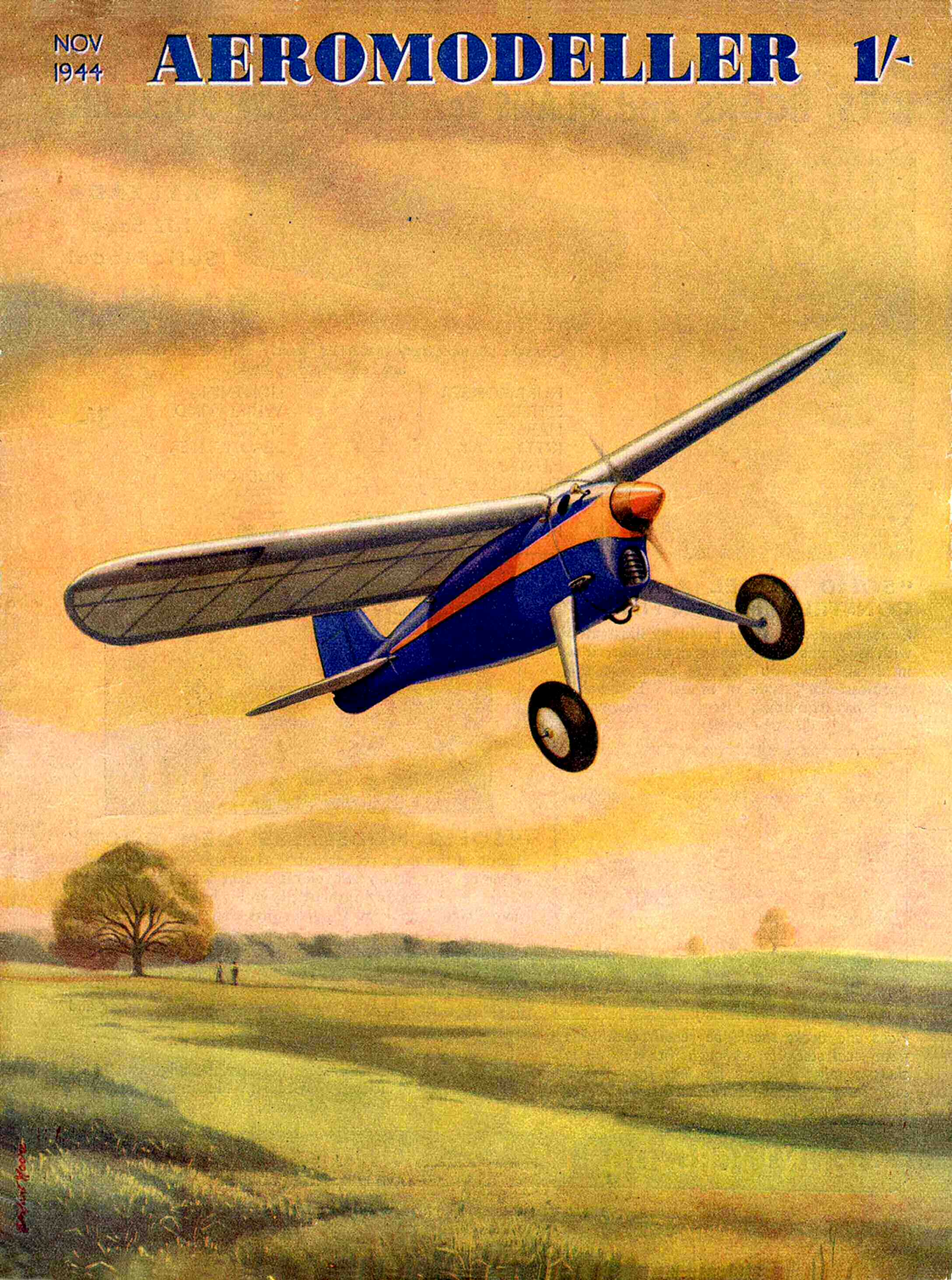
NOV
1944

AEROMODELLER

1/-



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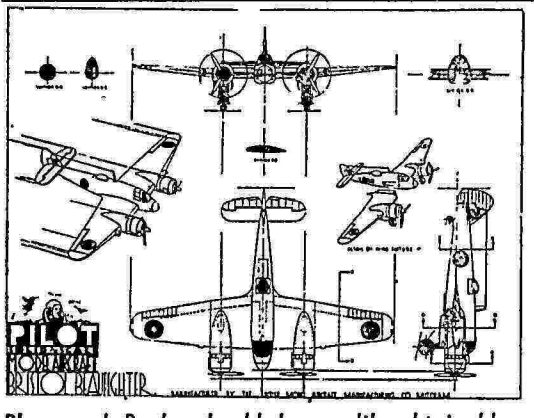
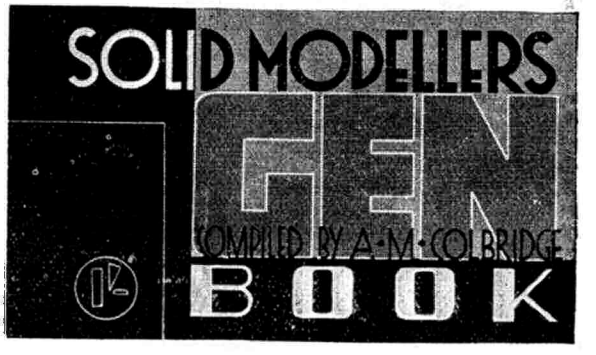


Plans and Books should be readily obtainable from local stockists, although Kits may be in short supply. Orders for Kits from A.T.C. and Service Personnel endorsed by C.O. or Unit through local stockist receive priority.



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BARRACUDA

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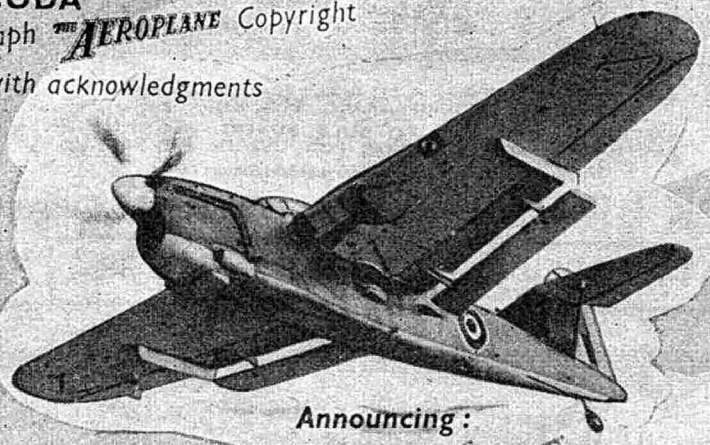

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(INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR")

The Model Aeronautical Journal of the British Empire

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"GOOD FOR RIP"

Aeromodellers throughout Great Britain, and in fact throughout the world, will note the resignation of Mr. C. A. Rippon from the office of President and Chairman of the Northern Heights Model Flying Club. "Rip" is well known for the pioneer work he has carried out in the development of the Model Aircraft Club movement in the London area. He was one of the founder members of the Northern Heights Club since its foundation some twelve years ago. In his letter of resignation Mr. Rippon refers to the many good friends he has made in the course of his connection with the Club, and calls to mind a number who have been launched on a successful aeromodelling career. Altogether there have been close on 1,000 members on the books of the N.H.M.F.C. since its inauguration. One of the most popular characteristics of "Rip" has been his willingness to lead and teach the young members of the Club—a characteristic not always found amongst the older members, and particularly the *more efficient* older members of Model Flying Clubs. Some of these are too prone to devote the whole of their time, and the Club's activities on behalf of their models; in other words—they look after only their own (flying) interests. Many are the youths who have been taught their first modelling by "Rip," and many of them have been the better for an association with such a fine character, and with a man who has given of his best in the training of these youths, not only in the art of aeromodelling, but in the more important art of being good Citizens. Outside the Northern Heights Club, Mr. Rippon is, of course, well known for his activities in organising the Northern Heights Rally, held annually for several years before the commencement of the present war. From all parts of the country journeyed keen aeromodellers to attend this "Rally," the fame of which spread far and wide around the country, on account of the efficient way in which they were organised under the leadership of Mr. Rippon. Concluding his letter to the Northern Heights Club, Mr. Rippon wished "all success for the future" and hoped that under wise and careful management it would continue to be one of the leading Aeromodelling Clubs in the country. He had a special word for the members (some 60 odd) now serving their country all over the world. We think this must be a record, and wonder if there is any other Model Aircraft Club in the country which has as many as 60 members serving in the Forces? Mr. Rippon has resigned from the Northern Heights Model Flying Club, following his election to the Chairmanship of the Association of British Aeromodellers, since he felt that his position would be somewhat invidious if he remained in what was virtually a "dual position." What one organisation has lost, the other, of course, has gained, and it is fitting that a man of Mr. Rippon's mature experience, sound judgment, and high skill should have been elected to such a responsible position as that of Chairman of the new National organisation which, incidentally, we hear is steadily gaining members and rapidly establishing contact with all aeromodelling organisations throughout the country. Few aeromodellers other than those directly associated with Mr. Rippon, will realise the tremendous amount of work and time he has given to the building up of the organisation of the A.B.A. It is rather like forming a new company. Before it can get into production all kinds and manners of arrangement must be made, the constitution must be thought out, approved, and set in type and distributed. Offices, a secretary, staff, legal documents in connection with tenancies, proofing of brochures, certificates, and so on and so on, must all be attended to. Many are the items which have to be arranged for in the early days of the formation of any organisation or company. But what does the outsider see? At first appearances, *nothing*; but nevertheless the foundations are being laid, and it is wise when building for a very large organisation that the foundations shall be well and truly laid. This has surely been done in the case of the A.B.A., and we congratulate Mr. Rippon on his achievement, the more meritorious since it has been carried out under war-time conditions.

Theory and Practice

Quite a lively discussion has been going on in our correspondence columns recently concerning just what combination of forces causes an aircraft, either model or full size, to climb. We do not think anyone has got very near to the right answer so far, but we are keeping our vast knowledge under our hat (where, of course, it normally resides). We are enjoying the whole thing immensely, and have no intention yet of giving the answer and spoiling the fun! Our mathematical readers have "waded in at the deep end" and a formidable army of slide rulers have been thrown into the battle. In accordance, however, with Newton's well-known law, a reaction has set in. Our offices have been almost overwhelmed with letters from readers who have no time for the mathematical approach to aeromodelling. They are at pains to point out that theory, especially of the empirical formulae type, invariably falls down when it has to face the acid test of being borne out in practice.

Model making in the South Pacific! Yes, they even do it there! American sailors visiting an island in the South Pacific were surprised to find that the native boys were actively interested in model aeroplanes. Note the three lads in the front row, i.e. second, ninth and tenth from the left each have model aeroplanes in their hands.

As one gentleman so aptly puts it, "two times two times a constant equals 99. So what?" The theorists, on the other hand, are equally condemning of the merely practical man who, they insist, depends from results upon his thumb.

We see in this the age-old war between the theorist and the practical man. We thoroughly deplore this lack of understanding and co-operation between two parties, who, out for the same ultimate aim, fly at each other's throats.

The nation owes a tremendous debt to the modern full-size aircraft. Without it, as it is, we could not have achieved our present position in the prosecution of the war or in world affairs, and we might not be writing these words now had it not been for the "Few" and their successors.

In this rapid development models have played an important part, and modellers may well feel proud of the role they have played in the past, and will play in the future. But could the present superiority of British aircraft have been achieved without the complete co-operation of both the theorist and the practical man? This is a question which should be given careful consideration by all our readers, particularly those whose letters referred to above, show such a distressing lack of understanding of one of the most elementary factors of successful aeronautical engineering.

We suggest to both parties that they should make a real effort to understand each other's attitudes of mind, before condemning, out of hand, a view-point with which they do not agree, mainly because they do not understand it.

Non-Flying Scale Models

Our recent editorial on the subject of non-flying scale models, in which we quoted a reader's views concerning super-detailed models, has aroused considerable interest. Letters from modellers whose preference is for non-flying scale work have been coming in steadily. From a study of these it is quite apparent that 1/72nd scale is going out of favour. We, personally, are not surprised at this as we have long since felt that the scope of the 1/72nd "solid" is somewhat limited. The serious-minded scale modeller will never be satisfied with building models whose size prohibits reproduction of detail. It may be argued that many well-detailed 1/72nd models have been produced. This is true enough, but on looking into the "scale of the details," the snag immediately becomes apparent. For example, most modellers employ cotton or thin thread for simulating aerial wires. This, scaled up to full size, would represent a cable of about two inches diameter!

We do not condemn the 1/72nd scale model as such, for it has served a most useful purpose during the war. It has been widely employed for aircraft recognition training, where detail work is not required. Furthermore, it has had a beneficial effect upon the supply of model kits, as it is quite obvious that with the severe limitation of supplies of timber for model aircraft purposes, the number of kits available would have been cut by half had modellers insisted on working to a scale of 1/36th. These remarks should not be taken to indicate that the supply position is greatly improving. It is not, nor will it until the relaxation of war-time restrictions.

A number of readers have criticised the Aeromodeller Plans Service, Ltd., for confining their ranges of full-size aircraft plans to 1/72nd scale. One or two writers point out that, while their interest lies in the realm of larger scale models, they can hardly be expected to turn these out when the only plans available are to 1/72nd scale. The majority, however, appreciate the handiness of the 1/72nd, and scale them up themselves, incorporating more details from an intelligent study of photographs and information contained in full-size aeronautical publications.

In view of the increasing interest now being shown in the fully-detailed non-flying scale model, it is the intention of this Journal to publish in the near future, at least one article each month on the building of a super detailed scale model, to a scale larger than 1/72nd. Upon the response forthcoming will depend the future production of similar articles, possibly in series form.

We thank the many readers who have written in on this subject. We regret that it is not possible, under present circumstances, to answer all the letters personally.

CONTENTS OF THIS ISSUE

Books Reprinted.

We are pleased to announce that two very popular "Harborough" publications are now again in print. "Radio Control," by Peter Hunt, is a 64-page booklet, size 8 ins. by 5½ ins., written in simple yet up-to-date style, and is, in fact, the only book of its type available in this country. The reprint includes a number of additional photographs and in bound in a stiff card cover in full colours. Price is 2s. from any bookstall, or post free from our Leicester offices, 2s. 2d.

"Petrol Engines for Model Aircraft," by that well-known modelling doctor, J. F. P. Forster, is now available, bound in cloth board, gilt blocked at 6s. (6s. 5d. post free from our Leicester offices), or in the standard form, with stiff card cover, in colours, at the same price as before, viz., 3s.

The fact that both these books went out of print within a few months of publication indicates their popularity, and is an assurance that they are up to the usual "Harborough" high standard of quality.

National Model Aircraft Exhibition.

We are pleased to give the first announcement of a National Exhibition of Model Aircraft, which is being organised by the AEROMODELLER, and will be held in London during the Christmas holidays. This Exhibition of Model Aircraft will be open from Friday morning, January 5th, until Saturday evening, January 13th, and will be held at the Dorland Hall, Lower Regent Street, W.1. The Exhibition will, of course, be open to the general public, and special facilities will be arranged for members of Model Aircraft Clubs to visit it.

A range of popular Competitions; open to all aeromodellers, and for which there will be no entrance fees, will be announced in our next issue, which, of course, will be the Christmas Double Number, price 2s., on sale at the end of November.

Petrol Planes.

Although the Air Ministry release on the flying of petrol planes in the southern half of England, which we were able (on behalf of *all* aeromodellers) to negotiate with the Air Ministry and announce in our last issue, has come towards the end of the flying season, nevertheless a number of aeromodellers have been able to get their models flying. Once again we stress the need for the greatest of care when flying petrol-driven model aircraft, both in the choice of location and efficiency of control. Despite all precautions, a model may fly further than intended, and under certain conditions might cause damage on return to land. For this reason we stress again, and we shall go on stressing, the need for Third Party Insurance cover, so that, should an unfortunate accident occur, at least compensation will be available to whoever suffers damage. The AEROMODELLER was the first Journal in the world to organise a Third Party Insurance scheme covering the flying of petrol-driven model aircraft. Whilst this scheme is cheap, it is nevertheless "A1 at Lloyds"—in fact, it is underwritten by members of Lloyds. The premium is 2s. 6d. per model per annum, and cover up to £5,000 for any one accident is thereby obtained. Full particulars are available from the offices of the National Guild of Aeromodellers, Allen House, Newarke Street, Leicester.

A.B.A. NEWS

1. Two important changes in the Constitution were made at the recently held General Meeting:—

(*a*) Rule 3, which limited Full Membership to those of 25 years of age and over, has been amended so that those of 21 years of age and over are now eligible for full membership. Any Associates who qualify under this amendment for full membership should, if they desire to transfer, notify the Secretary and enclose with their application a P.O. for 10s. 6d.

(*b*) The membership year was originally designed to begin and end on April 1st. As this would have borne unfairly on anyone joining the Association late on in the year, it was decided to alter Rule 4 so that the member's year begins upon the date of his acceptance, and his subscription falls due for renewal twelve months later. Members and Associates will be notified individually when their subscriptions become due.

2. The closing date for all events in the National Competitions has now been made March 31st, 1945. Full particulars of the rules governing each event are now available. Will those writing to the Secretary for entry forms please state the events in which they are interested.

The Competitions are open to all. For Members and Associates of the A.B.A. there are no entrance fees and no limit to the number of entries each competitor may make. For non-members of the A.B.A. the entrance fees are: 1s. for each entry in the Junior events, and fees ranging from 2s. 6d. to 5s. for Senior events.

In addition to the cash prizes of £300 already notified, Silver Trophies are also offered in connection with each event. The winners of these Trophies will hold them for a year.

MODEL MAKING "BOY POWER."

American aeromodellers are receiving valuable training on full-size aircraft under a scheme evolved by the Lockheed Aircraft Corporation in close co-operation with the local schools and colleges.

The two lads above are working on a B-17 Flying Fortress, quite a long stretch from a 5 oz. Duration model! Besides the experience they are gaining, these lads are doing a great job in maintaining full war production by counteracting the man-power shortage. As many as 4,000 boys from 40 different schools have worked in this scheme, helping in the production of the following aircraft: "P-38 Lightning," "Lodestar," "Ventura" and "Flying Fortress."

A SMALL REVERSIBLE MOTOR

BY SGT. F. DUDLEY

THIS motor utilizes a permanent magnet field. The steel for the magnet was obtained by cutting a piece from an old magneto magnet, heating and forging roughly circular. It is very tough and high-speed tools were required to turn it. It is preferable to make the various parts in the order given.

Turn, drill and bore out the field magnet to sketch 1. Turn up the parts shown in sketch 2.

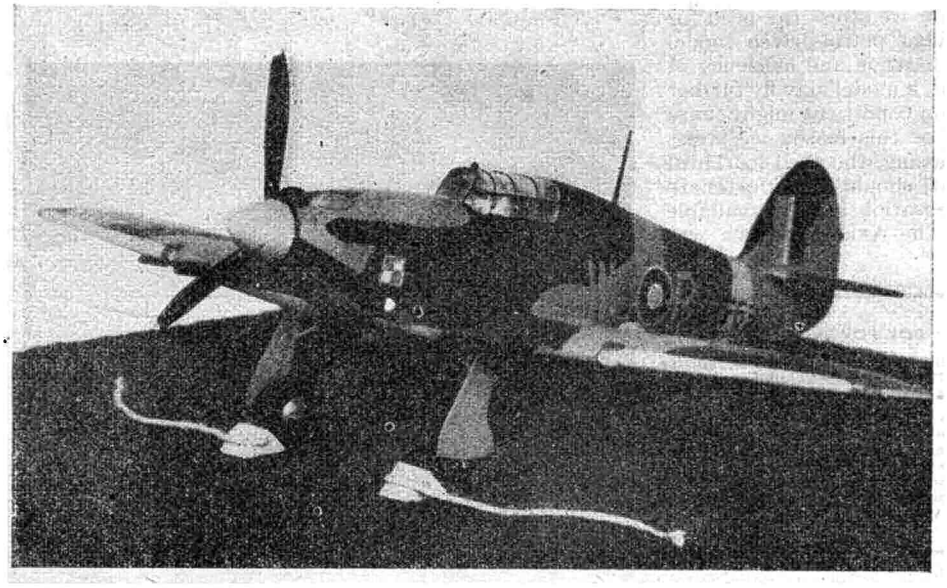
For the armature use a piece of soft iron—the writer used a piece of a black iron bolt. Drill a 1/16 in. hole down the centre, place between small centres in a lathe and turn an easy fit in the armature tunnel. Whilst in the lathe, divide into five equal parts. Cut off ¾ in. long. Drill and file out to sketch 3. The shaft is 1/16 in. silver steel. Solder armature on to it with the small bush (sketch 2) in between the armature and the end plate to allow a trace of end float. Take care to remove all sharp edges where the wire is to go. File gently if necessary for free running in the field magnet.

Next cut the slots as shown by the shaded portion in sketch 1. Drill two holes for the brush holders (Section A.A.), and get a piece of rod which is a good push fit in the bore. Push in, bind tightly with wire, heat the whole to bright red and drop in water. Let down the temper a little, say just under the straw shades. Put a touch of solder at points marked B, sketch 1, using acid flux. Wash all acid off. Solder in the end bearing left of sketch 2, in the centre hole of field magnet (left-hand end). Now magnetise the field magnet as strongly as possible from a permanent magnet.

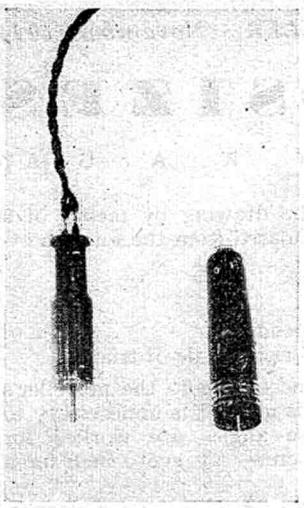
Make and fit brushes in the same way as shown in the article in the June issue. The shape is shown in sketch.

As a small lathe was not available, the commutator was made by drilling and filing as round as possible a piece of fibre and sticking five pieces of brass foil to it with the minimum space between each. An insulating bush was then fixed over it. Test for shorts between each section. This method is not very efficient unless very accurately made. A better way would be to make it by the same method given in the June issue. (The centre hole would be 5/64 in. and the outside ⅛ in. After turning divide off into five. The writer uses a home-made dividing attachment, and finds it very useful when making model aircraft.)

The winding is rather difficult to describe. In sketch the writer has numbered where each coil starts and finishes. Each

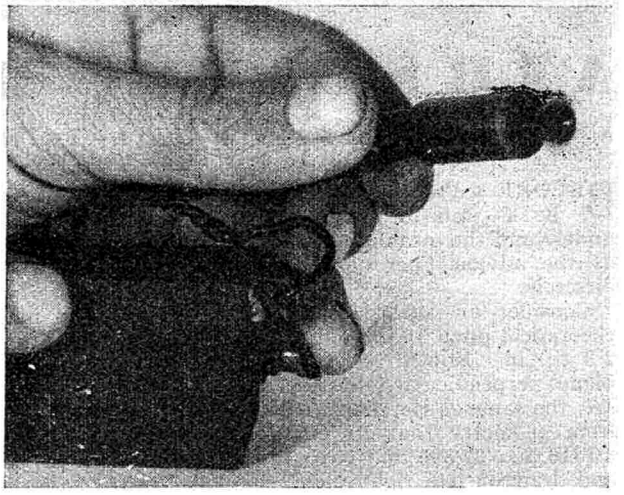


A model of the Hurricane IIC, constructed by the author and fitted with one of his baby electric motors.



The photograph on the left shews the size of the motor compared with a fountain pen cap.

Contact! ..... on the right the motor running at full revs. during a test. Juice is supplied by an Ever Ready dry cell No. 730.



pair of ends are twisted together and soldered to the nearest commutator section. The wire is any fine wire that can be obtained at present. Double silk covering means more turns, enamel appears to crack and short circuit. Thick wire means less turns greater current consumption but maximum power. Try to choose the happy medium. The one shown in the photograph is wound with about 36 gauge. Test for shorts, wire to armature after winding.

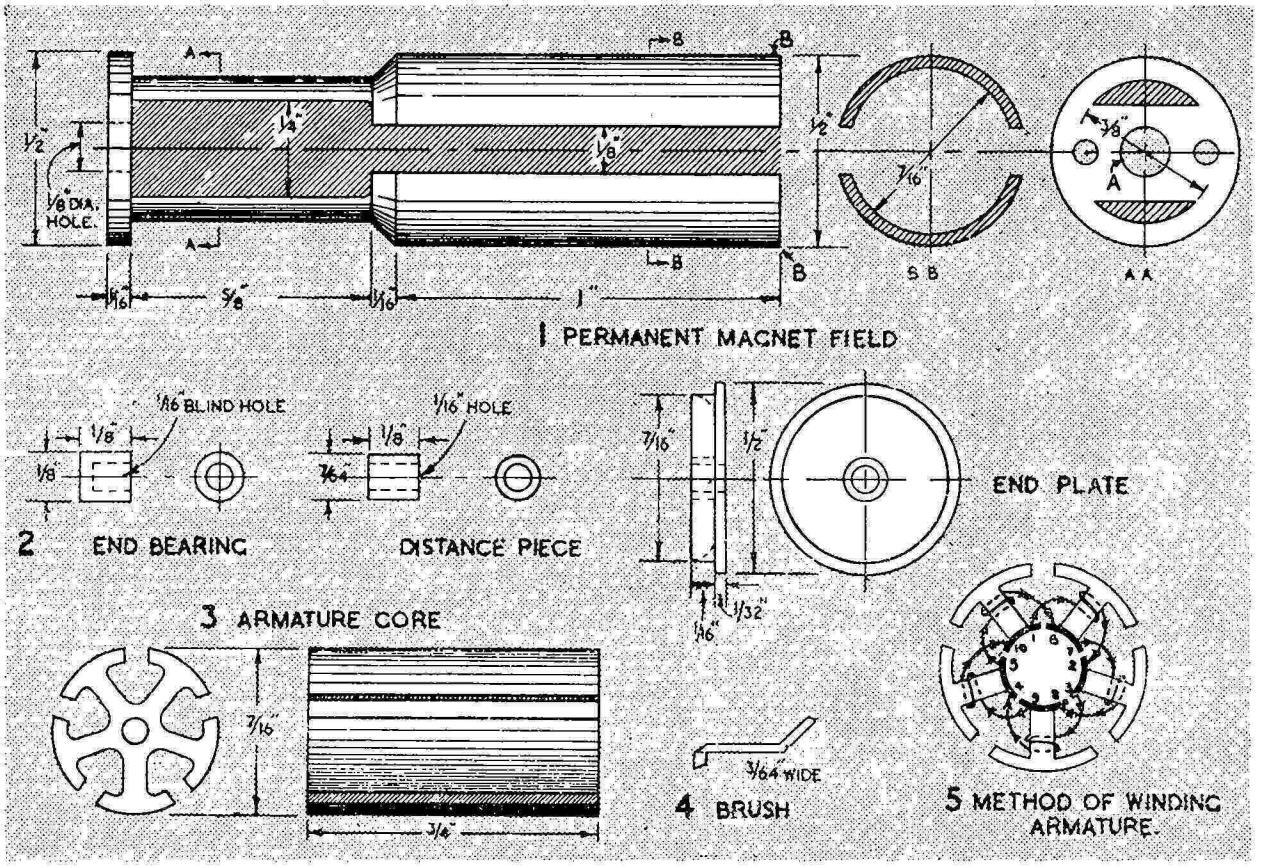
Assemble but do not solder right-hand end plate yet. Put on 3 to 4·5 volts. If it does not start, turn the commutator one way or the other a very small fraction at a time until the best position is found, and the motor runs both ways by reversing the current. Finally, solder on the end plate. Lubricate sparingly with thin oil.

To make a realistic radial engine for it, turn the end plate to the shape of a crankcase and reduction gear of suitable size provided there is a spigot to fit the armature tunnel. Mark off the crankcase portion (dividing attachment) into as many parts as cylinders required. A staggered double row for a Twin Wasp looks good. On each mark drill, say, a 3/32 in. hole. Get some 2 or 4 B.A. brass screws or, as appropriate, cut off the head, turn or file a pip on one end to fit the holes. Solder in place. Counterdrill the centre hole to leave about $\frac{1}{8}$ in. of bearing surface. If left, the unnecessary length will absorb power in friction.

This motor can be made larger or smaller according to requirements.

Any further information required will be supplied with pleasure.

Drawing below is twice actual size.



AIRSCREW BLOCK SIZES

A SIMPLE METHOD OF FINDING SAME BY R · A · GRAY

BEFORE we actually begin our analysis, it would be as well to make sure that we thoroughly understand the meaning of pitch. Pitch can be defined as the advance per one complete revolution of the airscrew.

Consider an airscrew with a diameter of 12 in., theoretical pitch 15 in., efficiency 60 per cent. and area 2·3 sq. in. Now if we take a cylinder with its end planes perpendicular to its axis and a diameter of 12 in., i.e., the same as the diameter of the airscrew, we know from geometry that its circumference $=\pi D$ or $12 \times 3{\cdot}1416$ in. $=37{\cdot}899$ in. If we also take a sheet of paper and draw on it a right-angled triangle, with a base of πD or 37·899 in. and a perpendicular of P or 15 in. we shall have a triangle similar to that shown in Fig. 1. If we now wrap the triangle round the cylinder as in Fig. 1a, we should find that it would make one complete revolution and would advance 15 in. The line traced by the hypotenuse of the triangle would be the helix traced by the tip of the airscrew. It follows, therefore, that θ (Fig. 1) is the angle that the tip of the blade should make with the base of the airscrew block. The blade angle for any other point along the airscrew blade can be obtained as follows :—

Solve $2\pi d$

Where d = distance from centre of airscrews, in inches.

The result obtained is measured along the base of a triangle, constructed as above. A line is drawn from the point thus obtained to the apex. The angle this line makes with the base is the required angle. Taking an example for the above airscrew, where $d = 4\frac{1}{2}$ in.

$$2\pi d$$
$$= 2 \times 3{\cdot}1416 \times 4\tfrac{1}{2}$$
$$= 28{\cdot}27 \text{ in.}$$

This is measured along the base of the triangle, as in Fig. 2, and a line drawn to the top of the perpendicular, the angle θ being the required angle. This angle can either be measured from the drawing by means of a protractor, or it may be calculated from the formula :—

$$\frac{a}{b} = + \text{ an } \theta$$

Where a = height of perpendicular
b = distance from right angle of triangle,

both units being in inches, according to the modeller's wish. If the latter method is used, it is unnecessary to construct a triangle. These angles are worked for several points along the airscrew, say every inch for a 12 in. airscrew.

Owing to the fact that air is a relatively thin substance, i.e., low density, there is a certain amount of slip between the airscrew blades and the surrounding air. If we were to test an airscrew with a pitch of 18 in., we should find that, owing to slip, it would not advance 18 in. per each revolution, but only about $\frac{2}{3}$ of 18 in., according to the efficiency of the airscrew. Taking our example airscrew with an efficiency of 60 per cent., we must allow for 40 per cent. slip. The actual pitch would therefore be :—

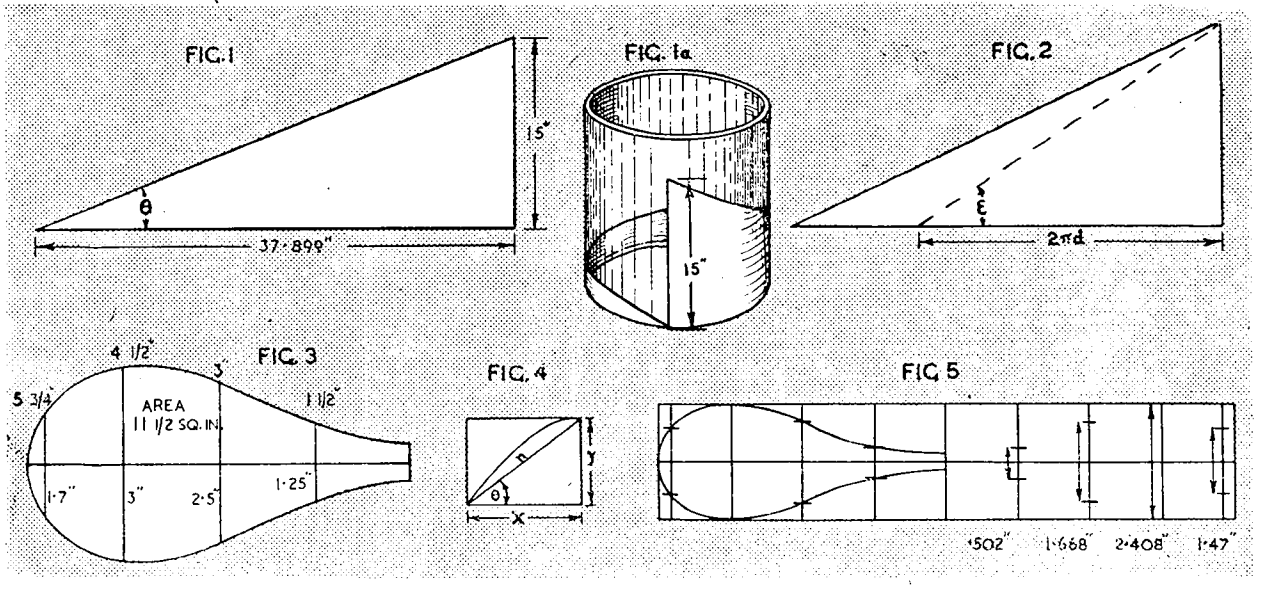
$$Pt + PtE$$

where Pt = Theoretical pitch
E = slip percentage.

$$= 15 + 15 \frac{40}{100}$$
$$= 15 + 6$$
$$= 21 \text{ in.}$$

The actual pitch is therefore 21 in.

To obtain the angle of the blade for the actual pitch, we re-draw our right-angled triangle with a base as before, but with a perpendicular of 21 in. The angles at the various points are then obtained by the methods previously described. These angles are the actual angles that the blade makes with the undersurface of the airscrew block.



In the example airscrew the blade angle at

$1\frac{1}{2}$ in. from hub = 66° 19′
3 " " = 48° 8′
$4\frac{1}{2}$ " " = 36° 36′
$5\frac{3}{4}$ " " = 30° 10′

It will be noted that the last measurement is taken $\frac{1}{4}$ in. from the tip, as this is invariably curved and at the tip is a mere point. It is *most important* that one of the points at which the angle is taken is the point about which the maximum area is concentrated. This is usually about ·75 radius. The angle at this position is one of the governing factors of the airscrew block size. In the example,

The $4\frac{1}{2}$ point = 1 × 75 of 6 in.

There is one other factor that must be taken into consideration, and that is the blade area. This may be found by drawing the airscrew on squared paper or calculated by the method given by R. S. Welford in the October, 1943, AEROMODELLER. For demonstration purposes, however, the squared paper method will be sufficiently accurate. A line is drawn from the centre of the airscrew to the extreme tip, and lines perpendicular to it are set up at the points for which the angles have been calculated. In the example, these are $1\frac{1}{2}$, 3, $4\frac{1}{2}$ and $5\frac{3}{4}$ in. The width of the blade at these points is the measured and the results tabulated.

We are now in a position to determine the measurements of the blank. Taking a section of the block $\frac{1}{4}$ in. from the tip of the airscrew, we have found the blade angle to be 30° 10′, and the width of the blade to be 1·7 in. We can now calculate the length x and 4 (Fig. 4) from the following formulæ :—

$$x = n \cos \theta$$
$$7 = n \sin \theta$$

the example $x = 1{\cdot}4 \times {\cdot}8646$ = Log ·2304
Log T·9368
·1672
= Antilog 1·470
∴ x = 1·47 in.
$4 = 1{\cdot}7 \times {\cdot}5025$ = Log ·2304
Log T·7011
T·9315
= Antilog ·8541
∴ 4 = ·8541 in.

Values of x and 7 are calculated for all the points at which angles were taken. In the example these are the

$1\frac{1}{2}$ point where x = ·5019 in.
4 = 1·145 in.
3 " " x = 1·668 in.
4 = 1·862 in.
$4\frac{1}{2}$ " " x = 2·408 in.
7 = 1·788 in.

Select the largest dimensions of x and 7, i.e., in the example these are x 2·408 7 1·862. These are the two measurements which determine the size of the airscrew block. Obtain a block to these dimensions, and a centre line along both faces and both edges, and mark perpendiculars as in the area drawing. On the face sides, the x measurements are marked in their respective positions, the centre line of the block passing through the centre of the measurements, e.g., if the measurement was 2 in., this would be 1 in. each side of the centre line. When finished we shall have a block similar to Fig. 5. Join all the points with a smooth curve as shown. The process is then repeated for the opposite face. Treat both edges in the same manner, using the Y measurements. You will then have a block marked out for a blank which will give you the correct pitch and area, etc.

To finish, I should very much like to say a word about workmanship. Many modellers leave the airscrew until the rest of the model is finished ; they are then inclined to skip over the airscrew with " that's near enough." Now this is not really good enough. Remember, the airscrew makes all the difference between a good and excellent model. No matter how much rubber we can stow in the fuselage, if we are unable to convert it into thrust efficiently, it is absolutely useless. Do not take the carving with the knife or chisel too far, but bring the rasp into play fairly early in your operations. I can vouch for the fact that you won't go far below the lines unless, of course, you happen to like rasping ! Finish off with the finest grade of glasspaper you can obtain, and give a coat of high-gloss dope.

WANTS——

(1) Pair Trexlar $2\frac{1}{2}$ in. dia. airwheels.—K. A. Miller, 32, Linton Road, Barking, Essex. (2) Copies of Frank Zaic's Year Books.—C. D. Hollewell, " Windyridge," Melton Road, Sprotbrough, Nr. Doncaster. (3) Plan of Auster Mk. I or similar scale petrol model, 4 ft. to 5 ft. span.—R. Webb, 221, Godington Road, Ashford, Kent. (4) Copy of " Indoor Flying Models," by R. H. Warring.—P. J. Bohan, 2, Patterdale Drive, Portico, St. Helens, Lancs. (5) 1·5 or 2·5 c.c. petrol engine, must be in good condition and good starter.—B. W. Littlejohn, 20, Wedgwood House, Kennington Road, London, S.E.11. (6) $\frac{1}{4}$ in. spark plug.—D. P. Williamson, 47, Freemantle Road, Eastville, Bristol. (7) Petrol 'plane, 6 ft. to 8 ft. span, without engine.—G. A. Glennie, Lethorn Moins, St. Vigeons, Arbroath, Angus, Scotland. (8) AEROMODELLERS, Nos. 1 to 45.—L. W. Curry, 40, Honey Pot Lane, Kingsbury, N.W.9.

DISPOSALS——

(1) Rodger's " 29 " petrol engine, 1 pair $3\frac{1}{4}$ in. airwheels, 10 in. propeller.—Midshipman (A) G. E. Taylor, R.N.V.R., H.M.S. *Macaw*, Bootee, Cumberland. (2) Reconditioned Brown Junior model " D " 10 c.c. petrol engine, complete with coil condenser and 14 in. propeller.—1123931 Cpl. D. Young, Room 4, Block 7, R.A.F. Station, Upper Heyford, Oxfordshire. (3) G.H.Q. petrol motor Class " C." Complete with coil and condensor, £7 or nearest offer.—A. J. Lang, 20, Montpelier Road, Twickenham. (4) AEROMODELLERS, June, 1943–August, 1944, 6d. each. " Nomographs," " Model Flying Boats," " Solid Scale Model Aircraft," 1s. 6d. each. " Model Gliders," "A.B.C. of Model Aircraft Construction," " Indoor Flying Models," 2s. 0d. each.—R. Moon, 8, Norman Street, Barrow-in-Furness, Lancs. (5) 6 ft. span petrol 'plane with airwheels and Brown Junior engine, also small quantity of balsa wood. Highest offer over £10.—G. Baker, The Hygienic Dairy, London Road, Westerham, Kent. (6) AEROMODELLERS, March – June, October, November, 1943, January–April, 1944, 8d. each.—F. Street, 44, Allstree Street, Alvaston, Derby. (7) Complete kit " Gull Wing Sailplane," 51 in. span, 15s. 0d.—R. E. Fuller, 2, Farm Road, Crombie, Fife, Scotland. (8) AEROMODELLERS, December, 1941, to August, 1944. Several Harborough publications.—S. G. James, School House, Pillowell, Lydney, Gols. (9) 2·5 c.c. Spitfire engine with prop., coil and condenser, pair $2\frac{1}{2}$ in. airwheels, spare coil, " Cadet " starter.—T. Kent, 8, Hythe Road, Sittingbourne, Kent.

EXCHANGE——

(1) 12 yds. $\frac{1}{4}$ in. by 1/30 in. Caton's rubber strip ; 12 yds. $\frac{1}{4}$ in. by 1/30 in. ditto ; 12 yds. $\frac{1}{4}$ in. by 1/30 in. ditto (soiled). Will sell but prefer exchange for two $\frac{3}{4}$ in. 24 T.P.I. spark plugs and a flight timer. Cash adjustment if necessary.—G. A. Tormey, 56, Windsor Road, Roby, Liverpool. (2) Exchange $\frac{3}{4}$ in. model engine spark plug for $\frac{1}{4}$ in. ditto. Carriage paid and cash adjustment if necessary. —1169225 Sergt. F. Dudley, Sergeant's Mess, R.A.F., Drem, East Lothian, Scotland. (3) " Wireless Worlds," July, 1942, to December, 1943, for any 18 AEROMODELLERS, excluding 1944 copies.—L. K. Scarratt, Ashfield Farm, Neston, Wirral, Ches. (4) 26 yds. $\frac{1}{4}$ in. by 1/30 in. rubber strip, 12 yds. $\frac{1}{4}$ in. by 1/24 in. ditto, 12 yds. $\frac{1}{4}$ in. by 1/30 in. ditto, 4·5 v. miniature microphone, pair ice hockey tubes with boots, size $6\frac{1}{2}$. Will sell but prefer exchange, cash adjustment either side, for two $\frac{3}{4}$ in. by 24 T.P.I. spark plugs and an efficient flight timer.—G. D. Tormey, 56, Windsor Road, Roby, Liverpool. (5) Completed " Isis " duration model in flying condition for small petrol engine complete.—L. W. Curry, 40, Honey Pot Lane, Kingsbury, N.W.9.

WON MINUS TWO

BY ROBERT JAMIESON

THE rubber shortage was in the acute stage, and McGillicuddy's experiments to find an alternative means of power having come to a sticky finish, we were forced to fall back on smaller models. A spate of building " one ounce of rubber " jobs was in progress.

The Maestro's " Flying Sporran " was one of the first of this type to be completed, and my own was ready about the same time. They were both tried out on the same evening, and McGillicuddy was far from pleased when my model consistently recorded better times than his.

" It's no' natural—gimme the stop watch," he said. But it made no difference, for the stop watch (used honestly) cannot lie. Shortly afterwards he discovered that my motor had two more strands of rubber than his, and his wrath was boundless.

In vain I protested that my rubber must be lighter than his. He would take no excuse, and interpreted my words as a personal insult.

" Rubber's all the same weight when it's stretched ! ! ! " he roared angrily. " And one ounce canna have more strands than another—it's no' honest— "

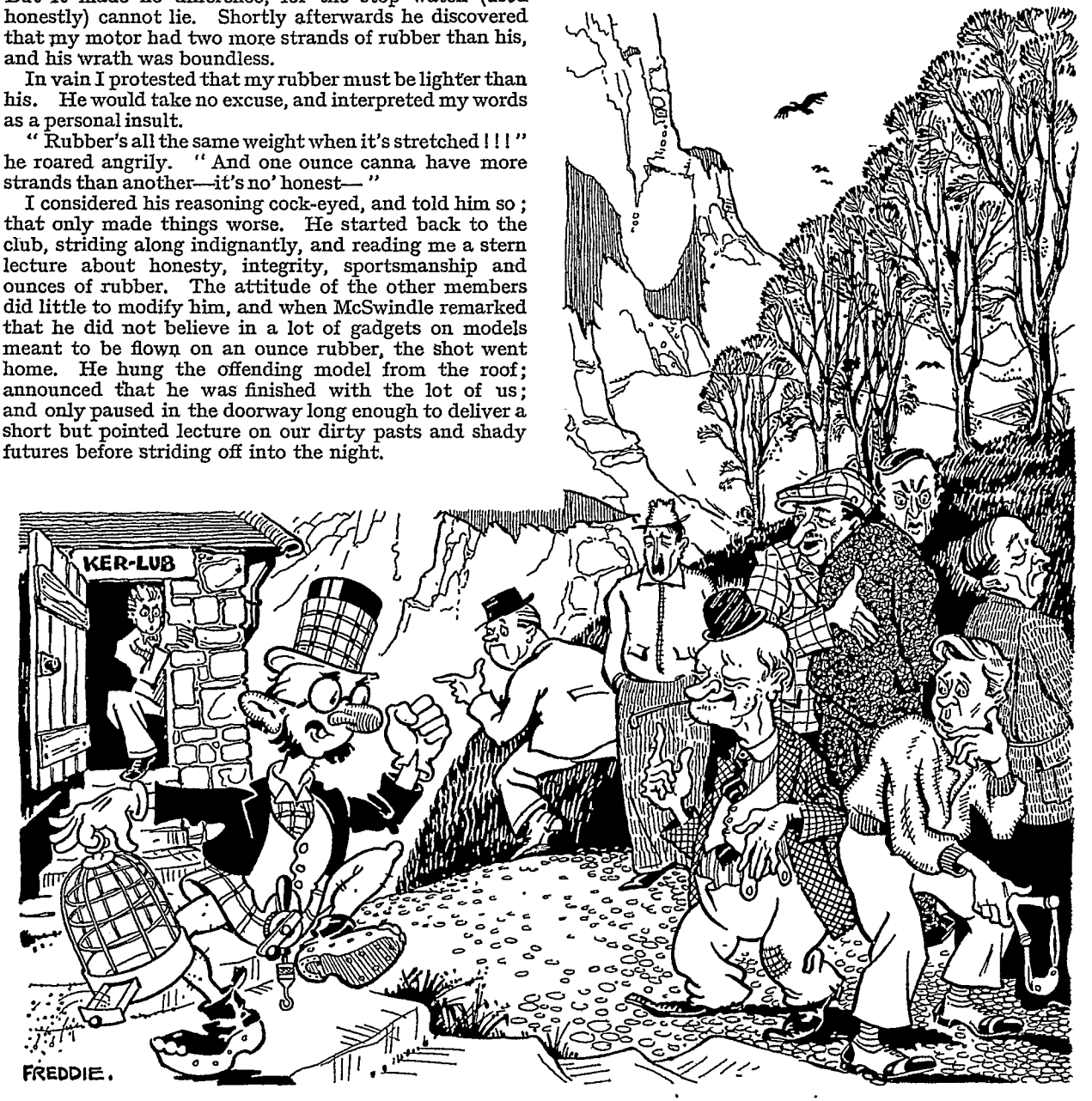
I considered his reasoning cock-eyed, and told him so ; that only made things worse. He started back to the club, striding along indignantly, and reading me a stern lecture about honesty, integrity, sportsmanship and ounces of rubber. The attitude of the other members did little to modify him, and when McSwindle remarked that he did not believe in a lot of gadgets on models meant to be flown on an ounce rubber, the shot went home. He hung the offending model from the roof; announced that he was finished with the lot of us; and only paused in the doorway long enough to deliver a short but pointed lecture on our dirty pasts and shady futures before striding off into the night.

Nearly a week elapsed before we saw him again.

Feeling that I was to blame for his absence, I did not feel too happy about it, but Snooky Munro re-assured me.

" 'E'll be back alright: trust 'im ! Old twister couldn't see anything goin' past 'im—besides, all 'is models are 'ere."

Although deprived of the Maestro, things went on much as usual, though with noticeably fewer wrangles and arguments. Then, during a lull in the sport one evening, we sat on a bench outside the club house, and



fell to observing the rook colony in a clump of trees just opposite. Their caws and antics were provocative.

" —If I only 'ad a catapult I'd make 'em skip," Snooky Munro observed. McSwindle too, it seemed, was also a crack shot, and apparently performed wonders of marksmanship in his youth. Joe Small said nothing, but after a bit of rummaging produced a Y shaped twig. If we only had a yard or so of rubber ! But it was too precious. It was then that my mind went back to the Maestro's remarks about ounces of rubber. If his model was too heavy to be flown on one ounce another strand or two less couldn't make much difference . . .

The would-be marksmen received my gift of rubber with delight, and in a few moments the catapult was in action—but the rooks did not suffer any casualties, and after a while their caws took on a distinctly jeering note.

The snipers were not put out, however, and consoled each other by talking about high angle trajectory, wind drift and the poor quality of the rubber supplied. Then McSwindle drew a careful bead on a rook obligingly perched on a high twig.

His shot went wide, so wide that the target did not even trouble to take evasive action, but as the stone curved downwards, Drambuie sailed up from behind the trees straight into its path.

He could not be badly hurt, as the stone merely flicked a wing tip, but to judge from his squawks he might have been dying in agony. The catapult was hurriedly hidden as the Maestro strode up.

" What's the meaning of this ? " he roared. " Pappin' stones at innocent birds— "

We immediately assumed expressions of cherubic innocence ; McSwindle went one better by making dire threats of what he would do to the culprit when he discovered him.

" But I've no time just now," McGillicuddy continued. " The Teuchle Toorie boys have been blawin' about the times they are putting up with one ounce of rubber—so we are going to have a wee challenge match : just me a Tumps McWhuppet, best of three flights— " And with that he went into the club to get his model.

" We can't let him go," I whispered to the others. " That job of his is underpowered as it is, and I took two strands of rubber to make the catapult— "

Sounds of movement inside the hut dried up the conference. The Maestro emerged, his model packed in the case. " I'll have to hurry," he said. "It's lucky Drambuie's no' badly injured—if I find out who did it— "

He made several dark threats before moving off. Immediately he was out of sight the conference was resumed.

" E'll just have to go and get walloped," said Snooky Munro, "for if you tell him about the two strands of rubber—then he'll find out about the catapult."

" A great pity you started that nonsense with the thing, Bob," said McSwindle. " it's alright having a bit of an argument among ourselves, but now we're letting club down— "

" That old twister's not the whole club," Munro broke in. " Do 'im good to get taken down a peg or two— "

The argument went its futile way, back and forth, then round in circles. Finally, for the sake of peace at home, it was decided to keep quiet about the two strands of rubber, where they had come from, and to what use they had been put. Though we could not get out of our minds that we had let the club down.

By the time the argument was decided, the evening was drawing in, so we decided to walk over and escort the Maestro home. We could at least offer him a little consolation.

He came striding towards us in the dusk, grinning all over his face and crooning a little song. Drambuie was perched on his shoulder, and, on spotting us, immediately assumed a " dying duck " expression and moaned faintly. But the Maestro called out :

" A grand match, lads ! I'm only sorry you weren't there. I won easily ; best flight over ten minutes—out of sight. Too bad the model's lost—it flew out to sea."

Miracles sometimes happen ! We stared blankly at one another, but quickly recovered and offered the Maestro our congratulations ; McSwindle being diplomatic enough to commiserate with him on the loss of his model, and saying :

" That means you will have to build another ' Flying Sporran ? ' "

" Tach— ! not at all," McGillicuddy answered brightly. " The Flying Sporran's safe in the club. I took Jamieson's model—seeing it was doing better than mine the last time it was out— "

When it sank home I turned on him indignantly :

" You've got a brass neck ! My good model— "

" Brass neck nothing ! " he snapped. " Let this be a lesson to you—wasting precious rubber, pappin' stones at innocent birds— "

In stunned silence we turned for home. After a few steps the Maestro spoke in a gentler tone.

" Did you hit anything—besides Drambuie ? Tach—you're poor shots with a catapult. Wait till to-morrow night and I'll show you— "

INSECTS – MASTERS OF FLIGHT

(*Continued from previous issue.*)

BY FRANK · W · LANE

CHADWICK, who has studied wing-beats stroboscopically, found that in a long continuous controlled "flight" a fruit fly beat its wings 486,000 consecutive times. The fly was held fast while under observation. The fastest speed recorded for this fly is just over 200 double beats per second.

The u-h-s films which have been taken of insects have not only proved the frequency of their wing-beat but have also thrown light on some of their amazing aerial manœuvres. I say "amazing" advisedly because on examining one of his films Magnan found that he had caught a fly looping-the-loop in *one-hundredth of a second!*

It is by the same cinematographic technique that the age-long question "How does a fly land on the ceiling?" has been finally settled. It has been revealed that as the fly nears the ceiling it turns on its side and, thrusting out its legs, "touches down."

Another unsuspected aspect of insect flight has been discovered by the well-known American exponent of high-speed photography, Dr. H. E. Edgerton. One of his films showed that when a house-fly takes off it springs backwards into the air for a distance of about an inch. The reason for this surprising manœuvre appears to be due to the anatomy of the fly's legs. They are constructed in a manner which well absorbs the shock of landing but are capable of lifting the fly only in a backward direction.

Before leaving the aerial manœuvres of insects, reference must be made to the power which some of them possess of flying both backwards and sideways. I am aware that some entomologists query both these flight actions, asserting that such apparent manœuvres are due to changes in body orientation too quick for the eye to register. Apart, however, from other evidence which can be adduced I must once again refer to the insect-like flight of the humming-bird. There is no question that this bird does fly both backwards and sideways, and this point having been established, I consider all *a priori* objections to allowing the same ability to insects is removed.

On this subject I would like to make two brief quotations from letters which Mr. Hollick kindly sent me after I wrote to him for confirmation of these seeming aerodynamical miracles alleged to be performed by insects.

"The rapid sideways darts made by hover-flies is probably due to a sudden checking of the wing movements on one side. . . . It is sometimes possible to get hover-flies to hover in front of one's outstretched hand, about four inches away and facing it. If one moves one's hand slowly towards them, I have repeatedly seen them keep their distance from it, thus flying slowly backwards."

The relative speed of an insect can be judged by the shape of its wings. The slow flyers generally have broad wings, and in flying keep the wing surfaces almost horizontal and fly in the manner of small birds. Swift-flying insects have narrow wings and turn the surfaces more nearly vertical with each stroke. Generally speaking, the longest species of each group of insects fly the quickest.

To obtain accurate speeds for insects in flight is a difficult task. The ingenious Magnan actually "harnessed" insects with delicate thread to an instrument which recorded time and distance travelled! Other methods are setting insects free in a darkened room and timing them as they fly to a lighted window and, perhaps best of all, filming them in flight against a marked background with a high-speed camera recording time. Typical speeds are recorded in the table at the end of this article.

Before leaving the subject I must refer to the extraordinary ideas which some people hold concerning the speeds at which some insects fly. I remember one man telling me quite sincerely that he thought wasps flew at 500 m.p.h. A fiftieth of that speed would be nearer the mark!

Even more remarkable, because of the wide publicity it received even by scientists, was the case of the American bot- or deer-fly, which was reported to be able to travel at over 800 m.p.h.—or faster than sound! Even to-day one occasionally meets this super-speed aeronaut—in print. I have before me now a book which states in the Introduction: "Every fact on these pages has been carefully authenticated," and then only a few pages further on I read: "The deer-fly has been known to fly 818 m.p.h. (note the odd 18! F. W. L.). The deer-fly travels half as fast as sound" (sic).

Evidently the author of this book has never read the results of some experiments concerning this fly by Dr. Irving Langmuir. He worked out that the power needed to move the fly at the speed claimed would be half a horse-power. For the fly to develop this power it would need about one and a half times its weight of food for every second in flight! Moreover, Dr. Langmuir constructed a model of the fly and found that when it was travelling at 64 m.p.h. it was invisible. Yet people had claimed to have seen "as a blur" the bot-fly when it was speeding through the air at over 800 m.p.h. If the bot-fly could be made to travel at the speed claimed it would encounter a wind pressure (let alone the complications set up by it passing the so-called "critical speed") of about eight lb. per square inch. Such a pressure would almost certainly squash the fly. No, insects are very wonderful flight machines but it is a pity one of them has been saddled with this ridiculous story.

Probably no insect has been studied so intensely as the bee and this brief study of insect flight may fitly conclude with a glance at that wonderful little insect's flying powers:

Half an inch long, a quarter of an inch high and one five-thousandth of a pound in weight—such is the physical specification of a bee. It has four wings, two large and two small, the larger being in front. They are attached to the upper part of the chord and this position keeps the centre of gravity low and increases stability in the air. In flight the four wings function as a single pair, the rear ones being attached by tiny hooks to a ridge which runs along the trailing edge of the front wings. Miss Annie Betts, the bee expert, says: "The bee flies by means of a pair of oppositely-acting, single-bladed airscrews, which simultaneously provide lift to carry her weight and thrust to propel her."

To drive its "airscrew" the bee's powerful "aero-engines" (the flight muscles) are supplied with relatively huge quantities of high-grade fuel (glucose). A flying

bee uses this fuel at the rate of between 30 and 40 milligrammes per hour. That means that in about two hours' flying time a bee uses its own weight of fuel.

A new light is thrown on the super-charged body of the bee when it is learned that the sugar content of its blood is the highest of any creature which has been investigated, being twenty times greater than that of man. Coupled with the supply of such rich fuel is the physiological factor of very rapid assimilation. A bee can develop 100 times more energy per unit of time and body weight than can a first-class human athlete. Miss Betts says that some bees develop ·42 horse-power per kilogram, and this figure is, I understand, considerably higher than that for the modern aeroplane.

With such power, fuel and wings it is not surprising that a bee beats its wings with a frequency which is among the highest of all insects. The maximum complete beat appears to be 330 per *second*, each beat traversing a path up, forward, down, backward and return to the upward position.

Bees have been known to fly distances across water up to thirty miles. They can stagger home with loads of honey weighing half their total weight. In the autumn, when the dead drones are being cleared out of the hive, some bees will lift and fly away with loads weighing considerably more than themselves.

Edwin Way Teale, in his fine book on the bee, "The Golden Throng," writes: "No machine man has ever made approaches the honeybee as an efficient navigator of the air. The bees outside my window are hovering, climbing, darting forward, stopping abruptly, swinging sidewise, flying backward."

Finally, here is a copy of a notice which was posted up in an aircraft factory of the American General Motors. I think it forms a fitting tailpiece to this brief study of insect flight and I reproduce it without comment.

> "According to the theory of aerodynamics and as may be readily demonstrated through wind tunnel experiments, the bumblebee is unable to fly. This is because the size, weight and shape of his body in relation to the total wingspread make flying impossible. But the bumblebee, being ignorant of these scientific truths, goes ahead and flies anyway—and makes a little honey every day."

SPEED TABLE.

Insect.	*Speed in m.p.h.*	*Wing beats per second.*
Mosquito	3·1	300
Stag beetle	3·3	33
Crane-fly	4·4	
House-fly	5·0	190
Painted Lady butterfly	6·0	
Bluebottle	6·0	
Cockchafer	6·6	
Hover-fly	7·7	240
Red Admiral butterfly	8·8	20
Locust	10·0	45
Wasp	12·0	200
Hornet	13·3	200
Honeybee (worker)	15·0	260
Honeybee (queen)	20·0	330
Horse-fly	30·0	200
Damsel-fly (*Agrion*)	30·0	
Hawk moth	33·0	
Dragon-fly (*Austrophlebia*)	55·0*	

* (This is the fastest authentic speed I have ever seen recorded for an insect. The speed was timed in Australia by a reputable entomologist—Dr. R. J. Tillyard.)

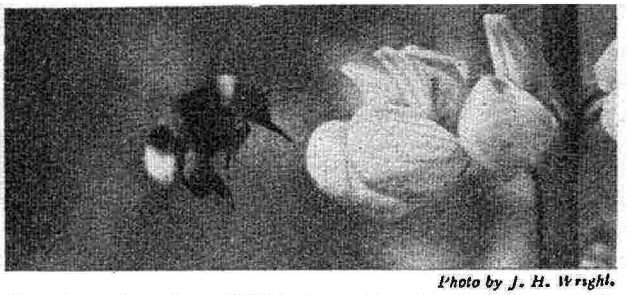
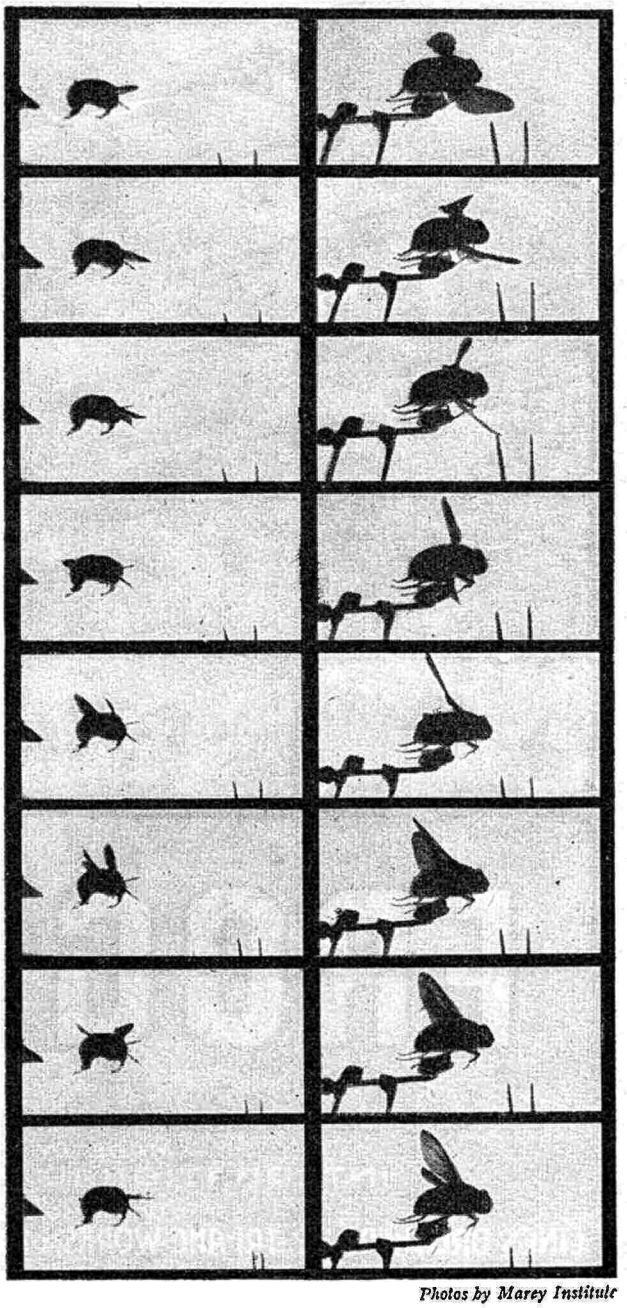


Photo by J. H. Wright.

Above shews a bee taken at 1/100th of a sec. Note that this has not stopped the wings, beating at approximately 300 beats per sec. Below left shews U-H-S. photographs of a bee taken at 1,200 photographs per sec. Right is a blue bottle in flight taken at 2,500 pictures per sec.



Photos by Marey Institute

"PETROL TOPICS"

BY J · F · P · FORSTER

WITH the lifting of the ban and the return of flying to all aeromodellers we should soon have some interesting and, I hope, amusing accounts of the supposedly maiden flights of those wonderful models on which many enthusiasts glibly became engaged during those now far-off days of the blitz and blackout. I have been glancing back through some of my correspondence of those days, and many were the protestations of faith in the future, for all said *when* we win the war and the ban is lifted, and not *if*. There were also many youngsters engaged on ambitious projects, some to be radio-controlled, and I wonder now what has become of them.

I wonder too what has become of all their writers. Many were on the verge of military age, and airminded to the point of obsession. How disappointed some probably were to find themselves grounded both in and out of the R.A.F. Others have doubtless realised their earlier ambitions, and a few, who have seen quite enough of the grimmer side of air war, will perhaps be glad for the future to keep their feet on the ground and watch their models flying for them. Some went away as boys, and will come back as old men—flying veterans aged less than 25. Still others there must be who will not come back. Let us not forget that but for *them*, we could not now be looking forward to freedom even in aeromodelling. Imagine flying activities strictly regulated by the Hitler Youth, with jackbooted storm troopers strutting around ready to throw any modeller voicing his objections into some labour gang or concentration camp! And where did all this lead in Germany? Surely indirectly to the flying bomb. What a degeneration of a fine sport and fascinating science!!

We have heard a good deal in the press about "controls" and the pro's and con's for their continuance after the war. What about aeromodelling? It seems to be generally agreed that with the certainty of a great increase in the popularity of the hobby and perhaps especially of the petrol modelling side, some sort of control may have to be exercised, in populated areas at least, over the flying of petrol models. If "control" is to have popular support, it must be imposed by a freely elected and representative body, and hitherto no society can claim to have represented the mass of aeromodellers in this country, and still less the petrol modellers. We have seen the results of the S.M.A.E.'s claim in this respect, which seems to me very analogous to the totalitarian grasp for power. Having foisted themselves off as a fully representative body, their first action was to confine any benefits to "party men" or members, thereby hoping perhaps to blackmail every would-be petrol modeller in the country into joining their Society. The vast majority of the Society's members were only indirectly members by virtue of their own small club's affiliation to the Society, and of this multitude of local clubs only quite a few included active petroleers amongst their members. Why was this? Obviously these clubs did not have very much to offer petroleers, and in many cases they had only restrictions and no advantages. As to the S.M.A.E. itself, the same applied only more so, and to an impartial, lone hand like myself, the Society's activities (or lack of them) seemed definitely prejudiced in favour of the rubber-powered model, and it only seemed to tolerate the petrol model on sufferance, rather as the sailing man tolerates the motor-cruiser enthusiast or the cyclist the motor-cyclist.

It is only natural that the S.M.A.E., which fathered the movement from soon after its earliest days and was partly instrumental in the Wakefield Cup being awarded for duration models, should continue to watch over the interests of this class of modellers. Nobody has argued with this, and indeed much praise is due to the Society for its past efforts in this direction. It was with the exclusiveness of its interest with which we as petroleers had to contend. It was becoming inevitable before the war that sooner or later, unless the Society took a broader and more progressive view of the movement as a whole, not only would another Society be formed to look after the interests of the petroleer, but possibly of other branches of the hobby too.

My first reaction on being invited to a founders' meeting of what has now become the A.B.A., was one of regret that the S.M.A.E.—with its long and at one time good record—should be supplanted by a new organisation. I went to the meeting determined to protest against this strife within the movement, and to speak in favour of confining the new association to the petrol model. After hearing all the indisputable facts and the figures now published by Mr. D. A. Russell, however, there does seem after all a good case for including the whole movement in the new Society, and the formation of separate sections represented by their own elected sub-committees, should see that fair representation of every branch of the movement should be maintained on the Council.

As in all such Societies, the present and first Council is a self-chosen body. Obviously they must have had some object in view when forming a new Society. As an unbiassed amateur and lone hand I naturally asked myself three questions:—

(1) Is this a "trade ramp," to be run for the benefit of the trade?

(2) Is this an organised attempt to smash the S.M.A.E.?

(3) Or is this an honest attempt to get the enthusiastic support, and eventually the full and freely elected representation of the whole aeromodelling movement, so that in dealing with the higher powers in the future, the Society's voice can really be claimed to be representative, and therefore carry some weight in the framing and mitigating of any regulations, or even legislation, which may in the future be imposed on the movement?

As regards the first question, we cannot deny that to begin with, the "trade" was well represented, as is almost inevitable under present conditions. There are not many disinterested amateurs from outside the London area who under war conditions can spare the time, and under war conditions travel up for frequent Council meetings. I do, however, feel satisfied that all these "trade" members were, and still are, active and practical aeromodellers, and although the more the movement thrives, so also thrives the "trade," we must not forget the advantages to the individual aeromodeller in the better service and variety of choice of materials offered by a thriving industry. For example, we have the "trade" to thank for the coming of balsa, far more than the public demand. If what they offer us is good, we shall soon demand more. A thriving trade can afford to advertise, and good advertisements are not only interesting reading, as we know from American magazines, but permit more reading matter and illustrations and eventually more frequent publication, and

therefore more topical news. There is no end to this sequence; we cannot get on without the "trade," and the trade, if it is wise, will, through its governing body, the M.A.T.A., see to it that it keeps its ranks clean. If its members continue to keep its customers' interest, and that of the whole movement to the fore, and refuse to admit purely commercial firms out to exploit what the original M.A.T.A. have made a good market, I am certain we have nothing to fear from them; and already we see very definite evidence of much for which to thank them. Furthermore, there are several examples of donations and trophies for the A.B.A. from firms *not* represented directly at the Council table. In due course when the membership has increased, a new and freely elected Council will succeed the present and first Council, and it is to be hoped that its policy will continue to reflect the original aims of the founders of the Association.

As regards the second question, I am now quite satisfied that there is no desire to smash the S.M.A.E., for we must face the fact that the A.B.A. has as its avowed object the genuine representation of the mass of aero-modellers in the country, a thing which the S.M.A.E. claimed, but failed to do. What will happen to the S.M.A.E. if the A.B.A. succeeds where the older Society failed, I do not know. I imagine its best hope for the future lies in devoting itself exclusively to the rubber-powered model and to club activities. I hope personally to see it survive this undoubtedly serious crisis, and to take its place beside the A.B.A. at national meetings and functions in much the same way as the A.A. and R.A.C. have jointly watched over the interests of all classes of motorists—in friendly rivalry instead of bitter competition. While these organisations have of course endeavoured to obtain special advantages for their members, they have not usually done so to the exclusion of non-members, but have worked for the benefit of *all* motorists. A first-rate example of this is now to hand where both organisations have jointly approached the authorities with a view to getting the basic petrol ration re-introduced. They have not requested any special consideration for their members, but for the whole motoring public. They would not in any case dare to make such a request. It seems that the S.M.A.E. had the audacity to do this in their representations for the lifting of the ban, and but for the bold intervention of Mr. Russell, the concession obtained might have been confined to their own members. I think this was the crowning *faux pas* in a most miserable story. However, this alone is not responsible for the formation of the A.B.A., for this was in any case becoming inevitable before the war. Let us rather remember the happier days, and the very real and successful efforts of the S.M.A.E. to popularise the movement in this country from its earliest days. They are the custodians and sponsors of several national competitions, not forgetting the Shelley Cup and Bowden International Trophy, and presumably will continue to sponsor these competitions unless or until they decide otherwise.

As regards the third and last question, I think the answer is definitely in the affirmative, and particularly in regard to the Association's efforts to become truly representative of the whole movement. I think we can go further, and say that so far it shows every sign of going the right way about it. It is practically impossible for any sporting or scientific association to include in its membership every devotee in the country. There are always to be found individualists and social hermits who will never join *any* Society on principle. There are also bound to be a number of people who for various reasons are unable or unwilling to join. I have always maintained in "Petrol Topics" that the club movement represented less than half the petroleers in the country. Just how far short of "half" is now only *too evident* from Mr. Russell's published figures! I am not in the least opposed to the local club movement and indeed I should not be at all surprised to see one formed even in my remote corner of England. I might even join one myself if they would have me! Nevertheless I am not, and never have been, a member of any local club, and have always been a "lone hand," and when I started writing this feature, I made no bones about voicing the opinions and recounting the activities of other lone hands. "Clubman" was already giving club members a fair deal, and I felt that it was time the lone hands, who probably formed the majority of "petroleers," also had a look-in in our national journal.

Having in my absence been co-opted to the Council of the A.B.A., I naturally wondered what claim to fame could possibly justify this. I have never yet entered a national competition, and still less won *any* competition. My colleagues on the Council evidently thought, in my case, that the pen is mightier than the sword!!! Not having seen my sword in action, I think they are probably right! Who else can I possibly be there to represent other than you, my readers, for if one thing *is* certain, I wasn't co-opted to represent myself!

And who *are* you? My correspondence during the last four years suggests that the majority of you are, like myself, "lone hands." When I looked around the Council table at the last meeting I decided rightly or wrongly that I was probably the only one present who had never previously been a member of any aero-modelling club or society or who had no trade interest. So long as I remain a co-opted member of the Council or of its sub-committees, I propose to take the liberty of trying to the best of my ability to represent the lone hand in the Association's deliberations. I know full well that you have not elected me for this task, but the sooner most of you join the Association, the sooner will you be able to attend the first annual general meeting and freely elect your own representative on the Council.

Returning then to question 3; what has the A.B.A. to offer lone hands that will induce them to join it direct and not necessarily through the medium of local clubs? It seems to me it offers them, *provided they join in sufficient numbers*, the only defence against arbitrary restrictions and regulations on the flying of petrol models. Hitherto we have been able to fly our models on any kindly disposed farmer's field. Third party insurance may quite easily not save the hobby from disrepute in the event of more or less serious accidents occurring, and if we have no strong representative body to stand up for us, we shall not have a leg to stand on in a court of law. As soon as the financial position of the Association is strong enough, I hope to see free legal defence as one of the benefits of membership, as in the case of the A.A. and R.A.C.

Already the Association has published an impressive list of national competitions, for which big cash prizes are to be awarded, and to which, through the generosity of certain individuals and of the trade in particular, many valuable trophies have already been added. Entry to all the Association's competitions is to be free to its members, with a small charge to non-members.

The petrol model has at last been put on the map, and the A.B.A. will see to it that petroleers get a square deal. The various sections will soon have their own sub-

DOWNTHRUST

(ANOTHER POINT OF VIEW)

BY ROBERT. BURNS

RECENTLY there have been some interesting letters and articles on the subject of Downthrust, but these have all taken the tone that we have to accept this as inevitable, an idea to which the writer does not subscribe. In fact, downthrust is only one of the rigging adjustments of a model, and it can be reduced or eliminated by carefully manipulating the others. In case readers think that this is impossible, they are referred to the plans of "Pegasus" in the April, 1943, AEROMODELLER, as one case where the thrust passes well below the C.G., yet no downthrust is used, and this is not an isolated case, as there have been numerous other models showing similar results.

The secret is to alter the rigging angles to give an extra tail lift during the power run which will balance out the stalling moment of the thrust. It might be thought that alterations to the rigging angles would alter the performance, but many models have the wings rigged at some 2° positive, yet give performances which agree with the calculated performances associated with incidences of some 6°, a state of affairs which can only be accounted for if the model is flying with its nose some 4° above the horizon. If we alter the rigging angle of the wings and keep the longitudinal dihedral angle the same by making a corresponding alteration in the tailplane, the model will alter the "nose up" angle and restore the performance, so this need not deter us.

Digressing a moment, the longitudinal dihedral, which is the difference in rigging angle between the wings and the tailplane, is important, as if it is incorrect it can require considerable downthrust angles even if the thrust passes through the C.G. of the model. There is a minimum value for the longitudinal dihedral, without which a model will not be able to pull out of a dive, and when flown with this value the C.G. will be well back on the wing chord. By increasing the longitudinal dihedral and moving the C.G. forward other glide settings can be found, but it can be shown by theory and has been confirmed by many trials that the increases in longitudinal dihedral will increase the tendency of the model to stall if it is allowed to fly above its normal speed. Thus any excess will stall the model during the power run, when it will be flying faster than its normal glide speed; so a first step towards eliminating downthrust is to find the best value for longitudinal dihedral. From trials, fast heavy models need rather less than slow light ones, and parasol types need less than normal, while low-wings need rather more. Values for parasols using cambered tailplane sections are about 1½°, while high-wings use 2°, and low-wings up to 4°, in the latter case with flat tailplane sections.

Having settled this, the other angle which is important is the one formed by the slipstream with the tailplane. As we wish to balance out a stalling moment, we want extra tail lift, greatest while the thrust is greatest and the slipstream fastest, and fading out as the thrust fades at the end of the power run. During the glide, the normal airflow at the downwash angle acts on the tailplane, and if the slipstream is allowed to act at the same angle it will increase the lift only by reason of its extra velocity, with inadequate results. If on the other hand we arrange for the slipstream to act at another angle so that during the power run it gives extra incidence as well as extra speed, the effect is much more powerful, and this can be done either by giving downthrust to the normal layout, or by giving the tailplane some positive incidence. As the effect cannot be calculated it must be found from trials, and these suggest that 1° to 2° positive will take care of parasols, 0° to 1° for highwings, using cambered tail sections in each case, while some low-wing types with the thrust well above the C.G. may require slight negative angles, with flat tails, or some 2° negative with cambered tail sections. One important modification arises where a folding propeller is used, and in all cases the tail angle must be about 2° less to compensate for this.

To sum up, if a parasol type is wanted, the tailplane angle is settled first, at plus 2°, then the longitudinal dihedral is added, 1½°, giving the wing angle of plus 3½°, for a fixed propeller. Trimming is directed to testing the longitudinal dihedral first, after the glide placing of the C.G., and then the power tests, which should show little need for downthrust. Similarly, a highwing model with a folding propeller, would be rigged with the tailplane at minus 2°, and the wing at 0°. The actual thrust setting required in this case would depend on the weight of the folding blade, but the offset should be small.

In conclusion, the writer has not used a folding propeller on a low-wing model, so here caution is advised.

"PETROL TOPICS" *continued from opposite page.*

committees, and matters affecting petrol models *will be considered by petrol men.* Having seen this thing from the inside, I have no hesitation in commending it very strongly to all lone hand petroleers, as well as to club members. We cannot have a truly representative body unless we *all* support it, and verbal support is not enough. We must join it and subscribe to it, and I am convinced we shall obtain good value.

Well, now the ban is lifted let us have your news and views again and we will soon resurrect "Topics" in its former vein. Though I promised to try and keep alive the petrol model during the ban, I'm afraid I've rather fallen down on the job of recent months. I must have your correspondence and particularly photos to keep "Topics" going in top gear. I've answered most of your letters by post this last year, and I have a small collection of photos, some of which I hope to publish in future "Topics," and to all those whose letters I have not acknowledged, I apologise whilst thanking you all.

THE DEVELOPMENT OF THE AVRO 504

INCLUDING PHOTOGRAPHS FROM THE AUTHOR'S COLLECTION.

BY E · J · RIDING

Avro 536. 130 h.p. Clerget.

MANY years ago, some wit coined the phrase "Old Avros never die—they only fade away." How true these words were to become can be seen when one realises that although Mr. A. V. Roe designed the first 504 in 1913, a few of its successors were still flying in 1941.

Apart from the bombing of Friedriohshafen in November, 1914, the 504 has been essentially a training aeroplane. During the 1914–18 War it developed from the original 504 through several versions until the type 504K was reached in 1918. The types 504A, B, C, D, etc., differed from the original only in minor details. The B and C had longer ailerons and a slight increase in the angle of incidence of the wings and they were fitted with the 80 h.p. 7-cylinder Gnôme rotary engine.

The 504J was fitted with the 100 h.p. Gnôme *monosoupape* rotary engine and was built in large quantities until superseded by the standard 504K fitted with the 100 h.p. Gnôme *monosoupape*, the 110 h.p. Le Rhône or the 130 h.p. Clergêt rotaries.

Nineteen hundred and nineteen saw vast quantities of service aeroplanes destined for the breakers yard, but owing to its fine qualities both in handling, maintenance and cost of operation, the 504K found a ready market in all the "mushroom" companies that sprung up in the civil aviation boom of that year.

Until 1929 the Avro 504K was the most common civil aircraft in the country, some 276 being registered. One of these, G-ABAA, was still flying in 1938 and has only recently been withdrawn from the Register. The following 504 variants have been produced since 1919 :—

504L Seaplane. In all outward appearances this was merely a 504K fitted with floats. It had a large fin and the rear cockpit was enlarged to seat two passengers. The engine was a 130 h.p. Clergêt 9-cylinder rotary. In 1919 the Eastbourne Aviation Co. operated five of these machines : G-EAFB, G-EAJH, G-EANS, G-EASD and G-EASE.

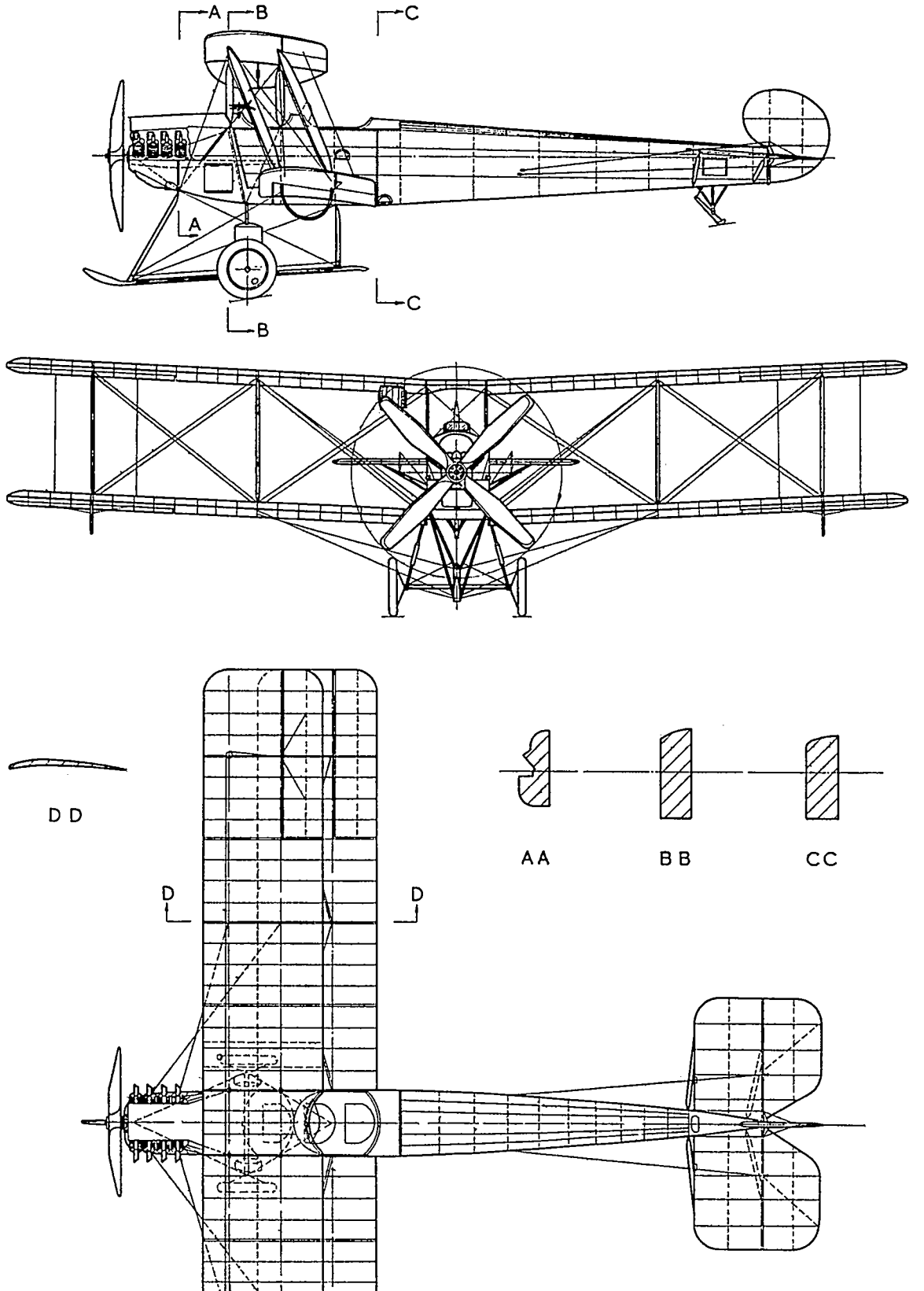
504M Enclosed Tourer. A three-seat totally enclosed touring machine fitted with the 110 h.p. Le Rhône, 100 h.p. Gnôme *monosoupape* or the 150 h.p. Bentley rotary engine. The occupants were seated in tandem with the pilot in front. The type was not very popular, but one of them, K.134 (early 1919 civil registration), was flying regularly at Hounslow just after the War.

536. Another 1919 design. This machine was actually a 504K in which the fuselage breadth had been increased by 9 in. in order to accommodate four passengers side by side in pairs in the rear cockpit, the pilot occupying the front cockpit in the usual fashion. Many 536s were built and were used by Surrey Flying Services, Ltd., of Croydon, for pleasure flights until about 1930. Machines belonging to this concern were painted royal blue fuselage with white letters and silver wings and were registered G-EAKJ, M and P, G-EBOF and Y, G-EBRB and G-EBTF. The engine fitted was the 130 h.p. Clergêt rotary.

548. This machine was produced as a result of the demands for Avro 504s utilising a stationary motor in place of the rotary types. The engine used was the 80 h.p. Renault, 90 h.p. R.A.F. 1A or the 120 h.p. A.D.C. Airdisco 8-cylinder air-cooled Vee type. When equipped with the latter, the machine was known as the 548A. The airframe was that of a standard 504K with the exception of the forward end of the fuselage and the fuel supply which was carried in a 16-gallon gravity tank

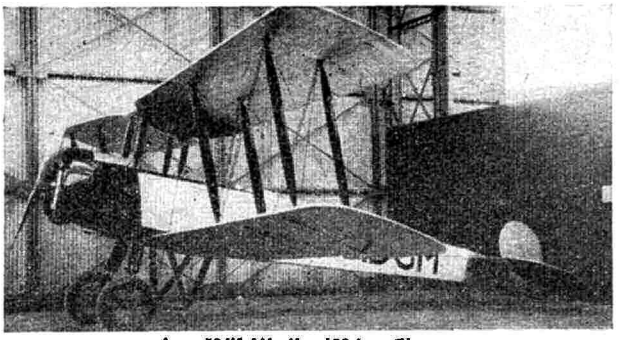
Avro 504K. 110 h.p. Le Rhone.

Avro 504N. 150 h.p. Armstrong-Siddeley "Mongoose."



AVRO 548

FT.



Avro 504K Mk. II. 130 h.p. Clerget.

attached to the underside of either upper plane.

Twenty-eight Avro 548s were registered in this country. They were used by the Henderson School of Flying at Brooklands between 1926 and 1928. Machines belonging to this company were usually left in their old wartime green camouflage colours and were registered G-EAJB, G-EBAJ, G-EBFM, 'RD, 'SC, 'VE, 'WH and 'WJ. The Giro Aviation Co. used this type from 1931 until 1936. Machines belonging to this concern were silver all over, with black letters, and were registered G-EAFH, G-ABMB and G-ABSV. The former was one of the original factory-built 548s and the other two were ex-R.A.F. 504Ks converted. With the exception of the length, which was 29 ft. 5 in., the dimensions and areas were identical with the 504K. One 548—G-EBIU—was still in service as recently as 1937.

552. Similar in most respects to the 548, the Avro 552 was fitted with the 200 h.p. Wolseley Viper 8-cylinder water-cooled Vee type engine. The prototype, G-EAPR, built at the Hamble works of A. V. Roe & Co., Ltd., was flown both as a seaplane and as a landplane. It was later used in connection with some early autogiro experiments. Many years later it was resurrected and re-registered G-ABGO and was flown considerably by the brothers L. J. and L. G. Anderson, of Hounslow, who disposed of it to the Inca Aviation Co., which concern used it for banner-towing until it was wrecked at Coal Aston late in 1933. It still had the pilot's cockpit behind the centre-section struts whence it had been moved during the autogiro experiments. The colour scheme was silver all over with a black nose and registration letters. Other 552s were registered G-ACAW, G-ACAX and G-ACRP.

504N. The Avro 504N was built in large quantities by the Avro concern during the years 1928–31, as a replacement for the 504K, as standard *ab initio* trainer in the R.A.F. A batch of these machines were serially numbered K.1802 to K.1823 and were silver all over with red, white and blue roundels on wings and fuselage, red, white and blue stripes on the rudder and the serial number painted on the underside of the bottom planes, the tops of the figures adjacent to the leading edge on the starboard side and *vice versa* on the port side.

In 1933 the 504N was in turn replaced by the Avro 621, and 504Ns began to find their way into the civil market, where they superseded the 504K in the pleasure flight business. These machines were fitted with the Armstrong-Siddeley Lynx Mk. IV 7-cylinder radial engine of 180 h.p.

In addition to the radial engine, the machine had an oleo-pneumatic undercarriage, a slightly more rounded fuselage, Frise-type balanced ailerons and a cut-out in the leading edge of the centre-section plane.

Fuel was carried in two 16-gallon gravity tanks slung under each top plane and the top speed was increased to 95 m.p.h. Many 504Ns which found their way into the civil field were refitted with the 150 h.p. Armstrong-Siddeley Mongoose 5-cylinder radial engine. With this lighter power plant and with one wing tank, the 504N proved very popular because it could lift four persons out of any average sized field with ease and it was possible to cut down the price of joy-rides to 3s. 6d. and still make it a paying proposition.

Sir Alan Cobham had some of the first ex-R.A.F. Avro 504Ns on his various National Aviation Day tours. Of these, G-ACRS, on which Capt. W. McKay used to give hair-raising aerobatic exhibitions, used to be K.1802.

G-ACRS had a yellow fuselage with black letters and silver wings.

G-ACLV, green fuselage, silver wings and black letters, was formerly J.8573, and G-ADBD, light blue fuselage, silver wings and black letters, was numbered K.1245. 'RS and 'DB had Mongoose engines and 'LV was fitted with a Lynx.

504K Mk. II. Originally produced in 1923, this was actually a 504N airframe with a 130 h.p. Clergêt rotary engine. One or two were registered as late as 1935, bearing the letters G-ADGM and G-ADGN.

Both were silver all over with black nose and registration letters.

504.0. The seaplane version of the 504N fitted with an Armstrong-Siddeley Lynx engine. Some had a fin similar to that of the 504L.

504R. Produced in 1926, this was the final 504 variant, sometimes known as the Gosport. It was a cleaned-up 504K fitted with a Gnôme *monosoupape* rotary engine of 100 h.p. One of these, G-EBNF, coloured blue fuselage with white letters and silver wings, was used for instruction work by the Lancashire Aero Club in 1926–8. Other 504Rs were registered G-EBNE, G-EBOX, G-EBPH and G-EBUY. 'PH was fitted with an experimental Avro Alpha 5-cylinder 100 h.p. radial engine and was used by Messrs. Hinkler and Leeming for a landing on the summit of Helvellyn in December, 1926.

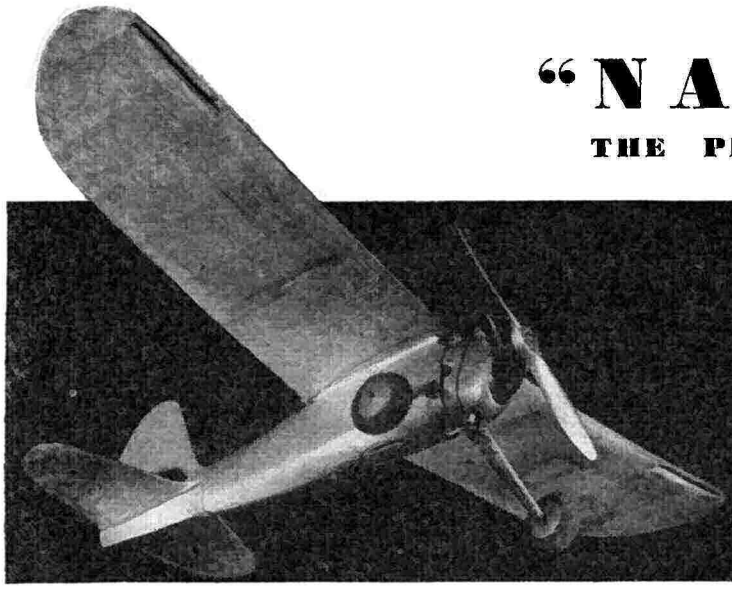
From time to time the Avro 504K has been fitted with engines other than those mentioned. Four aircraft—G-EADA, G-EADL, G-ABVC and G-AEAA—were fitted with the 3-cylinder Bristol Lucifer radial engine of 100 h.p. in which guise they were colloquially termed "three-pot Avros."

Probably the only specimen of its type is shown in the accompanying photograph of G-EBWO. 'WO was built by the Henderson School of Flying for one of their pupils and was fitted with a 100 h.p. Anzani radial. It was crashed and written off in April, 1929, a year after it had been built.

Avro 504K. 100 h.p. Anzani engine.

"NATSNEEZ"

THE PLANE ON THE COVER



A 31inch SPAN PETROL MODEL

BY

P. E. NORMAN

This model is the result of experiments to produce a really small and handy petrol model, with a good performance, as crashproof as far as possible, easy to maintain on the field, and possessing a pleasing appearance with simple construction.

It is powered with an engine of 1·8 c.c., 9/16 in. bore by ½ in. stroke, and 3 ozs. weight, which drives an 8½ in. propeller, 4½ in. pitch. This unit is of my own design and construction. Any engine of not more than 2·3 c.c. and 3 ozs. weight would be suitable.

Fuselage.

Commence by making the three formers: No. 1 from ⅛ in. hard sheet balsa; No. 2 from two laminations of 1/16 in. sheet balsa, cemented together with the grains running at right angles; and No. 3 from ⅛ in. sheet.

Join No. 1 and 2 formers with 1/16 in. by ½ in. strip balsa at the top, and a solid block of balsa at the bottom shaped to the section shown on the drawings.

Join No. 3 in position with two pieces of ⅛ × ¼ in.

Cut two pieces of 1/32 in. three-ply wood grain running vertically, carefully bend them to conform to the shape of No. 1 former, cement and pin them to the sides at the nose end as shown.

Cut two pieces of 1/16 in. sheet balsa and carefully fit to each side, cement firmly in position, lapping the joints together at the top and bottom rear portion of the fuselage, cement and pin in position till set.

Insert a piece of 3/16 in. sheet balsa at the top, having grain across, cement and pin securely, then push a cane peg in immediately behind this block, through the two sides, cement, and trim off the ends flush with each side. This takes the pull of the motor retaining dowel (see detail drawings).

Carefully sandpaper the fuselage, drill holes for the wing and tail fixing dowels, and cement pieces of 1/32 in. sheet celluloid on the inside of the fuselage where these occur. This celluloid is amazingly strong and will prevent any possibility of the dowels being torn out.

Cut the 3/16 by 1¼ in. slots in the sides of the fuselage immediately behind the front former. These slots accommodate the undercarriage anchorage.

Cement two blocks of balsa on the sides of the fuselage under the wing position. These can be sandpapered to form the wing root fillets, and appreciably increase the strength of the fuselage. Finally, cover the fuselage with bamboo paper, using mounting or tissue paste as adhesive, give two coats of clear and one of coloured dope, rubbing down to obtain a smooth finish.

Dope the inside of the fuselage as far as No. 2 former. This will help to prevent oil saturation.

The Undercarriage.

This is a simple cantilever type constructed from one length of 1/16 in. diameter spring steel wire, and faired to a streamline section with hard balsa or willow, cemented and bound on with a wrapping of silk.

Construct as shown on drawing, then insert in the slots in the fuselage, and cement in position.

The Wheels.

These may be small airwheels such as I described in December, 1943, AEROMODELLER.

Ribs.

Cut out a "master" rib to section shown.

Cut 14 1/16 in. sheet balsa slats and place them together with the "master" in place and carefully shape them all together. Ensure that the under camber is correct.

Cut slots for mainspar, leading and trailing edges.

Mainspar.

Made from 1/16 in. by ¼ in. hard balsa, with a piece of cane or bamboo of the same dimensions glued and bound to it at intervals for extra strength. The leading edge is gently "broken" where the dihedral angles occur, and cemented into the slots provided in the rib.

Leading Edge.

This is cut from ⅛ in. hard balsa sheet, cemented into the slots, and when dry, sanded down to the knife edge.

The wing tips are now added from ⅛ in. sheet.

Check the wing for "trueness" and see that the incidence is the same on both sides (incidentally I have made a small washout on each wing). This is done during the doping.

Add the 1/32 in. sheet balsa capping over the leading edge of the wing, extending back to the mainspar on the top, and about 1 in. back on the undersurface.

Continued on page 616.

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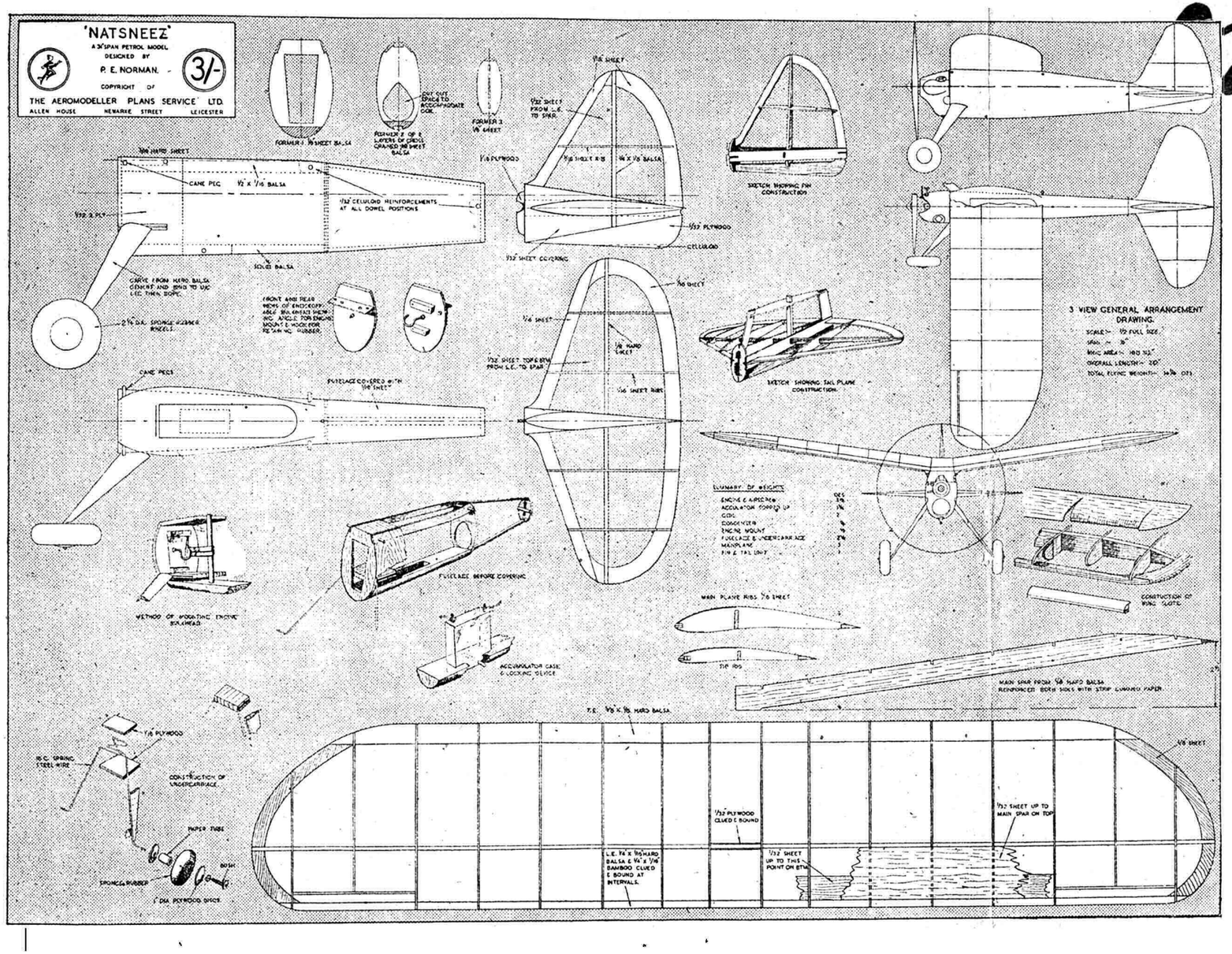
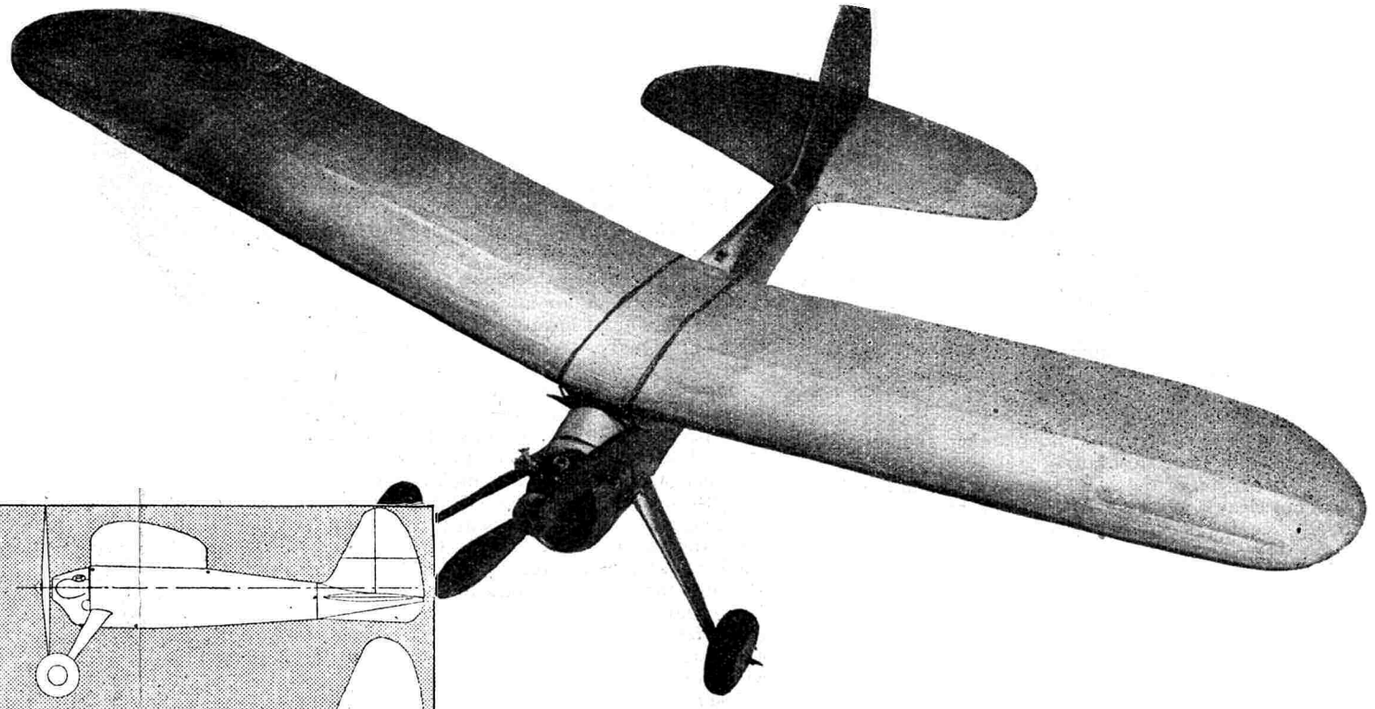
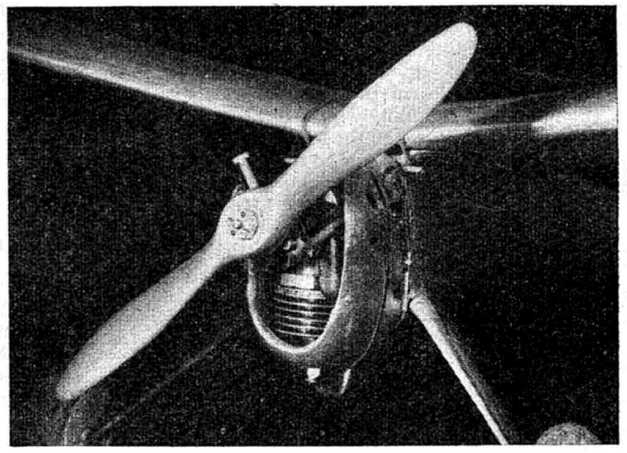
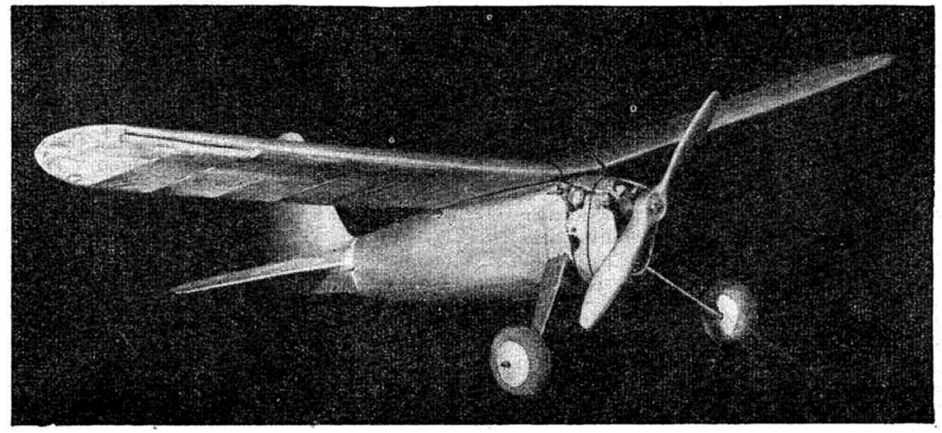




This, the smallest petrol driven machine yet to appear in the "Aeromodeller", is by no means a machine for the beginner. However, for the more experienced "Petroleer" such a small model is fascinating to fly and to watch, being fast and possessing a good climb. It will stand an amazing amount of knocking about and above all is handy to pack and carry, with the additional advantage of being economical to make.





Continued from page 613.

Wing Tip Slots.

These help the stability to a very marked degree, and for those who have not tried them on models, I thoroughly recommend them. The drawings should make their incorporation quite straightforward.

Cover the centre section of the wing with thin sheet celluloid, examine the complete framework for any undue bumps or lumps, and carefully sandpaper.

Covering.

Cover with bamboo paper. Cover the bottom of the wing first, using waterproof adhesive, and ensure that the covering is fastened to the undercamber. Water-shrink the bottom surface, before the top is covered, so that the paper can be re-glued to the undercamber, should it have pulled away during shrinking.

Cover the top of the wing, water shrink, and give two coats of clear dope and one of colour (mine is silver all over, except undersurfaces, which are left clear doped).

Fin and Tail Unit.

Any necessary trimming adjustments may be made by inserting a small packing between the end of the fuselage and the unit; when the correct glide has been obtained these should be cemented in position. Cut the front former from ⅛ in. sheet, and cut the slots for leading edges of the fin and tail.

Cement two strips of 1/16 in. by ⅛ in. balsa on each side, bring them together at the end and temporarily pin together, add the under fin, and cement in position.

Cut and fit the main post of the fin, slip the rib over it, then fit leading and trailing edges in position and cement—leave it to set. Carefully cut the two rectangular holes in the 1/16 in. sheets to receive the mainspar of the tail, which is now inserted, and set truly at right angles to the fin, and cemented.

Cut the ribs and slip on to the mainspar (see drawing), cut the leading and trailing edges of the tail and cement in position. Insert the 1/16 in. plywood tongue into the front former, and glue securely. Cover the fin and tailplane on both sides from the leading edges up to the mainspars with 1/32 in. balsa sheet, fair in the space between the upper and lower fin and tail with 1/32 in. sheet and finally cover the complete unit with bamboo paper, water shrink, and give one coat coloured dope.

The Engine Mounting.

This is detachable, which facilitates overhauls, adjustments, etc. Cut to same shape as No. 1 former, from 1/16 in. three-ply wood, and pin and glue two hardwood blocks on the back to locate it in No. 1 former.

Make a hook from the threaded end of a bicycle spoke and fix in position with 8 B.A. nuts, back and front. This hook holds the elastic strainers and these are stretched inside the fuselage and a strong wooden dowel is inserted, thus holding the mounting in position. It is a very simple scheme and I have experienced no trouble whatsoever with this method of attachment (dowel fits behind undercarriages platform). I have reinforced the front and rear formers of the fuselage with thick celluloid cemented into them.

The drawings should help to explain this mounting.

Engine Cowling.

This is carved from solid balsa, which is then cut in two and hollowed out to fit round the engine, leaving spaces for the needle control valve, ignition timing lever, contact points and petrol tank filler cap (in my model this is made from a bicycle oil filler cap), and I might add here that the celluloid tank is made in exactly the same way as the cases of my miniature accumulators (described in July, 1944, AEROMODELLER), and cut down in size to give approximately one minute's engine run.

The cowling is then glued together again, covered with silk or bamboo paper, and thoroughly doped inside and out against oil saturation.

The Accumulator Container Box.

This may seem an unnecessary item, adding extra weight, etc., but I have found it invaluable, if one does not want to make a new fuselage about every four weeks, due to acid eating it away! Also the little accumulator may be instantly removed for inspection and topping up, without removing the wing, but by simply withdrawing a rubber-covered bamboo peg. Cut a piece of thin celluloid sheet to double the length plus one inch of your little accumulator, by just over the breadth of it. Bend the celluloid into an inverted U shape, and carefully crease at the bends of the U to fit over the accumulator, fasten two sides to it, with amyl acetate, and leave to dry thoroughly. Put the accumulator into it and mark the positions of the positive and negative terminals in the top of the box. Drill two holes there and insert 8 B.A. screws from the inside, with large diameter washers on them, and then lock up with nuts (see drawing).

Insert the box into a space cut in the bottom of the fuselage and cement thoroughly in position; I should add here that I leave the fitting of the box till the very last job on the model, because I rig up the model with everything on for flying and balance for the centre of gravity, attaching the box and accumulator to the bottom of the fuselage with elastic bands, and sliding back and forth until the correct balance is achieved, when the position for the box is noted and cut accordingly.

Coil Fitting.

The coil is bound to a small strip of 1/16 in. plywood with adhesive tape. The plywood has a hole drilled and tapped 8 B.A.

The coil is inserted in the fuselage through the space covered by the wing (having, of course, connected length of cotton-covered electric wire to the terminals) and manœuvred till the end of the coil fits in the space in No. 2 former, when an 8 B.A. screw is passed up through a reinforced hole in the bottom of the fuselage through the tapped plywood.

The wiring is now completed and as will be seen from the drawing is very simple.

One connection is taken from the coil to a small screw located in the top of the fuselage just behind the wing. This serves as the positive connection for the booster battery, the negative connection being the exhaust pipe of the engine.

Test Gliding.

Test gliding is rather tricky until the chief characteristics have been found. There should be no tendency to "nose up" as the machine may spin in when the engine cuts on its first power flight. Adjust the pin and tail unit as necessary, until a perfectly straight glide is obtained, with no signs whatsoever of over elevation. Test with the engine running fairly slowly—if the model shows signs of banking with the engine running slowly, pack the engine mount to give slight opposite torque. These adjustments must necessarily be very small with such a small model.

When power flying never alter the tail unit once the correct glide is obtained.

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,

Since the publication of my article "Automatic Glider Control," certain alleged defects have been pointed out to me, the chief being probable interference due to inductance from both the wiring and possible shorts via the brass rings enclosing the iron triggers. Also the probable difficulty of such a relatively heavy magnet swinging about in an uncontrolled manner.

The problem of inductance is certainly one to be tackled, but regarding the freely swinging magnet, though a gymbals mounting has been suggested, I do not think that this difficulty will prove such a handicap in practice as it seems on paper, for the iron triggers themselves exert a steadying influence on the swinging magnet. By their attraction, each in turn hold it in position until the circling glider brings the magnet so far across the earth's lines of force that it breaks away from the hold of one trigger and swings round until further circling brings it under the influence of the other. (The slight friction in the needle bearings seem to act sufficiently as well as a damper.)

Incidentally this is why it is so important for the iron triggers to contain only the right amount of metal, "Neither too much nor too little."

My sport was model yacht racing which is held up for the duration, and turning to a kindred sport, sailplaning, I was immediately struck with the necessity of controlling the glider as efficiently as we do the model yachts, though the principle is different. In gliding there is no second natural element to employ. With yachting, the wind pressure on sail (or alternatively a vane) is harnessed for the proper steering of the yacht, together with other contrivances for "trick" work. So the article in the July number was intended mainly as a suggestion in theory for such as those who could work on it.

Leeds. A. ARNOLD.

DEAR SIR,

As soon as I heard of a British jet-propelled aircraft my first thought was how could it be applied to models. I discarded a design taking in air through the nose. Similarly a design incorporating an annular air scoop. My final decision was the drawing opposite. You will see that it is pretty well straightforward. Once the air has been drawn in it goes straight out at the back, losing no energy in turning corners. No doubt many readers could vastly improve on my theories but I would like to submit my idea as a suggestion in the hope that it will prove to be of some help in the development of jet-propelled models.

Hertford. N. SINALLMAN.

Several suggested layouts for jet-propulsion units have been received from readers. But knowing that practical results will add far more emphasis to this important subject, we intend publishing in the near future an article by an enthusiast who has made great advances in the construction of a turbo-combustion unit. He has, in fact, reached the stage where his unit has run for short intervals, a most creditable effort and one which no doubt will greatly interest all readers. [ED.]

DEAR SIR,

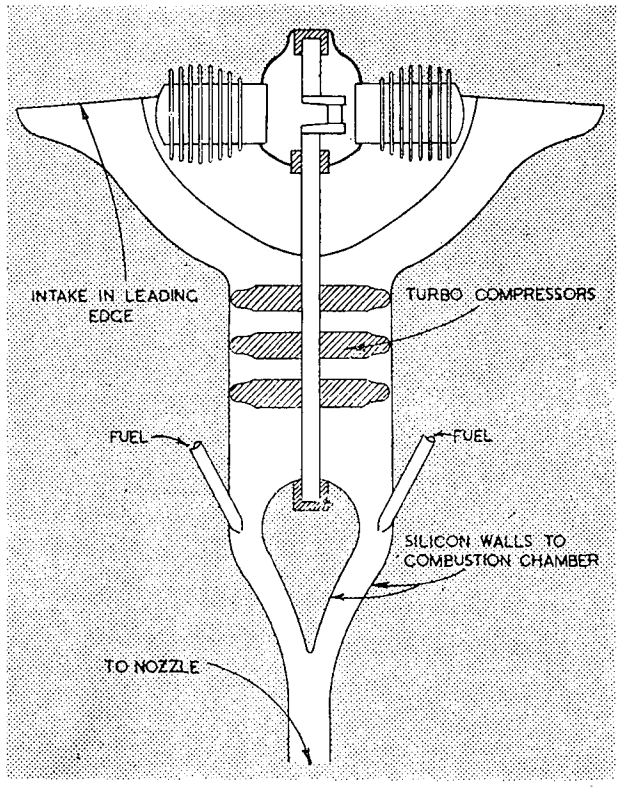
After a long silence on the matter of "downthrust," I am at last compelled, by a letter from Mr. Annenberg appearing in the July AEROMODELLER, to hold forth on my pet subject.

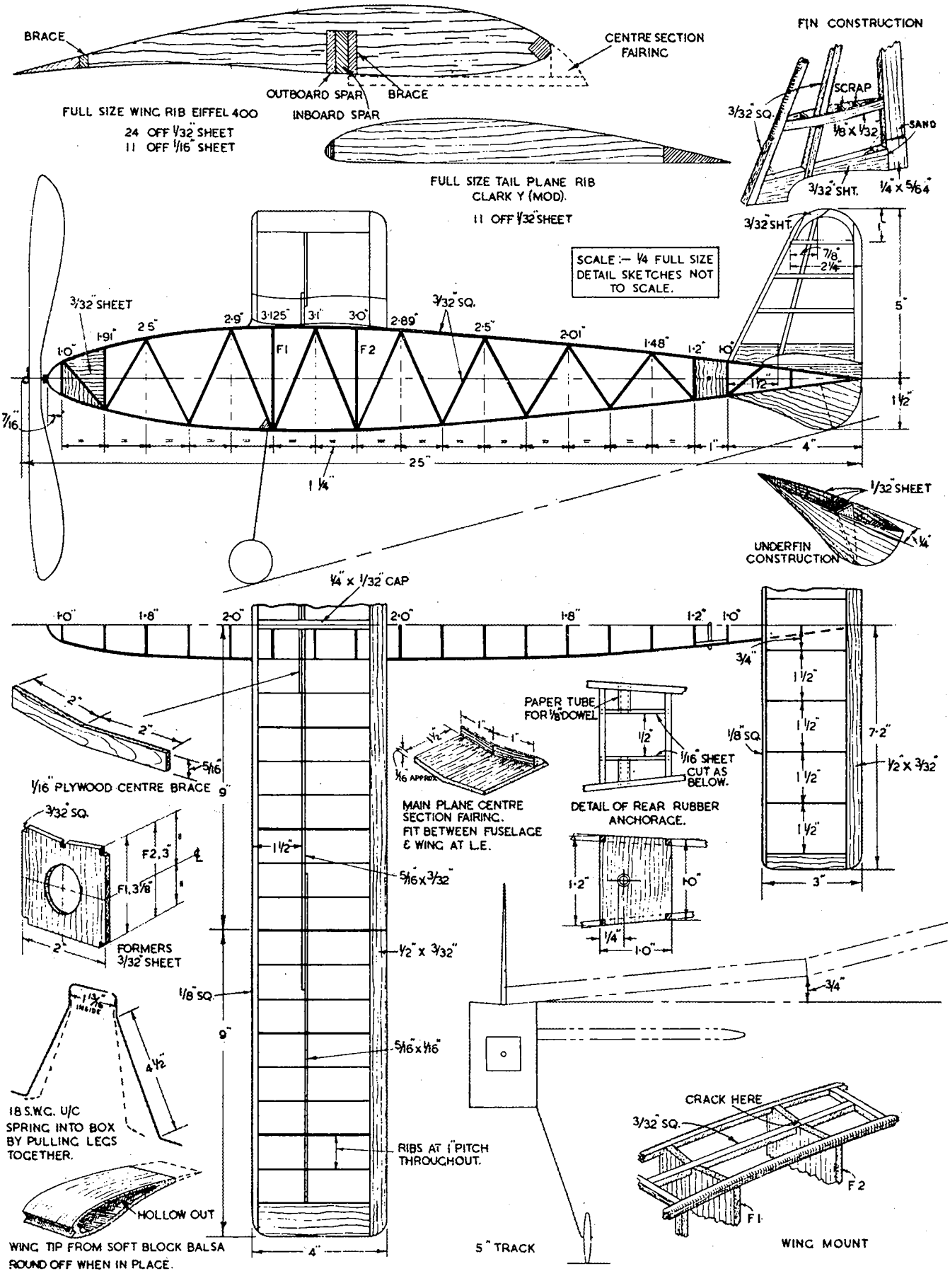
Mr. Annenberg, seizing upon what he imagines as a passing remark of Mr. Maxwell, hopes his "letter will serve as a basic guide to downthrust elimination." I am gratified that at least one person can see the light as regards the solution of "downthrust," but at the same time I should like to point out to Mr. Annenberg and others interested that I fully explained the C.G. theory in an article some two to three years ago, from which arose the various controversial opinions expressed since. Methods were shown in that article of bringing the C.G. position down to the thrust-datum-flying line and excluding change of angle of attack and downthrust elimination was fully outlined. Moreover, after following closely the various arguments set forth against my theory, I remain unconvinced that my original arguments are disproved. I assert that (*a*) the C.G.'s position being, by virtue of construction, well above the thrust line in a normal high-wing model is responsible for 90 per cent. of the inclination of the thrust line, the other 10 per cent. being responsible for obscure and complicated effects on the aircraft of the said inclination; (*b*) if the C.G. is designed to fall on the thrust-datum-flying line, downthrust of any degree disappears.

At the time of my original article, another controversy was raging; the angle of attack problem. My solution in theory and practice embodied a constant angle of attack stated as the one most preferred by the designer—almost invariably for most the best L/D ratio. The outcome seems to indicate a higher angle of attack in the glide than under power. The 10 per cent. "other causes" I mentioned earlier on no doubt was largely due to practical flyers, as inclining the thrust line not only through the C.G. but even above it would tend to tail heaviness in the glide, the phenomenon of high angle of attack gliding being known and used long before it was cleared up in theory by Maxwell and company.

The only true solution to this problem is to have the wings increase their angle of attack and move backwards or forwards

Continued on page 626




BRACE
CENTRE SECTION FAIRING
OUTBOARD SPAR
BRACE
INBOARD SPAR
FULL SIZE WING RIB EIFFEL 400
24 OFF 1/32" SHEET
11 OFF 1/16" SHEET
FULL SIZE TAIL PLANE RIB
CLARK Y (MOD).
11 OFF 1/32" SHEET
FIN CONSTRUCTION
SCRAP
3/32" SQ.
1/8" X 1/32"
SAND
3/32" SHT.
1/4" X 5/64"
3/32" SHT.
SCALE :— 1/4 FULL SIZE
DETAIL SKETCHES NOT
TO SCALE.
3/32" SHEET
3/32" SQ.
1·0"
1·91"
2·5"
2·9"
3·125"
3·1"
3·0"
2·89"
2·5"
2·01"
1·48"
1·2"
1·0"
F1
F2
7/8"
2 1/4"
5"
1 1/2"
7/16"
1 1/4"
25"
4"
1/32" SHEET
1/4"
UNDERFIN
CONSTRUCTION
1/4" X 1/32" CAP
1·0"
1·8"
2·0"
2·0"
1·8"
1·2"
1·0"
3/4"
1 1/2"
1 1/2"
1 1/2"
1 1/2"
7·2"
1/2" X 3/32"
3"
2"
2"
5/16"
1/16" PLYWOOD CENTRE BRACE
9"
1/16 APPROX
1"
1"
1/2"
MAIN PLANE CENTRE
SECTION FAIRING.
FIT BETWEEN FUSELAGE
& WING AT L.E.
PAPER TUBE
FOR 1/8" DOWEL
1/2"
1/16" SHEET
CUT AS
BELOW.
DETAIL OF REAR RUBBER
ANCHORAGE.
1/8" SQ.
3/32" SQ.
F2,3"
F1,3 1/8"
2"
FORMERS
3/32" SHEET
1 1/2"
5/16" X 3/32"
1/2" X 3/32"
1/8" SQ.
9"
5/16" X 1/16"
1·2"
1·0"
1/4"
1·0"
3/4"
1 3/16" INSIDE
4 1/2"
18 S.W.G. U/C
SPRING INTO BOX
BY PULLING LEGS
TOGETHER.
RIBS AT 1" PITCH
THROUGHOUT.
HOLLOW OUT
WING TIP FROM SOFT BLOCK BALSA
ROUND OFF WHEN IN PLACE.
4"
5" TRACK
CRACK HERE
3/32" SQ.
F2
F1
WING MOUNT

SQUARE cut wing and tailplane tips were incorporated from the experimental point of view. However, having flown the model on several occasions, any loss in efficiency which may be present is certainly not shown in the stability or soaring ability of this model.

Fuselage.

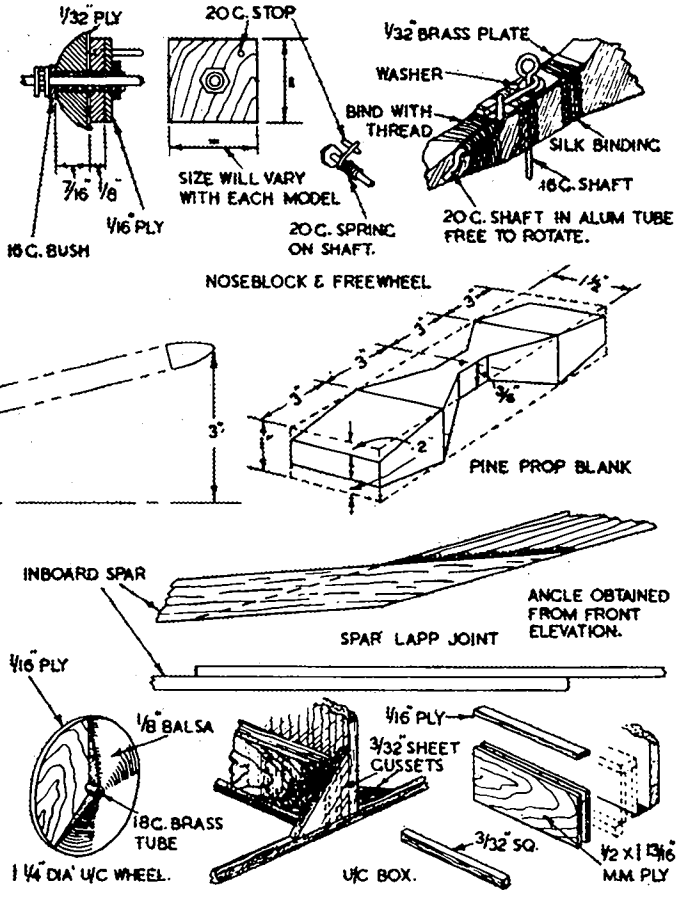
Is built along conventional lines, and the longerons of 3/32 in. sq. bass, birch, or any suitable good quality hardwood strip, are steamed and pinned down over the full-size layout in the usual manner. The same size of wood is used for the spacer members, and pieces are cut in pairs to make a neat fit at the various stations. These are pre-coated with Durofix which is allowed to dry, before finally glueing the pieces into position. Aft of former F-2 3/32 in. sq. balsa is desirable in order to keep the tail light, 24 hours is required for the glue to set hard.

Formers F-1 and F-2 are cut from 3/32 in. sheet firm balsa, and the motor clearance holes cut. Both edges of the hole should be sanded to a radius; apply several coats of thick B.O. to obtain a glass-like surface all over.

Assemble the fuselage by joining the two sides to the formers, then add the remaining cross braces. Sheet fill in the nose and rubber anchorage, exercise care at the anchorage position, this extra trouble is well worth the time involved as you won't have a rear peg pulling through. The undercart plywood box is made and securely glued into position and is well gusseted.

Mainplane.

Simply constructed, is light and strong. Plywood or metal templates are cut, two being required exactly



1943 FLIGHT CUP WINNER

BY I · S · CAMERON

alike; these may be transferred on to the template material from the AEROMODELLER airfoil section sheets. Twenty-four 1/32 in. sheet and 11 1/16 in. sheet balsa rectangles are cut and sandwiched between the templates, these are clamped together temporarily by pushing pins through, two into each template—(see Elmira 1 plan, February, 1943, AEROMODELLER.) Sandwich the 1/32 in. and 1/16 in. rectangles in the correct sequence, one 1/16 in., two 1/32 in., one 1/16 in., and so on. Mark the root spar and the tip spar positions on the underside and top of all the ribs while they are clamped together. Separate and connect the points, then cut out the slots. Cut the spars from a hard grade of balsa, make the knife-edged T.E. and build the wing up in three sections, viz., centre, and two tip panels. When thoroughly dry bring the three panels together and glue the spars giving the tip dihedral, then crack the L.E.M.S. and T.E. in the centre of the whole wing, and raise the centres ¾ in., thus completing the polyhedral. Reinforce the joint by adding the plywood brace at the spar and T.E., also ¼ in. by 1/32 in. capstrip over the centre rib.

Tailplane.

Has no spar and is built up similarly to the wing, the section being a slightly modified Clark Y. Use firm balsa for the L.E. and T.E. to help prevent the natural tendency for the tailplane to bend up upon doping.

Fin.

Of this streamlined section: build flat on the board using 3/32 in. by 3/32 in. balsa L.E., ¼ in. by 5/64 in. T.E., 3/32 in. by 3/32 in. M.S., 3/32 in. sheet tips and base. Add the ⅛ in. by 1/32 in. capstrips last of all, inserting scraps of balsa in between to prevent crushing.

Propeller.

May be carved from pine or similar fairly soft wood. Maximum undercamber is located at a point half way along the blade and is 1/16 in. The blades taper from ¼ in. to 1/32 in. at the tips. Reference should be made to the freewheel used, this is 100 per cent. efficient and can't fail. Finish with about six coats of B.O., finally polishing with metal polish.

Covering.

Sand the whole job lightly before applying tissue. Use B.O. No. 1 for the undercamber (jap tissue was used throughout on the original) black fuselage and fin, white wings and tail.

Doping. Fuselage one dope, wing one dope. Tail and fin one dope. B.O. (thin).

Rubber Motor.

Put one ounce of ¼ in. by 1/23 in. Dunlop, arranged into six strands, i.e. approx. 30 in. per strand.

Flying and Trim.

The fin is cemented on to the tailplane permanently, and the unit is secured to the fuselage by a band looped over the tailplane and hooked on to the small hook at the rear. Completely assemble the model and move the wing until the model balances 1/3 along the chord from the L.E. Try a few glides and adjust the wing incidence to obtain the optimum value for sinking speed. This can be accomplished by using a stop-watch and hand launching.

When ready to fly the model under power, trim for a right-hand spiral climb by adding right thrust to oppose the torque.

MONTHLY MEMORANDA.

BY O · G · THETFORD

Famous Lasts.

Three of the most famous aeroplanes of this War all ceased to be produced during August, 1944. The last Hurricane came from the Hawker shops; the last Swordfish emerged at the Blackburn factory and the last Dauntless dive-bomber was built at the Douglas plant.

In view of the amazing record of the Hurricane and its wide popularity among model builders it is thought fitting to record the details of the markings on the last of the famous tribe. The last Hurricane to be built was a Mk. IIC and it had the R.A.F. serial number PZ 865. It was camouflaged in the standard dark green and dark sea grey on the upper surfaces and medium sea grey underneath. Red and blue roundels appeared above the wings; red, white, blue and yellow on the fuselage, and red, white and blue beneath the wings. The usual 18 in. light-coloured band encircled the rear fuselage and the number appeared in black across this band. Red, white and blue fin stripes, 24 in. by 27 in. were carried. A yellow band was painted along the leading edge of each wing from the tip to a point just short of the outermost cannon. The name "Last of the Many" appeared in script on the sides of the cockpit.

Well over 10,000 Hurricanes of all Marks have been built, many of which were sent to Russia after 1942. The first production machine, numbered L 1547, was flown in October, 1937. L 1547 had a two-blade fixed-pitch wooden airscrew and details of its markings will probably be useful to those intending to build a model of the first Hurricane to place beside the last. It was camouflaged in dark green and earth on the upper surfaces and finished silver underneath. No markings appeared on the tail assembly. Red, white, blue and yellow roundels were painted on the wings and fuselage, and red, white and blue roundels beneath the wings. The serial number, L 1547, appeared in black beneath port and starboard wings in the same way as on modern trainers. The airscrew was finished black. The original type of "kidney" exhausts were fitted.

Story of the Seafires

There has been a great deal of confusion about the various Mark numbers of the Fleet Fighter versions of the Spitfire known as Seafires. Seafires were first mentioned in action during the North African landings late in 1942. Four versions can now be mentioned. They are the Seafire IA, the Seafire IB, the Seafire II and the Seafire III. The Seafire IA was developed from the Spitfire VB and is fitted with the Rolls-Royce Merlin XLV motor. It has a three-blade airscrew, radiator under one wing only and two cannon. Many of these Seafires were fitted with tropical intakes beneath the nose. The Seafire IB was the Fleet equivalent of the Spitfire VC and was generally similar to the Seafire IA but had four cannon in the wings instead of two.

The Seafire II was the first Seafire with the Merlin LXI motor. It was the Fleet version of the Spitfire IX high-altitude fighter and was fitted with four-blade airscrew and radiators beneath both wings.

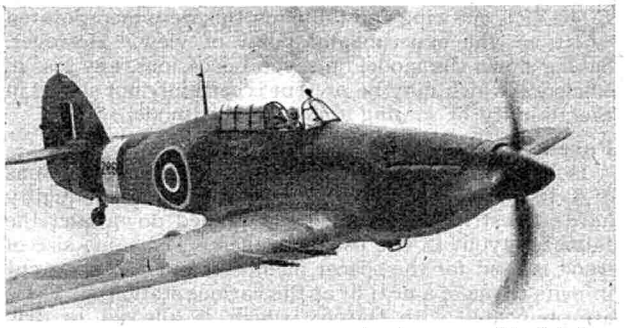


Photo by courtesy of Cyril Peckam.

The Last Hurricane.

The Seafire III, details of which were released in September, 1944, reverts to the Merlin XLV motor but is fitted with a four-blade Rotol airscrew like the Seafire II. The Seafire III is fitted with two cannon in the wings. Normal equipment of the Seafire III includes arrestor hook for deck landings, catapult launching spools and wings which fold upwards just inboard of the cannon and downwards near the tips.

Seafires are usually camouflaged dark sea grey and grey green on the upper surfaces and medium sea grey underneath. Roundels are the same as those on land-based fighters. Sometimes the name "Royal Navy" appears on the rear fuselage, but not always. A batch of Seafire III fighters are numbered MA 970, MA 971, MA 972, etc.

Tito's Spits.

Tropical Mk. VB Spitfires now equip a squadron of Yugoslav pilots flying with the Balkan Air Force based in Italy. These Spitfires have Marshal Tito's red five-pointed star insignia superimposed on the R.A.F. roundels on the wings and fuselage. The star insignia is also reproduced in miniature against the white bar of the fin flash. These Spitfires carry standard British fighter camouflage and one of them (with the individual recognition letter "M") is serially numbered JK 544.

Another Griffon Spit.

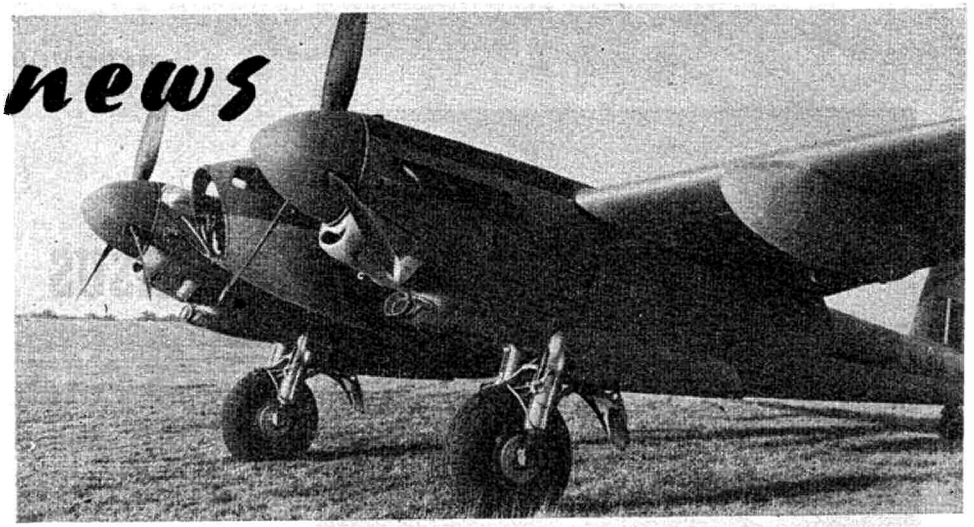
News has now been released of the Mk. XIV Spitfire, which is a high-altitude version of the Mk. XII. It is fitted with the Rolls-Royce Griffon LXV motor and a five-blade Rotol airscrew. Spitfire XIV is generally similar to the Mk. XII but reverts to the normal elliptical wings and has re-positioned ailerons. The wing has a slightly straighter leading edge between the fuselage and cannon. The fin has been extended slightly, and the rudder has been modified.

The prototype Spitfire XIV bore the R.A.F. serial number JF 316. It carried normal day fighter markings, the usual roundels and the letter "P" painted inside a yellow ring on the fuselage, just aft of the roundel. This special marking is carried on all prototypes whilst undergoing trials. A production batch of Spitfire XIV fighters is serially numbered RB 140, RB 141, RB 142, etc.

U.S. Operational Trainers.

It is learned from the U.S.A. that ex-operational Marauder bombers seconded for training and target-tug duties with the U.S. Navy as the JM-1 are painted bright yellow all over. Ex-operational Warhawks, used as fighter-trainers, receive a patch of yellow on the nose to indicate their function.

Photonews

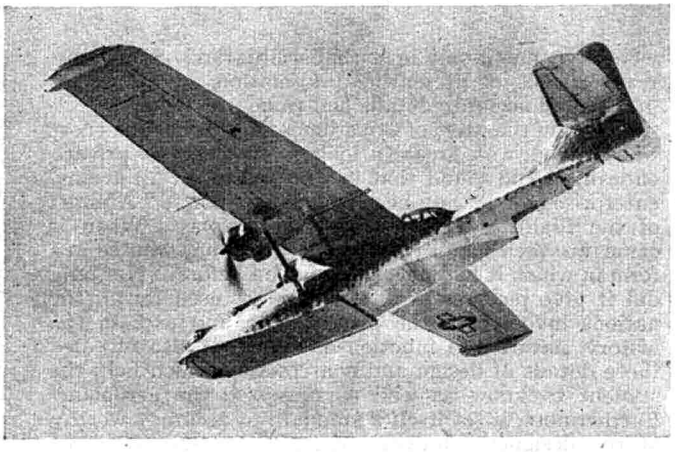


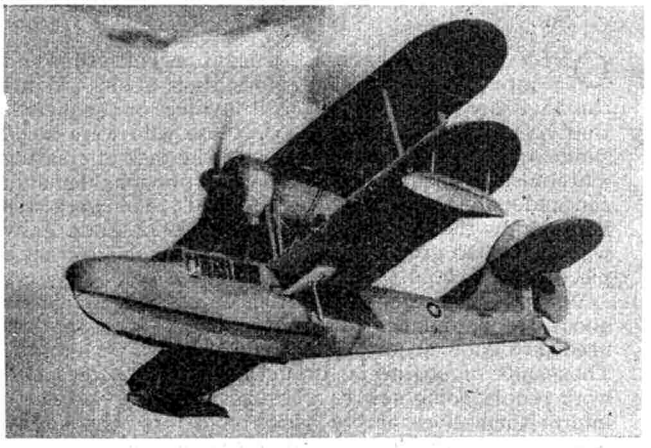
The Mark number of the Mosquito used for Photographic Reconnaissance (right) has not been released. It will be noted that the motor cowlings are modified, and that long-range fuel tanks are fitted below the wings. (*De Havilland Photo.*)

Below is the new Piper PT-1 training monoplane. The motor is a 130 h.p. Franklin 6 AC 298 four-cylinder horizontally-opposed type, which gives a maximum speed of over 150 m.p.h. (*Piper Photo.*)

Below (right) is shown the latest Griffon-powered version of the Spitfire, the Mk. XIV. Note the five-bladed airscrew. Other differences from earlier Spitfires include a further type of rudder, a modified wing and deeper twin radiators below the wings.

(*Photo: Vickers-Armstrongs, Ltd.*)





Immediately above is the PBN-1 Nomad, built by the Naval Air Material Center. The Nomad is ostensibly a Catalina, but has a taller fin and rudder, a lengthened hull, a new nose turret and modified wing-tip floats.

(*N.A.M.C. Photo.*)

Above (right). Although it has been in existence for a long time, pictures of the Sea-Otter I, developed from the Walrus, have only just been released. The motor is a Bristol Mercury XXX. The Sea-Otter is used for Air-Sea Rescue duties.

(*Photo: Vickers-Armstrongs, Ltd.*)

The Seafire III shown on the right is now in service and is fitted with a four-bladed Rotol airscrew. For ease of stowage the wings fold upwards from a point outside the wheel-wells and the tips fold outwards.

(*Photo: Vickers-Armstrongs, Ltd.*)

PEGASUS PRODUCTION

BY

E. COLSTON SHEPHERD,
B.A., B.Litt. (OXON),
LATE EDITOR OF "THE AEROPLANE"

Pegasus, the winged horse of Grecian myth, has held the imagination of air-minded men throughout the ages, and we, to-day, identify this symbol of speedy airborne strength with the swift dissemination of world aeronautical information, through the medium of The Harborough Publishing Co., Ltd., producers of "Aircraft of the Fighting Powers."

H. J. Cooper, left, apologises for the break in his "Aeroplanes Described" series. The Boeing P-26 will be carried forward to the December issue. Meanwhile his efforts are all devoted to "Aircraft of the Fighting Powers," Vol. V, of which a complete contents list will be found on page 627 of this issue.

ONLY those who have had a hand in collecting and interpreting detailed information about aircraft can have any idea of the labour it involves or the pitfalls that have to be avoided. Only those who were faced suddenly, when war broke out, with the task of creating material for which there had been no previous demand, can understand how bare was the field. The work was not merely that of making two blades of grass grow where one had grown, but of raising a whole crop on a piece of waste land.

With the war came a clamorous outcry for particulars about the aeroplanes taking part in it. The Services needed to know about our own and the enemy's aircraft. Thousands of engineers, draughtsmen, mechanics and work people, going new to a strange industry, wanted to inform themselves of the background into which they must now fit themselves. Members of the Royal Air Force, Observer Corps, Air Training Corps, gunners aboard merchant ships, spotters and many workers in A.R.P. looked around, without much hope, for some compact source of knowledge and enlightenment. And behind all these stood that great phalanx of the nation's youth, alive already to the challenge of the air and conscious of their vocation before any serious demand had been put upon them.

The study of aeroplanes, hitherto the occupation of a small fraction of the population and the hobby of still fewer people, became in a few short weeks the duty of many thousands and the special interest of still more. And, for the satisfaction of this sudden need, there was nothing to which the mass of the people could have ready access. Certain books of reference were available to the few. The files of aeronautical journals were to be found only in specialist libraries. Some more ready means of presenting information and of giving precise and accurate details had to be provided.

Knowing the ways of Government Departments, those whose need was greatest looked for help to private enterprise, and found that in one quarter at all events, enterprise had already been embarked upon. "Aircraft of the Fighting Powers" was on its way. When it came into their hands it presented what they wanted in a form in which it had never been given before. Not only did it give pictures of all the aircraft used by all the nations involved in the present war, and explain the history, nature and function of them; it also revealed those details of design and construction which help the student to know as well as recognise the aeroplane. Furthermore, it set itself a standard of accuracy worthy of the designer's drawing office. Successive years of getting together the raw material and turning it into the finished product, give an air of certainty and assurance to the preparation of the volumes yet to come. The difficulties and dangers are now foreseen. A staff, grown wise in discerning the true from the false, has developed its own means of obtaining what is wanted and of keeping pace with official "releases." The ground is tilled now and yields its annual increase. "Aircraft of the Fighting Powers" has built itself up into an institution. Its library of photographs, drawings and historical notes, bulges already and is still growing. Something valuable and enduring has been created amid the destruction of war.

Production of this series of volumes is one of the romances of the war, for it marks a piece of achievement on the industrial, as well as the editorial side.

The credit for it goes, without reservation, to Mr. D. A. Russell, M.I.Mech.E., whose special merit is a facility in finding a way through bottlenecks.

As the producer of "Aircraft of the Fighting Powers," Mr. Russell, who began, some years before the war, to specialise in aircraft technical publications, discovered a new meaning in the old biblical phrase: "Of the making of books there is no end." He found that he could assemble his material, have his plans drawn, select his pictures, make his blocks, arrange his pages and get the printing done; and then find himself with tens of thousands of books which were not books because he could not get them bound in time for publication date.

This was not a situation in which finance could help. Bookbinding firms, which had given firm promises, had lost labour to the forces and to war industries at such a rate that they were incapable of fulfilling their contract obligations. Forthwith, Mr. Russell set to work to establish a bookbinding works to bind "Aircraft of the Fighting Powers."

In setting out to get those processes done under his own control and by his own employees, Mr. Russell may have been indulging a natural liking for pitting himself against apparently insuperable obstacles. He may even have enjoyed, as I suspect he did, building up something from nothing in a world where everything he was likely to need was controlled or out of production. Yet that piece of defiant enterprise can be accepted as the stamp and hall-mark of the whole production of "Aircraft of the Fighting Powers."

Labour for the bookbinding was found in the same energetic and justifiably optimistic fashion. A manager, forewoman, and a couple of men skilled in their particular branches, were provided with some 50 operatives to train by the simple expedient of inviting local housewives to come "half-timing" at good pay! They are all volunteers. They work in good conditions of lighting, heating, refreshment and recreation. And they make a happy family. To the onlooker, sometimes daunted by the scarcities and restrictions of war-time industry, the whole thing looks something like a miracle.

The pages arrive from the printers not as single pages but as great, unfolded sheets, on both sides of which many pages (perhaps 16) are printed. The outer edges of these sheets have first to be trimmed clean and square. For that purpose a 3-ton power-driven guillotine is used.

Multi-page sheets of print go from the guillotine to the folders, whose task is to fold them to page size, fit in and fold the bigger pages of drawings, interleave successive sheets when folded and gradually build up the whole book in sections. Because of the folded drawings, not all of this work can be done by machinery; but when at last the whole book is brought together "in the raw," then the loose sections have to be stitched with cotton and bound together with tapes across the back. For that purpose, semi-automatic sewing machines are used. From the stitching, the books now go forward as books to those processes which give durability and long life to the bound volume. The flat back of the volume of pages has to be rounded and a sort of shoulder formed just near the stitching so that all the strain of opening the book shall not fall directly on the stitches. This is done by a machine which grips the back of the book in a pair of jaws and impresses a little channel to give this protection to the stitches. At the same time a roller moves back and forth under pressure across the back of the book to change it from a flat to a curved surface.

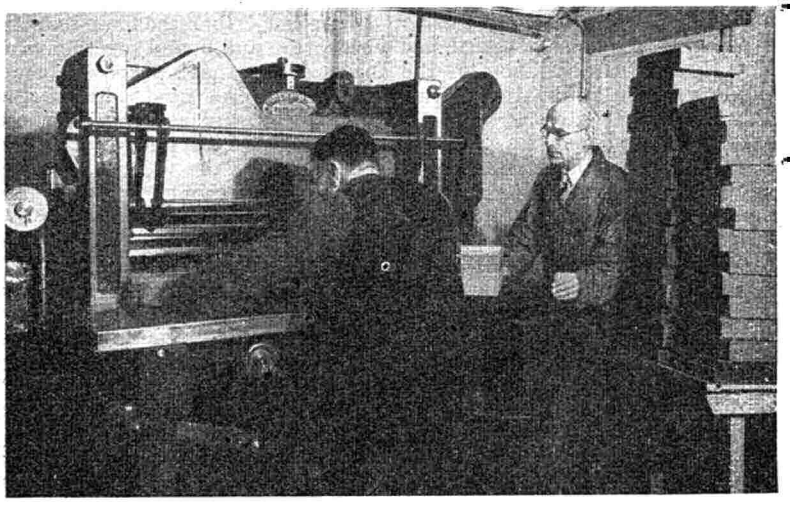
Meanwhile the covers, or "cases" as they are known in the book trade, have been in the making. Two pieces of stout cardboard form front and back cover. The case is made flat. The titles are impressed on it while it is flat. One piece of buckram, two boards, a strip of stout paper to line the back and a glue-pot are the apparatus of case-making. Lay the buckram flat, spread glue over it, fit the boards and the paper strip in their proper places on the buckram, neatly fold over the edges of the buckram, smoothe out the creases, and you have made a case. It goes into the press to dry.

Similarly, things have been happening to the book which approaches its case. A coating of glue has been evenly run down its back and a protective strip of gauze has been laid along it. When the titles have been put on the covers, with gold transfer sheets between the buckram and the brass engravings of a 1-ton press, the book is ready to meet its case; and more glue and further pressure complete the process.

All this to secure the culmination of a mass of devoted labour in the preparation of the book! It seems far removed from the painstaking collection of details, checking of facts, figures and measurements, making of plans and putting the whole together into book form. That system, like the bookbinding, grew out of a void. A need had to be met and the man who had applied himself previously to the interests only of model-makers, set about making an organisation to serve a wider field in a much more ambitious form.

In war-time, the world has to be scoured for information such as goes into "Aircraft of the Fighting Powers." The full picture of a new aeroplane is often a jig-saw, pieced laboriously together from a fact found here, an indistinct photograph reproduced in a foreign newspaper

Tracers at work on the fine linen tracings from which the printing blocks of the aircraft drawings are made.



Left is shown the three ton power-driven guillotine which trims several thousand sheets at one stroke, and also the heavy weight cards from which the cases are made.

there, a hint injudiciously dropped in a communique or an article elsewhere. The compiler of a work of reference must have a good background of æronautical knowledge, a keen eye for clues, and the ability to create an intelligence service of his own. Within limits, he must apply the same methods to the aircraft of his own land.

For instance, the obvious way of obtaining particulars of a new British aeroplane would seem to be to write to the maker and ask for photographs, a full description and a general arrangement (or G.A.) drawing. There are certain flaws in that method. Manufacturers are often not free to distribute photographs for publication in these days. If they are allowed to issue G.A. drawings, the reason probably is that these drawings were made long ago, at the design stage, and take no account of the modifications and pieces of extra equipment that have come together in that aeroplane during the interval. The only safe thing to do with a G.A. drawing is to check it at every possible point. Preparing the true drawing for publication therefore becomes the work of an expert.

Photographs of the complete aeroplane play a large part in this check, and many people would be surprised to find how dimensions can be calculated from a certain known measurement. The known diameter of a radial engine or an undercarriage wheel; the known length of a liquid-cooled engine can serve as the datum point for discovering a whole range of other dimensions. Other details are likewise drawn out of photographs. Sometimes as many as 20 photographs are consulted to check and complete a single drawing.

A Technical Department, under the direction of Mr. H. J. Cooper, the chief draughtsman, is engaged in preparing those drawings which appear year by year in "Aircraft of the Fighting Powers." As the scale is 1/72, those drawings must be absolutely accurate. Apart from publication in the books, they are sold in loose leaf form at the rate of over a million copies a year, for building of model aircraft used by the various services for training in aircraft recognition; and nothing but the truth and the whole truth is acceptable for such an important purpose. By collating all that can be seen in or deduced from photographs with such descriptive material as exists and with the original design as revealed by the G.A. drawing, a finally satisfactory drawing is obtained.

From the draughtsman, the final drawing—with its spars, ribs, bracing members and other constructional details in the proper positions; with aerials, guns, sights and bombs shown; and with sections of wing and fuselage revealed—is sent the rounds of the technical staff. This is the stage at which slips, errors and omissions should be discovered and put right. When the check is over, the approved drawing passes on to the tracers for reproduction on the linen sheets which go eventually to the blockmaker and are afterwards filed away as master copies.

Equal care in the tracing is obviously essential. All the insistence on accuracy in drawing could be made valueless by inaccuracy in tracing. An error of 1/16 in. on the linen would represent an error of nearly 5 in. in the actual aeroplane. The young women who do the tracing have been specially trained for the work. The claim that their work is more precise than that usually found in the Aircraft Industry is not to be disbelieved. Like other members of the technical staff, they are enthusiasts who want their work to be beyond criticism.

Again the check is applied to the tracing before it goes forward for blockmaking. Then the selection of pictures to go with it is made. In this,

Left shows one of the folding rooms where the two and three page plans are hand-folded and gathered into sections.

Right, a corner of the sewing department where the printed sheets are sewn together by semi-automatic process.

and in supplying the specifications and descriptive notes, Mr. O. G. Thetford makes his contribution. Manuscript, blocks and page layouts now begin to be ready to go to the printer. The book begins to come into existence and the endless watch on the printer by the editorial staff is mounted. Proof-reading is often taken by the outsider to be a simple matter of reading. In such a book as this it amounts to much more.

Printers are not expected to know much about the subjects with which their "copy" deals, or to distinguish the finer points of detail in the blocks they fit into pages. Take the various marks of the Spitfire and consider whether a printer could be blamed if sometimes he set one where another should be! Right up to the last page, vigilance is necessary. No-one understands better than Mr. Russell and his helpers, how vital is accuracy to the success of their venture; how useless is the merely approximate to those who have a genuine interest is aeroplanes.

Those of us who have dealt with the same subjects know what a wealth of care and watchful labour go into the making of a good aeronautical publication. We know that the printed error is greeted with a multitude of complaints and that no excuse can expiate the sin of erring in print. We know too that words of praise come charily from the reading public. That is one reason why I have been moved to write in praise of this achievement. Out of the blue, in the midst of a war which has mobilised almost everything for war purposes, a new aeronautical publication of high merit has come, grappling with the difficulties of "security," of control, of scarce labour and of elusive information.

Nevertheless, those who read "Aircraft of the Fighting Powers" will be none the worse for knowing something of the devotion that serves their interests. And the aeronautical community at large may congratulate itself on the development of a publishing organisation which has flourished on difficulties and schooled itself in overcoming obstacles.

From time to time we have welcomed well-known personalities in the aeronautical world to our offices and those of our Associates, the Harborough Publishing Co., Ltd. Mr. E. Colston Shepherd, late Editor of "The Aeroplane" and now official Air Correspondent to the British Broadcasting Corporation, was so interested on the occasion of his visit that he wrote the above article, as it was thought that many of our readers would be interested in learning how the "Aircraft of the Fighting Powers" series of volumes is produced.

During the time of its publication, the "Aircraft of the Fighting Powers" series has steadily improved in standard, and is now undoubtedly established as the standard reference book on aircraft used in the present war. Volume V, first copies of which will be on sale early in December, reaches an even higher standard, and carries a Preface by Mr. C. G. Grey, Founder and for many years Editor of "The Aeroplane." A contents list of the aircraft described in Volume V is given on page 627 of this issue, and orders may be placed with any Model Shop, W. H. Smith's bookshop, with any Bookseller or Newsagent, or obtained direct from the Publishers at Allen House, Newarke Street, Leicester.

Right shows a section of the case-making department where the books are inserted in their cases. From here the complete bound volume passes to the inspection department before its ultimate despatch.

Continued from page 617.

to compensate. This would result in the thrust datum flying line of the fuselage and its appendages remaining the same in the glide, but would involve considerable mechanical and constructional problems. Here, again, the downwash on the stabilisers may be altered, but could be taken into account in determining the longitudinal wing shift. On a shoulder-wing slabsider, one might imagine rear and main spar dowels passing through the fuselage, resting against the ends of horizontal slots in the fuselage under power and suitably tripped on rubber expiration for the dowels to move longitudinally fore or aft the rear dowel sliding in an inclined slot to alter the incidence.

A streamliner presents more of a problem. Any other solution such as folding propellers, auto tail trimmers, etc., would result in the fuselage changing attitude to the airflow and the airflow becoming out of alignment with the line of minimum resistance, normally the thrust-datum-flying, line. This would bring in some of those inefficiencies which elimination of downthrust reduces, though on a smaller scale.

This final ditch is exceedingly difficult to cross if the same flying line is required under power and in the glide with a change of angle of wing attack thrown in. But that is the goal if total efficiency is required. If the T.E. of the wing passed through the C.G., which would be approximately the case in a midwing machine with a lifting tail, flaps, coming into operation upon rubber expiration, might work the trick without creating a pitching moment.

The very nature of the past controversy on downthrust means that a large number of people have no guarantee that their carefully calculated angles of attack, etc., are really performing as well in the air as on paper. Unless something is done to lay out the subject more on the "Stubb's Wakefield" lines, in my opinion a large part of the new and interesting theories that appear in the AEROMODELLER in large numbers of late will, for the most part, be of academic interest.

B.L.A. B. R. ALDRIDGE.

DEAR SIR,

As a more or less technically-minded reader I think it possible to set Mr. R. Flanagan's mind at rest quite simply. His problems, boiled down, amount to these :—

(*a*) Why does an aircraft climb under power and at what velocity does it climb and glide ?

(*b*) What is the relation between torque and airscrew pitch and R.P.M. ?

The answers to (*a*) may be found by considering the equilibrium of the aircraft under the action of the four forces—Lift=L ; Drag=D ; Thrust=T ; Gravity=W. Denote climbing and level flight conditions by suffix C and no suffix, respectively. Let θ be the angle of inclination of the C_L of the aircraft to the horizontal, measured with the usual sign convention.

Please look at Diagram 1.

Resolving perpendicularly to C_L we obtain $W \cos \theta = L_C$, and since Lift and Drag $\propto$ (Velocity)^2, $V_C = V\sqrt{\cos \theta}$. $\therefore D_C = D \cos \theta$; resolving along the C_L (since the aircraft is in equilibrium).

$T - D \cos \theta = W \sin \theta$, and solving by elementary trigonometry

$$\theta = \tan^{-1}\frac{L}{D} - \mathrm{Cos}^{-1}\frac{T}{\sqrt{L^2 + D^2}}$$

interpreting this result :

(1) When $T > D$ θ is always positive, showing that only by climbing when under power can the aircraft maintain equilibrium.

(2) When $T = D$ $\theta = 0$, *i.e.* level flight.

(3) When $T = 0$ θ is negative and equals gliding angle.

To sum up, the aircraft climbs at an appreciably lower speed than that of level flight, while the gliding speed is but slightly lower, since, for a streamlined model, at any rate, gliding angle is small. $\therefore \sqrt{\cos \theta} \doteq 1$, $\therefore V_C \doteq V$.

(*b*) Mr. Flanagan is not the only one; I am sorry to say, who feels that the airscrew pitch should be coarse when torque is great. This is not so, as the following simple approach to the problem will show.

Let us consider a narrow strip of blade at ·7 radius from axis, in the conventional manner.

Let the airscrew revolve at N revolutions per second.

Let Blade Angle (i.e. 'Geometric Pitch angle') $= \propto$

Let angle of helix described by blade element with plane of revolution $= \theta$.

Let angle of attack of element $= \beta$ so that $\theta + \beta = \propto$, always.

We will first make one simplying assumption—that V remains constant. Using a similar method to that shown in Stubb's "Wakefields," page 38 (1940) and page 46 (1941) we may draw the triangle of velocities for our blade element.

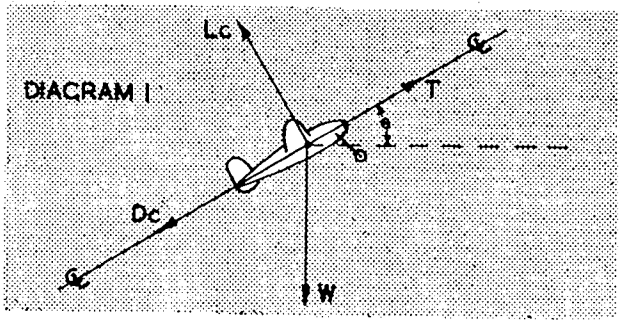
Please look at Diagram 2.

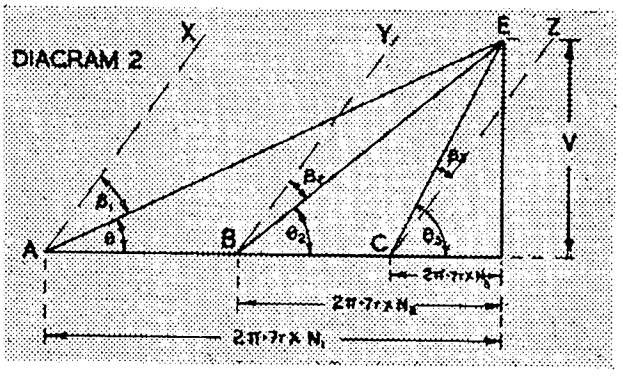
AE, BE, CE represent velocities of element in magnitude and direction when N has high (N_1), medium (N_2) and low (N_3) values respectively, corresponding to take-off, cruising and idling. Since we are considering airscrew as fixed pitch for the moment, AX, BY, CZ, *i.e.*, $\theta_1 + \beta_1 = \theta_2 + \beta_2 = \theta_3 + \beta_3 = \propto$ constant. Note that β_3 is shown negative ; supposing it equals angle of zero lift of blade airfoil section, then $N_3 = R.P.S.$, at which thrust vanishes. Of course, as torque, and therefore N, increases, so does θ decrease and β increase, and if too great a torque is applied β will reach a value such that airscrew blades are stalled. This gives the probable explanation of Dick Korda's revelation that "certain of his designs flew better on three-quarter turns "—the airscrews were stalled when full turns were applied.

Now it is obvious that with a V.P. airscrew blade angle must be *decreased* at start to avoid blade stalling and gradually *increased* as power runs out, so that the angle of attack of the blades (preferably that at which best L/D ratio occurs), is maintained and thus thrust is greater and is obtained throughout more turns of the motor. With a fixed pitch airscrew the blade angle should be fairly large, in the neighbourhood of 45 degrees, *but* at the same time it must be so designed that the blades are never quite stalled.

I have only approached this very complex subject in a quite elementary manner—such variables as the coefficients of torque and thrust have been omitted, but they do not affect the fundamental issues ; the formulae I have developed for model airscrew design, which show these results quite clearly would take rather too much space to prove here, and technically-minded readers—quite rightly—never accept formulae without proof.

P. J. IVENS.





VOL. V AIRCRAFT OF THE FIGHTING POWERS

Publication date is December 4th, 1944, and it is essential that you order your copy now to avoid disappointment.

As the War has continued, the compiling and publishing of such an extensive series of Volumes has become increasingly more difficult and costly. Therefore, the price of Vol. V will be 1½ guineas. It has always been the intention to put out "AIRCRAFT OF THE FIGHTING POWERS" as cheaply as possible, and you have only to handle other publications to realise the extraordinarily good value that you will receive in Volume V, even at the increased price. Paper has increased to close on three times, and boards for binding have risen to nearly five times their pre-war cost. Prices of cloth and labour have also been vastly increased.

Also increased, however, is the quality of material prepared for this latest Volume. A new and more attractive layout is used, including more photographs ; the Markings Compendium is 50% larger ; and—a Special Feature—an additional colour plate showing twenty-seven shades of camouflage colourings, made available to us by the Ministry of Aircraft Production.

Seventy different types of aircraft are given as listed below, each with detailed specifications, history, etc., a three-view 1/72 scale drawing and several photographs.

CONTENTS LIST

GREAT BRITAIN.

Hawker Tornado I.
Hawker Typhoon I RP.
Hawker Hurricane II RP.
Vickers-Armstrongs Spitfire VII.
Vickers-Armstrongs Spitfire VIII.
Vickers-Armstrongs Spitfire IV & XI.
Vickers-Armstrongs Spitfire XII.
Miles M-20.
D.H. Mosquito III & IV (Civil).
D.H. Mosquito PR. Gloster F9/37.
Bristol Beaufighter X.
Fairey Barracuda I & II.
Armstrong Whitworth Albemarle I & II.
Vickers-Armstrongs Warwick Transport.
General Aircraft Hamilcar I.
Handley-Page Halifax III.
Avro York I. Short Sunderland III.
British Taylorcraft Auster IV.
British Taylorcraft Model H.
Percival Proctor IV.

Commonwealth of AUSTRALIA.

Commonwealth Boomerang.

UNITED STATES OF AMERICA.

Lockheed P-38J & F-5 Lightning.
Bell P-39Q Airacobra.
Curtiss P-40L Warhawk.
Republic P-47D Thunderbolt.
North American P-51B & P-51C Mustang III.
North American P-51D Mustang.
North American A-36 Mustang.
Grumman F4F-4 Wildcat IV & V.
Grumman F6F-3 Hellcat I.
Chance Vought F4U-2 Corsair II.
Douglas P-70 Havoc.
Douglas A-20G Havoc.
North American B-25G & B-25H Mitchell.
Martin B-26C Marauder II.
Boeing B-17G Fortress.
Consolidated Vultee B-24J Liberator.
Lockheed PV-1 Ventura.
Douglas C-47 Skytrain Amphibian.
Waco CG-13a. Boeing C-98 (Scale 1/144).
Fairchild UC-86 Forwarder.
Monocoupe L-7a. Kellett YO-60.
Sikorsky R-4.

UNION OF SOVIET SOCIALIST REPUBLICS.

LA-5. PE-3. YAK-9.
TB-7 (Scale 1/144). IL-3.

GERMANY.

Focke Wulf Fw 190 A-4.
Junkers Ju 87D (Anti-tank).
Messerschmitt Me 110G.
Messerschmitt Me 410.
Junkers Ju 88C. Junkers Ju 188.
Dornier Do 217J. V-1 Kivic.
Messerschmitt Me 323 (Scale 1/144).
Blohm & Voss Bv 222 Wiking (Scale 1/144).

JAPAN

Oscar. Tony. Lily. Dinah.
Hamp. Rufe. Pete. Val.

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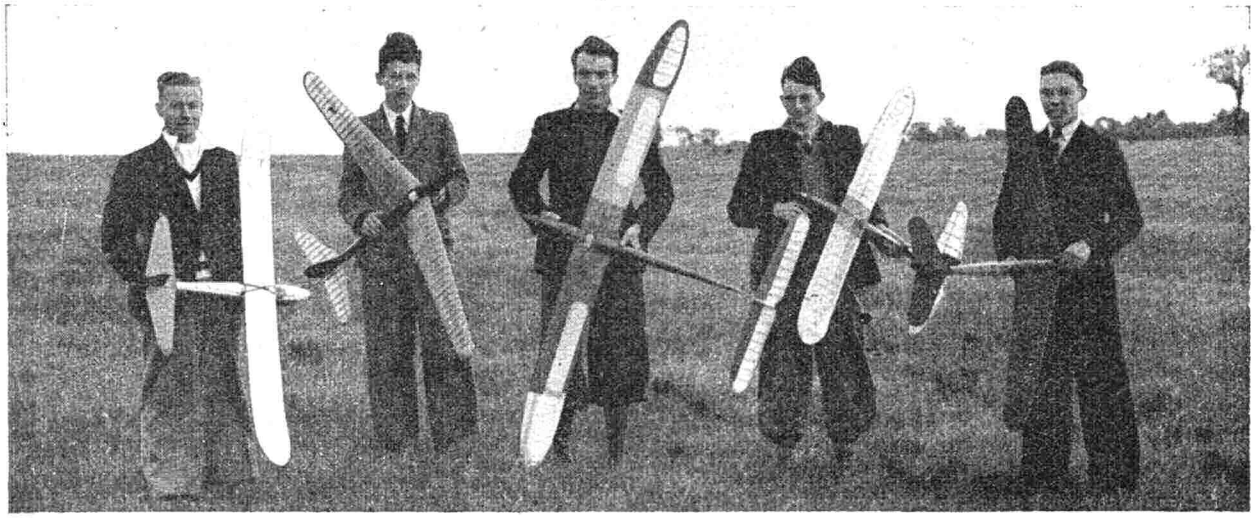
CLUB NEWS

BY CLUBMAN



O. J. Lee sends us this photograph of Members of the Grantham M.A.C. taken during the Weston Cup, 1944.

FOLLOWING presumably on the lessening of any threat from across the Channel nowadays, I am pleased to note that the Air Ministry has relaxed the limitation of its recent announcement regarding the flying of model aircraft, and enthusiasts in the South can now enjoy the same privileges as their more fortunate brethren further North. Providing the simple regulations regarding the non-flying of models between the hours of sunrise and sunset, or in officially prohibited areas are observed, any model under a maximum wing span of ten feet may be flown ANYWHERE IN THE BRITISH ISLES. Petrol models must be set to fly in a closed circuit, and engine run must not exceed 15 seconds, with a total airborne time of two minutes.

The subject of petrol models brings up the circumstances attendant at the recently held Sir John Shelley Cup, staged at Birmingham. I feel bound to protest at the lack of foresight on the part of the organisers in not making absolutely certain that this—the first meeting of its kind for some years, and therefore the centre of interest for a wide public—was not made the opportunity for really slap-up organisation. Pre-war experience showed that the control of public spectators is a paramount difficulty, and I and others have vivid recollections of police cars waiting in the lane outside Fairey's aerodrome whilst petrol contests were in progress.

Apparently, at Birmingham, we again had the unfortunate spectacle of models charging into the crowd, and I maintain that this state of affairs can be eliminated —and *must be*—by the provision of adequate policing of any ground where such contests are held. Officials know only too well how difficult it is to get the right kind of publicity into the daily press regarding model matters, but do they consider seriously enough the (shall I say gloating ?) joy with which said press would pounce on any accident that might occur, to the detriment of the movement as a whole.

I suggest to the S.M.A.E. that for future events of this nature, a few pounds spent in providing unquestionable control of the public—and competitors also if necessary ! ! —would be well spent, and rather than get them a name for panicking, would demonstrate to the thinking aeromodeller that they mean to maintain strict control as far as possible.

Biplanes put up some fine times in the K. & M.A.A. Cup held on August 27th. Nineteen clubs entered a total of ninety models, best flight of the day being set up by J. L. Pitcher of Croydon, whose model flew for 6 : 05·6. J. P. Buckeridge was not far behind with a best flight of 5 : 55, and apparently his other times were more consistent, as he once again wins a National contest. Mrs. Buckeridge won the Women's Challenge Cup for the second year in succession, besides placing third in the biplane event. Altogether Pharos seem to have had a bumper year, and I recommend their consistent enthusiasm to those clubs who adopt the defeatist attitude so well known in competition matters.

Some remarkable times were also put up in the Thurston Glider Cup event, though unfortunately I am not in possession of the full results. (Since received and included at the end of " Club News."—EDITOR.).

Signalman F. Gardner of the Central Mediterranean Forces wishes to thank the reader who sent him a parcel of modelling books following his request through these columns. No name was enclosed, and so this means is taken of conveying appreciation.

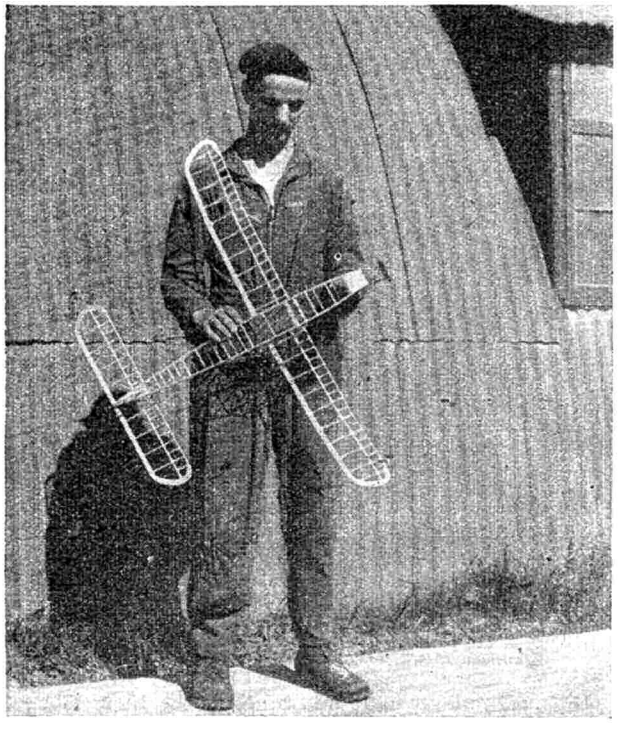
For once the weather was kind to the DONCASTER & D.M.F.C. for their rally on September 17th, and some good flying was witnessed. In an effort to evade the

K. & M.A.A. BIPLANE CONTEST

J. P. Buckeridge	Pharos	659·2
J. L. Pitcher	Croydon	484·4
Mrs. Buckeridge	Pharos	483·2
A. Mead	Pharos	422·7
W. Jones	Aylestone	412
R. Monks	Birmingham	378·8

WOMEN'S CHALLENGE CUP

Mrs. Buckeridge	Pharos	1127·3
Miss Green	Croydon	378·1
Mrs. Alexander	Pharos	319·1
Miss Dilks	Pharos	316·3



An American modeller in Britain. A. Davy sends us this photograph of Staff Sgt. Bernard K. Green of the United States Air Force, shown with a model he designed and built between "Ops."

crowds, the meeting was held on the Race Course, but within half-an-hour the models were encircled by a mob!

Final results were :—

Wakefield.	D. Helliwell (Korda)	3 : 50·2
	F. Gearing (Copland)	3 : 15
	B. Fox (Korda)	2 : 27
Open Glider.	S. Basset (Mick Farthing)	3 : 52
	J. Broadbent (Mick Farthing)	3 : 31
	B. Fox (Ivory Gull)	2 : 39
Open Duration.	M. Hetherington	4 : 25·8
	D. Helliwell	2 : 55
	B. Hetherington	1 : 49·7

F. Gearing was flying his 1 in. scale "Hornet Moth" and obtained consistent flights of 40 seconds from it.

The BIRMINGHAM M.A.C. lads turned out in force for the Thurston event, first three placings being J. Craven, 10 : 22·5; T. Kendrick, 9 : 05·6; and W. Galloway, 6 : 32·5. In the S.M.A.E. Cup "free-for-all" the gliders had a field day, the rubber-driven models being well in the background. Results again gave top places to Craven, Galloway and Kendrick, their times being 9 : 47·4, 7 : 36·3 and 5 : 36·5 respectively. Great interest has been taken lately in tailless gliders and times of well over a minute have been obtained.

In view of the rubber shortage; this year's contest for the St. John & Holy Cross Silver Challenge Cup was for gliders. Visitors from the Chester and Rhyl & Prestatyn Clubs were present, E. Meredith of Chester proving the winner with an average of 52·1 secs. F. Wilde, who placed second, made best flight of the day with 1 : 44·2.

The BLACKPOOL & FYLDE M.A.C. combined a contest with the Agricola Club on the day of the M.E. No. 1 event, and finished the winners by 455·35 points to 399·45. Conditions for the K. & M.A.A. Cup were chronic, in fact everything that makes model flying a pain! R. Ellis made three flights of 17·4, 24·9 and 31·6 secs., J. Pennington just scraped in one flight of 7 secs., and D. H. Whittaker made two flights of 23·2 and 23·4 secs. Hm. . . . some day out!! Doesn't the sun ever shine up Blackpool way? Best flight of the season to date was made by J. P. Clarke's glider in the M.E. No. 1 contest, time 2 : 54·6.

An interesting contest was a joint glider/rubber-powered event staged by the BRADFORD M.A.C., the power jobs almost coming out second best. N. Lees put up best flight of 5 : 05, full results being :—

N. Lees (power)	10 : 12 aggregate
S. Silvio (glider)	5 : 01 ,,
R. Gallagher (glider)	3 : 37·5 ,,
T. London (power)	2 : 49 ,,
F. Gallagher (glider)	2 : 48·5 ,,
G. Adcock (glider)	1 : 35 ,,
H. Austerwick (power)	1 : 32·5 ,,

The Bradford boys were favoured with good weather for the Thurston Cup, and Silvio and Gallagher lost their gliders after flights of 6 : 27 and 4 : 33, ending up with totals of 7 : 39 and 7 : 32·2 respectively, H. Scarth placing third with an aggregate of 3 : 55·5.

The HALSTEAD (Essex) & D.M.F.C. held their annual rally on the club's new flying field on the 26th August. The club glider record of 1 : 02·4 established in 1941 by D. Fisher, was broken by J. F. Greenfield flying his "Leander" for a flight of 1 : 05. This flight was made in a "nearest to 40 secs." contest, so the club is confident that this time can be improved upon later. The model in question proved its ability to take it shortly after its record-breaking flight. The model glided into the rear end of a horse, and before it could fall to the ground, said equine reared up and lashed out with both hoofs, the crash of the glider being struck being clearly audible 500 yards away!! The only damage sustained by the glider was ten wing ribs smashed—the leading and trailing edges being none the worse. Rubber-driven models were less successful owing to the poor quality of the remaining stocks of rubber. R. W. Richardson put up the best performance with his "Munchkin," gaining 25 points and winning the Club Cup.

At a recent meeting of the TAUNTON & D.M.A.C., the club record of 7 minutes was broken by J. Ford, whose 50 in. span glider "Thermic" made a fine flight of 15 minutes o.o.s. The model finally disappeared into the clouds at about 1,000 feet, and was ultimately returned the following day, having landed near Wellington Station, roughly 7 miles away.

LEEDS M.F.C. had a fine week-end for the S.M.A.E. Cup. Thermals were not apparent during the competition but, while testing before the event, D. Coveney broke the club H.L. duration record with a time of 4 : 36 o.o.s. Best flight during the contest was 2 : 21 by E. Jackson's glider, best aggregate being 5 : 17·2 by C. Furse's "Gutteridge Trophy Winner." K. Lloyd, while on a visit to Birmingham, built an "Ivory Gull" and lost it on its third flight after a flip of 4 : 30.

The BRISTOL & WEST M.A.C. was favoured with fine and sunny weather in both the S.M.A.E. Biplane Cup and the Thurston Glider Contest, there being a moderate breeze in the former, and a very light and variable one in the latter. A. H. Lee put up the best aggregate in the Biplane contest with 4 : 28·4, his model hanging on the prop. in rather an unconvincing manner,

but getting upstairs just the same. ("Meccano" construction was the popular description of his model due to the large number of lightening holes in wing ribs, spar, and even the trailing edge!) K. Moon, flying a modified "Aeolus," fitted with a low aspect/ratio wing, clocked the best aggregate in the Thurston Cup, with 3 : 2·4. He also managed to win both the Club Biplane and Glider contests, which were held in conjunction with the S.M.A.E. events, beating the next competitor by 3·4 and 1·9 secs. in the two contests respectively.

The club has at last managed to obtain a hall for indoor flying, and hopes to do some serious R.T.P. and free flying this winter. Special contests are being run for the longest flight by a free flying semi-scale helicopter, and for unorthodox models, the latter being required to complete an exact number of laps R.T.P., and to complete two laps carrying a dead load of 50 per cent. of their total weight, and finally distance R.T.P. They certainly have got to work for their money!

The RIPON M.F.C. held a very successful rally on the 27th August, when members of the Harrogate and York clubs competed with the local boys under windy and rainy conditions. Messrs. Ridge and Vandevelde lost their models during the day after times of 5 : 28 and 2 : 45 respectively—the latter being a new club record for "under 45 in. span" gliders. Results :—

Glider (under 45 in. span).

J. Piercy (York)	3 : 20·4 aggregate
J. Vandevelde (Ripon)	2 : 45·4 ,,
D. Knight (Harrogate)	1 : 49·6 ,,

Glider (over 45 in. span).

S. Ridge (York)	5 : 28·5 aggregate
E. Kullah (Ripon)	2 : 17·4 ,,

Duration (under 30 in. span).

W. S. Elliot (Ripon)	1 : 43·6 ,,
G. Smith (Harrogate)	1 : 13·2 ,,

Duration (over 30 in. span).

H. Speight-(Harrogate)	1 : 21·6 ,,

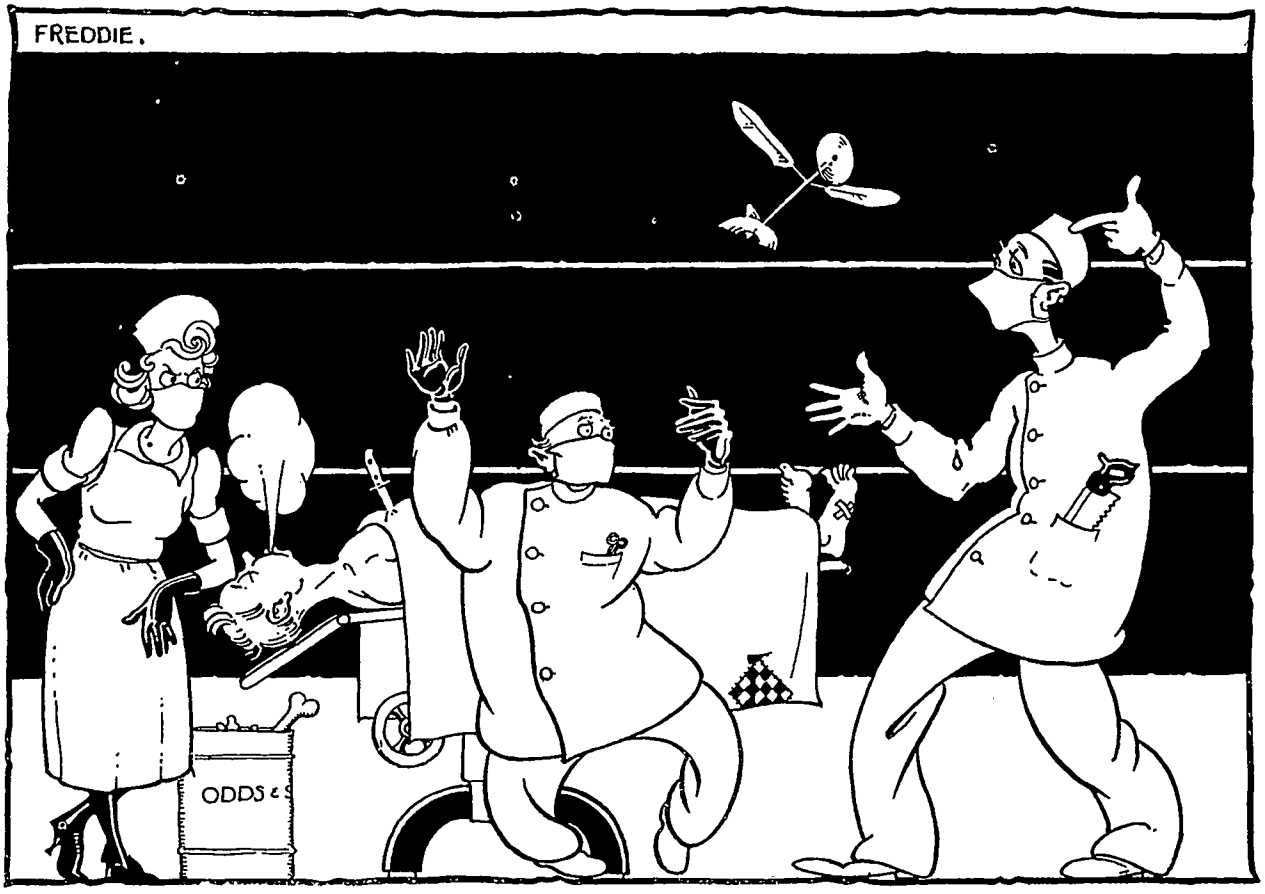
Best flight of the day : S. Ridge (York), 5 : 28·5.

Owing to the previous secretary having joined up, Mr. W. S. Elliot, of "Eildon," Whitcliffe Avenue, Ripon, Yorks, is taking over the running of the club, and would like prospective members to get in touch with him right away.

Two months of fairly good flying weather (strewth—what an admission!) has—despite the buzz bombs—enabled the BRENTFORD & CHISWICK M.F.C. to get in some good times, and placings in National contests has improved in consequence. S. Ford clocked 7 : 49·4 in the Pilcher event, A. Young flew 13 : 01 in the Flight Cup, and W. H. Porter timed 8 : 40 in the M.E. No. 1 Cup—one flight being 4 : 55. An indoor challenge match has been arranged with the Pharos, Hayes, Harrow and Uxbridge clubs.

The THAMES VALLEY M.A.C. found a spot of good weather for the Thurston Cup day, several promising flights being made. J. M. Stevens made the best flight of the day with 11 : 52·8, thus setting up a new winch, launch glider record.

Chaps—if you want BALSA in large lumps, go join



"YOU MIGHT HAVE FINISHED THE OPERATION FIRST!"

P. Russell of Stirling, winner of the "Clyde Model Dockyard Contest," complete with Trophy and winning machine.

the POOLE M.A.C. I am told that some members have found quite large blocks on the sea shore, presumably pieces of balsa rafts used by the Navy. (I assume that the wood is very well SEAsoned ! !) Some very good times were put up in a recent contest with the Northbourne M.A.C., one flight of over 7½ minutes being set up with a "Beauglider." A few experiments are being carried out by individual members on new forms of propulsion—one a rocket assisted glider which is more of a smoke screen than anything else !

WALTHAMSTOW M.A.S. entertained the Blackheath boys for an inter-club competition, the home lads taking the honours as follows :—

Open Glider.

C. Mayes (Walthamstow)	5 : 23·2
W. Taylor (Walthamstow)	3 : 56·6
W. Jackson (Blackheath)	3 : 30·2

Open Duration.

E. Lewis (Blackheath)	3 : 47·2
E. Aylward (Walthamstow)	3 : 31·6
R. Galbreath (Blackheath)	3 : 29

Team Event.

Walthamstow	931·4 points
Blackheath	755·5 ,,

F. Deudney is doing consistently well with both gliders and rubber jobs, and placed fifth in the Flight Cup with a total of 9 : 07·2. Good flights were also obtained in the S.M.A.E. Cup, J. Birchley getting 12 : 16 o.o.s. and several members getting flights of over 4 minutes.

The Clyde Model Dockyard Trophy contest, conducted by the GLASGOW M.A.C., was carried through in dry but windy weather on the 10th September. The gusty wind caused many crashes, and 'planes were carried out of sight very quickly, this causing the times to be very low although the general standard of flying was very good. Results :—

P. Russell (Stirling)	3 : 35·5 aggregate
R. Mitchell (Glasgow)	3 : 34·5 ,,
G. Sowter (Glasgow)	3 : 04·5 ,,
J. Mackinnon (Glasgow)	2 : 43 ,,

D. Butler of the SURBITON & D.M.A.C. seems to have things all his own way lately, putting up best time for the club in the K. & M.A.A. event with his model "Moonshine," the time of 2 : 30 being a new club record. He again made best time of the day in the Thurston Cup, his "Ranger II" flying for 7 : 37·2, while a junior, J. Gammon, made a fine flight of 6 : 29·8 o.o.s. with his "Miss Margaret." A. Wormald flew his "Mick Farthing" Glider for a fine flight of 17 : 46·3 in the S.M.A.E. Cup event, the machine being lost. Weather report from this club for the latter contest was "perfect with hardly any wind ! ! !"

A team comprising Messrs. Turner, Meads, Lofts and Jeffreys obtained a total of 2,984 points for the NORTHERN HEIGHTS M.F.C. in the M.E. No. 1 Cup, Mr. Turner setting up a new club record during the event with a flight of 31 : 00·5. Several members entered for the Biplane contest, J. R. Miller recording a total of 6 : 13·5, F. E. Wilson 3 : 59, and D. Lofts 3 : 22.

AYLESTONE M.F.C. entered nine machines for the K. & M.A.A. Biplane event, best flight being by W. Jones at 3 : 21·6. Jones made three fine flights in the Thurston Glider Cup contest with his model "Blue Diamond," times being 2 : 29·4, 2 : 36·2 and 6 : 00·4. The same model put up fine times also in the S.M.A.E. Cup, flights being 2 : 01·2, 3 : 29 and 13 : 53·2. Best time of the day was put up by a junior member, Graham Jones, whose "Mick Farthing" Glider flew o.o.s. after a time of 17 : 25·4 to set up a new club record. Altogether 19 flights of over 100 seconds were recorded by the club's twelve entries.

A Gala Day organised by the EDINBURGH M.F.C. was spoilt by poor weather, high winds and cold spoiling the prospects for good flying. Attendance, however, warmed the hearts of the officials—an international flavour being given by entries from England, Ireland, Scotland, and last but not least, F/Lt. Feltes of the R.A.F., Luxembourg. In all some forty models were entered in the four contests arranged, the *pièce de résistance* being the six-foot glider belonging to

LONDON LEAGUE (Round 2)

		(1)	(2)	(3)	Total
HARROW M.A.C.					
Rubber—S. Pederson		42·0	61·5	65·0	168·5
A. T. Gow		47·0	119·5	91·5	258·0
Glider— W. Weight		64·0	43·0	16·2	123·2
D. Spence		25·5	43·4	50·5	119·4
					669·1
BUSHY PARK.					
Rubber—M. A. Wright ...		160·0	70·5	99·0	329·5
A. H. Taylor ...		139·0	250·0	136·0	525·0
Glider R. W. Dawkins ...		115·0	337·0	92·5	544·5
A. T. Taylor ...		119·5	155·0	85·5	360·0
					1,759·0
PHAROS.					
Rubber—J. P. Buckeridge ...		305·0	130·0	117·2	552·2
A. Armes		55·5	6·0	86·5	148·0
Glider— P. Lee		67·5	25·5	20·0	113·0
K. C. Jenkins ...		17·0	100·0	9·0	126·0
					939·2
NORTHERN HEIGHTS M.F.C.					
Rubber—R. Copland		463·3	Model lost.		463·3
D. Lofts		144·0	83·2	113·0	340·2
Glider— J. Devall		126·0	89·0	86·0	301·0
F. E. Wilson		111·0	87·0	40·0	238·0
					1,342·5

THURSTON GLIDER CONTEST

September 10th, 1944

Individual.	Club.	Aggregate.	Plugge Points.
S. Ford	Brentford	1810·0	223
F. Mayo	Streatham	986·1	222
D. Butler	Surbiton	915·9	221
J. Stevens	Thames V.	786·5	220
G. W. W. Harris	Croydon	778·6	219
S. Spackman	Grantham	704·5	218

ORDER OF CLUBS

	Points.		Points.
1. Streatham	643	4. Walthamstow	614
2. Birmingham	617	5. Surbiton	612
3. Hayes	616	6. Aylestone	607

No. of Clubs, 32. No. of Entries, 184.

Best Flights of the Day :— S. Ford (Brentford), 1810 o.o.s.
F. Mayo (Streatham), 724 o.o.s.
J. Stevens (Thames Valley), 712.8.

Average weather, calm and sunshine.

S.M.A.E. CUP CONTEST

September 17th, 1944 Glider and/or Rubber

Individual.	Club.	Aggregate.	Plugge Points.
A. Wormald	Surbiton	1378·0	298
G. Jones	Aylestone	1251·0	297
G. W. W. Harris	Croydon	1210·2	296
W. Jones	Aylestone	1163·4	295
J. L. Pitcher	Croydon	1094·2	294
N. G. Marcus	Croydon	1080·4	293

ORDER OF CLUBS

	Points.		Points.
1. Croydon	883	4. Streatham	851
2. Surbiton	875	5. Pharos	848
3. Walthamstow	856	6. Aylestone	846

No. of Entries, 297. No. of Clubs, 41.

Weather conditions, calm and bright.

Best Flight :— A. Wormald (Surbiton), 1066·3.
G. Jones (Aylestone), 1045·2.

F/Lt. Feltes which, however, did not respond too well to the pulley launch installed. J. Crease of Edinburgh made best flight of the day with his "Elite No. 2," losing the model after 2 : 37. R. Bishop of Rosyth won the Open Cup for the second year in succession with a Wakefield model of his own design. Results :—

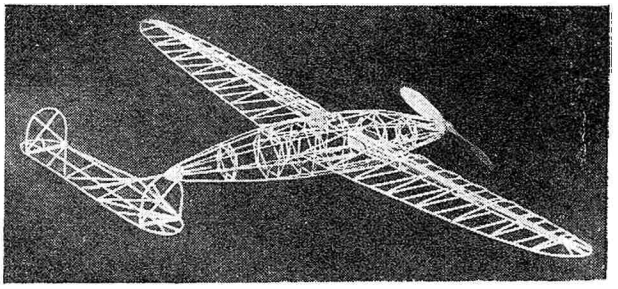
Open Glider.	J. Crease (Edinburgh)	3 : 31
	J. Thomson (Edinburgh)	1 : 13·4.
	P. Russell (Stirling)	32·5
Open Duration.	R. Bishop (Rosyth)	2 : 08
	M. Hill (Bedford)	1 : 17·2

Edinburgh beat Glasgow for the team event, while the novelty contest went to M. Chiswell of Edinburgh.

After a long spell of bad weather, the AGRICOLA M.A.C. had a fine spell for the S.M.A.E. contest, and club records were broken all round. The junior towline glider record was broken four times during the afternoon, the final holder being A. J. Telford with a time of 1 : 39. J. Owen raised the senior R.O.G. record to 3 : 31, while E. N. Johnson put the junior record up to 1 : 20.

The WALTHAM & ENFIELD M.A.C. is now well established with a membership of twenty. Meetings are held every other Friday at the Enfield Town Church Hall, commencing at 7.30 p.m. New members will be welcomed there or at the Enfield Playing Fields where flying takes place.

Following an unofficial discussion between several local model engineers and model aeroplane enthusiasts, it has been decided to form a new club in the Barnet (Herts.) and surrounding districts, to be known as the BARNET & DISTRICT MODEL ENGINEERING & AEROPLANE CLUB. Suitable accommodation has been promised, and the proposers invite applications from local modellers interested in forming a really strong up-to-date association. Applicants should be over 14 years of age, and may be interested in any branch of model making, as the scope of the club is intended to be comprehensive. Persons with suitable radio qualifications will be welcome, as it is proposed to conduct experiments with radio controlled model aeroplanes, boats and other mechanisms. Applications should be sent to Mr. H. C. Henly, 87, Manor Road, Mays Lane, Barnet, Herts.



A rather unusual constructional effort by R. Pressland. Employing 70 ft. of 1/16th sq. obechi, the weight of model as shown is 1 oz., the wing span being 32 ins.

The GREENFIELD M.A.C. is making slow but steady progress, and one of two members have been getting flights of about 1 : 30 recently. A solid model contest is to be arranged about Xmas, and anyone interested should get in touch with C. Jones of Noak Cottage, Greenfield, Oldham, for further particulars.

C. R. Carr, now serving with the R.A.O.C., and formerly of the MEDWAY & D.M.A.C., announces that he hopes to restart the club as soon as the present spot of bother is over, and would like old and prospective new members to get in touch with him through his home address, 16, Warner Street, Chatham, Kent.

Quite a number of new clubs are announced this month (see list appended) and the following are wishful of starting groups in their districts. Anyone interested should contact L. Fisher, 2, Gregory Crescent, Eltham, London, S.E.9, or J. Mitchley, 34, Lightwoods Road, Bearwood, Smethwick, 41.

T.T.F.N. and let's see some good work put in this winter with the r.t.p. models. There is still tons of development work which can be done with this type of model, and there is no question but that this type of flying definitely holds a club together during the "close season." All the best till next month.

THE CLUBMAN.

NEW CLUBS.

BATHGATE & D.M.F.C.
C. Byron, 52, Easton Road, Bathgate, West Lothian.

PRESTON (BRIGHTON) M.A.C.
W. Moulton, 109, Chester Terrace, Brighton, 1, Sussex.

LEYTON M.A.C.
R. A. Creed, 33, Morieux Road, Leyton, London, E.10.

STRETFORD M.A.C.
R. Ramsker, 84, Victoria Road, Stretford, Manchester.

THE BORDER M.A.C.
D. Attwood, 13, Alexandra Street, Eastwood, Notts.

PENWORTHAM M.A.C.
K. R. Tyson, 68, Liverpool Road, Penwortham, Nr. Preston, Lancs.

SECRETARIAL CHANGES.

READING & D.M.A.C.
E. Beeson, 111, Cholmely Road, Reading, Berks.

STRATFORD-ON-AVON M.A.C.
D. Megaincy, "Sunnymead," Birmingham Road, Stratford-on-Avon.

RIPON M.A.C.
W. S. Elliot, "Eildon," Whitcliffe Avenue, Ripon, Yorks.

REPORT ON THE S.M.A.E. COUNCIL MEETING HELD ON THE 1st OCTOBER, 1944, AT THE ROYAL AERO CLUB, PICCADILLY.

The Chair was occupied by Mr. A. F. Houlberg, and after the Minutes of the previous meeting had been read and confirmed items of correspondence were dealt with.

Among these was a letter from Mr. R. F. L. Gosling suggesting a "Consistent Duration Competition" for inclusion in the 1945 flying season. The Council decided to give priority on the next meeting's Agenda to competition matters, which will allow a full discussion on Mr. Gosling's suggestions, and also an early publication of the Council's proposals for the 1945 programme.

A claim was submitted by Mr. A. Armes of the Pharos M.A.C. for the 1944 Caton Trophy with a flight of 725 seconds. This was not accepted by the Council, the reasons for non-acceptance being: (1) no indication was made on the claim form as to whether or not the model was rubber driven, and (2) or conformed with the S.M.A.E. Fuselage Formula. Mr. Armes was invited to submit his model, if rubber driven, for checking by the Council at their next meeting.

A letter from Mr. D. A. Russell expressing dissatisfaction with the Society's lack of courtesy in acknowledging services rendered, was read. While recognition had been made in both AEROMODELLER and the S.M.A.E. Journal, the Council felt that a letter conveying the Society's gratitude to Mr. Russell for his generosity was very desirable, and the Hon. Secretary was instructed to reply.

Clubs and members will be interested to learn that the Council has at last obtained a large supply of metal badges of excellent quality and incorporating an improved fastener on the back. These will be sold at 1s. 6d. each, and applications should be made either to the Hon. Secretary or the Hon. Treasurer.

Another interesting addition is a new small-sized transfer which is approximately the same size as the lapel badge. These, and the usual larger type of transfer, are in plentiful supply, and can be purchased from either of the aforementioned officials, at a cost of 1½d. each.

All members should take advantage of the opportunity now offered to insure with the S.M.A.E. against Third Party Claims up to £5,000. Rates for rubber-driven models and sailplanes are 6d. per annum per member, and for petrol-driven models, 2s. 0d. per annum per member (including of registration). All insured owners of petrol-driven model aircraft will receive registration numbers for each machine, while *all* insured flyers will receive six specially designed transfers free of charge. All applications for insurance should be addressed to the Hon. Treasurer, Mr. L. J. Hawkins, 21, Palace Court, Bayswater, W.2. Will all Country Members note that they are automatically insured by the Society, free of charge for rubber-driven models and sailplanes on acceptance of membership, and may insure petrol-driven models on the terms stated above.

An application for the flying of petrol model aircraft on Epsom Downs was made by Mr. M. W. White of the Blackheath M.F.C. It is the wish of the Council to encourage this type of flying wherever possible, but they would like it to be known that in all cases the owner of the ground should be approached for sanction before putting into practice any approval by the Council. In this particular case, the Council urges the Blackheath M.F.C. to use the area on Epsom Downs known as Walton Downs only when flying petrol-driven model aircraft. Leicester M.A.C. also applied for the use of their club ground for flying petrol models, and the Council now awaits further advice pending a decision.

A new Club, the Hornsey M.F.C., was granted affiliation.

Members will be interested to learn that the last issue of the S.M.A.E. Journal (October) has gone to press, and this magazine will re-emerge in a new and enlarged form under the title of "Model Aircraft," and in addition to including articles by leading writers, club reports, etc., will carry action photographs or colours on the front cover. Many other ideas will be incorporated to create further appeal, and the Christmas edition, which will be a double sized issue, costing 6d., will be far in advance of anything the Society has yet attempted.

RULES FOR 1944-45 INDOOR POLE FLYING COMPETITIONS.

(1) The Competitions to be open to affiliated clubs only.

(2) The events to be run for each of three months concurrently, October, November and December, and January, February and March.

(3) There shall be two classes—Class A and B. Class A for models up to 1 oz. maximum weight and Class B for models from 1–2 oz. in weight.

(4) Class A shall be allowed a pole of 3 ft. maximum height and a maximum length of line of 6 ft. Class B shall be allowed a pole of 6 ft. maximum height and a maximum length of line of 12 ft.

Length of line to be measured from the top of the pole to the centre line of fuselage.

Should it be found necessary to reduce the length of line allowed in either class, the height of pole shall not exceed half the length of line in use.

(5) Two flights only per entrant shall be allowed R.O.G. and the aggregate of these to count as points. Failure to rise in one complete circuit constitutes a "no flight." Only one "no flight" allowed. Time to be taken from release of model to first touch down or contact with any solid object. There is no restriction on the number of attempts made by a club's member during each month: all such attempts are eligible for the Individual Aggregate Prize.

(6) Clubs competitions officials must forward results to the S.M.A.E. Competition Secretary to arrive not later than 7 days after the end of the month in which the attempts were made. (No entry will be accepted unless accompanied by a written and stamped post-card for acknowledgement.)

(7) The entry fee to be 2s. 6d. per club per month (to cover both classes).

(8) The aggregate of the three best flights per club will determine the winning club each month.

(9) In addition, the best individual flight will determine the winning individual monthly.

Prizes will also be awarded to the individual who attains the best aggregate monthly.

(10) Collective results will be tabulated and prizes awarded for the best individual results extended over each of the two three months periods.

Address: S.M.A.E. Hon. Competition Secretary, H. W. Towner, Esq., "Trencom," King's Drive, Eastbourne, Sussex. (Tel.: Hampden Park 471.)

The S.M.A.E. London Area Council's Dinner and Dance is being held on November 18th, 1944, at which the London District Inter-Club Challenge Cup will be presented. This function will be held at the Lysbeth Hall, Soho Square, London, W.1, and tickets, price 10/6 each, can be obtained from F. E. Wilson, 34, Babington Road, Hendon, N.W.4. (Tel.: HENdon 7163.).

Stop Press: Northern Heights are the winners of the London District Cup. Results as follows:—

N. Heights 1333·3 Walthamstow 1200·2

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