling neat fuel all over the place. It was whilst struggling with this annoying problem that I suddenly had a brain wave. Why not let the main jets do the necessary preheating and thus cut out the pilot jet altogether ? Of course, it meant restricting the range of control as it would have to be kept well open all the time, but as I was only interested in " full bore " performance, that did not matter in the least. Unit " C " was easily modified for the experiment. The pilot jet assembly was removed entirely and the main jet system altered so that the jet ring was in the forward end of the combustion chamber and the heater coils were behind in the path of the flame. I encountered a certain amount of difficulty in starting up, but once it really got going it was obviously a big step in the right direction. I did not spend any more time on it but started work on unit " D."

This was the simplest unit yet produced, and to look at it one would not think that it embodied the results of several months' work. I used the same fuel tank but the other parts were new. As can be seen from the diagram, the number of heating coils was further increased, as I considered that this would improve the starting characteristics: in practice this was so. This unit performed very consistently and with its aid I was able to carry out a number of experiments with fuels and



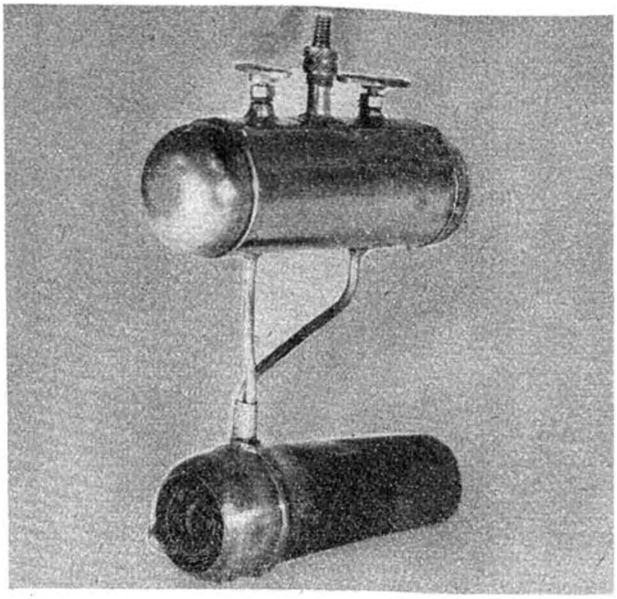


Last of the Line.—The unit shown above in a state of comparative nudity is unit " H " . . . Mr. Henwood's most recent and successful project. Assembled, it provides the heading photograph for this article.

jets. A new snag became apparent during prolonged tests with this unit. Owing to the small volume allowed for air space, the fuel pressure would steadily decrease as the fuel was consumed, and the quantity of gas generated would slowly fall off. In order to minimise this effect I fitted a separate air tank on unit " E," and the other major difference was the positioning of the jet ring ahead of the combustion chamber air intake. This unit also performs satisfactorily, but owing to the various components being held together by the tubular connections only, it was a rather clumsy affair.

Hitherto the problems of fuel supply and control had fully occupied my attention, and now that I possessed a reasonable working knowledge of these factors, I felt it was time to get down to the primary objective, the production of usable energy, *i.e.* thrust. Of course, I had not carried out all this work without attempting to ascertain if any thrust was being developed, and this I had done, by suspending a unit from cords and checking the movement by comparison with a plumb bob. This method was rather primitive and of limited practical value owing to instability of a unit thus operated. The ideal arrangement would be a test bed on which the static thrust could be read directly off a scale, and which would be compact enough to mount in a small wind tunnel in order to carry out tests under conditions approximating those of flight. Such a device would be quite easy to make and I intend to do so at a future date. Up to the present, the apparatus I have used has been of a rather more modest nature. It is simply a freely rotating counterbalanced arm with a radius of 5 ft., upon which the unit on test is mounted, and comparative thrust can be checked by measuring the velocity over a given period of time with a stop watch. This method appealed to me as the necessary parts were easy to make and it is very satisfying to see the unit actually nipping round under its own power.

Unit " F " was the first to be tried out on the arm and differed from its predecessors in that it was a more or less rigid assembly by virtue of the sheet metal structure shown dotted in the diagram. I also reverted to the internal jet ring, for reasons which I will explain later. The fuel tank was larger in order to increase the air space without resorting to the separate air tank employed on unit " E." A considerable number of tests



Premiere.—The pilot jet which as a feature of Mr. Henwood's first unit is clearly shown in this photograph. A comparison of this with the one overleaf clearly shows the great differences in design between his first and last productions.

were carried out and results were very satisfactory. Starting from rest and over a period of one minute, an average velocity of 11 ft. per second was consistently obtained, the maximum velocity attained immediately prior to cutting out being approximately 21 f.p. sec. With this unit I carried out many tests similar to those previously tried out on unit "D," but this time with the object of finding out the effect on the power output. I did not keep a log of the running times, but I estimate that this unit had well over an hour's operation to its credit when I finally scrapped it to make way for an improved model, and even then it was still serviceable.

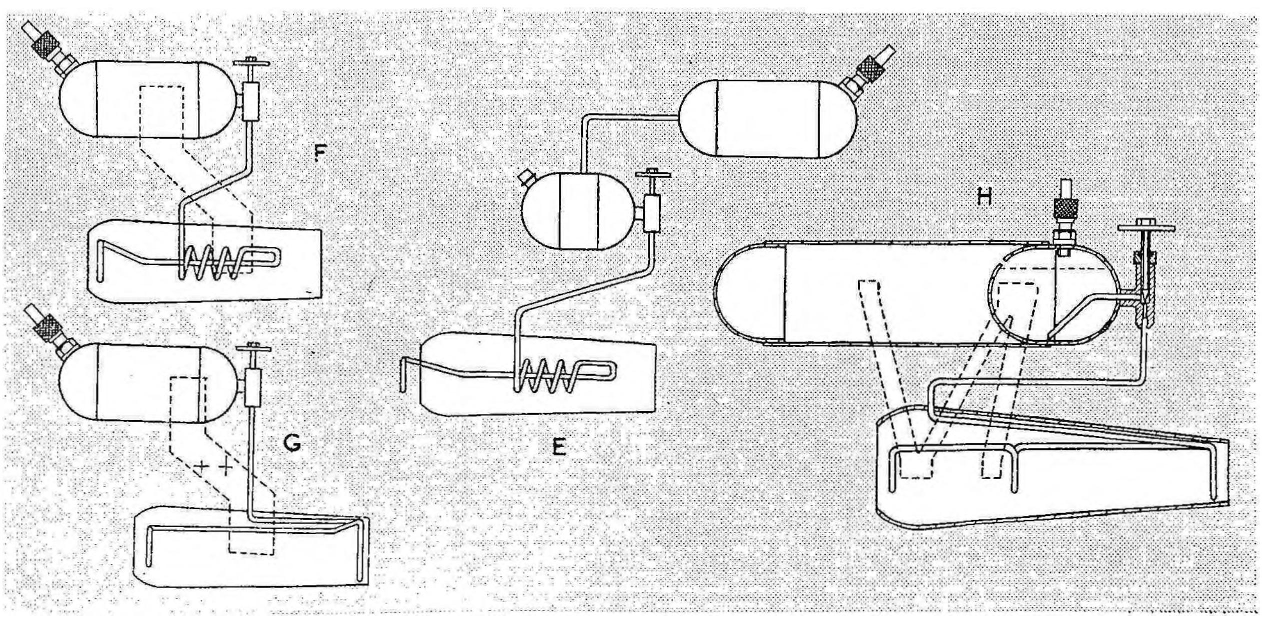
Externally, unit "G" appeared to be just a more compact version of unit "F," but the heater coil system differed radically. I found that just one coil, snugly fitted at the very tail end of the combustion chamber would (with alcohol or methylated spirits as the fuel) perform just as well as a more elaborate system placed nearer the jets, and, apart from the economy of material, it left the interior of the combustion chamber largely unobstructed, the superior gas flow resulting in a marked improvement in performance, the average velocity being 16 ft. per sec.

The latest unit "H" has put in a considerable amount of service on tests. I deliberately designed it with the idea of employing it in a flying model, so it has several features not found in previous units and is of lighter construction. I do not, by any means, consider "H" the last word: far from it. In fact, as is often the case, the more work I put in the more I find there is to know.

The unit, complete with fuel and ready to run, weighs 5½ ozs.; it will run steadily for fifty to ninety seconds on about 2 ozs. of fuel, according to the valve setting and on the test rig attains a maximum velocity of 24–26 ft. per sec. Its performance is interesting. The start from rest is smooth and gradual for 1⅛ to 2 revolutions of the arm, then the rate of acceleration increases rapidly; after twenty-five or thirty seconds, it slowly falls off but the unit is, I think, still slightly accelerating at the end of the run. The decrease I put down to the diminishing air pressure in the tank.

The power output from the unit is nothing startling, but I am confident that it will be sufficient to fly a model, and with this end in view I have carried out several experiments with flying models. Unfortunately, however, the contingencies of war have intervened, and for a while I have had to give up my experimenting.

In conclusion, I should like to make an invitation to the slide rule experts. Owing to the limited time at my disposal, my hands have been full with the production and testing of units, so that most of the designing was done by rule of thumb, and the development a result of trial and error, which, although a good way, takes a long time. So how about someone calculating the theoretical efficiency, jet sizes, duct proportions, etc., and if a few more modellers try their hand at building same, we should be able to improve this thing beyond recognition.



Goldilocks and the Three Props

A CHRISTMAS PANTOMIME FOR AEROMODELLERS

Book by Robert Jamieson - - - - - - - - *Decor by* Freddie

CAST

***SCRIPT** of the original production with the author's comments on the various catastrophes, misfortunes and disasters which befell the actors when it was performed before a hilarious audience at Auchengargle.*

Mortals

King Updraught of Thermalia .. ***R. A. Dussell***
Goldilocks, the Village Beauty ***Miss Emmar Bright***
Sloppy Takeoff, a wandering aeromod ***H. B. McGillicuddy***
Stretchum } **Windum** } **Stooges to Sloppy** { ***M. T. McSwindle*** { ***R. S. Bushbrooke***
Prince Blackwing of Belching Towers ***C. U. Tremble***
Artful Annie, Mother of Goldilocks ***T. McWhuppet***

Immortals

Fairy Flatulence ***Played by R. ("Pieface") Jamieson***
Demon King .. ***Played by C. Snoopert Doore***
Dove of Peace .. .. ***Played by Drambuie***

Chorus of villagers, courtiers, aeromods, etc.

ACT I

The village square of MUCH BANKING, in the Kingdom of Thermalia. The curtain rises to disclose a crowd of villagers and aeromods, all singing lustily.

King Updraught he is coming—to tell of his magic props,
That will send his models soaring, on every kind of ops.
So don't give him the berry, but stand and raise a cheer;
For if we praise him loud enough he'll maybe stand free beer.

Crowd divides. A villager steps to footlights and gazes off.

VILLAGER:
See—strangers are approaching—a trio of dirty tramps,
They'll be company for Artful Annie—the lazy scamps.

Enter Sloppy Takeoff, accompanied by Stretchum and Windum. The villagers gaze at them resentfully.

SLOPPY: Glad tidings for you all—now don't say tutts!
We've come to make your fortunes—

VILLAGERS: Nuts!

SLOPPY (*turning to his stooges*):
I fear we are not welcome, so ere we're cursed,
Let's to the pub, and slake our burning thirsts.

Stretchum and Windum almost fall over each other in their frantic efforts to open the door of the "Wing and Wallop" for Sloppy. The trio disappear inside.

A fanfare of trumpets is heard off. The crowd becomes tense; cheering is heard, and all burst into song.

Hail Updraught of Thermalia—bless his Royal Mantle.
Long may he pass the time away, his engines to dismantle.
Long may he build his model 'planes, with chisels, saws and axes,
For he hurts no one but himself, and never charges taxes. (*All cheer as King Updraught is wheeled in on a trolley, attended by courtiers and pages. The pages are using large model wings as fans. Unfortunately their efforts to put some ginger into the fanning process are handicapped by the small stage, and one of them knocks Mr. Dussell's crown off, and the other catches him a clout on the crust which causes him to play the scene in a rather dazed manner.*)

KING UPDRAUGHT:
Loyal subjects, a contest I announce—
Which ought to fill you all with vim and bounce.
If you don't have a go, you're lazy clods.
Royal Trumpeter—play up, and shout the odds.

Two trumpeters come forward and blow a fanfare. A large green spotted snake springs from the bell of one trumpet, and catches Snooky Munro—who was leading the orchestra with his harmonica—right on the nose. He takes this as a personal insult, and bounds on to the stage to demand satisfaction. In the confusion the wheels of Mr. Dussell's trolley retract, and decant him on the floor. Order is finally restored, and the show proceeds.

HERALD:
The King's new engine is run in. The King's new 'plane is ready.
But one thing now is lacking—a prop to fly it steady;
So Updraught will give wealth untold, to citizen or cop,
Who'll search through maths and formulæ, to find the magic prop.

The trumpets sound again. Courtiers affix notices to walls and trees. All cheer as King Updraught is wheeled off. The villagers look listlessly at the notices and wander off. Soft lights; sweet music; and Goldilocks comes on. She is definitely pinuptuous, dressed in tatters of the Metro-Goldwyn or curve-revealing type. After gazing intently at the posters, she comes down-stage to the footlights.

GOLDILOCKS:
Oh—if only I dare venture into the dreary mountains of Maths and Formulæ to find the magic prop. Then I could pay off the mortgage on our little cottage, and my dear old mother wouldn't have to take in washing any more. (*She bursts into tears.*)

SLOPPY (*emerging from pub and seeing her*):
By lifting tail—but you're a nice wee lassie;
Warped wings and all—but you've a snappy chassis.
Now dry those tears, they'll make your eyes all woppy.
Sit on my knee, and tell your Uncle Sloppy.

GOLDILOCKS:
Oh you are so kind. (*She sits on his knee, and puts her arms round his neck.*) But Prince Blackwing is going to turn us out into the snow if we don't pay our rent.

SLOPPY:
Never—at least not yet. There won't be any snow for a day or two. (*Artful Annie enters and sees them. She shakes her fist at Goldie.*)

ARTFUL ANNIE:
Get up—you lazy, good-for-nothing daughter.
To flirt like this you know you didn't oughter;
And you, young stranger, what have you in mind?

SLOPPY: Come to the pub, and I'll stand you a pint.

ARTFUL ANNIE:
Whoopee! (*She dives for the "Wing and Wallop," followed by Sloppy.*)

GOLDILOCKS (*looking after them regretfully*):
Ah—my poor, dear mother, how she does enjoy her snifter—but Sloppy might have taken me too.

The lights dim suddenly. Harsh, menacing music is heard. A great, black glider is seen against an angry sky, and as the thunder crashes and the lightning flashes, Goldilocks crouches appealingly in the limelight; Prince Blackwing enters and comes down stage.

BLACKWING:
So Updraught offers prizes, and holds a competition.
I'll see him and his petrol 'planes all burning in perdition.
But here's a pretty wench—a gift I'm sent,
Although her undercart's a trifle bent.

GOLDILOCKS (*throwing herself at his feet*): Oh—your Highness, don't turn my poor mother out of her cottage—

BLACKWING:
Tach—the old dame's in her dotage.
But you—by streamline: you're a pretty lass—
I think it's about time I made a pass.

He makes the pass: Goldie recoils and tries to flee, but he catches her by the wrist.

BLACKWING:
Aha, me beauty—now you're in me power;
At Belching Towers you'll be within the hour.

As Goldie struggles in his grip, soft music is heard, and the good Fairy Flatulence floats down from the roof. Unfortunately something goes wrong with his wires and he has to deliver his lines hanging head downward, with his nether parts facing the audience.

FAIRY F.:
Stay—foul master, though you think you've snecked her,
My magic power will comfort and protect her.
Go to the mountains—find the magic prop;
Run Goldilocks, my dear—and never stop.

Blackwing recoils from the fairy, and Goldie beats it. As Flatulence is being drawn up to the roof, Blackwing utters an incantation. A great flash, and the Demon King comes up through the trap door. The dramatic quality of this entrance is rather spoiled. The trap door sticks, and he brings most of it up with him.

DEMON KING:
Don't worry about Flatulence, I'll fix him.
He'll soon find out as I'm the one who tricks him.
He has no power to stave off her disaster—
Come Flatulence, and meet your master.

After usual signature tune, Flatulence again comes down from the roof. This time the wires break. He plunges head first through the big drum, and delivers his lines with the ruins draped round him.

FAIRY F.:
'Tis true my powers are few—yet I defy you;
I'll do my best your foul plans to deny you.
I'll fight you till the hour of darkest dawn.
Blackwing and Demon King—the battle's on!

All vanish. Artful Annie rushes on to the stage, followed by Sloppy, his stooges, and the villagers.

ARTFUL A.:
Oh, my beautiful daughter! She's gone to the mountains and I'll never see her again.

SLOPPY: No—a thousand times no!

STRETCHUM: No—not a thousand—the motor won't stand it.

SLOPPY: Then nine hundred and ninety-nine times no. I'll follow her—I'll save her, and find the magic prop too; coming with me, boys?

WINDUM: Sure—if you'll pay the 'bus fares.

VILLAGERS: Stop—you can't go to the mountains!

SLOPPY: Why not?

VILLAGERS: You haven't brought us a drink yet.

Curtain: End of Act I

ACT II

SCENE: *A dreary valley in the mountains of Maths and Formulæ. Goldilocks is seated at the mouth of a tiny cave, tending a small fire.*

GOLDILOCKS:
Alas, my poor mother will think I have deserted her. Soon she will be turned out of our little cottage—I do hope the snow comes on in time. If only I could find the magic prop. I thought that big Bo-hunk Sloppy would have followed me by this time, but some men seem to have no sense.

She looks up as the usual signature is heard, and sees Fairy Flatulence clinging to the scenery, high up in the flies. He's evidently "had some" as regards the wires, and is taking no chances this time.

FAIRY F.:
Fair maiden, now cheer up and don't look sick;
This magic spell will help to do the trick.

A parchment flutters on to the stage. Goldie grabs it and pronounces the formula. Nothing happens; she looks enquiringly at Fairy F.

FAIRY F.:

Alas, sweet maid, with you the spell won't tick,
An aeromod alone can do the trick.
So find someone who's built a 'plane or two,
The magic prop he'll quickly find for you.

Fairy F. goes off. Goldie returns to the fire. A scrabbling noise is heard and Sloppy—and his stooges—comes sliding down the rocks at the back of the set.

GOLDILOCKS:

So you've turned up at last—you big stale bun,
Tho' any man is better far than none.
Come: spill the spell—and bawl it good and lusty,
To find the magic prop won't be so dusty.

Sloppy picks up the parchment. He advances to the footlights and proclaims:

Oh streakum—strokem—fly a model high,
And never dope the tissue till it's dry.
Oh heekum—hœkum—may the villain drop,
And my sweet princess find the magic prop.

A dramatic chord from the orchestra. A blue flash—and the whole set swings open to reveal an aeromod's treasure house. Stacks of balsa bound with great skeins of rubber. Dope in great jars: reams of rainbow coloured tissue: rows of engines, coils and timers: and, revolving slowly on their spindles, three silver props inscribed "Magic—very special." Sloppy turns to Goldie with a courtly gesture. The stooges—gibbering faintly—start to loot the treasure cave. Goldie gets the props and returns to Sloppy, who gazes at her fondly and says:

Come honeybunch—let's go, and now don't fuss,
We may have to wait ages for a 'bus.
So on your journey back don't let's be flurried,
I'd hate your darling mother to be worried.

They prepare to leave the stooges bearing great stacks of plunder. Harsh, menacing music is heard, and the shadow of wings falls over them. Prince Blackwing stalks on to the stage, laughing sardonically.

BLACKWING:

You think your fortune's made—but that's a bubble,
I let you find the props to save me trouble.
On 'plane of Updraught's they will never whirl;
I'll keep them for myself—'long with the girl.

He makes a signal. Blue flames, and the Demon King comes up through the trap as before. Goldie screams and flies to Sloppy for protection. The Demon King casts a spell over Sloppy and his stooges, who are frozen motionless, unable to stir hand or foot. They are bound together with a great skein of rubber while Goldie watches. helplessly—torn with grief at the fate of her lover. Miss Bright spoils this scene somewhat by powdering her nose at this point.

BLACKWING (*advancing on helpless trio and gloating*):

Ha! Now you'll starve to death, and serve you right.
But when I bomb the valley—don't be fright!
I'll fill this valley up with rocks and stones,
I'd hate the police to find your bleaching bones.

With a last taunt at the helpless trio he goes off, dragging the sobbing Goldilocks with him. The shadow of his wings falls over them, and then a terrific crash tells that the valley is blocked—they are trapped! The stooges moan but Sloppy cheers them up.

We'll get free of this mess—never fear,
Stretch out the rubber and let's struggle clear.

They manage to free themselves and Sloppy whistles. Drambuie appears, carrying—instead of the usual olive branch—the bone of a kipper, to which the head and tail are still adhering. He does a few circuits of the stage, preening himself with delight at being in the limelight.

SLOPPY:

Come, faithful friend—with ceremony dispense,
You'll take news of our plight to Flatulence.

A message is fixed to Drambuie's leg. He goes off pronto, and in a few minutes Fairy F. appears as before, high up in the flies.

FAIRY F.:

Alas! I cannot help you to escape,
For Blackwing's got you up against the tape.
But where's your brains?—I don't mean to insult,
You've loads of rubber—make a catapult.

Sloppy yells with delight as the idea sinks home, quickly the skein of rubber is untangled and fixed to the crotch of a tree at the side of the stage. Stretchum and Windum heave and grunt as the great bunger is stretched to the limit.

SLOPPY (*seats himself on it and declaims*):

With grace and ease I'll speed through cloud and air,
Straight to the rescue of my lady fair.
And Blackwing will have cause this day to rue,
I'll twist his tail and warp his rudder too.

With a resounding "Pong" the great catapult is released—and Sloppy sails high in the air.

Curtain: End of Act II

ACT III

SCENE : *The great, dark, vaulted hangar of Belching Towers. At the back of the set is seen Blackwing's sinister glider. Alongside is a work bench. The prince is working feverishly—fitting an engine to his glider. The three silver props—stolen from Goldie—are seen on his bench. With the limelight on her, Goldilocks sits at the front of the stage. Despite her captivity, she has managed to effect a change of costume ; though her ensemble is, if anything, more oomph-some than her Act I get-up. As the curtain rises she looks appealingly at the audience, who are horrified to discover that she is loaded with chains and manacles.*

BLACKWING :

Now, my proud lass, your secret yield to me,
Or else—no sugar in your morning tea.
Of these three props, which is the magic one
To fly my 'plane straight up beyond the sun ?

GOLDILOCKS (*moaning and clanking her chains to gain sympathy*) :

You'll never make me tell—I'm undismayed.
Soon Sloppy Takeoff will come to my aid.
So treat me as you will and spoil my " healf,"
I do not know the magic prop myself.

BLACKWING :

Enough of this fooling. Sloppy is due for a shock when he comes snooping around—see ! (*With a dramatic gesture he pulls aside a curtain—to reveal a large mirror. Goldie looks at it and starts back in wide-eyed horror. Sloppy—with his Stooges behind him—is seen painfully toiling up the steep rocks that lead to Belching Towers.*)

BLACKWING :

We must prepare a welcome for our guests. We must see that the dungeons are well aired—it would never do if he caught a chill while starving to death.

He laughs and rubs his hands sardonically.

GOLDILOCKS : Mercy—please—mercy for Sloppy.

BLACKWING :

No mercy will I show to the clodhopper,
He'll get it where the chicken got the chopper.

Prince B. goes off and Goldie struggles to her feet, clanking her chains in the process. She drags herself to the centre of the stage, then starts as a low call comes from the cockpit of the black glider. Sloppy is crouching in it.

GOLDILOCKS :

Oh ! darling Sloppy—do not tarry there,
That wicked Prince has sworn to curl your hair.
And plans your doom in dungeons deep and damp,
I'd hate to have a husband with the cramp.

SLOPPY (*climbing out of the glider*) :

I've dodged him so far—soon we'll be free and wealthy,
But let's get out of here—it's not so healthy.

GOLDILOCKS : But the magic prop—which one is it ?

SLOPPY : One of the three—we'll take these two and leave the other for Blackwing—it may console him.

Quickly he removes Goldie's manacles. His Stooges appear at the window.

STRETCHUM : Hurry, boss—he's coming !

SLOPPY :

Take Goldie with you—see and treat her gently,
And I'll buy you a car—a Rolls or Bentley.
But hurry, boys—straight to our kingly ruler,
If we're caught here—we'll be bunged in the cooler.

Stretchum and Windum assist Goldie through the window. Blackwing's heavy tread is heard approaching—Sloppy seizes the remaining prop and places it on the motor which is already mounted in the nose of Blackwing's glider. Then he darts to the window and vaults through. Almost before he vanishes Blackwing re-enters. At the sight of the empty hangar he roars with rage, shaking his clenched fists at the ceiling and shouting :

They've foiled me and escaped—yet left a prop.
Is it the right one—or another trick ?

He mutters his spell. The Demon King pops up as before. Mindful of his trouble with the trap-door in Act I, he is now wearing a tin hat.

DEMON KING :

Blackwing, me boy, that is the real wind shovel,
To put paid to old Artful Annie's hovel.
The money and the girl—you're sure a winner,
It's all laid on, certain as I'm a sinner.

BLACKWING :

So vengeance shall be mine—till Updraught rots,
And Sloppy Takeoff's legs are tied in knots.

Curtain : End of Act III

ACT IV

Scene I. King Updraught's workshop. The renowned " Bystander " dominates the set. The walls are decorated with scenes from aeromodelling history. Pieces of petrol engines are scattered around. King Updraught is seated on a throne-like bench, lapping in a piston. Sloppy and Goldie enter, and kneel before him.

KING UPDRAUGHT :

How now, good subjects mine ?—don't look so dizzy,
But tell me what you want—I'm rather busy.

SLOPPY :

Your Majesty, here are two props, and both are magic,
But I fear the fate of Blackwing will be tragic.

KING UPDRAUGHT :

What do you mean ? *The loudspeaker behind the king begins to boom. The King starts, Sloppy is unmoved—but Goldie clings to him in fear. Prince Blackwing's voice—harsh with menace—booms out.*

BLACKWING :

You poor sap, Updraught, now you're on the bust,
I'll bomb your palace till it's only dust.
My glider's got an engine, and a prop ;
So Sloppy Takeoff soon will get a shock.
This poem, I'll admit, is not so strong,
I make it up just as I go along.
But vengeance shall be mine—so don't you scoff !
Get ready : here I come—I'm taking off !

The sudden roar of a motor is heard. The shadow of wings falls across the stage. Goldie moans.

KING UPDRAUGHT (*gathering his robe around him*) :

Helter-skelter—out to the shelter,
Though we may find it cramped a bit,
On the lawn mower we can sit.

As they dash out, the stage revolves to reveal the palace gardens. This is meant to be a triumph of stage technique, but as the other set swings into view Prince Blackwing and Artful Annie are surprised in the act of sharing a sandwich and a bottle of beer. They get off hastily, Annie still clutching the bottle. Again the shadow of the wicked Prince's glider falls across the stage. A sudden tearing rip—and the glider crashes dramatically. An agonised howl from Blackwing ; Drambuie swoops gracefully across the stage, carrying the prop from Blackwing's 'plane.

SLOPPY :

I knew that prop would never fly it,
Blackwing was just a fool to try it.

KING UPDRAUGHT :

So now let's celebrate without a care,
I've got the magic prop—and one to spare.

GRAND FINALE

A magnificent set, the exterior of Updraught's palace, with a grand marble staircase at back centre. Enter the villagers in their Sunday suits, cheering joyfully ; a great procession sweeps down the central staircase. More cheers as King Updraught enters with Artful Annie (very loudly dressed) on his arm. Excitement mounts to a climax as Goldilocks—all tricked up like a Xmas tree—comes down the stairs on Sloppy's arm. Boos and hisses as Prince Blackwing—plentifully adorned with sticking plaster and hung with the same manacles as confined Goldie in Act III—is brought on. He is led before Sloppy, who looks at him with pity.

SLOPPY :

I'll let you off, though you're a naughty lad,
But on this day all people should be glad.
So beat it, Blackwing—scram, you silly goon !
My bride and I are on our honeymoon.

KING UPDRAUGHT :

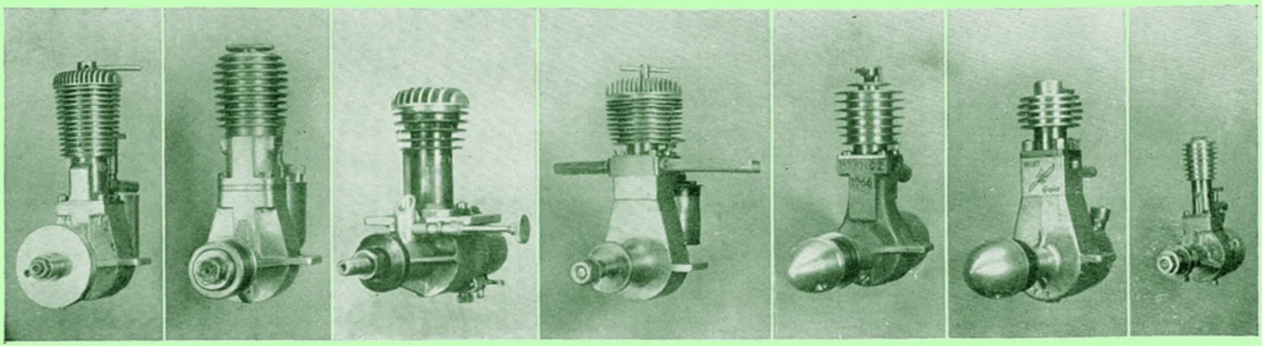
And now they're speeding to the magic lands,
In my new model—built by my own hands.

Amid tumultuous excitement a low, rakish two-seater is wheeled on. Sloppy and Goldie climb in, the motor is started up, and the crowd divides to right and left to make way for the take-off. Once more Drambuie flutters overhead—still grasping his kipper. Yet again Fairy Flatulence descends from the roof, and hovers over the 'plane like a protecting spirit. The final tableau is rather spoiled. Fairy Flatulence's wires snap again, and he plunges right on top of the honeymoon express. The fuselage cannot take it, and the whole set-up sags and breaks in the middle. As the curtain falls, Sloppy sticks his head out of the wreckage and delivers the tag in a rather strained voice.

SLOPPY :

We hope our pantomime you have enjoyed,
Although this final scene leaves me annoyed ;
We trust you'll leave us with a thankful cheer,
And come to see our show again next year.

THE GEN ON "DIESEL" ENGINES



BY LAWRENCE H. SPAREY

With an introduction by

D. A. RUSSELL, *M.I.Mech.E., Managing Editor, The* AEROMODELLER

In the history of research and development are recorded many instances where work has followed similar lines during concurrent periods, but in places spaced many miles apart. The story of the model "Diesel" engine is yet another example of this, and, accordingly, it is not possible to name any one person as its "inventor."

My own experience of internal combustion engines ranges over the past twenty-five years—shortly after the last war I was engaged on the manufacture of "Diesel," "Semi-Diesel," "Hot-Bulb," and the normal type of petrol engines of capacities of from a few horse-power up to as much as fifty horse-power per cylinder—and in that period there have been innumerable improvements, alterations, additions (not to mention subtractions !) attributable to many men ; yet none could (or would) claim to be the "inventor" of any of these many features.

Similarly with the model "Diesel" engine. During the past three or four years, development work has been carried on, to my own knowledge, in Italy, Germany, Switzerland and France—possibly in other European countries too—as well as by the "Aeromodeller" Research Department in this country. Curiously enough, I do not know of any comparable work having been carried out in America !

And so, to the question "Who invented the model 'Diesel' engine ?"—I can only say, "I do not know—certainly we did not" ; but we were the first in this country to carry out, in the period above referred to, considerable research and development work. This, however, does at least enable us to publish the first authoritative survey on this type of engine, based on our own practical work.

THE advent of the miniature "Diesel" engine for model aircraft work seems likely to increase considerably the number of power-driven model aeroplanes, and interest in its possibilities and character is, naturally, widespread. This article is intended to give an outline of the position at the present time, and is based upon data gathered from all available sources, coupled with personal experience gained whilst assisting Mr. D. A. Russell, M.I.Mech.E., and Mr. A. S. Brentnall in their researches in this field.

In spite of its apparently recent introduction from the Continent, it may now be disclosed that a considerable amount of development work has been done on this side of the Channel, and that Mr. Russell and myself had successful model "Diesel" engines running a very considerable time ago. Several of these engines are illustrated in this article. Also, the researches of my colleague, Squadron-Leader Peter Hunt, of radio-control fame, into the matter of fuels, have made a valuable contribution to success, and his findings will, I understand, be published in a special article in next month's "Aeromodeller." For this reason the question of fuels will not be touched upon here.

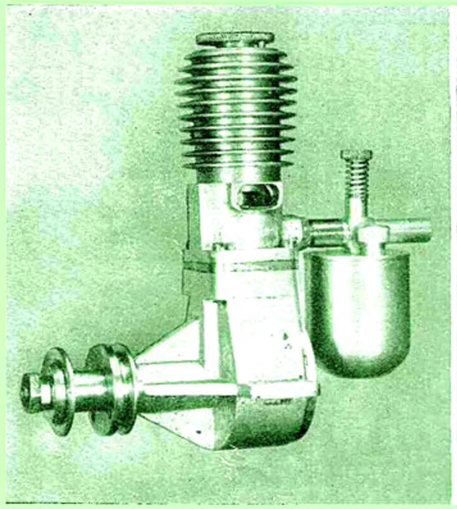
Principles of the Model "Diesel"

Although these new engines are commonly known as "Diesels," they are not, in fact, true Diesel types. Rather should they be known as "Compression-Ignition." In the Diesel engine proper, a charge of air is first drawn into the cylinder of the engine, and compressed by the upstroke of the piston. This compression heats up the air to a considerable temperature, and into this hot mass a tiny charge of fuel is injected from a fuel pump at the peak of the compression stroke. The fuel thereupon explodes, thus providing the power stroke, and it is upon the precise timing of the injection of the fuel that the engine timing relies. Severe mechanical difficulties had to be overcome before the full-sized Diesel engine was brought to its present state of perfection; not the least of which was the making of a suitable injection pump capable of delivering the precise, tiny quantity of fuel against the enormous pressures in the cylinder head. In the large sizes of engines this was found possible, but when applied to such small engines as are required for model work it was not practicable to construct pumps nor jets with the requisite precision.

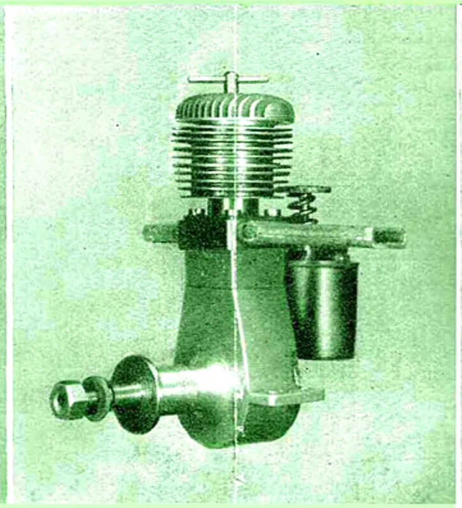
In view of these difficulties the orthodox Diesel principle was abandoned and, seeking solution along a different road, the *Compression-Ignition* engine with which we are concerned was evolved. The solution was found by combining with the fuel of an ordinary two-stroke *type* of engine a substance known as an "*accelerator*," such as *Ethyl Ether*. An "accelerator" is a substance which, when added to any normal engine fuel, lowers the octane number of the fuel, and imparts to it the property of detonating under high compression. This detonation provides the power stroke. Such is the principle of the model "Diesel" engine, although a considerable modification in the actual mechanical design becomes necessary.

General Characteristics of Design

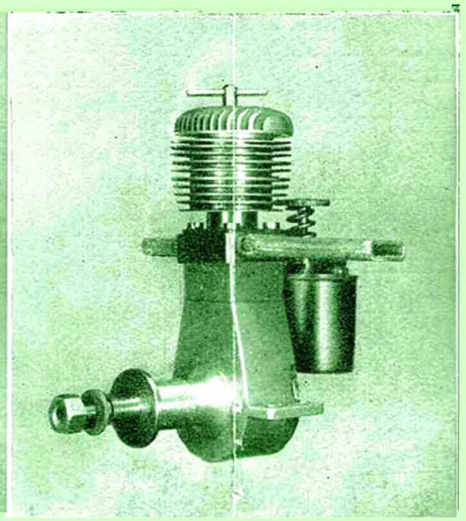
From the sectional drawing given here of a typical "Diesel" type, two features will be evident. First we note that the engine is of extremely long stroke. More striking, however, is the small piston at the top of the cylinder, having provision for adjustment of position by means of a screw protruding from the top of the cylinder head, and acting in opposition to the piston proper. This component is called the "*contra-piston*," and its function is to provide an adjustment of the compression ratio of the engine. Usually, the compression is adjustable between ratios of 10 to 1 and 20 to 1, which is a much greater range than is required, as the compression ratio for correct running is rather critical. In some engines, in fact, this contra-piston is omitted altogether, the correct compression ratio being obtained by grinding away the seating of the cylinder barrel, or by some other such permanent adjustment. The gain lies in the fact that the overall height of the engine may be made less, and that the operation of the engine is confined to one control only. Against this may be offset the disadvantages that extreme precision is required in the design and manufacture; that no compensation may be made for minute leakage due to piston and cylinder wear; and, more serious still, an absolute uniform standard of fuel mixture must be maintained for perfect performance.



3 c.c. No. 8B, with flat-top piston and twin exhaust ports. Variable compression. Weight 8 ozs. A highly successful engine.



2 c.c. No. 5A, with flat-top piston, and fitted with experimental exhaust belt. This engine, however, runs better without exhaust pipes.



5 c.c. No. 12A. A very satisfactory engine with deflector piston and twin exhausts. Variable compression. Will swing a 14 in. propeller at 4,500 r.p.m. Weight 9 ozs.

The long stroke, which is advantageous in obtaining high compression—and which also makes possible a long piston-seal to prevent leakage—makes the model "Diesel" slightly taller than a petrol engine of equivalent capacity. The space occupied by the contra-piston also adds to the height. Similarly, the long stroke makes a large crankcase necessary, so as to accommodate the increased swing of the crankpin. Thus, the "Diesel" is apt to be of larger overall size than a normal engine of like capacity.

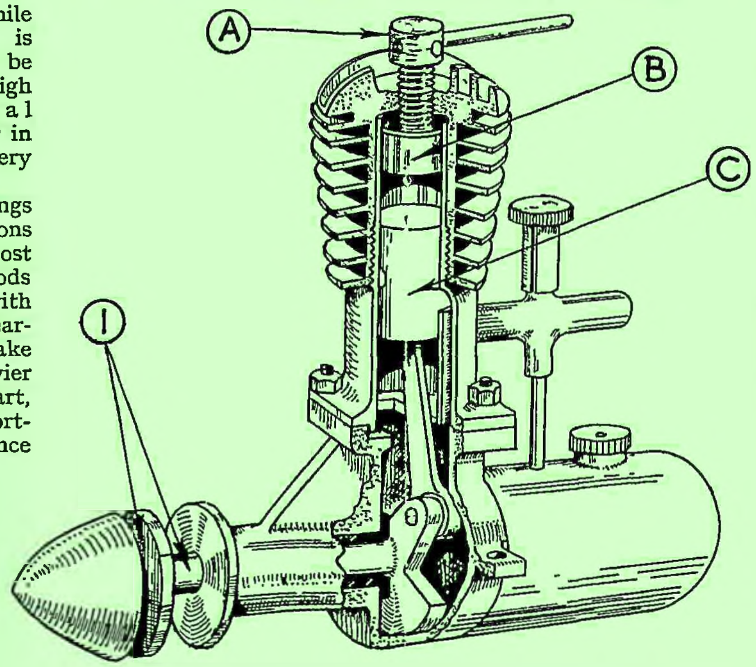
The usual compression ratio of small *petrol* engines is between 4 and 6 to 1, while that of the "Diesel" is around 16 to 1. As may be expected with these high compressions, internal strains are much greater in the "Diesel," requiring very sturdy construction.

Crankshafts and bearings of truly massive proportions are desirable, whilst the most satisfactory connecting rods are those of solid steel with hardened and lapped bearings. These necessities make the small "Diesel" heavier than its petrol counterpart, but this is of little importance considering the absence of any ignition accessories, and the fact that *the power developed per c.c.* by the "Diesel" engine is very much greater than that developed per c.c. by the normal petrol type engine.

Generally speaking, the wear and tear on the small "Diesel" is greater than that on orthodox units, making necessary the use of special steels for certain parts. Cylinders, crankshafts and connecting rods may well be made from nickel-steels and hardened. Lapped, cast iron bearings will be found to stand up to the job in preference to the more usual bronze. If, however, due regard is given to these points there is no reason why the small "Diesel" engine should not live as long as the normal petrol type.

Owing to the need for a small compression space, the usual deflector on the piston head is not often used on the "Diesel" engine. The piston top is usually flat, and this seems to have no adverse effect on the simple operation of the engine. Some sort of deflector is, however, sometimes used, and this takes the form of a small step milled into the side of the piston so as to register with the transfer port in the cylinder. Nevertheless, there seems no reason why a normal deflector piston should not be used, provided that the cylinder head or contra-piston is profiled to register exactly with the piston top. Irrespective of the difficulty in machining which this entails, our experiments tend to show that some advantage in speed and power may be obtained by the use of a deflector of some sort.

Sectional drawing of typical Ignition Compression Engine. (A) Compression control-lever. (B) Contra-piston. (C) Piston. (I) Starting pulley.



Linked with the problem of high compression is the matter of starting the engine. It is not easy, against the high compression, to flick the propeller by hand with the requisite smartness for a start. For this reason a small pulley is usually provided on the propeller mounting, so that the engine may be smartly turned over by means of a cord. The starting of these small "Diesels" is invariably extremely easy, as both starting and running are—apart from the simple compression and throttle controls—purely dependent upon the *mechanical efficiency* of the engine itself, and are not subject to that bugbear of model engines—ignition troubles! This freedom from ignition faults must be experienced to be appreciated, as once the correct starting and running positions of the controls have been determined these engines perform with unfailing regularity.

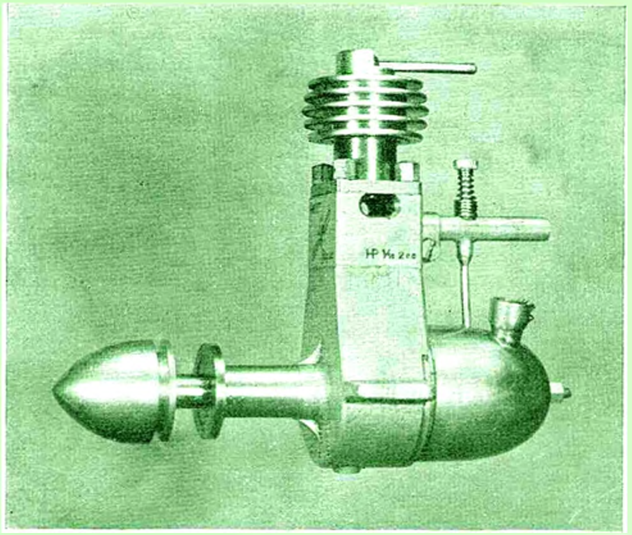
Another reason why starting by cord is advisable is that hand-flicking of the propeller—especially when the engine is hot—is apt to be dangerous, and although it may not continue to run at incorrect settings, the danger to the fingers from a sudden spin of the propeller is considerable.

Altogether, it may be stated that small "Diesels" must be made with an accuracy and precision much greater than that required for ordinary petrol engines, and that special attention must be given to the design of ports, transfer passages, and the choice of materials.

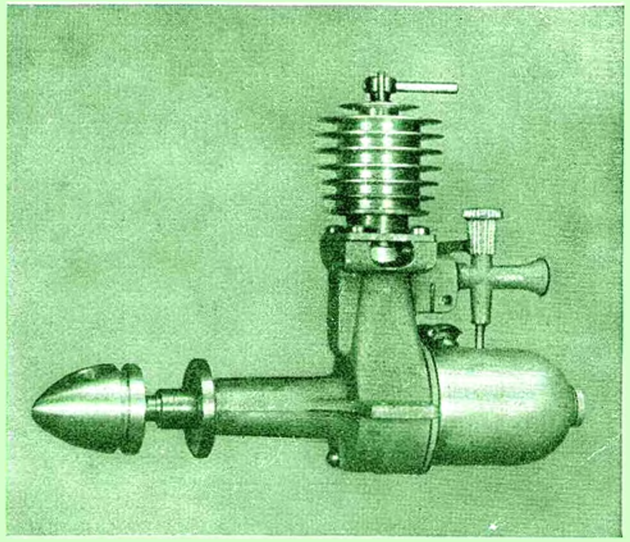
Running Characteristics

Miniature Compression-Ignition engines have definite running peculiarities of their own, which differ considerably from those of orthodox petrol types.

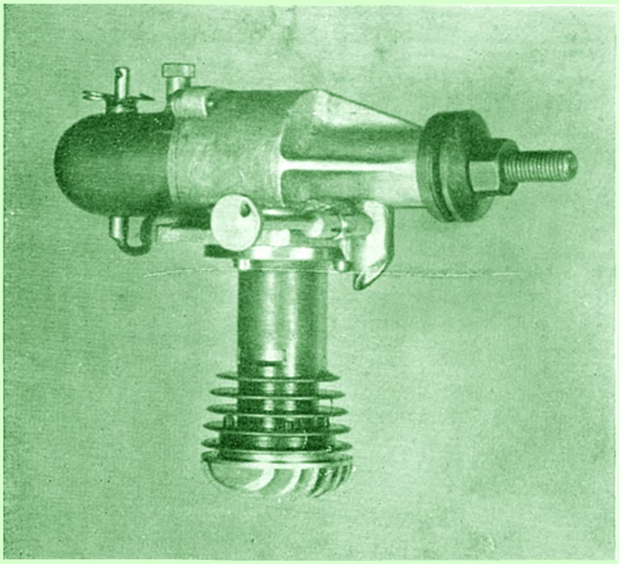
In the first place, there is a definite relationship between the compression ratio and the throttle setting. It is possible to start and run the engine at a great variety of settings, none of which may be the correct one for maximum efficiency. Preliminary trial-and-error tests will, however, give the correct settings, when the control lever of the compression adjustment may be anchored between stops so as to provide a range of adjustment between small limits.



An Italian engine—the 2 c.c. Giglio—with flat-top piston and twin exhausts. Weight 7 ozs.



The "Movo," an Italian engine of 2 c.c. capacity. Flat-top piston, twin exhausts. Weight 6½ ozs.



Another Italian engine of 5 c.c. capacity, designed to run inverted. Flat-top piston, fixed compression and single exhaust. Note spring-loaded fuel cut-off needle for flight timing. Weight 10 ozs.

In making these trial-and-error tests it is, at first, advisable to run the engine at the *lowest* compression ratio consistent with regular firing. Should the compression be too low this will show itself in mis-firing, and the "compression lever" should be adjusted slightly until regularity is maintained. The throttle needle should then be adjusted. By *shutting* the throttle too much the engine will be made to "pink" badly, and this will be evidenced by a series of loud, metallic "knocks." Similarly, should the throttle be *opened* too much the same symptoms will be manifest; the engine will be found to "knock" badly at the limits of about one-third of a turn of the needle valve. The correct needle setting for that particular compression ratio will lie midway between the limits of "knock."

Now, the compression may be increased slightly, when the engine will again "knock" badly. A readjustment of the throttle needle, as before, will again correct this. Continue this series of adjustments until the engine is running evenly and at its maximum speed, *but without "knocking."* When the compression ratio has been raised too high, this will be indicated by the engine slowing down, and "knocking" no matter how the throttle needle is manipulated. It is important that the engine should not be left to run for long periods when "knocking," as this will have a disastrous effect upon the bearings.

When starting the engine the throttle needle should be shut down, and the engine given a few sharp turns with the cord to warm it up. Then open the throttle to its known setting, choke the air intake with the finger, and turn the propeller twice by hand to draw up the fuel. Now increase the compression slightly beyond the correct running position, and start the engine with the cord. As the engine picks up speed reduce the compression to its running position, and adjust the needle valve in the manner stated, so that maximum revolutions are attained.

Miniature "Diesels" will not run slowly under load, but require maximum revolutions to run efficiently. So much is this so that they will refuse to run at all if the diameter or pitch of the propeller is too great. For this reason airscrews must be accurately matched to the engine, and it will be found that best results will be had by keeping the propeller at its possible maximum diameter, and reducing the pitch until the greatest revolutions are obtained. When running correctly, however, the small "Diesel" will produce considerably more power than a petrol engine of equivalent capacity. Maximum revolutions seem to be about 5,000 r.p.m. under suitable load.

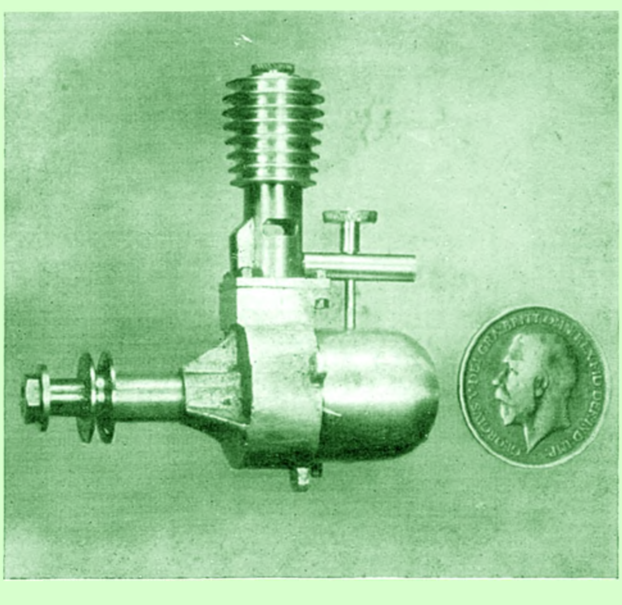
One curious feature of the small "Diesel" is that it runs extremely cool, so that it is quite possible to grasp the cylinder with the hand even after a protracted spell of running. This is principally due to the extremely rapid evaporation of the ether fuel. At the present state of development the fuel does not seem to be completely burnt, and there is always a dribble of liquid from the exhausts, which makes these engines rather "dirty" in use.

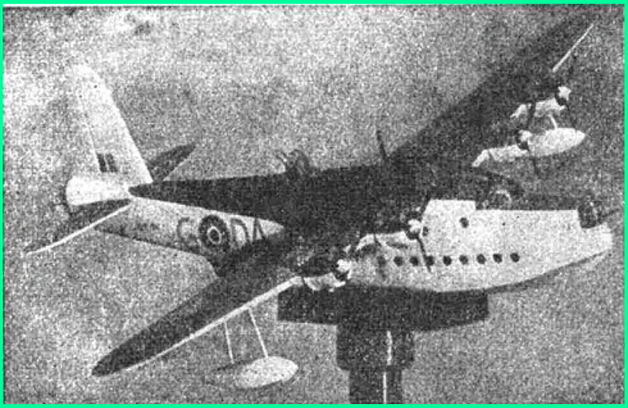
General Conclusions

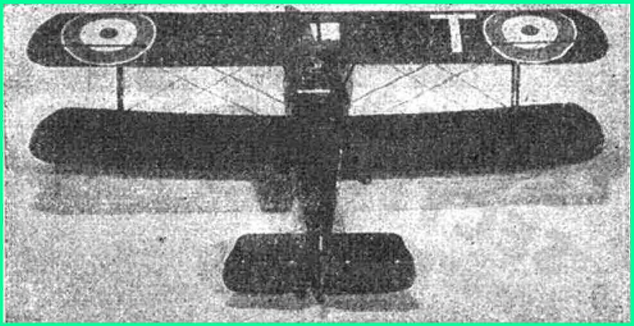
There can be no doubt that the miniature compression-ignition engine opens up a new phase in model aeronautics, solely because the weight of any electrical equipment is absent. This means that model aeroplanes of rubber-driven size and weight may be designed as power machines!

In spite of its apparent simplicity the "Diesel" engine does not seem suitable for general amateur construction, owing to the extreme precision required, and the necessity for hardened parts. Cylinder bores must be honed or lapped to a glass-like finish, and must be dead parallel and circular. Pistons must be similarly accurate, and must fit the bores to within microscopic limits. Even the different expansion factors of a cast iron piston and a steel cylinder will cause sufficient leakage to stop the engine! Nevertheless, some Aeromodellers will undoubtedly attempt to build model "Diesels," and we, at the "Aeromodeller" Offices, will be pleased to hear from them as to how they get on.

0.7 c.c. engine, No. 11B, photographed with a halfpenny. Deflector piston and twin exhausts. Will swing a 6 in. propeller at 5,000 r.p.m. Weight 2¾ ozs.







(Above) MODEL OF THE MONTH. Winning model in Class D of the A.B.A. Solids Competition held earlier in the year. Built by R. A. Chivrall, this delightful Camel is minutely detailed, even to the lacing on the fabric.

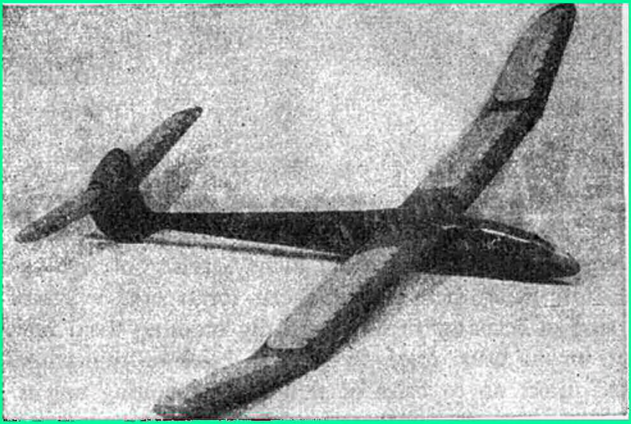
(Top left) " FULLY FURNISHED, H & C." ! Another excellent model which won a well-earned first place in Class B of the A.B.A. Competitions. This Sunderland, constructed by R. V. Mason, features a hollowed hull with all interior details.

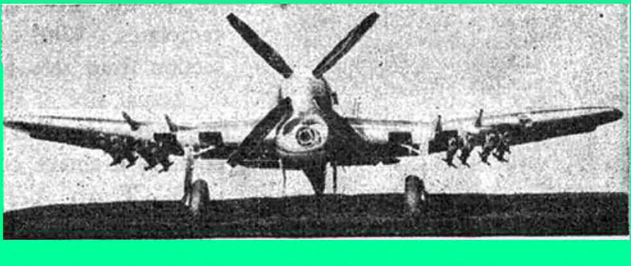
(Centre left) ANOTHER TRIBUTE. The characteristic Temple lines are apparent in this Tribute built from A.P.S. plans by K. Last of Bridport.

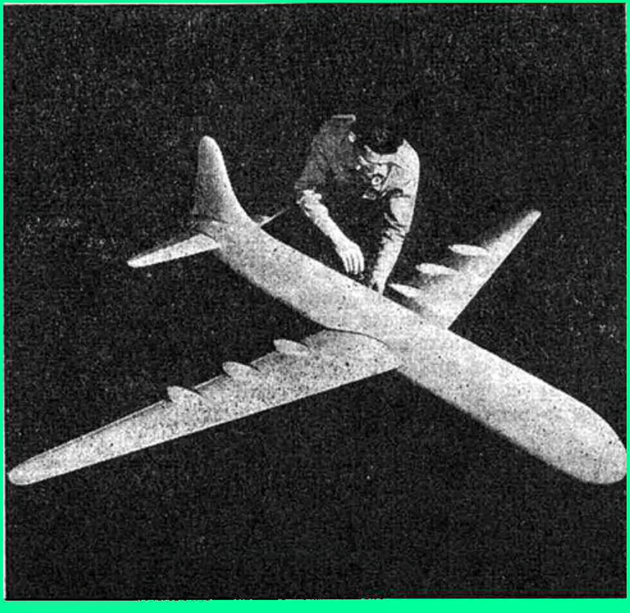
(Below) FORMIDABLE FRONT. A constant prize-winner, this model Typhoon is the work of J. Hardman. A good second in Class D of the A.B.A. Competitions, t also took a first prize at the First National Model Aircraft Exhibition.

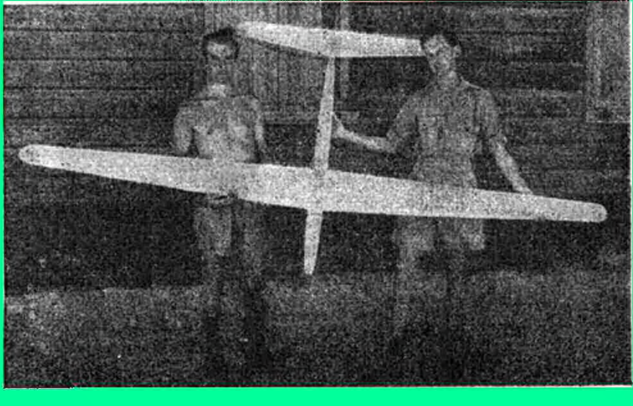
(Bottom left) MINIATURE GIANT. A view of the wind tunnel model of Convair's 204 passenger Model 37 air-liner. This 9 ft. span model is 1/36th of the actual size of the 160-ton transport, is made from laminated, aged birch, weighs 110 lbs. and cost £2,500.

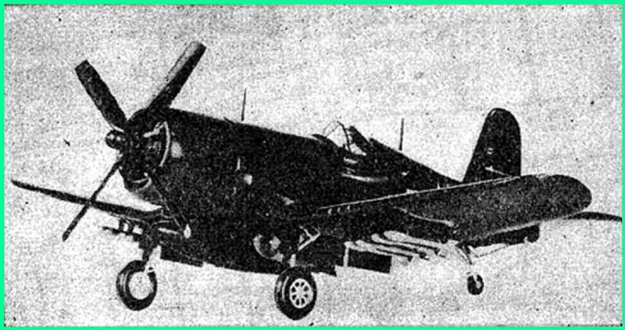
(Bottom right) BALSA BEDOUINS AGAIN. News of Middle East activities comes from W/O. Calverley now of the Shallufa M.A.C. Nothing could provide better proof of their unbounded enthusiasm than this 10 ft. span glider designed and built by Cpl. " Jim " Taylor seen on the left.











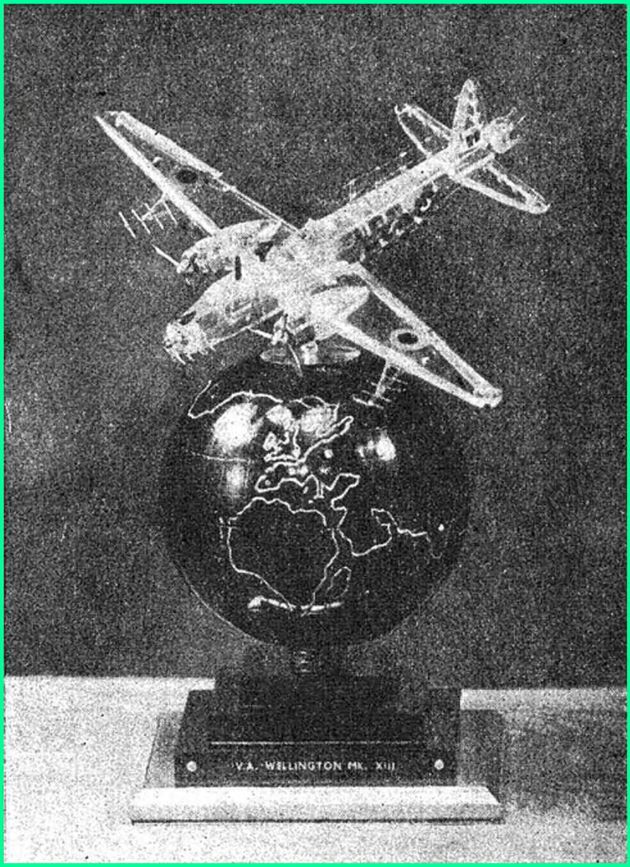
(Above) EIGHT TO THE BAR. *This 1/9th scale model of a "Corsair" fighter bomber is calculated to delight the hearts of all solid modellers. It was built in the experimental woodshop at Chance Vought Aircraft.*

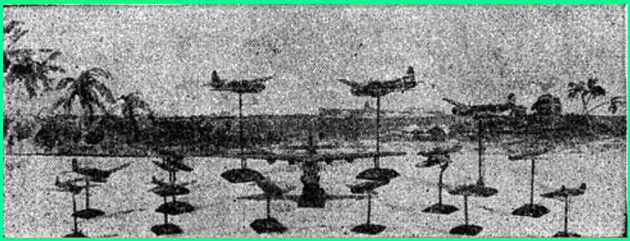
(Right) GLOBE-TROTTER. *An unusual and ingenious combination of aeromodelling and decorative beauty, this scale Wellington created in Perspex by W. Booth of Blackpool would add piquancy to any collection.*

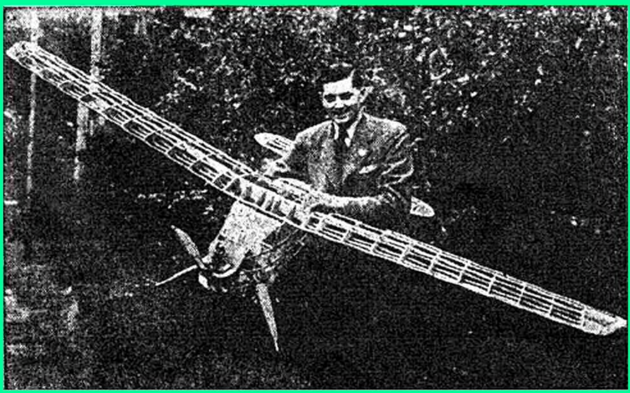
(Below) ORIENTAL SHOWCASE. *Models of Japanese aircraft arranged for recognition purposes at an Army School of Recognition. Every effort is made to induce atmosphere, illustrated by the painted background of swaying palms and surf-lashed beaches. Everything is there except the "music off"!*

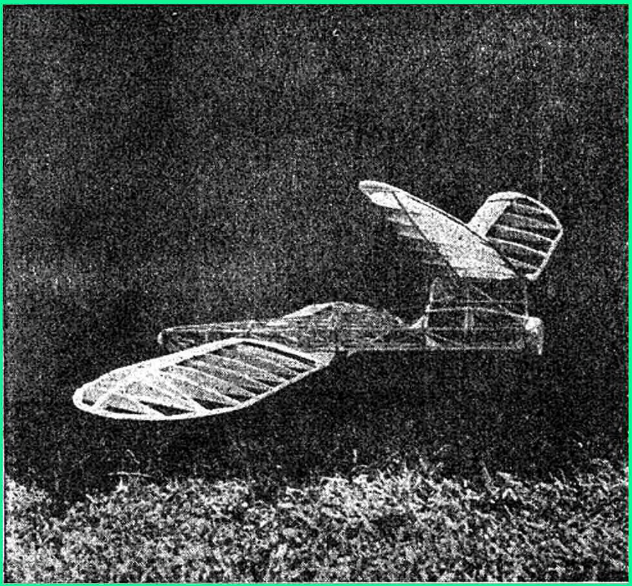
(Bottom left) ONCE MORE THE FIRE GOD. *A nearly finished "Vulcan," dwarfing its proud owner, G. Farley of Eastleigh. The model is powered with a Hallam engine, and should by now have weathered its test flights.*

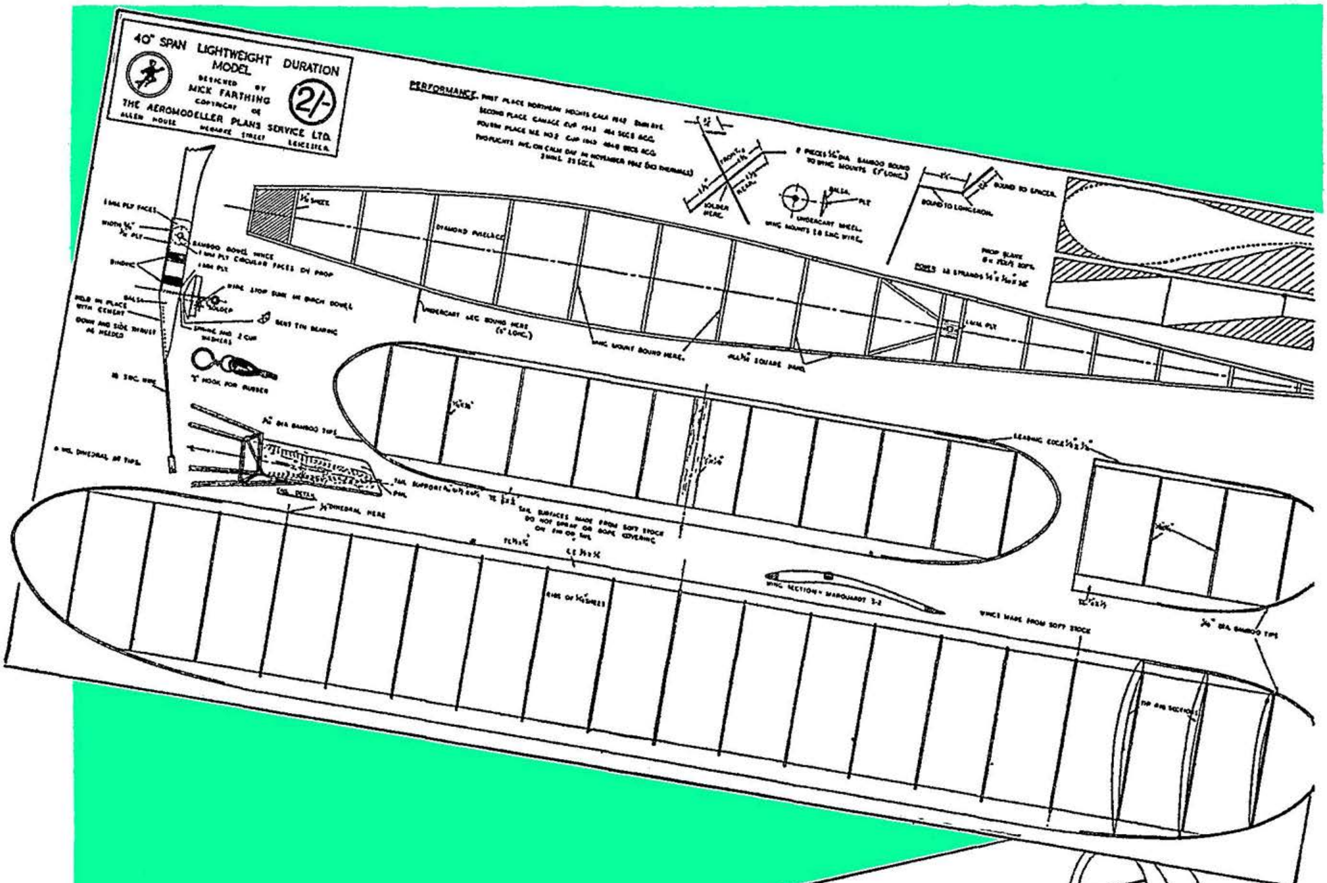
(Bottom right) ANIMAL, MINERAL OR VEGETABLE? *We are loth to commit ourselves, but we could make a guess! t is actually a model tandem-wing pusher by that ardent devotee of this type of aircraft, P. R. Payne of Campden, who informs us that the model should fly very well when covered, having a calculated duration of 6½ minutes in still air (!) Research into new model aircraft formulae is a worthy object, however, and we wish him success.*







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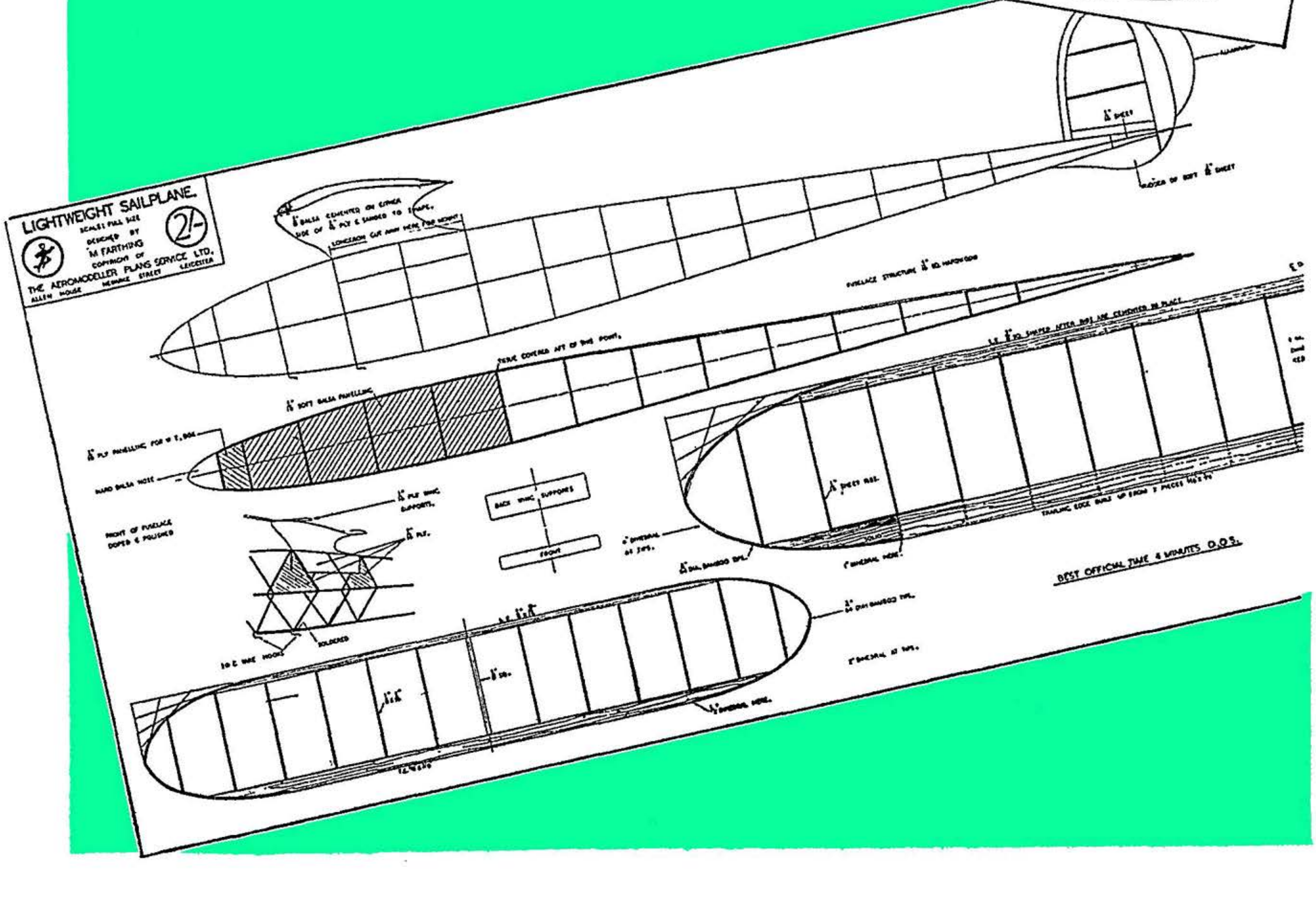
LIGHTWEIGHT SAILPLANE.
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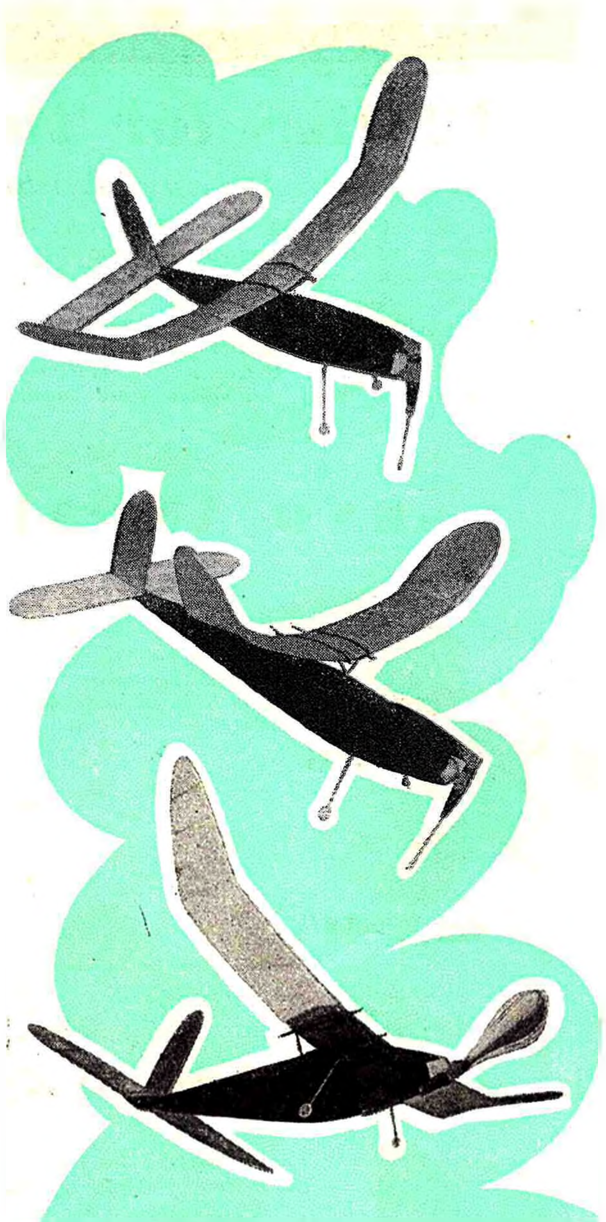
THE MICK FARTHING LIGHTWEIGHT CONTEST MODEL



DESIGNED by one of Great Britain's most successful lightweight enthusiasts, this machine has proved itself in many competition fields, and has an impressive number of National and other contests to its credit. With duration as the one aim in view, every non-essential has been omitted, and the weight of the residue cut down to an absolute minimum. The result has to be seen to be believed. The machine is placed vertically on its tail for the take-off, and when released climbs straight up, helicopter fashion. It is interesting to note here that the original model was not fitted with an undercarriage, this being added later to pacify competition secretaries and other denizens of the underworld! As it is, the undercarriage is only 6 in. long, whilst the airscrew radius is 9 in.

As can be seen from the drawing, the construction of the machine is quite simple, the only part liable to present any difficulties being the airscrew. For the experienced modeller the model represents but a few evenings' work.

The covering of the machine, particularly the surfaces, should be very carefully done, as the rather flimsy framework is easily warped. On no account should the tail surfaces be sprayed, whilst the wing should be very carefully pinned down to dry: the importance of this cannot be over emphasised.

A point of interest to the technical wallahs is the wing section. Thin, highly cambered sections such as this are the best that "orthodox" sections have to offer for this class of model, but the modern tendency in the aeromodelling world seems to be away from them to the thicker, lower cambered sections. This probably arises from a subconscious tendency to follow full size practice, and it is time that aeromodellers realized that airflow over a model is entirely different from that over a full sized machine at ordinary speeds. Anyone who doubts the efficiency of sections such as the Marquardt S-2 in a machine of this class should study Mr. Farthing's machine in flight for a few minutes. Another example of practice vindicating theory.

But we have wandered slightly! This is a description of a model, not a dissertation on aerofoil sections. Due to the wing loading and the section used, the speed of this, especially when gliding, is very low, and this results in remarkably few breakages, despite the light construction. Thus, on the whole, we have here an ideal machine for competition flying, which combines superb performance with reasonable robustness. Build one for next year's competitions and be up with the winners!

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The HARBOROUGH PUBLISHING

OVER TO YOU

Introducing the Boffin's News of Modellers Overseas

" A cantankerous Bird is the Boffin,
Who lineshoots from cradle to coffin
Flapping undersized wings
He chortles and sings
To hide from his friends he knows noffin."

THE efforts of far-flung modellers to carry on in spite of incredible difficulties of supply, climate and local pests, including Nazis, form a saga of enthusiasm that would baffle any pen but a Boffin's. Month by month we shall endeavour to paint some picture of what the other fellow is doing overseas everywhere.

Model Sahib.

First place in the pioneer class must undoubtedly go to Mr. Carr Taylor, tea planting in Bengal. Of his situation, he writes : "My bungalow is 4,000 feet up, and I have only to walk 20 yards across the compound to my local flying ground, where I can look sheer down to the river 2,500 feet below." For six months of the year the wind comes up and for the other six goes down the slope. This aeromodeller set out from England in 1939 laden with all the balsa, rubber and other etceteras he could carry, augmenting his stock with supplies from Singapore just before its fall. An American friend brought over a GHQ petrol engine in 1942. The black market was scoured for silk; old negatives and tooth-brush handles were dissolved in thinners (how he got this is a story of its own) for dope, while tardy Aero-modellers provided up-to-date news of developments at home. In spite of these trials and tribulations he has produced " Paharini "—a 6 ft. sailplane, a silk-covered "Air Cadet," and a design of Frank Zaic's, "Miss Science," featuring the GHQ motor. These fly into all kinds of odd spots, as when " Miss Science " had to be rescued from an aboriginal compound, where it had alighted in the main square amongst the local bullocks treading out rice on the hard-beaten earth. On his return Mr. Carr Taylor is looking forward to the peace and quiet of Eaton Bray.

H. Veenstra holding his 1941 Dutch Tailless Championship winner—the last " non-political " event before the modellers went underground.

Dr. Ing. Piotelli launching Peros I, his 9 ft. glider at the flying ground near Tel Aviv. Behind him may be seen members of the local Model Aeronautical College.

Dogged Dutchmen.

Two Dutch modellers write of their wartime activities. Mr. Stockermans of Tilburg gives a full account of club meetings, which were rather spoilt by the advent of Quisling versions of the Hitler Youth—never very popular with the loyal Netherlanders who arranged " underground " flying meets to avoid such contamination ! Politics even extended to a ban on one of our old friend Van Hattum's books, because of his anti-Nazi views. Mr. Van Aal of Rotterdam, who looks after the Luchtvaart Archief, writes feelingly of the state of his records when the enemy had finished with them. Both these stalwarts, however, speak of the speedy re-birth of the movement in Holland—many clubs are now re-formed as groups of Airscouts.

A Funny Bird the Fish is.

Brigadier Parham, now with S.E.A.C., sends a fascinating account of aerodynamics amongst the flying fish. " There is no question about the flight of the flying fish," he writes. " It *is* a flight and may last anything up to eighty yards or more. The fish emerges at high speed, and at a very slight rising angle, preferably from the forward face of a wave. The surplus speed (above stalling speed) plus a wonderfully flat gliding angle and a little lift from the 'slope wind' up the face of each wave carries the fish along a foot or so above water for about fifteen yards. It is by then in a tail-down position, and dropping its vertical tailfin into the water, gives a rapid burst of 'wiggles' with which it builds up speed for a continuation of the flight. Once it gets going it glides like a very beautiful silver and blue scale model (no pun intended) monoplane. I always thought them incapable of making a controlled flight, until I saw one do a nicely banked 90 degree turn and continue its flight for nearly another hundred yards—must have been at least a B licence pilot! . . . They are pure 'aeroplanes' with an 'airscrew' at the tail like the famous Paulham-Tatin of 1911—but in the fish's case it is a waterscrew!"

Piatelli in Palestine.

Older readers will remember Dr. Ing. Piatelli, who has been in Tel Aviv for some time now. His latest glider, Peros I, has a wing span of about 9 ft., and combines characteristic Italian features with really robust construction. Peros II, now in the design stage, will utilise the same wings and tailplane to fly a "tail-first" design. Flying at Tel Aviv must be a modeller's ideal with non-stop thermals, camel recovery service, and pyramid launch! Only blot, the thought of an occasional sandstorm.

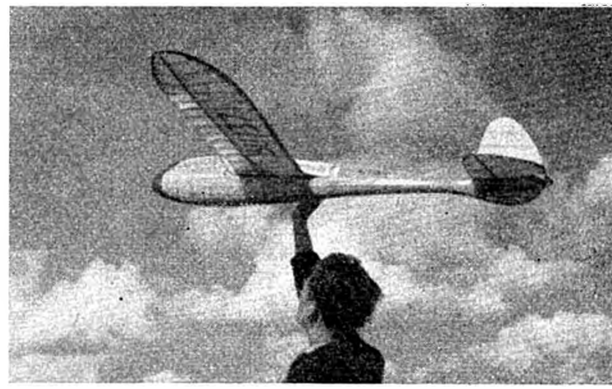
North American Paradise:

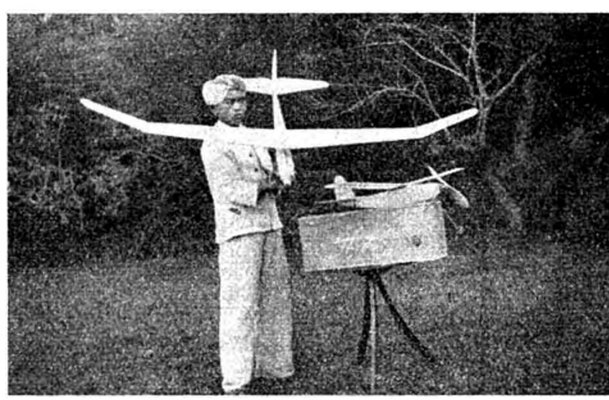
Now news from the land of plenty. Mr. Alcock of the Toronto Gas Model Club mentions building petrol jobs with a delightful nonchalance. There it is possible to design the model of your heart's desire and select just the engine to suit it best from an almost unlimited range, whereas in this little island of ours it is still a question, as Mrs. Beeton puts it, of "first catch your hare."

Ted Alexander—whose model dirigible has already been featured in our columns—is now engaged on experiments with helicopters. In his usual thorough way he has mocked up no fewer than four alternative rotor drives. The first successful flying model is under test, but he is still busy "ironing out the bugs." The Boffin will be after the full story of the production model in due course.

Another American celebrity, Frank Zaic, has dropped us a line from Natal, where he is filling in time waiting for his release number to turn up with work on tailless models. The usual spinning troubles have been worrying him, but have now receded to the painful memory class. We pass on his greetings to "the boys" everywhere.

The time has come for the Boffin to be hustled unwillingly from the stage, but remember this column is called "Over to YOU"—you write it, you send the pictures, while the Boffin does little more than hang around pretending it's all his own work!





Top—A Dutch modeller demonstrates that modelling in Holland has kept up with the times in spite of "the troubles".

A Canadian enthusiast wonders how to get them all together. This old Ford took five entrants and all these models across the border to try for the American "Nationals".

Gurkha Boy "Dalbir" with Mr. Carr Taylor's glider and Air Cadet. These both pack into the small box beside him.

Helicopter that really flies! Ted Alexander's latest petrol-engined version. Note the main rotor drive and transmission to compensating rotor.

COUNTERACTING THE EFFECTS OF ENGINE FAILURE IN TWIN-ENGINED MODEL AIRCRAFT

BY N. K. WALKER, B.Sc.

Pt. II

In the first section (October issue) the author summarized the whole work and then dealt in detail with the "Burns" method of correction, this being based on toed-in fins. Both static and flight conditions were dealt with. In the third and final section which will appear in the February issue, the author will deal with what he calls the "Aerodynamic" method of correction.

The "Maxwell" Method.

Mr. Maxwell suggested the method, probably known to many readers, of toeing-out the engines to create a flow over the single central fin. This, he suggested, could be made to balance the yawing moment of the engine, and gave details of a successful flight test.

Now firstly, toeing-in the engine will reduce the moment arm about the C.G. and if d^1 is the new moment arm :—

(11) $d^1 = d \cos \psi - h^1 \sin \psi$ where "ψ" is the offset angle of the engine, and h^1 = distance from C.G. to point about which engine is pivoted. Note: if "h" is negative, as in a pusher aircraft, the moment arm will be *increased* not *decreased*.

The lift coefficient of the fin depends on the engine, offset angle.

Assuming the slipstream blows straight back in line with the propeller axis then the lift coefficient is

(12) $C_L{}^1 = \psi \times \frac{\cdot 1\ AR^1}{2+AR^1}$ where AR^1 is the effective aspect ratio of the fin.

For a twin fin job, with end plate fins :—

(13) $$AR^1 = \frac{(\text{height of fin})^2}{\text{Area of one fin}}$$

but if the fin is entirely above the tailplane as in the single fin model, then the aspect ratio is :—

(14) $$AR^1 = 2 \times \frac{(\text{height of fin})^2}{\text{fin area}}$$

since the tailplane acts as an aerodynamic "mirror" and removes the tip loss from one end of the fin, while if the tailplane splits the fin into two portions (14) must be applied to each part, $C_L{}^1$ calculated from (12) separately and the two values must be meaned in proportion to their respective areas.

The basic equation is then similar to equation (10) :—

(15) $S^1/A_F = d^1/l \times 1/C_L{}^1 \times A/A^1$

or (16) $$S^1/A_F = \frac{d \cos \psi - h^1 \sin \psi}{l} \times \frac{2+AR^1}{\cdot 1 \psi AR^1} \times \frac{A}{A^1}$$

Now to get a rough idea of the effect of the other quantities we will assume that the propeller axes intersect at the centre of the fin and assume that the deflection of the slipstream by the main airstream can be ignored.

Then it can be shown that the only criterion of the possibility of obtaining a balance is the aspect ratio of the fin, and that as all the fin must be in the slipstream, there are definite limits to the possible aspect ratios. Static balance is almost impossible since about 80% of the slipstream must be captured.

To find the correct offset angle when the fin area is fixed.

Generally, the fin area shape and moment arm, etc., are already fixed in our minds and we wish to know the correct value of ψ for balance. Let us collect all the terms in ψ together from (16) and call them "G."

Then $G = \frac{\psi}{\cos \psi - h^1/d \sin \psi}$ and this is plotted against ψ in Fig. 6.

Equation (19) can now be written as :—

(17) $$G = \frac{A_F}{S^1} \times d/l \times A/A^1 \times \frac{2rAR^1}{0\cdot 1\ AR^1}$$

From this equation we can find G and can look up in Fig. 6 the corresponding value of ψ.

Note that the thrust line need not pass through the centre of the fin. The value of ψ can be varied to quite a large extent as long as the fin remains immersed in the slipstream, which must of course be checked.

It is particularly important to check the effect of torque on the Maxwell method since the effective value of ψ is altered when the model sideslips.

The effect of Torque.

Under the action of torque, a model will first bank in the opposite direction to the rotation of the propeller, then sideslip. This sideslip acts in conjunction with the dihedral of the wing, giving more lift to the forward wing panel and reducing the lift of the other wing panel, thus producing a rolling moment which balances the torque and prevents any further increase in the sideslip.

At the same time the main airstream strikes the fin, generating a yawing moment tending to turn the 'plane into the sideslip. Provided that the propellers turn inwards this yawing moment will oppose that due to the thrust and will greatly help to achieve balance.

Now the angle of sideslip β is given by :—

(18) $$\beta = 30 \frac{(1+q)}{(1+2q)} \frac{(2+AR)}{(\ AR\ )} \frac{Q\,C_L}{yW} \text{ degrees.}$$

Where Q = torque. (lb. ft.) W = weight of model. (lbs.)
y = tip rise of wing above the centre-section. (ft.)
C_L = Wing lift coefficient. AR = Aspect ratio of wing.

$$q = \frac{\text{tip chord}}{\text{root chord}}$$

The angle of sideslip should not exceed 15 degrees, otherwise there is danger of the fin stalling. If it does the dihedral must be increased but this is only likely to occur in highly-powered rubber models. Note that measurements may also be in ozs., inches and oz. inches as long as these are consistently adhered to.

The yawing moment on the fin is now calculated as :—

(19) $$N = \frac{W\,b\,\beta}{C_L} \left\{ 0\cdot 08 \frac{S^1}{S} \frac{l}{b} \left(\frac{AR^1}{2+AR^1} \right) - 0\cdot 00061 \right\}$$

and this will reduce the amount of correcting moment required from the fin. This may be allowed for by multiplying the required fin area or lift coefficient by $\frac{Td^1 - N}{Td^1}$

In the above equation :—

S^1 = *total* fin area. b = wing span.

AR^1 = effective fin aspect ratio. (See comments on

equations (16) and (17).)
and the fin is assumed 80 per cent. efficient.

Estimation of " Q " for a petrol engine.

To work out ß and N we must know the engine torque. For rubber models this is easily estimated or measured, but it is generally unknown for petrol engines. (For Baby Cyclone, Q = 0·19 lb. ft.)

However :—

$\eta = \frac{JTD}{2\pi Q}$ or (20) $Q = \frac{JTD}{2\pi\eta}$ and for an average petrol model $J = \frac{1}{2}$ and $\eta = 0{\cdot}67$ so $\underline{Q = 0{\cdot}12\ TD.}$

N.B.—The curve of efficiency against J is nearly a straight line at lower values of J than that for highest efficiency, so for take-off and climb when J is rather less than ½ the ratio of J to η is still the same and Q is still 0·12 DT.

The effect of the main airstream

In addition to the correction above for torque, a correction must be applied to the engine offset angle ψ in Maxwell's method if the airstream is not parallel to the thrust line. Note that this correction *must* be applied even if the sideslip angle is very small.

Now the difference between the engine offset angle ψ and the sideslip angle ß is (ψ—ß) and it can be shown that if ψ—ß is not zero the slipstream will be deflected immediately behind the propeller in a direction more parallel to the main stream thus effectively reducing or increasing the value of ψ according to the relative values of ψ and ß. This new sideslip angle ψ^1 is given by :—

(21) $$\psi^1 = \beta + \left(\frac{a}{1+a}\right)(\psi - \beta)$$

and this is the value of the offset angle which will be read off from Fig. 6, after finding G from equation (21). ψ must then be calculated from equation (26) given below using values of $\frac{1+a}{a.}$ from table 1.

From (25) we have by rearranging :—

(22) $$\psi = \beta + \frac{1+a}{a}(\psi^1 - \beta)$$

and this equation has been used in the discussion of Maxwell's experiment.

Note that under static conditions $\psi^1 = \psi$ and that when $T_c = 0$ $\psi^1 = \beta$, so that for rubber models the actual value of the offset angle will not make much difference to the control as long as the fin is immersed in the slipstream.

The deflection of the slipstream further down-stream.

In addition to the initial deflection of the slipstream dealt with above, the mixing of the slipstream with the surrounding air deflects the slipstream in a curve and eventually it is almost parallel to main airflow.

This can be shown to have no effect on the fin force but it does alter the position of the fin in the slipstream and a fin which is in the slipstream in a static test may be too far forward in flight.

The position of the centre line of the slipstream can now be drawn on a plan view of the model if we remember that the angle between the slipstream and the airflow is halved when the slipstream cross sectional area is doubled.

Fin effect of the propeller.

The propeller acts as a fin when the airflow is at an angle to its axis. This can be estimated by assuming that it acts as a fin whose area equals the side area of the propeller and which has a lift curve slope of 0·05 per degree. Note that the angle of attack or sideslip of this fin is the difference between the engine offset angle and the angle of sideslip. It is not of great importance but should be allowed for if the airscrew is of the shovel blade type and is placed a long way from the C.G.

Mr. Maxwell's experiment.

The following data was provided by Mr. Maxwell or estimated by the writer :—

S = 16 sq. in. S^1 = 2·5 sq. in. l = 4·63 in. l^1 = 6·63 in. W = 0·0795 oz. AR = 4·0. AR^1 = 3·2. D = 3·0 in. A = 7·07 sq. in. T = 0·02 oz. Q = 0·19 oz. in. h^1 = 1·0 in. d = 1·5 in. y = 0·75 in. V = 7·9 ft./sec. C_L (wing only) = 0·51. T_c = 0·14.

The great importance of this experiment is that from it we can estimate the relative sizes of the various effects.

(1) The reduction in yawing moment due to the reduced moment arm when the engine is offset.

(2) The fin moment due to the action of sideslip caused by the torque. Note that the propeller turns inwards so this effect is favourable.

(3) The Maxwell effect, or the action of the slipstream on the fin.

The yawing moment due to the thrust is 0·02 × 1·5 = 0·030 in. oz. This is balanced by :—

(1) The reduction of moment arm due to offset of 0·15 in. The reduction is 0·02 × 0·15 = 0·003 oz. in., i.e. 10 per cent. total.

(2) The angle of sideslip is given by (18) as,

$$\beta = 30 \times 2/3 \times 6/4 \times \frac{0{\cdot}19 \times 0{\cdot}51}{0{\cdot}75 \times 0{\cdot}0795} = 4{\cdot}6 \text{ degrees.}$$

The yawing moment N from (19) is (remembering that the fin has inefficient square tips which cause a loss of fin efficiency of 7 per cent.)

$$N = \frac{0{\cdot}0795 \times 8 \times 4{\cdot}6}{0{\cdot}51}\left\{0{\cdot}080 \times \frac{2{\cdot}5}{16} \times \frac{4{\cdot}63}{8} \times \frac{3{\cdot}2}{5{\cdot}2} \times 0{\cdot}93 - 0{\cdot}0006\right\}$$

$= 5{\cdot}73\ [0{\cdot}00414 - 0{\cdot}0006]$
$= 0{\cdot}020$ *oz. in. or 67 per cent of total.*

(3) The Maxwell effect is given by (6) and (15) as

$$N = \frac{C_L{}^1\, S^1\, T\, l}{A} \times \frac{A^1}{A_F} \text{ and } \frac{A_F}{A} \text{ from Fig. 1 is } 1{\cdot}03$$

also since a = 0·0735

$$\frac{A^1}{A} = \frac{1{\cdot}0735}{1{\cdot}147} = 0{\cdot}937 \text{ and } \frac{A^1}{A_F} \text{ is therefore } 0{\cdot}91$$

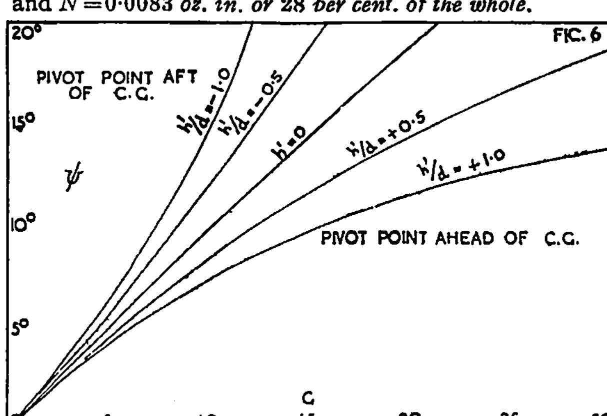
$$\text{So } N = \left(\frac{0{\cdot}1 \times AR^1}{2 + AR^1}\right) \cdot 93\, \psi^1 \times \frac{2{\cdot}5}{7{\cdot}07} \times 0{\cdot}02 \times 4{\cdot}63 \times 0{\cdot}91$$

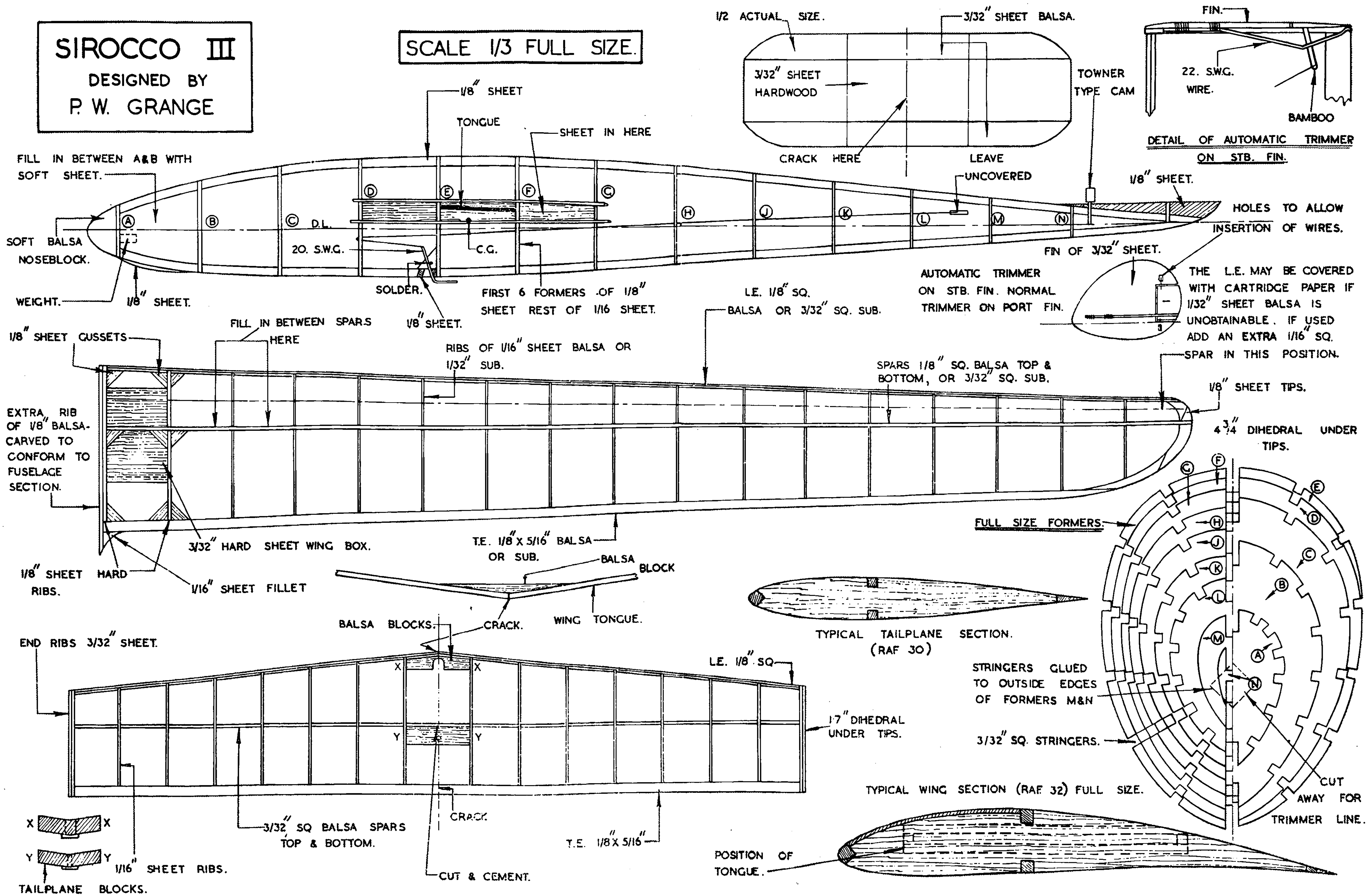
$= 0{\cdot}00170\ \psi^1$

$$\text{But } \psi^1 = \beta + \frac{a}{1+a}(\psi - \beta) = 4{\cdot}6 + {\cdot}0683\ (9 - 4{\cdot}6)$$

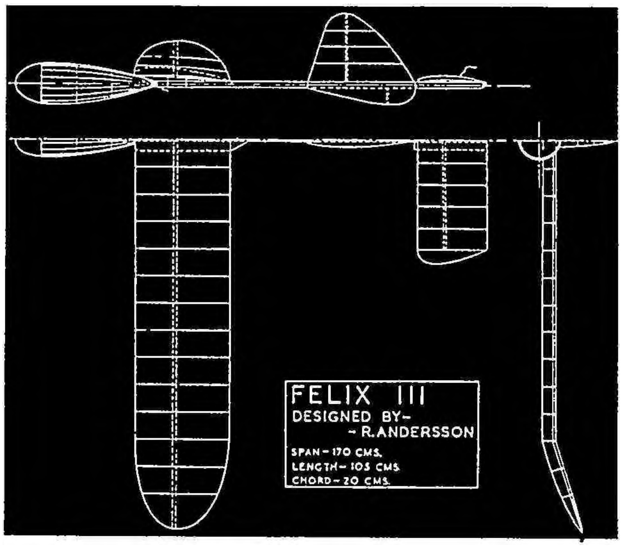
= 4·9 degrees (not 9 degrees).

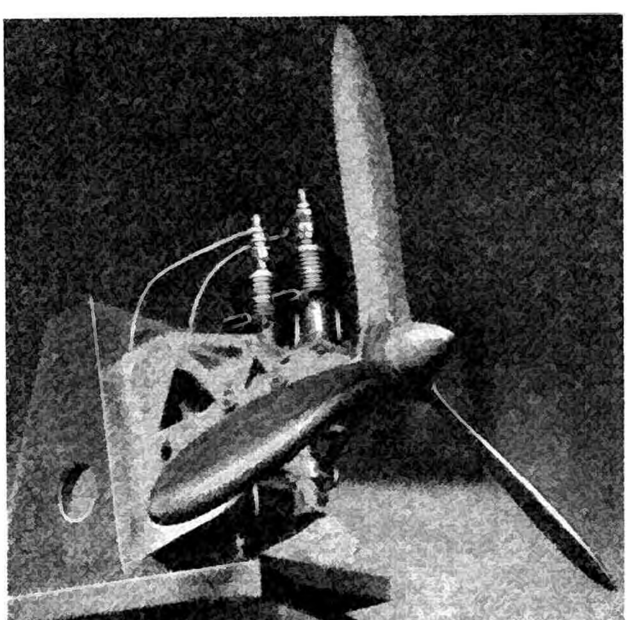
and *N* = 0·0083 *oz. in. or 28 per cent. of the whole.*





SIROCCO III
DESIGNED BY
P. W. GRANGE
SCALE 1/3 FULL SIZE.
1/2 ACTUAL SIZE.
3/32" SHEET BALSA.
3/32" SHEET HARDWOOD
CRACK HERE
LEAVE UNCOVERED
TOWNER TYPE CAM
FIN.
22. S.W.G. WIRE.
BAMBOO
DETAIL OF AUTOMATIC TRIMMER ON STB. FIN.
1/8" SHEET
TONGUE
SHEET IN HERE
FILL IN BETWEEN A&B WITH SOFT SHEET.
D.L.
C.G.
20. S.W.G.
SOFT BALSA NOSEBLOCK.
WEIGHT.
1/8" SHEET.
SOLDER.
1/8" SHEET.
FIRST 6 FORMERS OF 1/8" SHEET REST OF 1/16 SHEET.
1/8" SHEET.
HOLES TO ALLOW INSERTION OF WIRES.
FIN OF 3/32" SHEET.
AUTOMATIC TRIMMER ON STB. FIN. NORMAL TRIMMER ON PORT FIN.
THE L.E. MAY BE COVERED WITH CARTRIDGE PAPER IF 1/32" SHEET BALSA IS UNOBTAINABLE. IF USED ADD AN EXTRA 1/16" SQ. SPAR IN THIS POSITION.
L.E. 1/8" SQ. BALSA OR 3/32" SQ. SUB.
FILL IN BETWEEN SPARS HERE
1/8" SHEET GUSSETS
RIBS OF 1/16" SHEET BALSA OR 1/32" SUB.
SPARS 1/8" SQ. BALSA TOP & BOTTOM, OR 3/32" SQ. SUB.
1/8" SHEET TIPS.
4 3/4" DIHEDRAL UNDER TIPS.
EXTRA RIB OF 1/8" BALSA CARVED TO CONFORM TO FUSELAGE SECTION.
3/32" HARD SHEET WING BOX.
T.E. 1/8" X 5/16" BALSA OR SUB.
1/8" SHEET HARD RIBS.
1/16" SHEET FILLET
BALSA BLOCK
CRACK.
WING TONGUE.
BALSA BLOCKS.
END RIBS 3/32" SHEET.
L.E. 1/8" SQ.
1.7" DIHEDRAL UNDER TIPS.
X
Y
CRACK
3/32" SQ BALSA SPARS TOP & BOTTOM.
T.E. 1/8" X 5/16"
1/16" SHEET RIBS.
CUT & CEMENT.
TAILPLANE BLOCKS.
TYPICAL TAILPLANE SECTION. (RAF 30)
FULL SIZE FORMERS.
STRINGERS GLUED TO OUTSIDE EDGES OF FORMERS M&N
3/32" SQ. STRINGERS.
CUT AWAY FOR TRIMMER LINE.
A B C D E F H J K L M N
TYPICAL WING SECTION (RAF 32) FULL SIZE.
POSITION OF TONGUE.





WORLD NEWS

Sweden—Felix III.

The machine on the left is well known in Sweden. It was designed by Rune Andersson, known in Swedish circles for some obscure reason as "Banana" Andersson. Being the brain-child of such a well-known modeller, it goes without saying that the performance of this machine is superb.

France—Kit Evolution.

The firm of "Airplan" recently provoked quite a stir in French aviation circles by the announcement of a new constructional kit. Having previously confined their production to model aircraft and engine kits, they now intend to market a kit for a full-sized machine. The kit will include all the vital and highly stressed parts ready made, with plans and instructions for the production of the rest by the constructor—a task quite within the capabilities of the average "handy man."

The machine is of orthodox low-wing design, but the constructor has the choice of two fuselages—a two-seater or a single-seater, the latter being the easier to construct. In both cases the wing and empennage are identical. The engine may be from 30 c.c. to 60 c.c. in capacity.

America—Seeing by Touch.

The middle left photo shows four blind employees of the Bell Aircraft Corporation "looking" at a B-29 model of their own construction.

Chile—Official Recognition.

The Aero Club of Chile recently decided to give official encouragement to the aeromodelling movement, and to take steps to foster its growth. By last August nearly twenty clubs had been affiliated.

Russia—Aeromodelling Anniversary.

The thirty-fifth anniversary of aeromodelling in Russia was recently celebrated by a four-day national meeting at an aerodrome near Moscow.

The first important meeting was held in 1910, when 30 models were flown. In 1945, 200 models competed varying from sailplanes and petrol models to helicopters and clockwork-powered machines.

Italy—An Interesting Engine.

The two-stroke twin-cylinder engine shown in the accompanying photo (left) was originally intended by its designer, G. Calioni, for a model hydroplane, but is now fulfilling the role of an aircraft engine. The two cylinders result in much smoother running than is usual with ordinary engines, whilst good mechanical design and workmanship ensure reliability and performance. Apart from the layout of the cylinders, there is nothing unusual about the design, except of course the crankshaft and the ignition system. The former was machined in one piece from high tensile steel, and runs in three phosphor-bronze bearings, whilst the ignition system includes a distributor in addition to the usual contact breaker.

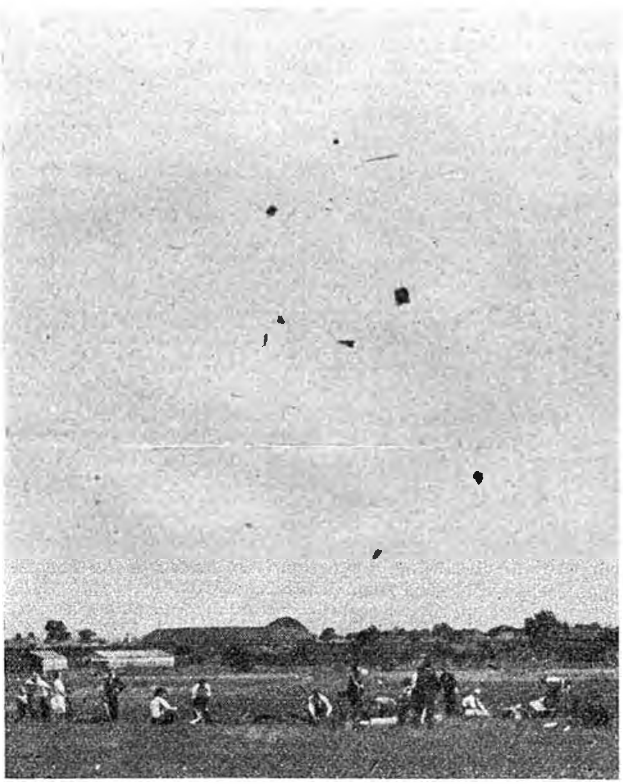
With a bore of 26 mm. and stroke 27 mm., the engine has quite reasonable proportions, although the horse-power developed is over 0·9 h.p. This is developed at 4,500 r.p.m., for an all-up weight of 1·6 kg.

England—Hot Air at Hounslow.

A model meeting, especially a national contest, is a source of attraction for many queer individuals, but most people were definitely surprised when a couple of immature whirlwinds rolled up for the Hamley Trophy Contest.

The second one was a very ambitious affair, and the dust which it picked up stretched up in a long column from the ground to the cloud base at 2,000 ft. During its passage across the field, it removed those papers which its predecessor had left, wrapped as much of the spectators' clothes around their necks as was possible, removed one model from terra firma (later depositing it again, rather too firmly) and generally filled everything and everybody with large helpings of dust. This much to the delight of several small boys who were immensely pleased at being able to watch competitors stripping their engines down.

Readers will no doubt be interested in an explanation of these phenomena, which is as follows :—When certain conditions exist (an extremely hot day with no wind) the hot sunshine on sandy soil produces a marked instability in the air above it, and strong thermals are likely to develop. The air which flows in from all sides to take the place of the rising air develops into a strong whirl (due to the conservation of angular movement) if the convergence is sufficiently great. This rising whirl of air is the whirlwind, or "dust devil," as they are known in the desert.



Baby Cyclone. *(Above.) The size of the second "Hounslow Spout" is well indicated by this picture. The column of dust reached right up to the cloud base.*

The Higher the Fewer. *(Left.) The first disturbance started the entertainment by helping itself to any unattended light material such as newspapers.*

The Heart of the Trouble. *(Below.) The base of the second whirlwind is here shown sweeping through part of the crowd, and a competitor holds his machine down, while spectators' clothes swirl tightly around them.*

Readers' . . . . . . Letters

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

DEAR SIR,

In reply to Mr. Cooper I offer these notes on my Stability Factors, to show what reasoning I base them on. The full explanation would run to thousands of words and needs a book or several articles to do it justice, so I hope that this sketch will not be taken as exhaustive.

The tailplane acts with the wing to cause a shift of their combined lifts, in a stable manner. Typical Wakefield models show zero shift with R.A.F. 32 wings and cambered tailplanes, when the Longitudinal Dihedral is negative, at $-3°$, but when it is positive at $1\frac{1}{2}°$, dives cause a forward shift of $3\frac{1}{2}$ inches and a stall a rearward shift of $\frac{3}{4}$ inch. This is the same for high-wing, low-wing, or mid-wing models, broadly speaking. With Long. Dihedral of $4\frac{1}{2}°$, shifts are $7\frac{1}{2}$ and $1\frac{3}{4}$ ins. Notice shifts are about in proportion to Long. Dihedral of $4\frac{1}{2}°$, shifts are $7\frac{1}{2}$ and $1\frac{3}{4}$ ins.; and that the diving reaction is four times the stalling reaction. The figures are for a dive or stall of about 6° from normal.

My experience is that a model can handle this difference so long as both shifts are below some limit, in other words there is a maximum value of Longitudinal Dihedral for each model. Mr. Boulesteix will agree, although the reason is not due to any effect of downwash. It is due to the shift of forces, resisted by the inertia of the model, acting for more or less time, and thus storing up more or less energy before the model begins to swing. Whenever the swing is set going the tailplane has a new angle of attack resulting from its forward velocity and its vertical velocity due to rotation, so the shift reverses. The longer the tail moment arm the more the angle of attack, and also the greater distance the tailplane force moves through, so the work it can do in dissipating this stored-up energy is measured in terms of tail lift times moment arm. If we can set a limit to the shift of total lift, then the Moment of Inertia of the model is a good measure of the energy to be dissipated. Thus a simple way of gauging stability is found by making sure that the value of Longitudinal Dihedral is such that it falls within the two limits, of no stable shift of total lift, and excessive shift, and then arranging that the number given by the tail effect and the Moment of Inertia, when the first is divided by the second, is within limits found from experience,

My Stability Factor is simply

$$\frac{\text{Moment of Inertia}}{\text{Weight} \times \frac{\text{Tailplane Area}}{\text{Wing Area}} \times \frac{3}{4} \times L_2}$$

the factor of $\frac{3}{4}$ being an assumed value for tailplane $Cl_{max.}$/Wing $Cl_{max.}$ L is the distance from the C.G. to tailplane C.P. The factor is non-dimensional, and it will be found to give a very good indication at the design stage of the ability of the model to deal with turbulence in the air, without exceeding the loss of height permissible. For gliders the factors ought to be under 0·8, but 0·9 can be used for bad models which are not to be flown in rough air. 0·7 or lower indicates very good stability, and I have had values as low as 0·55. For rubber-driven models, the maximum is higher, up to 1·1. The difference between the sections in use in models is so slight as not to be noticed at all.

May I now answer Mr. Cooper's questions? (1) The first set of calculations were made at the first set of weights, the modified set at the new weights. (2) The effect on the stability of a model glider, of adding $3\frac{1}{2}$ ozs. in the form of rubber, airscrew, etc., would be to increase the Moment of Inertia greatly, and the tailplane force also, though the chances are that this would not be so great. A bad model would result in having higher factors, which would take a long time to get out of bother. (3) I have no test data on the modified aerofoil. I know it has a shade less drag than the regular type because it gives a slightly better L/D ratio in trial models. I know the effect of the slight extra camber will be slight extra C.P. shift and know also that this can be met by slight extra longitudinal dihedral. If I cannot use the modified type until I find time to build a wind tunnel and test it, I am afraid that the type would not be used, but surely it is better to use it when I can, rather than to wait?

Ayrshire. R. BURNS.

DEAR SIR,

The many and loud moans from different aeromodellers at various times on the subject of the deep " groove " tendency of the model plane movement, especially as far as standard competitions are concerned, has prompted me to bring to your notice a method of determining a " competition " all up weight which alleviates the penalties of flying a " semi-scale " or " Tailless " model against orthodox machines at comparable loading (*i.e.* F.A.I.).

The suggested rule is :—

All up weight (ozs.)+3 Aw+6 At = W ozs.).

where Aw=wing area in sq. ft.

At=Tailplane area in square ft.

This, at first sight, appears rather horrible but applying it to several standard cases shows some interesting results.

(*a*) At=1/3 Aw .. .. .. Standard Type.
then W=5 Aw

Which is " Flight Cup," " Gouge," or F.A.I. loading to all intents and purposes.

(*b*) At=1/6 Aw .. .. .. Semiscale Type.
then W=4 Aw

i.e. a semiscale model is allowed a lower "wing" loading.

(*c*) At=0 .. .. Tailless Type
W=3 Aw

i.e. A tailless model is even better off than the semiscale.

A standard formula gives

$V=29\sqrt{\frac{W}{C_L}}$ where W=wing loading is 16/□ ft. and C_L =lift coefficient based on wing area. This shows that, W ÷ C_L should be roughly constant to bring all three above mentioned types into the same class. Reasonable values of C_L that can be held (and still retain stability) for each type are

Orthodox	Semiscale	Tailless
0·75	0·60	0·50

Simple mental division shows that the flying speeds are comparable, advantage lying slightly in favour of the Tailless type. This will give a slight favour to the Tailless type. This will give an incentive to tailless competition models which, in my opinion, is a good thing.

It is to be noted that this ruling eliminates automatically the tail area 0·33 by wing area rule. From the point of view of the people who want a model to look reasonable, this is necessary on the present ruling, but on the other hand, a reduction below the 33 per cent. offers a negligible advantage in drag reduction and a considerable disadvantage due to the reduction of stability, hence for competition work no intelligent modeller would use much less than 33 per cent. unless he was sure of the stability. A point of interest is that a designer will now have to think, not what is the largest tail area he can use, but what is the optimum tailplane area for the conflicting requirements of total weight and stability, *i.e.* a little more thought will be involved in the design (do I hear howls of protest from competition winners ?) After all, a full scale designer does not make a tailplane a certain area because A.P.970 (the standard full scale book of rules) says the aircraft will *look* horrible if he uses more than a certain per cent. wing area—so why should a model plane designer ?

I would, in conclusion, like to express the hope that the suggestion put forward in this letter will cause a sufficiently violent storm in official quarters (and in your journal) to bring the matter to the notice of the people regulating competition flying.

Farnborough. R. H. ANNENBERG.

The Aeromodellers' Own Exhibition

Ably led by the "AEROMODELLER" the past ten years have seen an enormous development of the aeromodelling movement in Great Britain. The British aeromodeller now has greater opportunities for developing his hobby than ever before and the "Aeromodeller" in its eleventh year of publication, with a national circulation is backing him to the limit, supported by Associate Companies producing a wide range of publications, three-view scale drawings and fully dimensioned flying model plans.

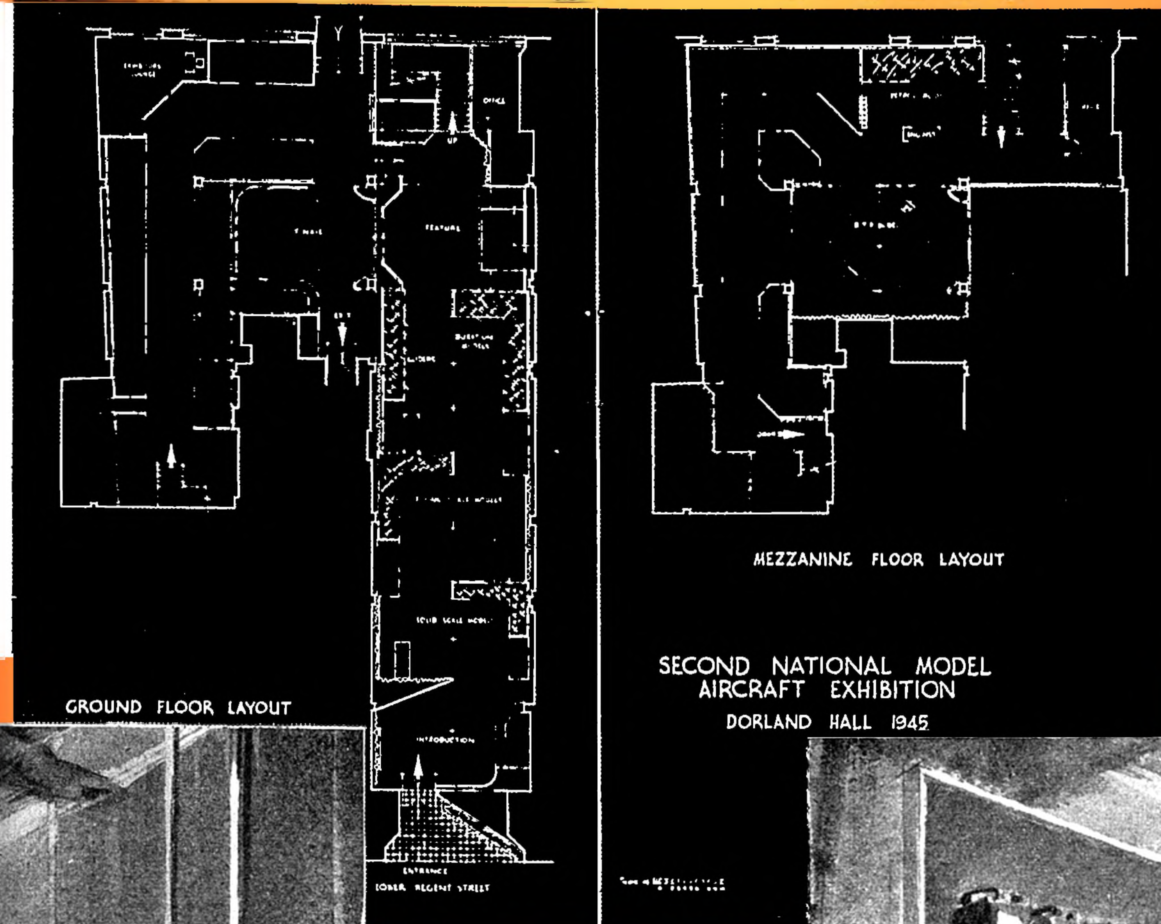
The purpose of this Exhibition is to display to the general public the extremely high standard of design and workmanship which the Aeromodelling Art has now achieved. Many years ago model aircraft ceased to be classed as "toys" except by the ignorant and uninitiated! To-day, model aircraft range from extremely accurate scale models to full-size aircraft of a few inches span, to large petrol-engine driven radio-controlled aircraft of 10 to 12 ft. span, incorporating many design features to be found in full size aircraft. There are model flying boats, seaplanes, high performance sailplanes, "duration," scale, semi-scale and competition type aircraft, both petrol engine and rubber-driven. In addition there are Helicopters, Rocket-propelled and Jet-propelled models and a wide variety of "original designs."

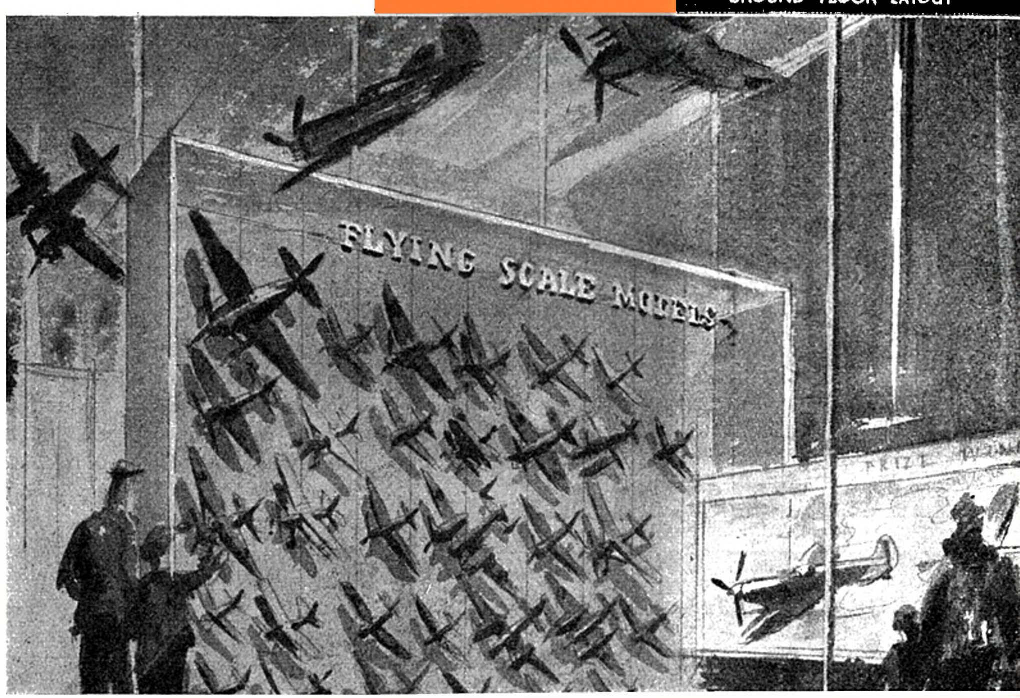
To Britain's first National Model Aircraft Exhibition organised a year ago under extremely severe wartime conditions and open only for a few days after Christmas, came nearly 20,000 people to see a really first-class display.

It is anticipated that well over 100,000 persons will visit the much larger and much more diversified second National Model Aircraft Exhibition during its five weeks' run. Many well-known figures in the "full-sized" aircraft Industry acquired their early understanding of flight from model aircraft. To-day, with a new ultra high-speed technique before them they still find model aerodynamics can help. It is not surprising that many of these men retain their interest and will come to admire the models on display.

There are many hundreds of Model Aeroplane Clubs throughout the country, many of them united under the leadership of the Association of British Aeromodellers.

(continued overleaf)





Architect's impression of a typical display in the flying scale model section.

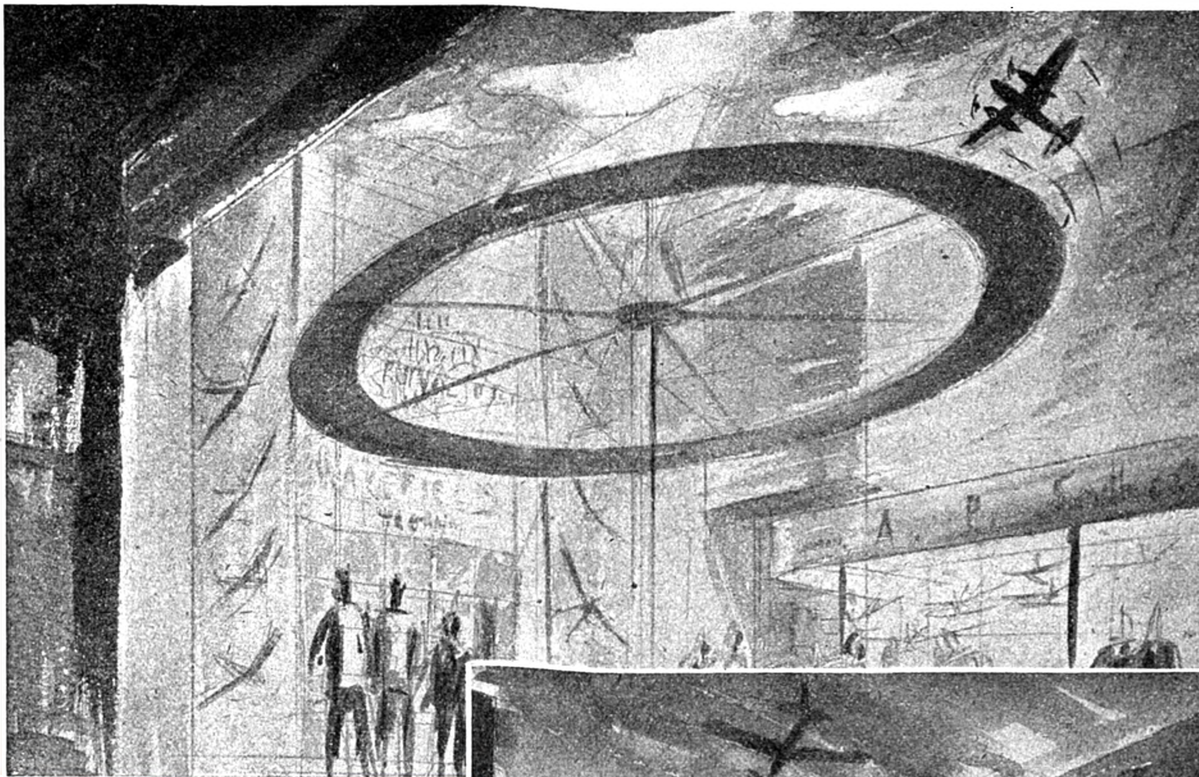
HOW TO GET THERE

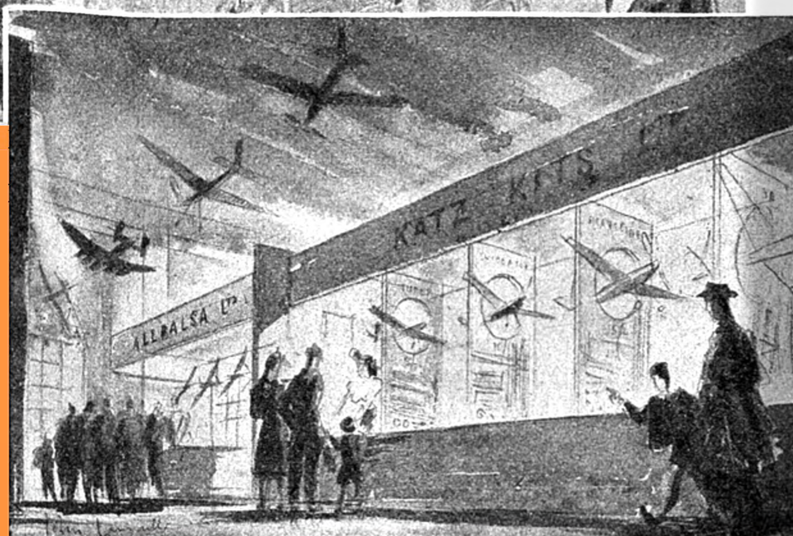
When you are in PICCADILLY you are virtually in DORLAND HALL. It is dead south of EROS and is in the very heart of Theatreland, Cinemas, Restaurants, Hotels, in fact in London's Playground. You can get there with ease from any of London's main line RAILWAY TERMINI and you can reach it on all of London's UNDERGROUND routes. BUSES from all points of London's compass pass through Piccadilly. Simply take a ticket to PICCADILLY and you are within a few yards of Dorland Hall and the EXHIBITION.

GETTING THERE WILL BE SIMPLE LEAVING WILL BE DIFFICULT FOR YOU WILL NOT WISH TO GO

Impression of "Petrol Corner" by the Exhibition Architect

Sponsored and Organised by the AEROMODELLER





The Air Training Corps also has encouraged in many of its squadrons the building of model aircraft. Hundreds of Public, Preparatory and Elementary Schools include model aircraft building in their curricula and the L.C.C. has for a number of years organised Model Aeroplane classes in its Men's Evening Institutes. Search where you will, and you will never fail to find the keen Aeromodeller! Come and see for yourself during the Christmas holidays the height to which his enthusiasm and craftsmanship have risen.

Top sketch by the Exhibition Architect depicts one of the electrically-driven R.T.P. models flying above its perspex landing strip. Whilst the lower sketch is an impression of a section of the Trade Stands. These and other impressions by the Exhibition Architect, John Lansdell, F.R.S.A., N.R.D., give a very good idea of the elaborate and highly skilful way in which the Exhibition is being arranged.

Don't forget DORLAND HALL

14th DECEMBER, 1945 to 12th JANUARY, 1946

ARMCHAIR AERONAUTICS

By Lt. Comdr. R. Pierce, R.N.V.R. (retd.)

Manager of the Aeronautical Bookshop.

A new series which will appear each month to keep students advised of new books as they are published. All books reviewed may be purchased from the Aeronautical Bookshop, 7, Hanover Court, London, W.1.

BEFORE 1939 it was possible to look back at short range on the work of the pioneers who designed and built aircraft before there was any true science of aeronautical engineering. Those days seem very remote in history now, and by a large proportion of the present practitioners of the arts of aircraft design, the existence of a time when research did not dominate the designer and guide his early steps can hardly be comprehended; it lies so far outside their personal experience.

Apart from particular and sometimes revolutionary innovations in design, the most important feature of the decade in applied aerodynamics have been the wind tunnels, allowing tests to be made substantially under full scale conditions and an enhanced recognition by engineers of the practical usefulness of basic aerodynamic theory. The typical designer thought of himself as having very little use for the offerings of the mathematicians and he had very little disposition even to enquire into that application to his own work. He is much more disposed in that direction now.

The higher branches of mathematical physics have taken a place and gained a universality of respect such as they hold in no other branch of engineering science, but, however favourable the designers' inclinations may now be toward the mathematicians, his competence to co-operate directly in the mathematicians' work is still in most cases very limited. Mathematical aerodynamics remain a pursuit returning results only to the specially trained and gifted few. Among students of aircraft design not one out of fifty will ever make or will have the special qualities required for making a personal contribution to the extension of basic theory. It behoves all students and would-be students, therefore, to extend their field of study that they may be in the van of progress and aspire to be named among the chosen few. It is with this idea and ultimate aim in view that this series of articles are written. It is further emphasised that no one book contains the whole of what one should be required to know, but as wider reading gives greater knowledge the following books have been selected with care and are recommended as a useful introduction to the study of aerodynamics, aircraft design and construction.

Subsequent articles will deal with all phases of aviation in turn, and with new publications as and when they become available.

AERODYNAMICS OF THE AEROPLANE
by W. L. COWLEY. Thos. Nelson. 5s.

This book is written for students who have reached matriculation standard. The use of mathematics has been avoided except in extremely simple form. What has been given will serve to show the student that mathematics will play an important part in his work. Though this book gives only a very elementary survey of present-day aerodynamic conceptions, it covers all the ground required by the student at this stage.

AIRCRAFT DESIGN by C. H. LATIMER NEEDHAM, M.Sc. (Chapman & Hall.)

This book has been written to meet the need for an up-to-date work dealing with the general principles of aircraft design and is intended to be of use both as a text book for serious students of the subject and as a guide for the increasing number of private constructors of aeroplanes. In order that the process of design shall not be continually interrupted with explanations of the principles underlying the various features of design, the book has been divided into two columns, the first of which outlines in simple language the principles of flight and stability, whilst the second deals mainly with the mathematical treatment of design.

Vol. I., 22s.; Vol. II., 25s.

INTRODUCTION TO AERONAUTICAL ENGINEERING (Pitman. Three volumes.)

This series is intended for the use of all those who are engaged in practical aeronautical engineering and who feel the need of at least an elementary knowledge of the theory underlying their practical work. For this reason it should appeal equally to draughtsmen, apprentices and students at technical schools who are desirous of entering some kind of aeronautical work.

The present series consists of:—Vol. I. "Mechanics of Flight," by A. C. KERMODE. 8s. 6d. Vol. II. "Structures," by J. D. HADDON. 7s. 6d. Vol. III. "Properties and Strength of Materials," by J. D. HADDON. 7s. 6d.

A COMPLETE COURSE IN ELEMENTARY AERODYNAMICS by M. A. V. PIERCEY, D.Sc. English University Press. 21s.

This is a most important and valuable book which should remain the practical standard work on the subject for years to come. The work presupposes a very limited knowledge of algebra, trigonometry and mechanics. The experiments relied upon require only simple apparatus, applications of aerodynamic principles and methods are illustrated by examples worked in the text, covering an appreciable range of difficulty without making demands on ingenuity. Additional questions of comparable standard can be found in the aeronautical examination papers of the Royal Aeronautical Society.

PHYSICS OF FLIGHT
by LANDE RHEINHOLD. Pub. Co. 16s. 6d.

The basic principles involved in the flight of aeroplanes are here given in condensed and concise yet comprehensive form. The author has trimmed away the non-essentials which make most text books bulky and unreadable. In stating the fundamentals so briefly his aim is to provide a framework which students of engineering and physics can utilise in attaining a thorough knowledge of aerodynamics. The text is generously illustrated with sketches, diagrams and half-tones and is supplemented by frequent problems, to aid the reader in understanding the specific application of the principles discussed. Some consideration is given also to such innovations as helicopters, autogyros and flying bombs.

25% Price Reduction ordered by 31st January

Aeromodellers have waited

In the Duration Plans there are likewise over 30 to choose from, among them is the well known 'Sunbeam' reduced from 2/- to 1/6; the 'Itzme III' usually 3/- now 2/3; and the 68 inch span 'Big Stuff' catalogued at 6/-, but now 4/6.

Then there is the range of Gliders, with over twenty famous names, such as the ever popular 'Aegus,' usually 2/-, now 1/6; 'Cracow' and 'Sunclipper' both listed at 3/- each, but now offered at 2/3 each. Semi-scale models with 'Jackdaw' as a good example, reduced from 2/- to 1/6. Flying boats, too, are well represented in the range with the 'Gull' available for 2/7½ instead of the usual 3/6; and Petrol Models for the more ambitious with the famous 'Westland Lysander' plan normally 7/- and now 5/3.

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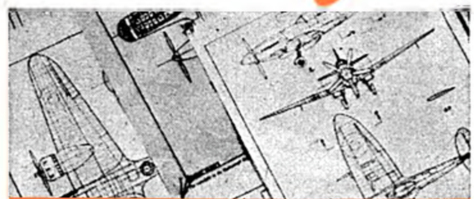

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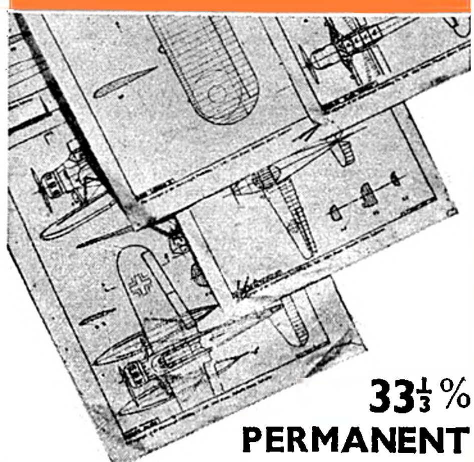

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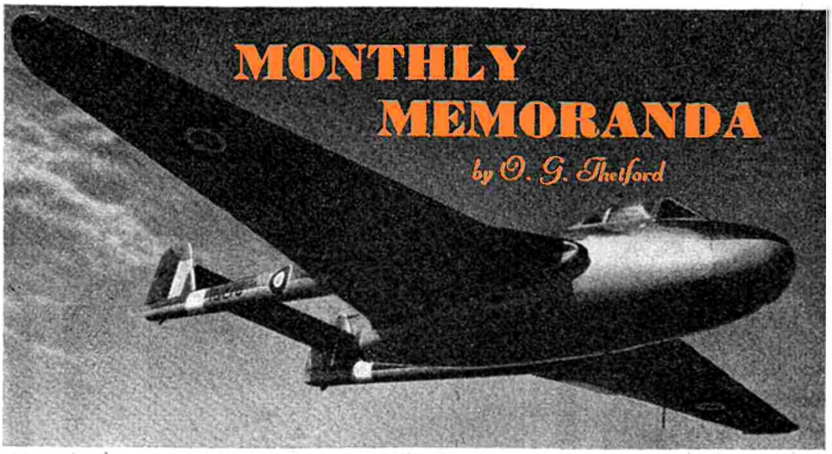
ALLEN HOUSE • NEWARKE ST. LEICESTER

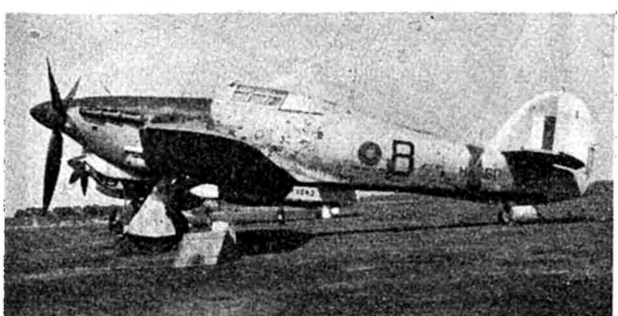
MONTHLY MEMORANDA

by J. G. Thetford



Batting It.—Britain's only twin-boom fighter, the De Havilland Vampire jet-propelled aircraft, which made a spectacular appearance over Hyde Park one week-end in September, 1945. The Vampire is likely to challenge the speed record set up by the Gloster Meteors at Herne Bay. Photo : Charles Brown.

Shining Armour.—First picture to be published of a Spitfire fighter in natural aluminium finish, with black anti-dazzle cowling. This particular aircraft is a Spitfire VIII of South-East Asia Command. Photo : Peter M. Bowers.



Silver Once Again.—One of the veteran Hurricanes still in first-line service on the Burma Front at the end of the Japanese War. Note the aluminium finish and the small red and blue fuselage roundel. Photo : Peter M. Bowers.

A Twin-Boom Jet.

Making its first flight on September 20th, 1943, at Hatfield, the De Havilland Vampire jet-propelled fighter was the first aircraft in Great Britain or the U.S.A. to exceed 500 m.p.h. in level flight. The Vampire, the D.H. 100, is in quantity production for the R.A.F. at the Preston factory of English Electric, formerly manufacturers of the Halifax bomber. Of all-metal construction, except for the wooden cockpit, the Vampire is fitted with the De Havilland Goblin jet turbine motor, also employed in the Lockheed XP-80A Shooting Star and the Gloster Meteor II. Armament is four 20 mm. cannon and the operational ceiling between 45,000 and 50,000 ft. One Vampire has been used for deck-landing trials by the Royal Navy. The Vampire has a span of 40 ft., a length of 30 ft. 6 in., a height of 9 ft. 9 in. and a wing area of 258 sq. ft.

Vampires have normal day fighter camouflage and the serial numbers TG 278, TG 279, etc.

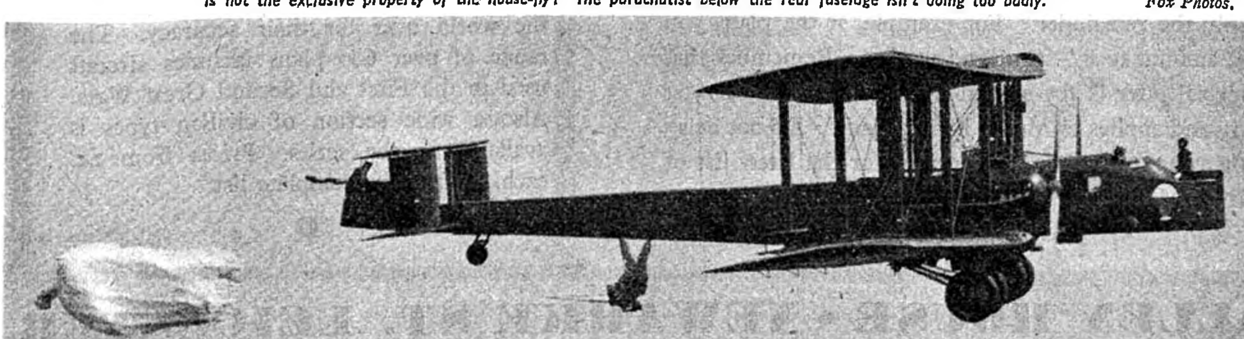
Spitfire Replacement.

After serving with the R.A.F. in about thirty main variants, the Spitfire is now due for replacement by a completely new design—the Spiteful. The Vickers-Armstrongs Spiteful XIV single-seat fighter has straight-taper laminar-flow wings and a deeper fuselage giving improved view forward over the engine from the cockpit. Another notable improvement is the wide-track undercarriage, the main wheels retracting inwards. Fitted with a 2,050 h.p. Rolls-Royce Griffon 85 motor, the Spiteful has a maximum speed of 465 m.p.h. at 26,000 ft., a climb of 2,500 ft./minute, a range of 530 miles cruising at 260 m.p.h. and a service ceiling of 41,500 ft. Span is 35 ft., length 32 ft. 4 in., height 10 ft., wing area 210 sq. ft. and loaded weight 9,300 lb. An early production Spiteful has normal day fighter camouflage and the serial number RB 515. The Royal Navy version is known as the Seafang.

World's Most Powerful Trainer.

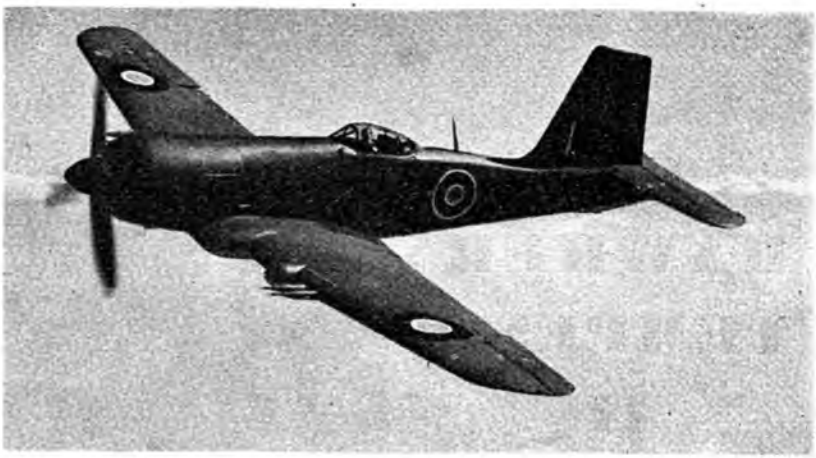
Produced as an advanced high-speed trainer to reproduce the characteristics of fast "twins," the Bristol Buckmaster has side-by-side dual controls forward and a wireless-operator's station aft. Of all-metal construction and fitted with two Bristol Centaurus VII radials of more than 2,500 h.p. each,

Where Fliers go to in the Winter-time.—This picture of a parachute training Virginia from Henlow (see Flashbacks) proves that walking upside down on ceilings is not the exclusive property of the house-fly! The parachutist below the rear fuselage isn't doing too badly. Fox Photos.



the Buckmaster has a maximum speed of 352 m.p.h. at 12,000 ft., an initial climb of 2,245 ft./minute and a service ceiling of 30,000 ft. Loaded weight is 33,700lb., span 71 ft. 10 in. and length 46 ft. 5 in.

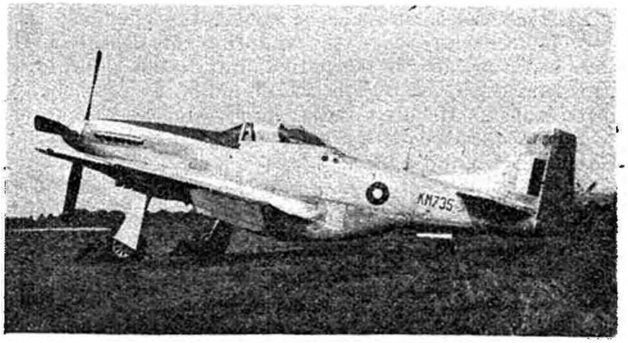
Production Buckmasters are camouflaged in dark green and dark earth on the top surfaces and are Training Yellow underneath. The serial number is reproduced in black beneath the wings. Two production batches are serially numbered TJ 714, TJ 715, TJ 716, etc. and RP 176, RP 177, RP 178, etc.



Best Brand Blackburn.—This Firebrand IV is one of the most formidable of the new generation of "strike" aircraft for the Royal Navy, and can function as a torpedo-bomber, dive-bomber, rocket-fighter or normal fighter. *Blackburn Photo.*

Fleet Torpedo-Fighter.

First Blackburn fighter design for the Royal Navy since the Skua and Roc is the Firebrand IV single-seater, now in full production. In the new "strike" category, the Firebrand is a combination of fighter torpedo-carrier and dive-bomber and large flaps make it eminently suitable for deck operation. Wings are folding for easy stowage and a Bristol Centaurus IX radial is fitted, the top speed being 350 m.p.h. at 13,000 ft. (without torpedo) and 342 m.p.h. at the same height with the torpedo. Rate of climb (with torpedo) is 2,200 ft./minute, operating speed 256 m.p.h. and stalling speed 75 m.p.h. Loaded weight is 15,671 lb., the span 51 ft. 3½ in., length 39 ft. 1 in. and wing area 381 sq. ft. Armament consists of four 20 mm. cannon in the wings and a 1,850 lb. torpedo or alternative bomb-load. Production Firebrands are numbered EK 637, EK 638, EK 639, etc.

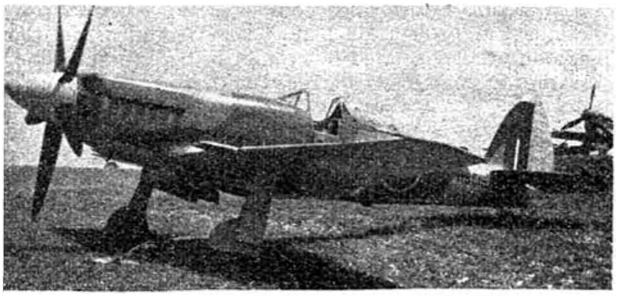


Long Way from Home.—An interesting picture of a North American Mustang IV of South-East Asia Command with natural metal finish and red and blue roundels. *Photo: Peter M. Bowers.*

R.A.F. Flashbacks—13.

The Vickers Virginia was the standard night-bomber of the R.A.F. from the mid-twenties to about 1935, when the Heyford came into service. The Virginia X had a crew of four and was all-metal with fabric covering. The span was 87 ft. 8 in., the length 62 ft. 3 in. and the loaded weight 9,650 lb. (less than that of some modern single-motor fighters!). Fitted with two 470–500 h.p. Napier Lion V motors, the Virginia carried a bomb load of 3,000 lb.

Virginias equipped Nos. 7, 10 and 58 (B) Squadrons and No. 502 (Ulster) Squadron in Northern Ireland. They were doped dark green all over and had red and blue roundels. One of No. 502 Squadron's Virginias carried the serial number K 2339 in black beneath the lower wings and on the rear fuselage.

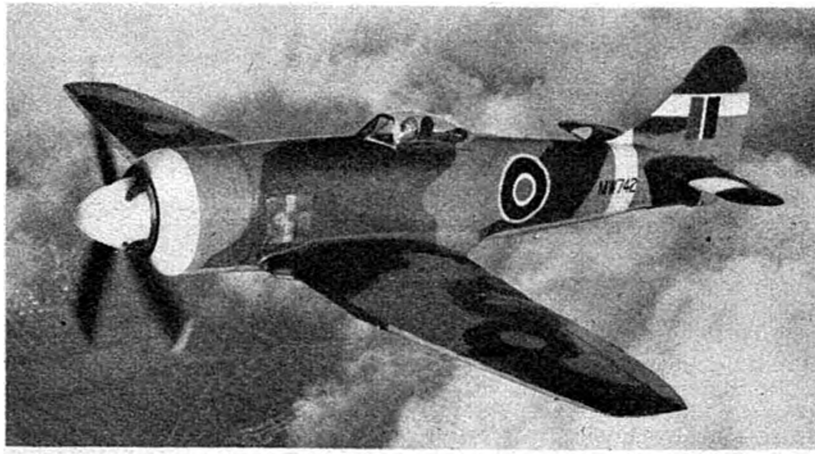


Inherited Temper.—Finally replacing the long line of Spitfires is the Spiteful XIV, which has five-blade airscrew, laminar-flow wings and wide-track undercarriage. *Photo: A. T. P.*

Fastest of its Class.—The Bristol Buckmaster advanced twin-motor trainer is closely related to Bristol's latest torpedo strike aircraft, the Brigand. *Photo: Bristol.*

A E R O P L A N E S   D E S C R I B E D   X X X I V

THE HAWKER TEMPEST II



ORIGINALLY intended for operations against the Japanese in S.E. Asia, the Hawker Tempest II was just too late to see action, but it has gone into squadron service with Fighter Command. It is especially interesting as the first radial motor single-seat fighter to go into service with the Royal Air Force since the Gloster Gladiator biplane.

The Bristol Centaurus motor installation was first tried on the Tornado, production of which was abandoned in favour of the Typhoon. In February, 1941, the Hawker Company received a contract to convert the Tornado prototype to take a Centaurus motor, and this version first flew on October 23rd, 1941. This aeroplane, HG 641, proved of considerable value in providing flight experience with the new motor. Compared with the Vulture-Tornado, the Centaurus-Tornado had a new centre fuselage and a revised motor mounting. With the cessation of Vulture and, consequently, Tornado production, the project of fitting the Centaurus in the Typhoon was considered but found to be impracticable.

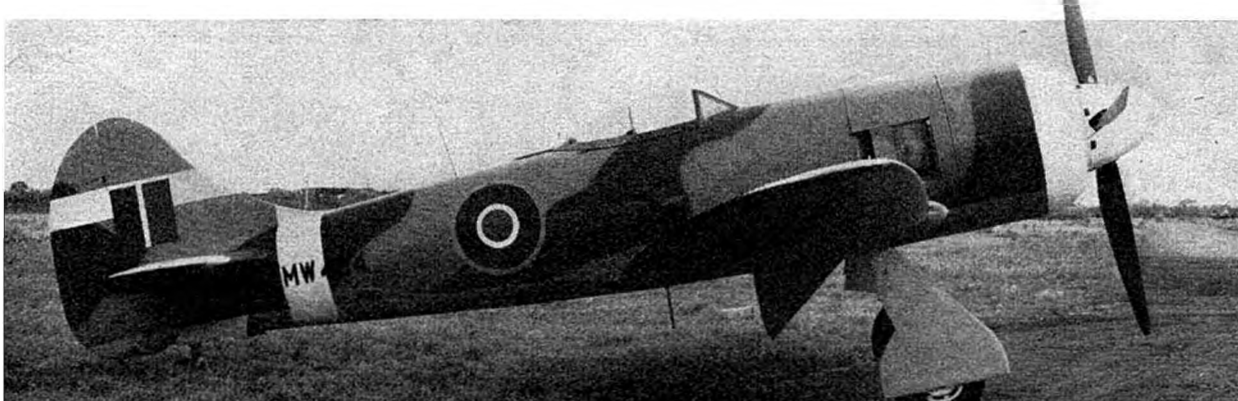
With the emergence of the Tempest, the Centaurus motor once was again proposed as an alternative power-plant. In the summer of 1942 the Hawker Company redesigned the exhaust system of the Centaurus so that individual exhaust pipes led back from each cylinder to eject at the side of the cowling. The Centaurus cowling was modified to suit the Tempest airframe and the ducting and cooling system also underwent revision. The air intake and oil cooler were located in the wing root and a large spinner installed, leaving a small cooling entry which was nevertheless highly efficient.

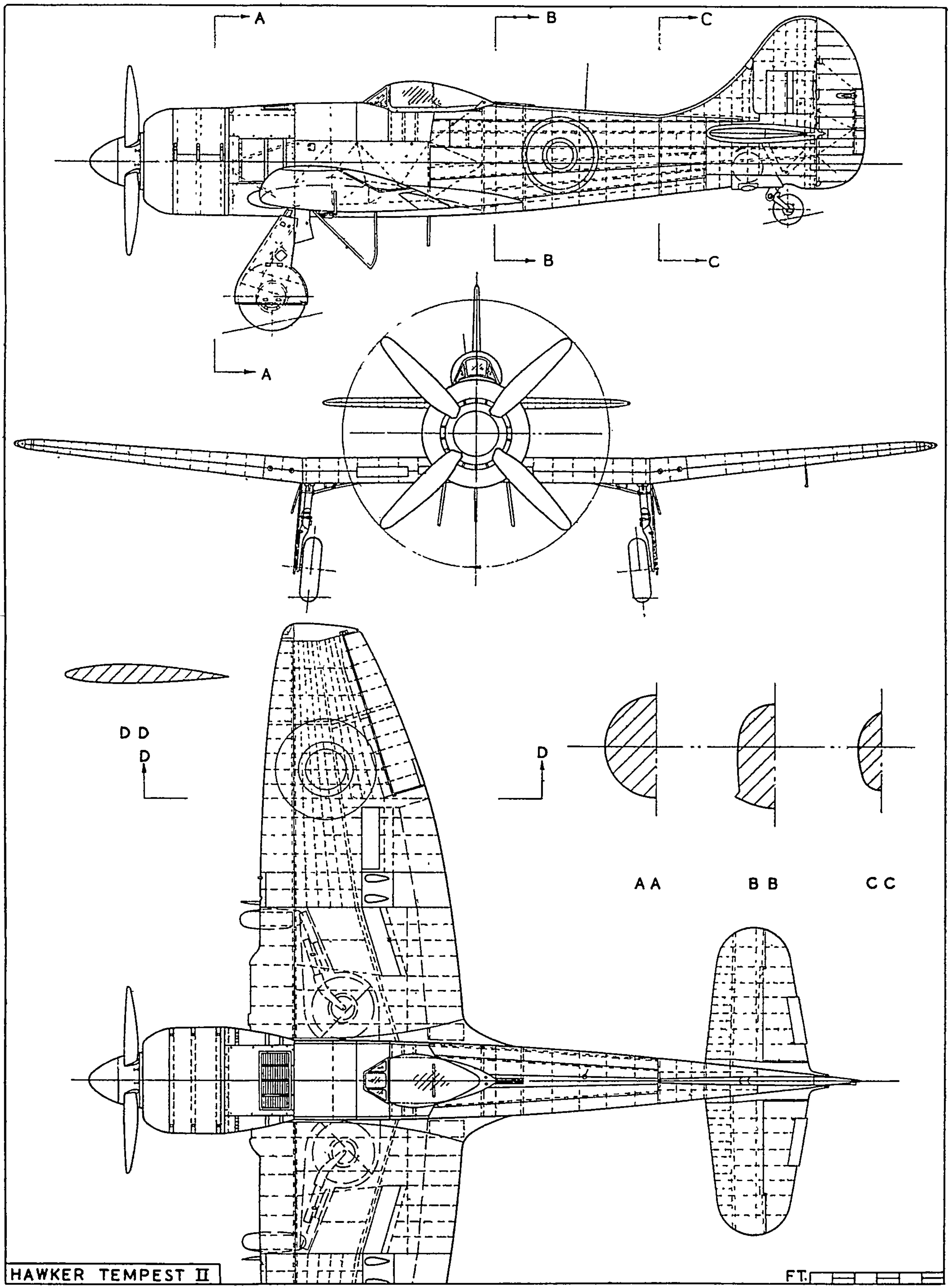
The first prototype Tempest II, as the Centaurus-Tempest was designated, first flew on June 28th, 1943. This aeroplane received the R.A.F. Service number LA 602. The first production Tempest II made its initial test flight in the autumn of 1944.

No performance figures for the Tempest II have yet been released.

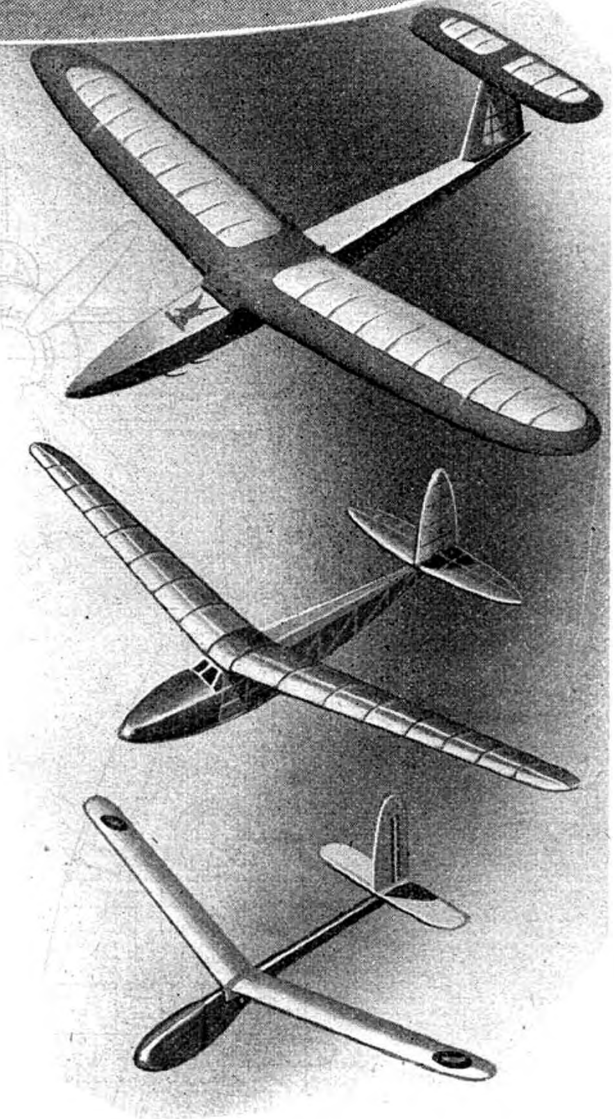
Fighter Command Tempest IIs are camouflaged in dark sea grey and dark green on the top surfaces and medium sea grey underneath. Red, white and blue roundels appear above and below the wings, the roundel on the fuselage being red, white and blue with an encircling yellow ring. The usual fin flash is displayed and the white spinner and rear fuselage band is enhanced by a white ring round the front of the cowling and longitudinal white bands across the fin and rudder and across the centre of each tailplane. These are clearly illustrated in the accompanying photographs. Production batches of Tempest IIs are numbered PR 657, PR 658, PR 659, etc., and MW 402, MW 403, MW 404, etc.

Specification : Single-seat low-wing monoplane fighter. One Bristol Centaurus V 18-cylinder air-cooled sleeve-valve radial motor, 2,500 h.p. plus. All-metal construction with stressed-skin. Span : 41 ft. 0 ins. Length : 33 ft. 6 ins. Height : 14 ft. 6 ins. Loaded weight (approx.) : 11,000 lb. Armament consists of four fixed 20 mm. cannon mounted in the wings. Four-blade constant-speed airscrew.



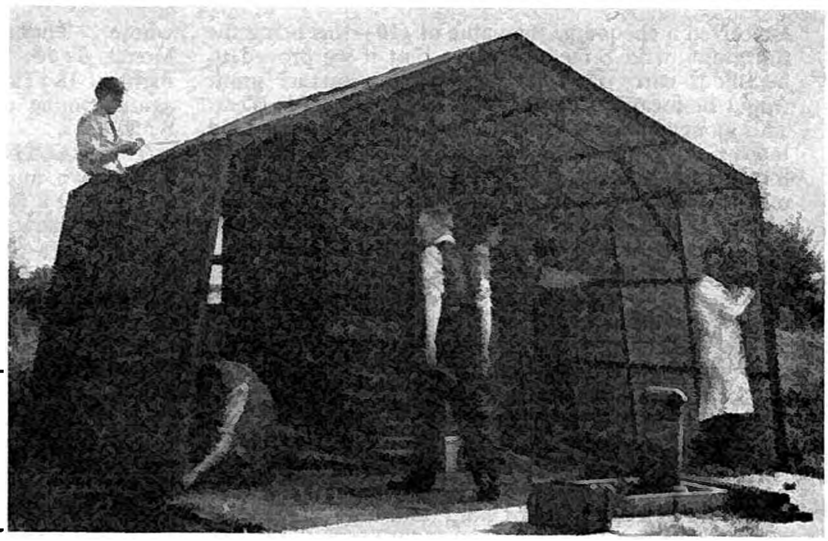


HAWKER TEMPEST II



Ye Olde CLUB NEWS

By Clubbeman



Power Jets Prefabricating.—Members of the newly-formed Power Jets M.A.C. dismantling an ex-Army hut prior to its removal and reassembly as their new clubroom. To these chaps, as to every other new club, we wish every success—and who knows, with a little help from Air Commodore Whittle, they may yet be the first to fly a successful jet-propelled model!

WRITING this some eight weeks before the event, it feels strange to wish you all a very merry and happy Christmas, but that is the way things go in the publishing world . . . Christmas numbers out in November, with the necessary material written in October. However, 'twas ever thus, and it gives me great pleasure to once again echo the traditional good wishes, made all the more possible of fulfilment by reason of the return of Peace—however turbulent it seems at the moment.

This Christmas marks the beginning of a new era, both in a general sense, and particularly in the aeromodelling world. Projects envisaged during the war years, and necessarily restricted under the existing conditions, will be brought forth in all their " glory," and—if I may act the part of a prophet for once—the prospects for a greatly improved enjoyment of our chosen hobby are extremely bright. Many radical changes are in the offing, and I for one look forward to many improvements in such things as supplies, designs, competitions, etc. In particular, I hope for a swift return to contests with an international flavour, and suggest for my own part that a start could definitely be made in 1946, even though a full participation by all interested countries may be temporarily hampered by conditions still obtaining in some newly liberated areas.

I note that the S.M.A.E. are taking the contest-conscious aeromodellers into their confidence this year and calling a general meeting for the 2nd December for the purpose of discussing rules applicable to future competitions. While commending this as a good move, I feel that the situation could have been better approached had this " free-for-all " discussion been held earlier in the season, the opinions put forward being sifted out by a sub-committee and put into some concrete proposals at a meeting held to fix the next season's programme. Having had some experience of these general meetings, I know that invariably 90 per cent. of the available time is frittered away with arguments between small sections of the gathering, and much time is wasted on an unproductive discussion on the merits (or otherwise) of types that have been ruled out of order long ago.

I do seriously suggest that the best way to tackle this very important problem is to form a panel of *experienced* competition experts—and by this I mean a panel formed of chaps from all parts of the country—who can draw up a suggested list of contests, rules and relevant suggestions, all cut and dried to put before a general meeting of the type under discussion. The panel's recommendations would form the basis of the business, and modifications and additions arising from the general meeting incorporated in a final scheme, brought up at the Annual General Meeting for ratification.

I have news of the Government grant to the GREAT YARMOUTH M.A.C., and pass on the information here in order to assist others who may wish to qualify for this financial aid. Quoting from the Secretary's letter :—

" The Government, through various local authorities, authorise a certain sum of money to be allocated to the organisations to which the youth of towns, cities and villages belong. Each organisation receives a share according to their requirements, and with full consideration to the size of the club. The grant is renewed annually, subject, of course, to the local authorities' decision.

" Investigation proved that the grant was being given to nearly all the clubs in the town, football, cricket and other pastimes in the usual order. I, being of the opinion that aeromodelling is the most up-to-date recreation, made application, but met with some objections. The main objection was that some of the local ' bigwigs ' considered aeromodelling a child's game, and model aircraft as ' toys.' Another objection was that as we were a new club, the Council could not see what we were aiming at.

" However, these difficulties were soon overcome, for I managed to get the town's Youth Officer interested in model aircraft, and he agreed to help us. Firstly, we arranged to put on a show in aid of a War Charities Fund, which proved a great success, and followed this up with an extensive publicity campaign with posters and reports in the local Press.

" The result was increased membership, the realisation of the public and local authority as to the real existence of an aeromodelling club, and its place in the town's affairs. We also obtained the services of our M.P. and the vicar as President and Vice-President respectively ! With such important people behind us, I plugged the club for all I was worth, and other members did their share of the donkey work.

" After nine weeks of continued correspondence, I received a cheque to the value of £10—this being the full grant, with a memo stating that if we proved to be able to carry out what we planned a further grant would be awarded at the beginning of the New Year. This money has enabled the club to be on a very sound footing, and we stand very high among the town's most popular clubs. I may add that the club has been offered two seats on the Council which controls the issuing of these grants.

"I would like to record the great help I received from the A.B.A. officials during our campaign, their assistance proving invaluable, and the club owes them a great debt.

"In conclusion, we shall be happy to assist any other club who contemplates applying for a grant, and if any club feels that their case can be helped by quoting our case as an example they may do so with our full permission and best wishes."

Well, there you are, chaps, you know how to go about it now. As I suspected, it requires a guiding hand that is not afraid of a spot of hard work, and full co-operation from all members, everyone pulling his weight and making the club a worth-while group to qualify for the grant.

The Yarmouth club recently staged an inter-club event with the Norwich group, some pretty good times being set up in the course of the day's flying. Norwich generally had the better of things until J. Lamb brought out his "King Falcon," when, by careful trimming he set up an aggregate of 5 : 05·2, including the best flight of the day. J. Mannall put up a good flight with his scale "Waco Hadrian," time being 1 : 58·2.

The BRISTOL & WEST M.A.C. is combining with the local engineering and ship model clubs to hold a joint exhibition at the City Museum next January. This is the first time in the history of Bristol that such an exhibition has been arranged, and it is hoped to make it a regular feature, if the public reaction is what they anticipate it to be. The Museum is normally open from 10.30 a.m. to 6 p.m., but arrangements have been made with the authorities for selected parties to be admitted from 7 p.m. to 9 p.m. on the Thursday and Friday of the first and second weeks for which the exhibition is open. Anyone wishing to take advantage of these semi-private showings should contact the secretary of the joint exhibition committee, Mr. M. Garrett, 35, Wellington Walk, Henleaze, Bristol 9.

THE PARK M.A.I. is collecting a big audience on Mitcham Common every Sunday afternoon, with members of the Streatham club also in evidence. The most popular model in the club at present is the "Igo," of which several are in evidence, all averaging over a minute without thermals. Indoor flying has also commenced, best time to date being 1 : 13.

After changing hands several times during the season, the club F.A.I. glider record in the WITNEY & D.M.A.C. is held by G. P. Harris, with a time of 2 : 44, the model being an "Ivory Gull"—which has been lost and found twice during the season.

WILMSLOW M.A.C. has now been able to obtain a club room with the help of the local guild, and r.t.p. flying has been tried for the first time, F. Wraith setting up the best times so far with 40·5 and 38·6 sec. The outdoor duration figure stands at 2 : 20, by J. Adie's "Ajax."

W. B. Ames of 29, Clinton Avenue, New Haven, Conn., U.S.A., would like to correspond with someone in this country who is a 1/72nd scale model enthusiast.

September 30th saw some consistent flying with the KINGSBURY M.F.C., best times going to R. Miles, whose "Thermic 50" clocked 9 : 20 o.o.s., and R. Monks 6 : 10. A week later J. Bowermany made a flight of 18 : 15 o.o.s. with his "Tempus Fugit," Monks again coming up for second best with 16 : 05 o.o.s. and 9 : 20 o.o.s.

The WALTHAMSTOW M.A.S., despite the weather, have flown in all the S.M.A.E. competitions this year, and gained a fair amount of success. F. Dudeney made the best show, losing his model in the National Cup event after a time of 9 : 45, taking the club r.o.g. record at the same time.

DONCASTER & D.M.F.C. report kindly weather during the past few months, and some outstanding flights have been made. W. Monks broke his own club record for tailless models with a flight of 1 : 26, using a 150 ft. towline—and no thermals! An inter-club fixture with some visitors from Mexborough was highly successful, F. Gearing winning the Consistency event with three fine flights of 42·5, 45 and 45 seconds, flying his "Jackdaw."

The BIRMINGHAM M.A.C. have enjoyed a very successful season, which ended with R. Perry winning the Open Duration event, also the "A.V. Branch Memorial Trophy" while visiting the Worcester Rally on September 23rd. W. Dallaway won the Nomination event, while F. Chatwin bagged second place in this contest and third in the Open Glider. The "Junior Cup" went this year to J. Cleland for his performance in the Thurston Cup, his aggregate being 6 : 23.

A rather high wind marred the rally staged by the WORCESTER M.A.C. held at Perdiswell Aerodrome (until recently an R.A.F. training drome) on the 23rd September. Visitors were present from Birmingham, Tewkesbury, Walsall, Kidderminster, Coventry, Bromsgrove and Wolverhampton, and all were complimentary regarding the organisation. Full results were:—

Open Duration.		
R. Perry	(Birmingham)	3 : 41·4
R. T. Parham	(Worcester)	3 : 10·2
J. P. McGill	,,	3 : 01·9
Open Glider		
S. Ward	(Wolverhampton)	3 : 47
H. G. Crook	(S. Birmingham)	3 : 10
F. Chatwin	(Birmingham)	2 : 56
Nomination.		
W. Dallaway	(Birmingham)	

The Worcester Challenge Cup for the best flight of the day went to J. P. McGill.

The Gala Day held by the BRENTFORD & CHISWICK M.F.C. was a great success, though the weather left much to be desired. A good all-round standard of flying was maintained in the duration events, while the workmanship displayed in the Concurs classes was the best seen for a long time. Results:—

Open Duration.		
A. Geddie	(Bromley)	10 : 45·5
J. Miller	(Northern Heights)	6 : 40
Open Glider.		
A. Marcus	(Croydon)	8 : 21
R. Webb	(Harrow)	8 : 08
Open Petrol (Nomination).		
K. Tansley	(Northern Heights)	1 sec. error.
B. Gunter	(Bushy Park)	4 ,,
G. Clarke	,,	14·5 ,,
Tailless.		
R. Connor	(Brent. & Chis.)	1 : 19·4
J. Marshall	(Hayes)	1 : 18

Concours d'élégance.
G. Dunmore (Leicester)
— Waldon (A.B.A.)

The NORTH KENT M.A.S. saw some consistently good flying at Ninefields on September 30th, two contests being held. H. Sayers won the glider event with an aggregate of 5 : 16·6, followed by J. Knight, 4 : 56·7, and A. R. Parker 3 : 56·4. The rubber event went to M. Wickens, who clocked 3 : 49·5, T. Wickens coming second with 3 : 43·4, and A. R. Parker third with 2 : 36. The "construction" prize had to be split three ways, the judges being unable to decide between Messrs. Hall, Rumley and Knight.

The CARDIFF M A.C. have again won the decentralised Welsh Rally, thus completing the hat trick. Times were: B. Morgan 3 : 26, R. Prior 2 : 38, P. Persen 4 : 40, and J. Phillips 4 : 53. On the previous Sunday Phillips raised the club sailplane record to 3 : 42.

North London aeromodellers over 17 years of age are wanted to join an Adult Club in North London. Full particulars are obtainable from the secretary, 70, Blundell Street Islington, N.7.

During "Loughton Fair Week," the LOUGHTON GREMLINS held an exhibition which raised the sum of £90 for Loughton Services Fund. The centre piece was a display of photos of Loughton airmen, and solid models were well in evidence. The best flying model on show was a replica of the "R.W.D.8."

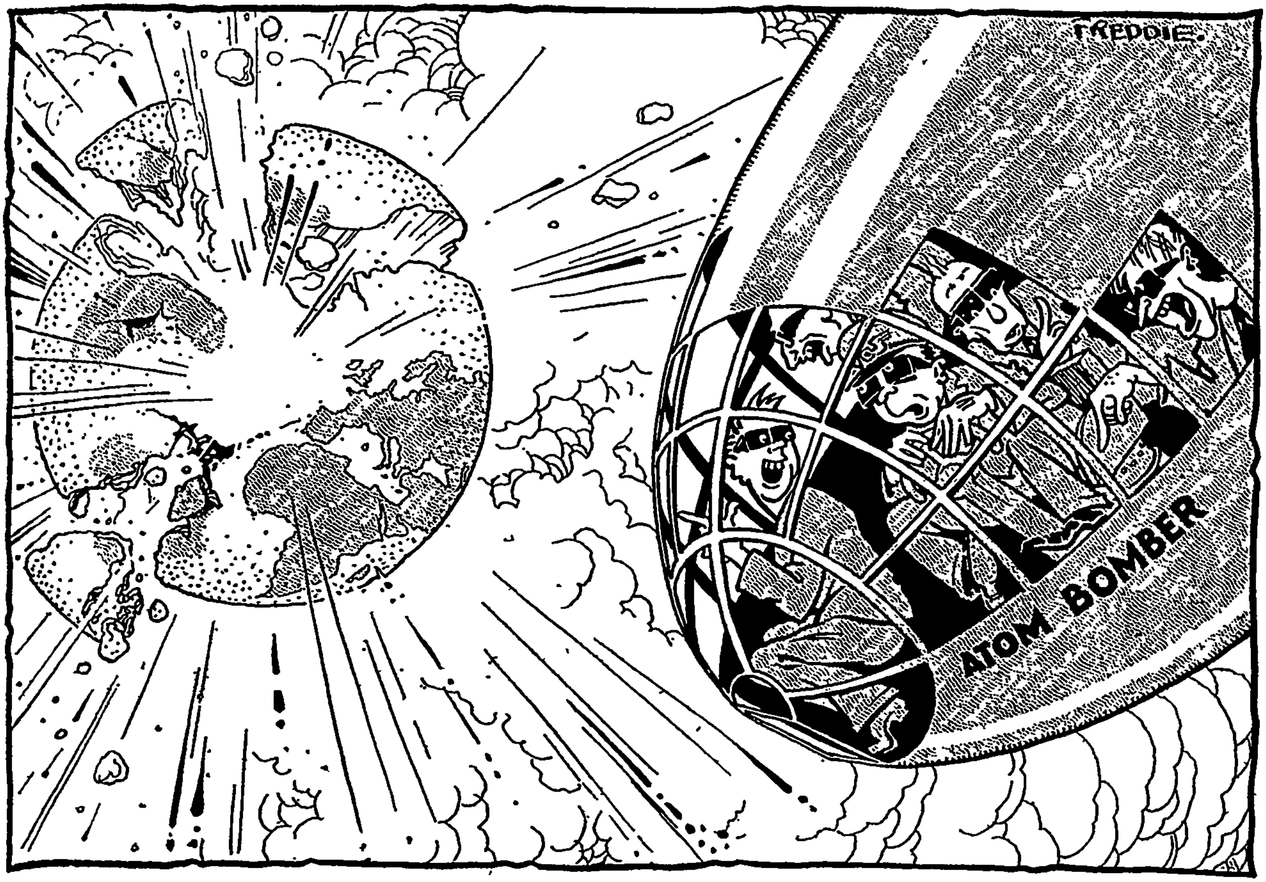
Indoor flying is enjoying a spell of popularity with the SHEFFIELD SOCIETY OF AEROMODELLERS, and each meeting sees the record pushed up a bit higher. The original record of 60 secs., set up by L. Wilson, has been raised at each meeting by C. Atkinson. His latest time of 2 : 00·8 makes him the first member to top the two-minute mark.

This season has been a poor one for the MERSEYSIDE M.A.S., the main troubles being foul weather and a lack of new, high-performance machines. On September 30th, the club, flying at home, beat the Wallasey M.A.C. by 19 points to 12 in duration and gliding matches. There were no thermals, but times were quite good, and both sides agreed that they had had a very pleasant afternoon's flying.

Two competitions have been held recently by the WALTHAM & ENFIELD M.A.C., both on the basis of the best flight of three attempts. J. Warren won the glider event with a best time of 1 : 45, while the second contest went to R. A. Parker, whose rubber-driven job flew for 2 : 16.

Activities in the indoor field are wide and varied with the BLACKHEATH M.F.C., and many new models have appeared, including some with variable pitch props—both mechanically operated and with flexible blades. Members are building or designing models for every conceivable competition that may appear in next year's S.M.A.E. programme, so that Blackheath may well be considered a formidable opponent on the field in 1946.

The VICTORIA M.A.C. have been fortunate enough to find a new club room, and any interested aeromodellers are welcome any Wednesday, Friday or Saturday from 7. to 10 p.m., at St. Simon's Institute, Morpeth Street, Bethnal Green, E.2. Club records for the past season



"O.K.! IT WORKS—NOW WHERE DO WE LAND?"

are :—

Glider T.L.	D. Reece	6 : 06
,, H.L.	L. Steward	25·4
,, Tailless	R. Mander	21
Duration R.O.G.	G. Oates	7 : 10
,, H.L.	S. Levy	1 : 30
Indoor r.t.p.	W. Morley	1 : 0·78

Still more chaps are desirous of forming clubs in their districts, so as usual, those interested, get in touch with the following: G. Gartlidge, 31, Orme Road, Pool Fields, Newcastle-under-Lyme, Staffs.; W. H. G. Ayling, 31, Shepway Avenue, Maidstone, Kent; H. W. Prahl, 89, Park Road, Teddington, Middlesex.

There is quite a spate of new clubs notified this month, and this I am sure settles once and for all that twaddle still heard here and there that aeromodelling is "on the way out." Never before has the hobby enjoyed such popularity as it does at the present moment, and we have nowhere reached the peak yet. To all new groups, my best wishes, and to you all, once again my very sincere seasonal greetings, and let us all look forward to a real aeromodellist's year in 1946.

THE CLUBMAN.

NEW CLUBS.

FALKIRK & D.M.F.C.
W. Ure, 83, Wallace Street, Falkirk, Scotland.
BARGOED M.F.C.
A. G. Taswell, 36, McDonnel Road, Bargoed, Glam.
BRIDGWATER & D.M.A.C.
J. W. E. Newby, 72, Taunton Road, Bridgwater, Som.
BURSCOUGH M.A.C.
H. A. Tidy, Liverpool Road South, Burscough Town, Nr. Ormskirk, Lancs.
OLDHAM M.A.C.
R. J. P. Thomas, 18, Abbeyhills Road, Oldham, Lancs.
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P. Cracknell, 48, Hampshire Street, Hull.
GRIMSBY & CLEETHORPES M.F.C.
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HAY (Hereford) A.M.C.
E. Abel, Old Toll House, Hay, Hereford.
SWINDON M.A.C.
R. Gunter, 45, Pavenhill, Purton, Wilts.
HULL & D.M.A.C.
A. Arthur, 146, Hessle Road, Hull.
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E. T. Polhill, Collyers School, Horsham, Sussex.
SOUTH MANCHESTER M.A.C.
G. G. Kenyon, 41, Rushford Street, Longsight, Manchester 12.
WEST WORTHING A.C.
P. F. Springett, 135, St. Andrew's Road, W. Worthing, Sussex.
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M. Benstock, 2, Glendinning Avenue, Weymouth, Dorset.
ST. JOHN'S CENTRE M.A.C.
R. W. Maynard, 22, Stuart Road, Stoke, Devonport, Plymouth.
DOVER YOUTH CLUB M.F.C.
T. J. Kettle, 43, Millais Road, Dover, Kent.
NORTH LIVERPOOL A.M.C.
L. Prendergast, 53, St. Matthew's Avenue, Litherland, Liverpool 21.
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HINCKLEY (198 Sqn. A.T.C.) M.A.C.
H. Shuttleworth, 9, Bradgate Road, Barwell, Leicester.

SECRETARIAL CHANGES.

SALFORD M.A.C.
N. Middlemiss, 65, Cholmondeley Road, Pendleton, Salford.
SEAHAM M.F.C.
M. Bainbridge, 6, Victoria Street, Seaham, Co. Durham.
BURY & D.M.A.C.
E. Hargreaves, The Baron's Cottage, Edgeworth, Nr. Bolton Lancs.
HATFIELD M.A.C.
J. Fraser, 35. Cecil Crescent, Hatfield, Herts.
WALSALL M.F.C.
G. H. E. Wood, 6, Cobden Street, Palfrey, Walsall.
BISHOP'S STORTFORD M.A.C.
B. F. Courtman, 12, Thornfield Road, Bishop's Stortford, Herts.
EAST BIRMINGHAM M.A.C.
J. Sawyer, 1836, Coventry Road, Yardley, Birmingham 26.
READING & D.M.A.C.
W. E. Harris, 71, Hatherley Road, Reading.
AIREBORO' GRAMMAR SCHOOL M.A.C.
K. Shippon, 12, Henry Terrace, Yeadon, Near Leeds.
VICTORIA M.A.C.
W. R. Clark, 31, Temple Dwellings, Old Bethnal Green Road, London, E.2.
BARROW M.A.C.
N. Gregory, 64, Wellington Road, Hatch End, Middlesex.

WANTS AND DISPOSALS

IMPORTANT NOTICE . . Will readers please note that as from the February issue, Wants, Disposals and Exchange will appear under CLASSIFIED ADVERTISEMENTS. Advertisement Rates are as follows:—Minimum of 18 words 3/- and 2d. per word for each subsequent word. Box numbers are permissible—to count as six words when costing the advertisement. Press Date for the February Issue is DECEMBER 20th.

All restrictions on advertisements are now removed, i.e., Wants can now be inserted for petrol engines, etc., but the Editor reserves the right to refuse any advertisement.

Every effort will be made to publish existing Wants, etc., in the January issue, but no further items can be accepted unless prepaid in accordance with the above scale.

WANTS

(1) Copies of "Model Airplane News," state price required.—J. P. Buckeridge, Pharo, Blossom Way, Hillingdon, Middx. (2) Electric motor, any voltage.—M. Murrell, Station House, Manea, Cambs. (3) Back copies of "Model Airplane News," "Air Aces," AEROMODELLER, and "Model Aeroplane Constructor," also Zaic Year Books.—14867515 Pte. L. P. Spink, R. Company, 2nd Bn. South Staffords, Zone 1, B.L.A. (4) AEROMODELLER copies from July, 1940 to March, 1945.—D. W. Nicole, La Colomberie, 36, Colomberie, St. Helier, Jersey, C.I. (5) Flying model electric motor, or address of person who can make same, state price; AEROMODELLER, August, 1943.—G. B. Onions, 7, Staverton Rd., Oxford. (6) AEROMODELLER, July, 1940 and October, 1941, full price if in good condition.—J. Mills, 5, The Woodlands, Upton, Wirral, Cheshire. (7) "The Design and Construction of Flying Model Aircraft," "Model Aeroplane Manual."—W. Brown, 167, Ringwood Rd., Parkstone, Dorset. (8) "Gas Turbines" and "Jet Propulsion for Aircraft."—C. S. Drake, "Poplars," Roseacre Lane, Bearsted, Kent. (9) Copies of AEROMODELLER containing photos and details of 1 in. to 1 ft. "Horsa Glider" and "Kirby Kite" sailplane; AEROMODELLERS prior to 1943.—Ward, 54, Ridgeway Drive, Swindon, Wilts. (10) AEROMODELLERS, 1939–45 (2 sets).—Sigmn. F. Gardner, 31, South Terrace, Sowood Ave., Ossett, Yorks. (11) AEROMODELLER, January, 1944, good condition.—R. Diamond, Nailstone, Nuneaton.

DISPOSALS

(1) 95 m.p.h. semi-scale Thunderbolt, control line model. Sell or exchange for 3 in. airwheels and timer.—R. E. Landon, 4, Goodwin Road, Shepherd's Bush, London, W.12. (2) AEROMODELLERS, 1943, except March issue, Jan., 1944–June, 1945, 25s.—R. Gow, 23, Kelvinghaugh Place, Glasgow, C.3. (3) AEROMODELLERS, 6 Vols. (unbound), Dec., 1938 to Nov., 1944, £4. 10s.—N. H. Wilson, Hillrise, Chalfont St. Peter, Bucks. (4) American Red Zephyr petrol model, silk covered, without engine, £8.—R. J. C. Canham, 35, Cheddon Road, Taunton, Somerset. (5) 3·5 c.c. B. 30 petrol engine, needs attention. Complete with coil, condenser, flywheel and stand.—J. Crook, 21, Tulketh Brow, Ashton, Preston, Lancs. (6) 1/60th scale Super Fortress.—P. Plater, c/o 15, Arno Avenue, Sherwood Rise, Nottingham.

EXCHANGE

(1) 50 yds. of ¼ in. by 1/30 in. rubber strip (brown) for any aero nautical books.—G. Lee, 225, Kitts Green Road, Lee Hall, Birmingham, 26. (2) New "Adept" lathe with face plate, dog chuck, compound slide rest, hand plate and carrier, for petrol engine, any c.c.—8132 R. Ames, M.T. Sec. 7, 3rd Parachute Bn. Army Air Corps, Melton Mowbray, Leics. (3) 15 strips of pre-war balsa, ⅛ in. by ⅛ in. by 18 in., sheets ⅛ in. by 3 in. by 18 in. for "British Aircraft," Vol. I and/or cash.—R. Rawlinson, 41, Upper Ground, Blackfriars, London, S.E.1.

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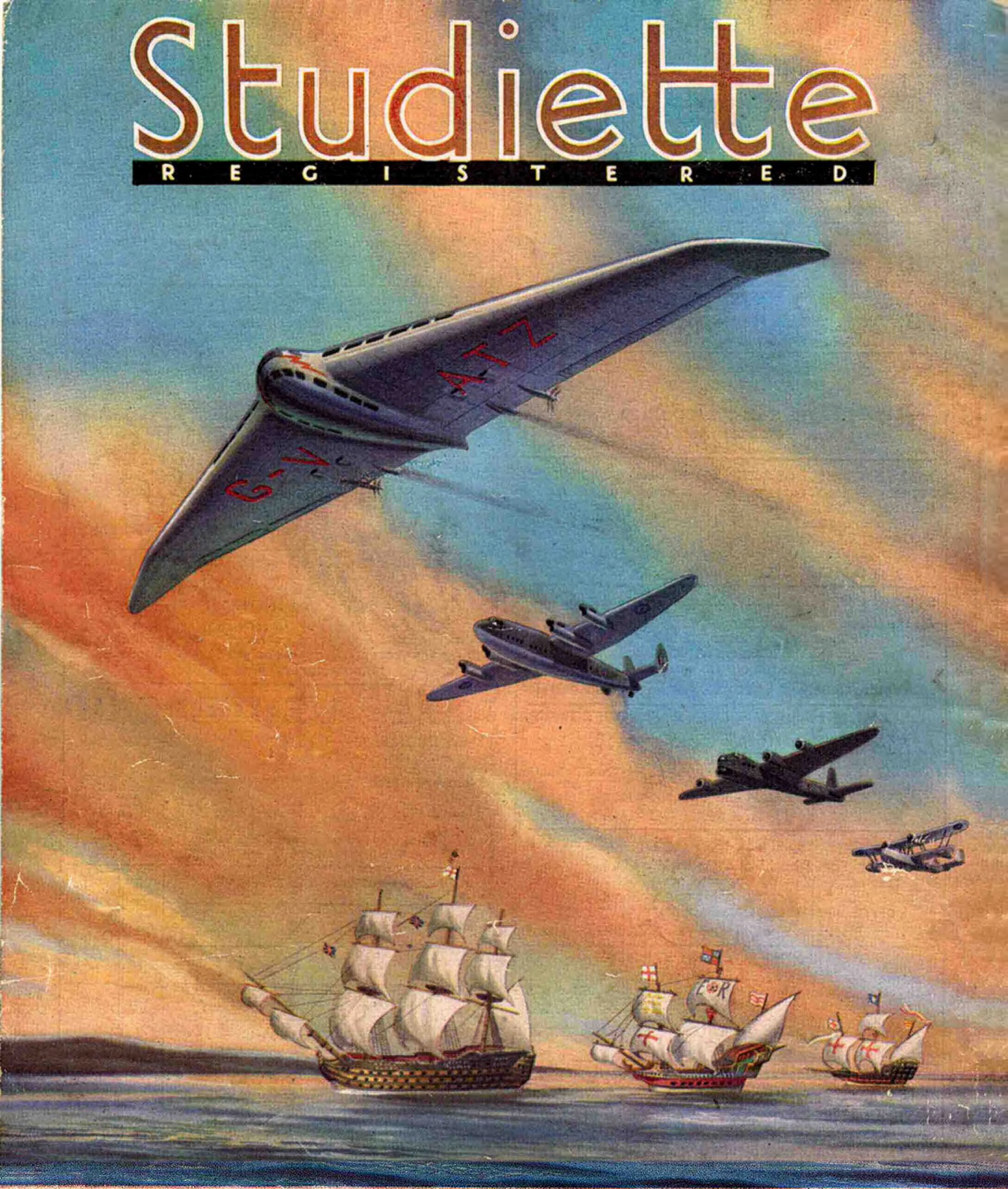
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