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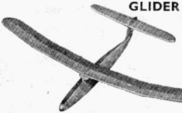

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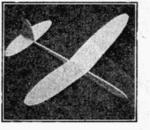

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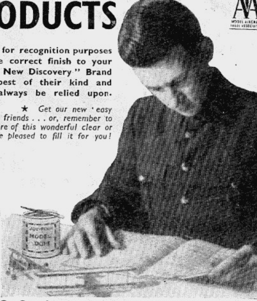

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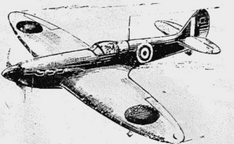

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AEROMODELLER

(INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR")

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JANUARY 25th, 1944

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EDITORIAL

FROM time to time during the past few years we have published "fiction" articles. At first they were not too well received, mainly because readers were scared that we might develop the feature, run a serial, and finish up as a fiction magazine! As the good lady in "Pgymalion" said: "Not b—— likely!"—and when readers realised that our "fiction" would only appear from time to time, and then always be devoted to aeromodelling, they became quite appreciative of this feature.

It must be over two years now since McGillicuddy was introduced to readers, and there is no doubt that in that time he has established himself in no uncertain way. So much so, that recently his creator, Robert Jamieson, conceived the idea of preparing a "Year Book" containing a series of stories about the Maestro. The MSS was passed round our staff and then on to a selection of aeromodellers, who unanimously voted it good and very funny; and so with a flourish, Freddie introduces in our "Club Notes" this month "McGillicuddy's Year Book" by Robert Jamieson, price 3/6 from any Model Shop, bookstall or newsagent, or 3/9 post free from our Leicester office. The book has an attractive coloured cover, is size $8\frac{1}{2}$ in. by $5\frac{1}{2}$ in., contains 104 pages, and is lavishly illustrated throughout by Freddie. "McGillicuddy's Year Book" records the inauguration, history and development of the aeromodelling hobby which, according to him, dates back some thousands of years before the Pyramids were built! Readers will find this book ideal Christmas fare.

Third Party Insurance.

Once again we remind all readers that their current N.G.A. insurance expires on January 31st, 1944, and that in our next issue we shall publish the usual membership application form, which must be used when renewing or taking out insurance for next year's flying season. A leaflet is available describing this service, which will be sent on receipt of a $2\frac{1}{2}$d. stamp (which includes 1d. for the price of the leaflet, in accordance with Paper Control regulations). We would impress upon readers the importance of covering themselves against Third Party liability when flying model aircraft, whether Duration, Flying Scale or Glider type. Third Party cover whilst flying petrol planes is normally provided, but suspended so long as the Air Ministry ban on the flying of petrol planes is in existence; but recently it was extended to cover the running of model race cars powered with miniature petrol engines.

The S.M.A.E. "Solids" Contest.

We would draw attention to the notice published on behalf of the two S.M.A.E. "Solids" Contests, the *first* of which closes on December 31st, 1943. Entry fees must be sent to the Hon. Competition Secretary, Mr. H. J. Towner, at "Trencrom," Kings Drive, Eastbourne, Sussex, by that date, *but no models should be sent to Mr. Towner*. Full particulars of the competition are given in the notice and/or may be obtained direct from Mr. Towner; but in view of the imminence of the closing date, we once again emphasise that entries for the *first* of the two competitions must be in Mr. Towner's hands by the last day of this year.

Rubber is News.

From Birmingham comes an indignant letter from a reader giving us the latest information in regard to a "non-essential" use of Aeromodeller type rubber strip. He says:—

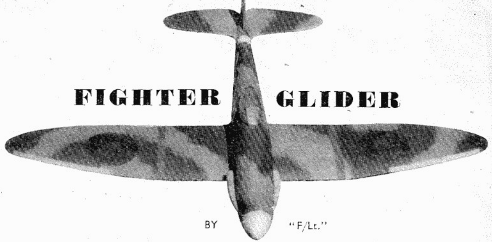
"The day before this letter was written my mother bought a bunch of imitation "bone" rings to amuse my five months' old brother. To my amazement these were threaded on a 12 in. piece of $\frac{1}{4}$ in. square Aeromodellers' rubber. I do not consider this fair to we Aeromodellers."

Well, there it is! We have reported on several occasions such use of Aeromodeller strip rubber to the Rubber Control, who replied that such odd quantities as may be used in this way are outside their control, and can only be job lots, and that certainly no rubber is being, or has for some time, been issued for purposes such as those to which we have referred. We would add that we hear that a very small quantity of strip rubber may be available to the Model Aircraft Trade early in the New Year, and this may be a forerunner of further small supplies to be released from time to time. We can say that, to our certain knowledge, the Rubber Control are aware of the need of the Model Aeroplane Movement for supplies of strip rubber, and we have little doubt that, as soon as the rubber situation eases, a fair and appropriate allocation of rubber strip will be made to the Model Aircraft Trade. Meanwhile, we can only advise readers either to explore their local toy and fancy goods shops . . . or persevere with gliders!

D. A. R.

CONTENTS OF THIS ISSUE

FIGHTER GLIDER



BY "F/Lt."

IN the May issue of the AERO MODELLER, Mr. Jones stated that he preferred using his model Halifax as a tow-line glider. This set me thinking.

Elastic is hard to come by and balsa wood is even scarcer. A glider seems the answer. It is a well-known fact that a moderately loaded model glider is more efficient than a lightly loaded one, and here the use of harder woods becomes an asset. Again, the modern aircraft looks much better with its undercarriage retracted, and in the case of a flying model (unless some very complicated gear is used for lowering the undercarriage) the propeller is liable to be damaged.

Therefore, working on these facts, I prepared a lay-out for a free-lance low-wing monoplane fighter glider. I was a bit dubious about a low-wing glider, unless excessive dihedral was used, but my fears were entirely unfounded, and the completed model glides as well as any pukka glider I have built, and looks far more impressive as can be seen by Mr. C. Rupert Moore's painting on the cover.

The main particulars are as follows: Span, 42 ins.; length, 31 ins.; wing area, 1½ sq. ft.; wing loading, 8 ozs./sq. ft.; all up weight, 12 ozs.

CONSTRUCTION.

(Plan appears on pages 90 and 91.)

Obecchi wood, 1/16 in., is used for the formers which have their centres cut out. The stringers, thirty-two in number, are 1/16 in. square birch. The tailplane and fin is made up of 1/4 in. square and 1/4 × 3/8 in. soft balsa outline, sanded to shape, with 1/16 in. sheet balsa ribs. Rudder and elevators are hinged with soft wire. The nose block, which fits into a square cut out of the nose former, and is detachable, forms the spinner of the aircraft. It is hollowed out and lead shot is poured in through a hole in the back to obtain trim. Two launching hooks are cemented to the bottom of the fuselage. The cockpit cover is moulded out of transparent plastic material.

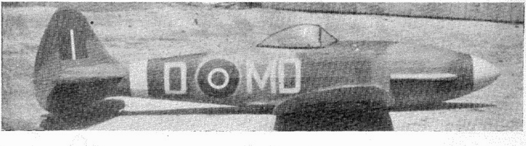
A single deep 1/4 in. hard balsa sheet main spar is used, with balsa wood ribs of Clark Y section. The leading edge is 1/8 in. square birch or 1/4 in. balsa, and trailing edge 1/2 in. by 1/8 in. balsa wood sanded to conform to the section. The leading edge as far back as the centre of pressure, top and bottom, is covered with 1/32 in. Obecchi wood. The mainplanes have two 1/4 in. birch pegs which fit into paper tubes well cemented and braced across the fuselage. These protrude about 1/2 in. in each side and are covered in to form the wing root fairings and fillets.

The whole aircraft is covered with bamboo paper, and from the rear of the cockpit cover forward, a double covering is used. Two sorts of clear dope are applied, and then the fighter scheme camouflage is sprayed on, complete with all "trimmings." Undercarriage covers are thin card pasted on the underside of the wing.

As I have stated previously, the glide is extremely good, although for hand-launching a fairly hefty shove is required, but with a slight breeze blowing there is a strong tendency to soar.

This type of glider seems to open up a new field for competition, and perhaps after the war we may see full scale models of all the modern fighters and bombers being flown as gliders, and a very pretty sight too!

I, myself, am starting on a 1 in. to 1 ft. fully detailed model of a Mosquito.



AIR LEAGUE OF THE BRITISH EMPIRE

POST - WAR AIR TRANSPORT

The Aerial League of the British Empire (later changed to the Air League of the British Empire) was founded in 1909, with its main object:

"To disseminate knowledge and spread information showing the vital importance to the British Empire of air supremacy, upon which its commerce, communications, defence, and its very existence must largely depend."

The signatories to the Memorandum of Association were:

THOMAS HEATHCOTE OUCHTERLONY, Lt.-Col.
CHARLES HENRY TILSON MARSHALL, Col.
HENRY THOMAS ARBUTHNOT, Major-General
FRANCIS GORING RIDEOUT, Major-General
JAMES TURNER CUMMINS, Major-General
THOMAS SEYMOUR BRAND, Rear-Admiral
REGINALD AMBROSE CAVE-BROWNE-CAVE, Capt.
HENRY WYLIE, Major-General

The Air League's Achievements

Empire Air Mail. By the 1930's the aeroplane had become capable of materially assisting in commerce and communications. The Air League conducted a campaign advocating the establishment of the flat rate air mail charge of 1½d. throughout the Empire. This was inaugurated by the Government in 1935.

Imperial Air Defence. With the rise of Hitler the war clouds began to gather over Europe. German military aviation, in thin disguise, developed rapidly until Hitler triumphantly announced (fortunately untruthfully as regards quality) that he had an air force equal to ours. During this period the Air League never ceased to urge the strengthening of our Air Force, and it can claim that the expansion schemes started in 1935 and thereafter increased were due in large measure to its advocacy.

Empire Air Day. In order to bring the public to an understanding of the possibilities of aviation the Air League, in 1934, arranged an annual Air Day, when civil and military aerodromes throughout the country were thrown open to the public. This aroused public interest, stimulated recruiting, and provided the R.A.F. with an opportunity of displaying its skill to those whom it was destined so gallantly to defend in the Battle of Britain.

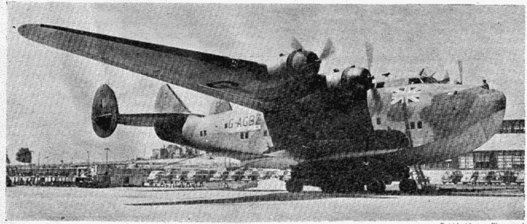
Young Pilots' Fund. In 1935 the Air League established a fund to help pay the costs of learning to fly for selected young men. At that time there was no Royal Air Force Volunteer Reserve, and a course of elementary flying tuition cost no less than £30. Many of the young men trained by this Young Pilots' Fund took part in the Battle of Britain or became instructors to the greatly enlarged air forces subsequently developed.

Air Defence Cadet Corps. In 1938 the Air League established the Air Defence Cadet Corps, a training organisation for young men between the ages of sixteen and eighteen. By the outbreak of war this was over 20,000 strong. In 1941 the Corps was taken over by the Air Ministry, its name changed to the Air Training Corps, and it was enlarged to a strength of 200,000. Today the Air Training Corps is known in every corner of the land, and thousands of its former members are now serving in the Royal Air Force.

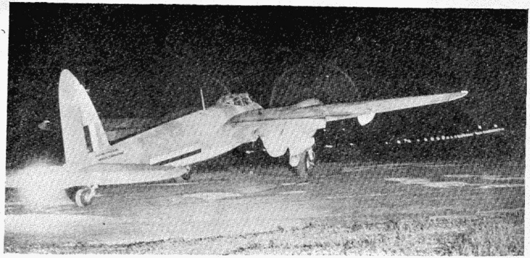
Air Training Corps. Although the Air Training Corps is now administered by the Air Ministry, the Air League continues to publish the *Air Training Corps Gazette*, an illustrated technical instructional magazine, which sells over 100,000 copies monthly to cadets, R.A.F. personnel, and others, and is probably read by many times that number of people. The profits are all given to the A.T.C. Welfare Fund.

Why You should Join the Air League. There are no material advantages to be gained directly by the individual who joins the Air League. Its members band themselves together in order to form an organisation which will effectively advocate their views on aviation.

A 40-ton British Overseas Airways Boeing 314A beached at the American terminal at Baltimore.



British Airways Photograph



Air Ministry Photograph

The versatile De Havilland Mosquito "civilianised" for British Overseas Airways.

Membership is open to all. The constitution of the League is democratic, and any member, except those directly engaged in the management of aircraft manufacturing companies, may be elected to the Committee.

Membership. The membership subscription is £1 (one pound) a year. This entitles a member to a membership badge and a copy of books and pamphlets distributed free by the Air League. It also entitles him to make use of the Air League's Information Bureau.

Societies and clubs, etc., can join the Air League *en bloc* for a subscription of 25s. a year. This entitles the club or society, although not the individual member, to a copy of all books and pamphlets distributed free by the Air League, and to use the Air League's Information Bureau.

A Policy for Post-War Air Transport

Air Transport in Commerce. High-speed air transport will be necessary for mails, hurrying passengers (for instance, across the Atlantic), and urgent freights. It has been found indispensable in war, and will be equally necessary in the busy years of reconstruction that lie ahead. Slow water-transport will always be cheapest; road and rail transport will retain much of their usefulness. Air transport offers cheap speed. Only a part of the world's freight will be carried by air, but even for this part a large air transport industry will be required.

Air Transport for Defence. A thriving air-transport system is as necessary an auxiliary to the R.A.F. as the Merchant Navy is to the Royal Navy.

All aircraft can be put to some use in war. Germany's use of air transport in Norway, Crete and elsewhere played an important part in the conquest of those territories.

Air transport also helps to maintain an active aircraft manufacturing industry which can be turned over to the production of military aircraft in war.

These advantages are incidental and are most likely to arise when commercial aviation, as in America, is allowed to develop free of immediate military requirements.

Imperial Co-operation. The development and continuation of the Empire demand that the United Kingdom should develop its air transportation in **closest co-operation with the Dominions and Colonies.** Swift air transport will encourage settlement in outlying parts of the Empire, and routes thus developed will have a strategical value in war. The aircraft industries in the Dominions found necessary in war will have their value also in peace.

International co-operation will be necessary in the planning of routes, the standardisation of fares and freight charges, the standardisation of airworthy requirements and agreement as to subsidies. Airports' signalling, radio and meteorological facilities will have to be developed on an international scale comparable to that of the meteorology or postal services before the war.

These are matters for international conferences rather than internal political advocacy. What we can advocate now is that the Empire must show the way to the development of air transport in the community of nations.

Freedom of Operation and Passage. It is essential that in this development stage there should be freedom of operation and passage in air transport. Monopolies in the past have proved dangerous and inefficient. The idea of a world combine which should have a monopoly of air transport is at first sight an attractive theme which has been developed by visionary writers, and in years to come something of that kind may develop. At the moment, however, it appears unlikely that international agreement on the constitution of such a combine could be reached. It is sufficient in the meantime to secure international co-operation and freedom of passage.

The system that has worked in America is advocated, i.e. regulated competition. **Anyone who can demonstrate that he can operate an air service with safety and without cutting should be allowed to do so.** Air transport is young and flexible, and has need of initiative and enterprise. It should be possible for a small company to start up business, as one can in sea and road transport. The inflexibility and exclusiveness of railway companies should be avoided, at least in the

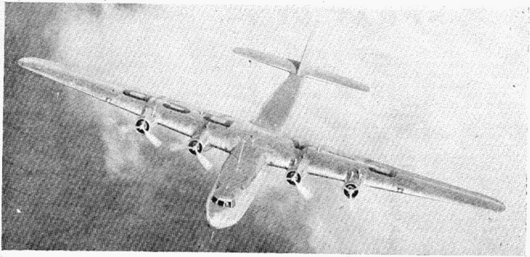


Photo by courtesy of the "Aeroplane."

British Overseas Airways "Ensign" Air Liner in flight.

early years. The situation may alter after that, but we are not concerned here with more than the early post-war years.

State Aid. State aid to aviation should take these forms:

Payment for services rendered, i.e. payment for carriage of air mail. The early steamships had such assistance.

Special subsidies in respect of development work on new routes, if mails cannot be carried.

Provision of airports and ground signalling aids, as for marine navigation and harbourage.

Research and technical education. Although manufacturers and others will have their own research establishments, a central national establishment with large wind tunnels and facilities for advanced training and experimentation should be provided. A precedent exists in the Government Agricultural establishment.

Ministerial Control. In the early days when aviation was young and small it was reasonable that control of both civil and military aviation should be in the hands of one Ministry, the Air Ministry. The Air Ministry found it necessary, however, to have a separate department for civil aviation.

With the outbreak of war part of the functions of the Air Ministry were transfered to a separate Ministry—the Ministry of Aircraft Production, the name of which indicates its function.

Whether the Ministry of Aircraft Production is retained as a separate Ministry or not, it appears that *a separate Ministry will be desirable for air transport* after the war. Land and water transport are not under the control of the War Office or Admiralty, and there now seems to be no need for subordinating civil aviation to military aviation in peace time.

Civil aviation might come under some other Ministry like the Board of Trade, or a Ministry of Transport, but a separate Ministry appears to be most desirable. Government control should be reduced to a minimum necessary to secure the public safety and international co-operation.

Private Flying and Gliding. The ownership of aircraft is always likely to be more costly than the ownership of cars or yachts, and the operation of aircraft will always demand more skill. It is unlikely, therefore, that aircraft will ever be so numerous as cars, but many private people are likely to want to own them, and every facility should be given to enable them to do so, subject to a careful licensing scheme.

Club flying, as practised before the war, seems to be the right solution for those unable to afford individual aircraft. Government encouragement of this is recommended.

Gliding is a healthy sport for youth, and is one that should be encouraged.

There is plenty of room in the air for private flying, as well as for air transport, and under proper regulations and with adequate radio communication neither should interfere with the other.

These activities help to foster good international relations and provide the foundation of air training for the nation's manhood which may be of increasing value.

It is also important to consider that as the motor-car industry depends largely on the manufacture of private cars, so a thriving aircraft industry, of value to the nation both in peace and war, can be built up on the manufacture of private and club aircraft.

Training. The Air Training Corps should be continued as a means of offering elementary instruction in aviation to the whole youth of the nation, whether they wish to make aviation their career or not. Thus every citizen may acquire in youth a basic understanding of the problems of flight and a vision of the widening horizons that the development of the air age offers to mankind.

Advanced technical training to selected personnel should be provided at Government Research establishments and by chairs of aeronautical engineering at universities.

SPRAY GUN—BY R. W. NEWTON

AEROMODELLERS, whether they build flying or solid types, often feel that the standard of their work could be vastly improved with the aid of paint spraying apparatus. This is very true because few of us are gifted with the ability to use a brush with sufficient skill to produce a really satisfactory job; all of us have, at some time or other, seen otherwise good models spoiled by poor painting and, in any case, a spray gun can speed up the work enormously, especially on large surfaces.

Before proceeding with the description, some idea of the problem as I saw it may be useful.

(*a*) The equipment must be simple, both operationally and in construction.

(*b*) High air pressure must be avoided, otherwise, apart from the difficulty of supply, the covering of flying models could be easily damaged.

(*c*) The paint spray cone developed by the gun should not be large and, preferably, should be adjustable.

(*d*) Trigger control should be provided.

(*e*) It should be possible to clean the gun quickly in order to deal with colour changes.

Construction.

First of all the main barrel (D) should be bored and drilled in accordance with the drawing, making quite sure that the bore is true, otherwise the jet control and spray release will not function correctly. The outside thread and nozzle shoulder may now be cut, once again ensure concentricity for the same reason. Lastly the side entry holes should be drilled.

The air inlet stub (E) and the barrel support (K) may now be made. The stubs entering the main barrel must be a close push fit, otherwise difficulty will be experienced when assembling the pieces. The bore in the supporting pillar must also be a push fit over the tube (M) because this tube is left unsoldered to facilitate cleaning.

The jet (A) may now be made and, if required, can be threaded internally and then, if a corresponding thread is cut on the nozzle shoulder, various jets may be made to produce different shapes of paint spray, i.e. fan-shaped, conical, etc.

Now the needle should be attempted. Great care is necessary here and a very hard quality brass is required, steel is even better. The guide shoulder at the centre must be quite smooth, and a very good sliding fit in the barrel is desirable.

The last turned part is the gland nut (F); this should slide smoothly on the guide shoulder of the needle. Although not shown in the drawing, this part must be knurled on the outside.

All the remaining parts are fairly straightforward sheet metal parts. Not too hard quality brass must be used, otherwise danger of fracture is likely along the bends, especially if they are not always made across the grain of the material. All holes should be drilled after the general shape has been made and bent up.

Assembly.

Assembly is quite simple, if all parts have been accurately made and fitted in the order given. The main barrel supported, air inlet and the short down tube (C) must all be sweated at the joints and, unless screwed jets are to be used, the jet must also be sweated in position. The general assembly diagram gives a clear picture of the position of all parts and there should be no difficulty here. The pivots for (B) and (P) are short lengths of 3/32 in. diameter brass rods; the pivot for (B) being soldered to the bracket (N).

Holes are drilled in the cap of the jar to take the 2 B.A. thread on the support (K) and also the tube (C) which only just passes through. A 2 B.A. nut is used to secure (K) and then both (K) and (C) are securely soldered into the cap. The gland nut (F) is best packed with a small leather washer soaked in oil and is screwed up as tightly as possible without restricting the movements of the needle.

For those wishing to make the simplest possible model the parts (A) (C) (D) (E) (K) and (M) only are required and, since there is no longer a needle operating through the centre of the gun, there is not the same need for high accuracy, therefore, the bore, etc., can be drilled with an ordinary drill and not set up in a lathe. The barrel (D) is slightly modified. The gland nut thread is not required, but the bore at this end tapped 2 B.A. for about ⅜ in. In use a 2 B.A. screw is used to seal the bore, but can be easily removed when cleaning the gun. Such an arrangement, although simple in the extreme, will be found very effective and capable of coping with most jobs.

Air Supply.

In addition to the gun all that is required is an air reservoir and a pump. The former can consist of any metal container, preferably cylindrical, from one gallon size upwards. Make certain that the can is of fairly heavy gauge metal because it will have to withstand pressures of the order of 20 lbs. per square inch. A car type pump fitted with a foot stirrup is best because with this pattern the apparatus needs only one operator, unless it becomes necessary to use stencils held in the hand.

Returning to the can, this must be fitted with a valve from an old car inner tube and also an air outlet, similar to (E) over which the air supply tube is fitted. Both valve and outlet must be securely soldered in position. The reservoir must now be tested for leaks by fitting the air line, squeezing it tightly and pumping the can up to a fair pressure. If any leaks are present they will be evident in an audible manner and must be sealed by soldering at that point.

The air line should consist of about four feet of 5/32 in. bore, heavy wall, rubber tubing.

Using the Gun.

If all is well, the apparatus should now be ready for use, and the paint container charged for a first trial. Using normal coloured dopes of the kind employed by aeromodellers, something between equal and two parts of thinners will be required. The exact amount is best found by trial and error, and varies with the colour and air pressure in use. If the paint is too thick, the spray will be full of clots and in any case will be intermittent. If, on the other hand, the paint is too thin, it will be found to run badly as it is applied to the surface being painted. Correct mixture is indicated by a fine even spray that does not run or form into heavy clots on the

sprayed surface. Once the correct mixture is found it is best to mark the paint can for future reference.

One important point that has so far been overlooked is the leather washer in the cap of the screw jar. This is to ensure that the jar is air-tight because the air by-pass tube (C) is intended to put air pressure on top of the paint, to assist the suction at the top of the main lifting tube (M). This results in either the use of a lower air pressure or thicker paint, whichever is the more important.

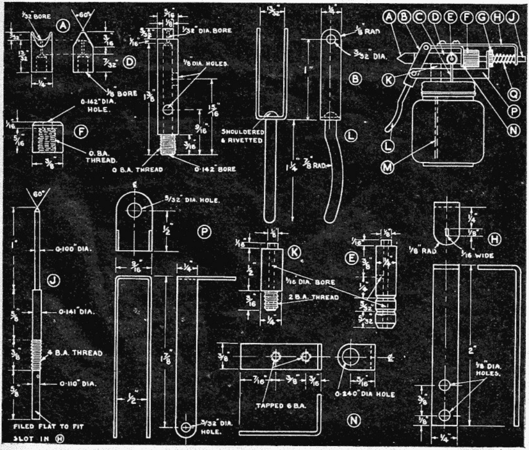
If the jar is leaking, air bubbles will be seen coming from the bottom of the tube (M).

Whenever changing colours or putting the gun aside for some time, thoroughly clean both gun and container. If several screw top jars are available they can usefully be employed for various colours, being attached to the gun as required.

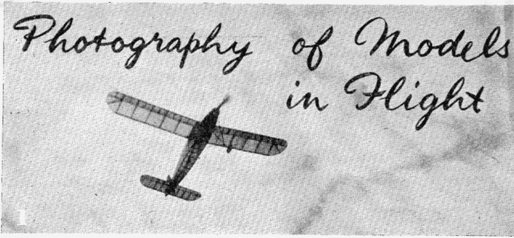
In the near future, I shall hope to hear that you are all spraying your paint instead of brushing, and if anyone has any difficulty at all when making or using the apparatus described, I shall be glad to give any help that I can via THE AERO MODELLER.

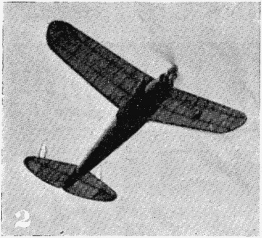
Material List.

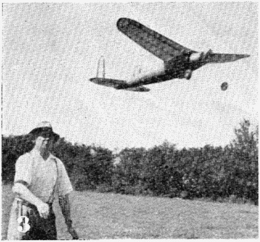
(A) $\frac{1}{4}$ in. dia. hard brass rod.
(B) 1/32 in. sheet brass.
(C) 1/16 in. outside dia. brass tube.
(D) 5/16 in. dia. hard brass rod.
(E) $\frac{1}{4}$ in. dia. hard brass rod.
(F) $\frac{3}{8}$ in. dia. hard brass rod.
(G) 4 B.A. milled edge nut.
(H) 1/16 in. sheet brass.
(J) 5/32 in. dia. mild steel or very hard brass.
(K) $\frac{1}{4}$ in. dia. hard brass rod.
(L) $\frac{1}{8}$ in. dia. soft brass.
(M) 1/16 in. outside dia. brass tube.
(N) 1/16 in. sheet brass.
(P) 1/32 in. sheet brass.
(Q) 24 s.w.g. or 22 s.w.g. piano wire. Wound on $\frac{1}{8}$ in. dia. rod.



Photography of Models in Flight







BY A · GALEOTA

ALTHOUGH articles have appeared from time to time on model aeroplane photography in THE AERO MODELLER, I am sure a few practical hints as the result of my long experience will not be found superfluous.

Many of my pictures have appeared in these pages, and many readers, particularly those interested in photography, may have wondered about my outfit, material employed and accessories. Well! my camera in these past few years is a modestly priced second-hand and much-used Press focal plane outfit of quarter plate size. My past experiments have been somewhat costly, but to-day my camera pays its way. I have acquired a style entirely of my own, and a very simple method. I have also owned all sorts of roll cameras, but nowadays I find the quarter-plate Press the most suitable, especially under present conditions as plates are more easily obtainable than films.

Although I have snapped models in flight in a few cases with a shutter speed of 1/100 of a second, the camera should be provided with shutters capable of at least 1/200 or 1/250 of a second and even of 1/400 speeds generally obtained with cameras fitted with "Compur" shutters.

In the case of cameras with focal plane shutters, a speed of 1/1000th of a second and more can be relied on, but 1/500th will be sufficient in most cases even with petrol-driven models, and I have been able to combine such speed together with the use of a light yellow filter and fast Panchromatic plates to the best advantage by obtaining a good tone of the sky and the sharpest definition of the model in flight. For those who are interested, my camera is fitted with a Cooke Aviar Lens of 5¼ in. of an aperture of f.4/5, producing strong negatives even when stopped down at about f.11. But the most important factor in photographing models in flight is a really fine day, with very light breeze, blue sky and nice clouds with bright sunshine. Such days are rather rare, and that is why really good artistic pictures of models in flight are also rare. Pictures taken on dull days or while the sun is behind the clouds are generally of very little use. Winter months, of course, are not suitable for this kind of photography.

Whatever type of camera you use, never attempt to photograph your model whilst chasing her about the field, or at a distance away from the lens of more than 30 or maximum 35 feet, or the model will come out so

small on the negative that it will be impossible to obtain a decent enlargement. Make a proper study of the best angle at which your model looks at her best and then try to snap her when she is flying from about the same angle (not easy, of course, but it can be done).

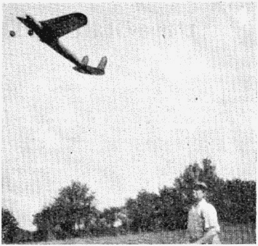
To meet these requisites, you will need all your patience and perseverance. Having asked a friend to launch your model for you, choose a proper spot in the field away from the crowd, make sure the background is also suitable; by that I mean when the model is in flight she should be well above hedges and trees, appearing clean against the sky. When all is ready get at a distance of about 9 yards from your assistant, facing the direction towards which the model should fly, kneel on the ground and be ready to shoot as soon as the model is in the suitable spot and in range, well against the sky and on a steady climb. To secure a really good picture this operation may have to be repeated several times, and you must be prepared to miss several shots, but a good picture will repay you for your expense and trouble.

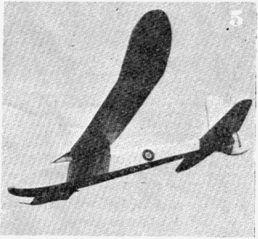
In all cases the models should be set for short flights and in tight circles. Most of my pictures of duration or semi-scale models were taken single-handed. I hand-launched them in close circles, picking up the camera (previously set), and shooting when the model was overhead or just a moment before, and always waiting for a nice cloud formation to complete the picture, but never, as I mentioned, at a distance over 30 feet. In case of team work you may cut away your collaborator when enlarging the negative and the result may be of a model looking high up in the sky.

Never get disheartened by failures and by your friends' criticism, be bold enough to judge your own pictures, and when you have gained enough experience to produce good enough pictures for publication, remember that the decision rests entirely with the Editor, and his decision is the only one that counts.

Enlargements must be sharp and rich in all tones, small and dull prints are useless for publication.

(1)	1/100 sec. at f/11.	Duration model soaring.
(2)	1/500 sec. at f/8.	Experimental petrol model designed and built by Mr. S. C. Wade.
(3)	1/500 sec. at f/8.	Mr. Wade's petrol model, which is powered with an "Elf" engine.
(4)	1/500 sec. at f/8.	
(5)	1/350 sec. at f/11.	(Yellow filter) The "Ivory Gull" II.
(6)	1/350 sec. at f/11.	(Yellow filter.)

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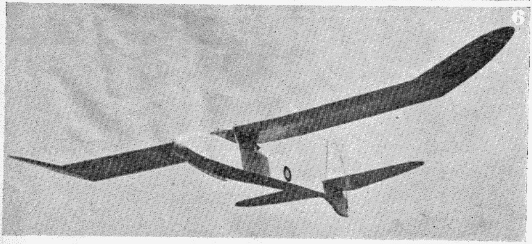
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1/48 SOLID SCALE MODEL MOTORS

ARTICLE III——BY "S · B · S."

THE logical successor to the engine previously featured in this series—Perseus, is of course the Hercules.

Construction of the model is the same as with the Perseus, except that there is a little more of it. Various parts are shown in the drawing to the full 1/48th scale, two views of each item being given. The enlarged detail of the cylinders is, of course, not to scale, but has been magnified to show how the finning is simulated.

The order of construction and assembly is as follows:

(1) Parts C and D, the two halves of the crankcase; which are then cemented together. Arrange them so that you have 14 separate flats in the 360 degrees—equally spaced; otherwise it will look more like a single row seven when viewed from front or back.

(2) Part B, the timing gear case, is marked out first, complete with the holes for the pins P. These are then drilled carefully with a pin mounted in a pin chuck. *After* this is done cut out the disc: Dress off nice and true, and cement to the crankcase.

(3) Part A, the prop. boss. 5/16 in. dowel rod, or better still, an "0" gauge knitting needle, are best for this. Drill a hole through the centre to take the prop. shaft.

(4) Paint the foregoing parts jet black and allow to dry hard.

(5) Make the crankcase bolts from pins, each about 3/32 in. long, and fit in the holes already drilled in B, allowing them to project about 1/32 in.

(6) The blower outlet case, E, is next. Cement to D.

(7) Part F. Cement to E, dead in the centre; don't forget the small flat on the topside for the carburettor.

(8) The cylinders, J. 14 in all. They are identical with those of the Perseus model. I again used the jig which was made for that particular motor. A detailed description of the jig was given in the article on the Perseus.

Speedy production might be affected by cutting a pair of 7 gauge needles into 6 or 8 lengths, and mounting the jig on each end in turn, doing the bulk of the drilling in one sequence.

Colour the cylinder grey before cutting off from the needle and then mount the front row of 7 on to part 6. Make sure that the rear port hole is looking straight to the rear of the model, otherwise, you will have trouble fitting the induction pipes O. Give the first row of cylinders a coat of varnish or finishing dope, and when dry, repeat the process with the back row. I advocate the finishing of one row first, because there isn't much room to work varnish on after all cylinders have been fitted.

(9) The induction pipes, O. These are made from about 16 or 17 gauge wire. I enamelled a length of this black before I shaped and cut the pipes. You'll scrape some paint off in the making, but it is easier to touch up when in position than to try and paint the whole of each pipe after they have been fitted. *Note.*—The pipe to the bottom cylinder, front row, passes through the hole in the oil sump, L, and this letter must, therefore, be made and fitted at the same time.

(10) The ignition conduit ring, N. This is made from wire of about 22 s.w.g. It should be a neat fit over F.

(11) The plug leads, K. These are made from 36 s.w.g. wire. Double a length in two; put a dab of cement in the hole in the top of the cylinders and hold the loop of wire in until set. Do this to all the 14 cylinders, and trap the ends between the ring, N, and part E. Trim off the waste.

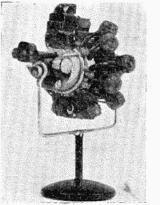
(12) The magnetos, M, and other auxiliaries, Q, R, & S. These should be a straightforward job. I made mine from various bits of knitting needle, the long thin shaft on S being made from the same wire as used for the induction pipes.

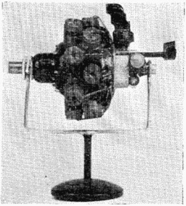
(13) Part G, the carburettor with air intake on top. This can be made from bits of 1/16 in. and $\frac{3}{8}$ in. thick wood, or, you can file it out of the solid as I did. Again using a thick needle. (Golly! This bloke must own a needle factory.)

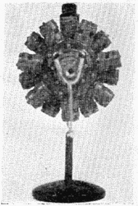
Nose, crankcase and blower parts should all be black, but, in order to show up the auxiliaries, I did E and N in silver. G is all black. M, in black with the tiny discs tipped silver. R, black with the thin extremity silver. S, all black. The cylinders and the oil sump, L, grey. The induction pipes, and the thin naked band round the cylinders are also black.

A bright round wire nail, drilled 1/16 in. through the centre, makes the prop shaft, and a small bright washer sitting up against the nose of A finishes the job off.

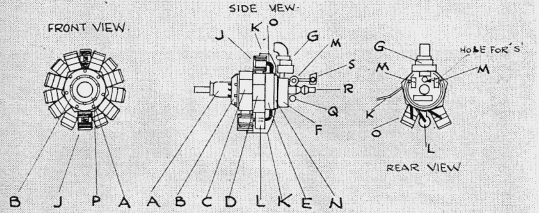
For mine, I made a little exhibition stand out of 22 s.w.g. soldered to a nail, and mounted on a large black button. That's all: Happy knitting.

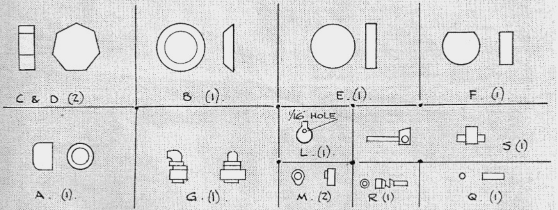




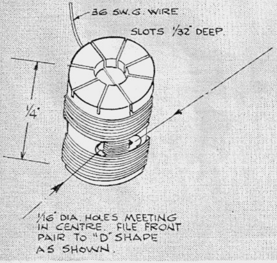


1/48th. SOLID SCALE "BRISTOL HERCULES".





ENLARGED DETAIL OF CYLINDERS



FILE OFF END OF 7 GAUGE KNITTING NEEDLE SQUARE. DRILL 3/32" DIA. HOLE IN TOP ABOUT 1/16" DEEP. CUT RADIAL SLOTS AS SHOWN. DRILL PORT HOLES: 2 AT FRONT & 1 AT REAR - ALL 3 AT 1/8" FROM TOP. INSERT 36 GAUGE WIRE IN SLOT & CLOSE WIND DOWN TO PORT HOLES. PASS THROUGH FROM PAIR & WIND ROUND BRIDGE BETWEEN HOLES UNTIL FILLED - THEN CONTINUE TO WITHIN 1/32" OF BOTTOM. SECURE WITH CEMENT & TRIM OFF WASTE. CUT OFF CYLINDER 1/4" LONG & DRESS BASE NICE & SQUARE.

BALSA WOOD—ITS ORIGIN AND GROWTH

BALSA WOOD is a timber of which there are several varieties, very widely found in the States of Central and North Southern America. The best comes from Ecuador and carries the botanical name of Ochranhama Lagopus. It is also found in Trinidad, Honduras, Brazil, etc., but experience has shown that the timber from these States is generally much heavier and harder than that from Ecuador. The lightest timber requires a climate

With apologies to Guiness.

which is extremely hot and which has a very heavy rainfall at the same time. Ecuador has this for three months in the year.

The name Balsa is derived from the Spanish word "balsa" for raft, for the old Conquerors noticed that the Indians used this very light wood to build rafts on which they lived and travelled. They still use balsa wood logs for the same purposes as they did when the first Europeans set foot on American soil. Attempts have been made to grow this tree in the Botanical Gardens at Kew and also in the United States of America, but so far the only success which has been obtained is to get a small plant which grows up to about 3 ft. in height.

In the early days of the marketing of balsa wood reliance was placed on the natural supplies which are found in the primæval forests which cover a large part of the world where balsa wood grows. Its growth is extremely rapid, as can be seen when the grain of the wood is examined, a tree of 50 ft. in height and 3 ft. diameter being obtained in about four to five years. The best timber comes from trees about four years old and planks are obtainable which are as light as 4 lbs. per cubic foot. In such wood the empty cells of the timber can be seen quite easily and any such wood is remarkable for the rapidity by which it will absorb water. There is not a great deal of this timber. It was realised, however, some years ago that the natural supply of the timber brought in by Indians would soon be brought to a state when only the very young and immature trees would be brought to the coast. Therefore, a considerable amount of experiment was carried out to obtain balsa wood planted in selected ground from seeds taken from the wild variety, the growth of the timber being very carefully watched as time went by and the trees only cut when they reached maturity. By this method a very great deal has been done in improving the standard of timber exported and parcels of timber are now received of very high quality and contain planks as long as 18 ft. ×18 in. ×5 in. thick. These planks are perfect and entirely free from the brown core found in the very centre of the tree, which has given so much trouble in the past. The average weight of the timber works out at about 7 to 8 lbs. per cubic ft. As a comparison, cork weighs about 11 to 13 lbs. per cubic ft., and has very little constructional strength.

The timber on being felled is stripped of its bark, is very full of sap and consequently very heavy compared to the dry wood, and it is logged down to the coast in the same way as many other varieties of timber. It is ripped up into rough sawn planks 6 ft. to 15 ft. long, 6 in. to 15 in. in width and 1 in. to 4 in. in thickness and is shipped in that condition to the United States of America or Europe as the case may be. There it is again carefully examined and selected, and air or kiln dried.

In normal times the timber was being increasingly used in aircraft work, both full size and model; and plywood for aircraft, boats, trunks and panelling, etc. It was also used as sound proofing for rooms, electric motors, etc., insulation against heat for all classes of insulation work, particularly where cases and vans were in question, as the saving of dead weight was considerable. In particular, it was in extensive use for the storage or transport of solid carbon-di-oxide, which is the newest and one of the most efficient chilling materials. In regard to its thermal conductivity, the rate at which it passes heat is at the rate of 0.31 B.T.U. per hour per square foot for timber in 1 in. thick panels. Here, again, it is seen that it compares very favourably with cork, which has about the same thermal conductivity. It was also used to a small extent in certain wireless apparatus for use as the diaphragm owing to its comparatively high modulus of elasticity, and in another direction in X-ray work where it was cut up into fine strips, and also for making up into surgical boots and apparatus.

Under war-time conditions its use is confined mainly to aircraft and life-saving apparatus such as lifeboats, floats, rafts, etc., in which several million cubic feet per annum are dealt with by the U.S.A. Defence Supplies corporation.

FINDING THE WEIGHT OF WING RIBS

BY J · M · FOULKES

When designing a recent model I ran into the usual difficulty of finding the weight of the wing ribs. This obviously depended on the density of the wood, its thickness and the area used. The first two were easily obtainable, but not so the last. So I developed a method for finding the area, using the simple formula :—

$A = KC^2$

where : A = area of rib in sq. ins.

C = chord of rib in ins.

K = a constant varying with the section.

K is determined as follows :—

First is required a table of ordinates, giving upper and lower surface camber at 10 per cent. intervals as a percentage of the chord, e.g. for Clark Y :

Station	0	10	20	30	40	50	60	70	80	90	100
Upper Surface	3·5	9·6	11·36	11·7	11·4	10·52	9·15	7·35	5·22	2·8	·12
Lower Surface	3·5	·42	·03	0	0	0	0	0	0	0	0

By subtracting lower from upper ordinates a table of drafts is obtained as follows :—

Station	0	10	20	80	40	50	60	70	80	90	100
Draft	0	9·18	11·33	11·7	11·4	10·52	9·15	7·35	5·22	2·8	·12

Now letting C in. = chord of rib.

To turn the table of drafts to inches the table above will have to be multiplied by $\frac{C}{100}$

These drafts will then be spaced at intervals of 10 per cent. of $C = \frac{C}{10}$

Now applying Simpson's rule for areas.

No. of draft.	*Draft.*	*Simpson's Numbers.*	*Products.*
1	0	1	0
2	·0918C	4	4 ·0918C
3	·1133C	2	2 ·1133C
4	·117C	4	4 ·117C
5	·114C	2	2 ·114C
6	·1052C	4	4 ·1052C
7	·0915C	2	2 ·0915C
8	·0735C	4	4 ·0735C
9	·0522C	2	2 ·0522C
10	·028C	4	4 ·028C
11	·0012C	1	1 ·0012C

$$\text{Area} = \text{Sum of Products} \times \frac{\text{Spacing.}}{3}$$

(Continued on page 96.)

THE DE HAVILLAND "MOTH" (Type 60)

BY E · J · RIDING

D.H. 60 Prototype. (Mk.I. A.D.C. "Cirrus" engine). Photo by courtesy of "FLIGHT."

IN February, 1925, the De Havilland Aircraft Co. Ltd. announced that a two seater light aeroplane was in an advanced state of construction and would be flying within a month.

The machine made its first flight on February 22nd, 1925, piloted by its designer, Capt. G. de Havilland, who also christened it the "Moth."

The sixtieth type to be designed by the company, the "Moth" was destined to play a most prominent part in the development of the light aeroplane movement in this country. At this time, a number of light aeroplane clubs had been formed in Great Britain and the Air Ministry had held a series of competitions with the object of finding a suitable type of training machine with which to equip these clubs under a subsidised scheme. The competitions had produced several more or less successful machines, but they appeared to be totally underpowered for the duties on which they would be employed. The average power available was in the neighbourhood of 40 h.p., and Capt. de Havilland decided to break away from the ultra-light category and produce a machine which, in addition to possessing an ample reserve of power, would be sufficiently robust to withstand the wear and tear of instructional flying.

The first "Moth" can be said to have been designed around the Aircraft Disposal Companies' "Cirrus" engine, for, in collaboration with the D.H. Co., Maj. F. B. Halford of the A.D.C., set about designing an engine of about 60 h.p. from existing A.D.C. engine parts. Thus one-half of the A.D.C. "Airdisco" 8-cylinder vee-type engine formed the basis of the first "Cirrus" and, an event which is unusual in the aircraft industry, both aircraft and engine were completed at the same time.

The original "Cirrus" engine weighed 260 lbs. and had a capacity of 4,500 cc., developing 60 b.h.p. at 1,800 r.p.m. The "Moth" was of all wooden construction, the fuselage being of spruce and plywood box pattern, employing light spruce longerons and cross-members topped by a semi-circular plywood decking. The wings were made to fold, a telescopic jury strut being fitted to each wing cellule to take bracing strains when the locking pins at the front spars were withdrawn for folding.

Each wing had two spindled "I" section spruce spars supporting built-up girder type ribs of spruce. D.H. type differential ailerons were fitted to the bottom planes only. Like the wings, the tail surfaces were of normal wooden construction with tip bends made from light alloy tubing. All flying surfaces were fabric covered. As will be seen from the photograph of the original "Moth," the rudder was unbalanced but balanced ones were fitted on all production machines. The first machine was registered G-EBKT, and a public demonstration was given at the old aerodrome at Stag Lane—now a housing estate—early in March, 1925.

The authorities were so impressed by its performance that it was decided to place orders with the firm to equip the five existing clubs under a subsidised scheme. Accordingly, production went ahead with ten machines, which were registered G-EBKT, 'KU, G-EBLI and G-EBLR to G-EBLY inclusive, the allotment of these machines being as follows:

'LI and 'LU to the London Aeroplane Club at Stag Lane; 'LR and 'LV to the Lancashire Aero Club, Woodford; 'LX and 'LY to the Newcastle-upon-Tyne Aero Club, Cramlington; 'LT and 'LW to the Midland Aero Club, Castle Bromwich; and 'LS to the Yorkshire Aeroplane Club at Sherburn-in-Elmet.

Thus was formed the nucleus of the flying club movement in this country. At the outbreak of the present war, one of these original "Moths" was still in service, and it is interesting and gratifying to know that a year or so ago the de Havilland Aircraft Co. Ltd. acquired this machine—G-EBLV—for posterity. The "Moth," like many other production types, has passed through many stages of development. The first models, as already stated, were fitted with the 27/60 h.p. A.D.C. "Cirrus" Mark I engine, and later with the improved "Cirrus" Mark II of 30/80 h.p. The third model was

known as the "X" type, or D.H. 60X, to give it its full title. At that time, the prefix "X" signified that the machine was purely experimental, since it embodied certain modifications which, if proved successful, were to be incorporated in the standard version. It differed from its predecessors in that certain alterations had been made to the wings, engine and nose, tailplane and rear end of the fuselage, resulting in a marked increase in speed and an improved vision for the pilot.

The first machine to be equipped with the "Cirrus" Mk. II engine was registered G-EBNO, and G-EBQH was the first D.H. 60X.

Having traced the development of the "Moth" up till 1928, it is fitting at this point to give a brief summary of its magnificent achievements during those three years. In May, 1925, the first long-distance flight in a "Moth" was made by Sir Alan Cobham, who flew from London to Zurich and back in a day. In the King's Cup race of 1926 three of the five machines to finish the course were "Moths," the winner being H. S. Broad on G-EBMO, at an average speed of 90·5 m.p.h. In November of the same year, Messrs. T. N. Stack and B. M. T. S. Leete, flying G-EBMO and G-EBKU respectively, took off from Stag Lane on a flight which was to finish up in India. Both machines were equipped with "Cirrus" Mk. II engines. The King's Cup race was again won by a "Moth" in 1927, the winner, G-EBME, being piloted by W. L. Hope, who had taken great pains to improve the performance of his mount. It had a new, but otherwise standard, "Cirrus I" engine, the span of the top plane was increased by several inches, the centre-section tank removed and a special tank built into the front cockpit. Smaller wheels and a sloping windscreen completed the transformation. Its average speed over the course was 92·8 m.p.h.

R. R. Bentley's flight to Cape Town and back; Maj. A. M. Millers' South African tour, and the height record of 17,289 feet (for two-seater light aeroplanes) were other "Moth" achievements during 1927.

Although essentially a civil aeroplane, the "Moth" has, from time to time, been supplied in its various forms to the R.A.F. In 1927, a flight of these machines, equipped with Armstrong-Siddeley "Genet I" five-cylinder air-cooled radial engines and piloted by instructors from the Central Flying School, gave an outstanding exhibition of aerobatics in formation in the R.A.F. display at Hendon. Some of these aircraft bore the service serial numbers J.8816, 7, 8 and 9.

In 1928 two more versions of the "Moth" appeared. They were the "Cirrus III" model and the "Gipsy Moth," or D.H. 60G. The former was similar to all intents and purposes to the "X" type, and was fitted with the 95 h.p. A.D.C. "Cirrus III" engine. The D.H. 60G. was fitted with an engine of de Havilland's own design, the 100 h.p. D.H. "Gipsy" engine.

Like the "Cirrus" engines, the "Gipsy" was a four-cylinder in-line air-cooled engine. A D.H. 60G, G-EBYZ, piloted by W. L. Hope, won the King's Cup in 1928 at an average speed of 103·2 m.p.h. In November of the same year, H. S. Broad ascended from Stag Lane aerodrome in G-EBYK, fitted with a D.H. "Gipsy" engine. He landed again twenty-four hours later, thus breaking the world's endurance record for light aeroplanes. It is interesting to know that the petrol consumption on this flight was only 63 gallons. The D.H. 60G was quickly followed by the D.H. 60M, or metal "Gipsy Moth." The first of these machines appeared during the summer of 1929 and a great many were built, both in this country and in the Dominions. Batches of D.H. 60M aircraft in

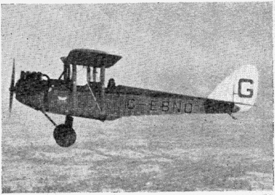


Photo by courtesy of "FLIGHT."

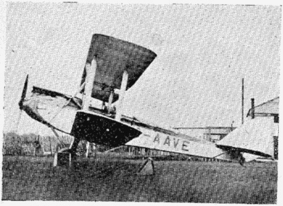
D.H. 60 (Mk. II A.D.C. "Cirrus" engine.)

Photo by courtesy of "FLIGHT."

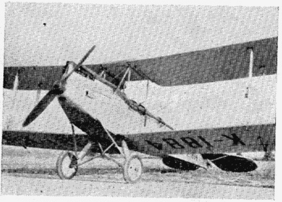
D.H. 60X. (Mk. II "Cirrus" engine.)

Photo by E. J. Riding.

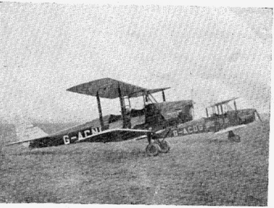
D.H. 60G. (Wooden version). (100 h.p. Gipsy I engine.)



D.H. 60M. (Moth metal version.) 100 h.p. Gipsy I engine.



D.H. 60M. (Metal service version.) 100 h.p. D.H. Gipsy I engine.



Photos by E. J. Riding.

H. 60. ("Moth Major" with 130 h.p. D.H. Gipsy Major engine.

service with the R.A.F. bore the serial numbers K.1200 to 17 and K.1838 to 94. They were painted aluminium all over and carried red, white and blue roundels on the sides of the fuselage, top surfaces of the upper planes and under surfaces of the lower planes, together with red, white and blue stripes on the rudder, the blue stripe being adjacent to the rudder post. Service serial numbers were carried on the rudder, sides of fuselage aft of the roundel, and on the under side of the lower planes. They were used for various training and light communication duties. 1929 also saw a 600-hour reliability tour carried out on a "Gipsy Moth." The engine in this machine, G-EBTD, was taken off the production line at random and installed in a standard "Moth" and sealed in the presence of A.I.D. With the exception of routine attention, the engine ran untouched for 600 flying hours, equivalent to a distance of 51,000 miles.

Although production went ahead with the D.H. 60M, a large number of wooden "Moths," fitted with the 95 h.p. A.D.C. "Cirrus III" engine were built. Several of these were supplied to National Flying Services Ltd. in 1929 for use in connection with their chain of flying clubs throughout the country. Batches of these machines were registered G-AAMM to G-AAMZ inclusive, and G-AAPA to G-AAPJ, G-AAPL to G-AAPO inclusive.

Another version at this time was the Coupé "Moth" —a D.H. 60G having both cockpits totally enclosed. Three of these machines were registered G-AADX, G-AAEE and G-AAGE.

"Moths" with D.H. "Gipsy" Mark I and II engines, were eventually superseded by the "Moth Major," which proved to be the last of the "Moth" line. The D.H. 60 Major was equipped with the four-cylinder inverted in-line air-cooled D.H. "Gipsy III" and "Gipsy Major" engine of 120 and 130 h.p. respectively. The prototype was registered G-ABUI and about 147 were built. The last "ex-works" "Moth" to be registered in this country was G-ADIO and the appearance on the register of several more of these machines, even as late as the G-AF section, is accounted for by aircraft being brought back from abroad or ex-R.A.F. stock restored during the Civil Air Guard boom in 1938–9. Thus K.1907 became G-AFMY in 1938 and was owned by the Horton Kirby Flying Club near Dartford, just before the war.

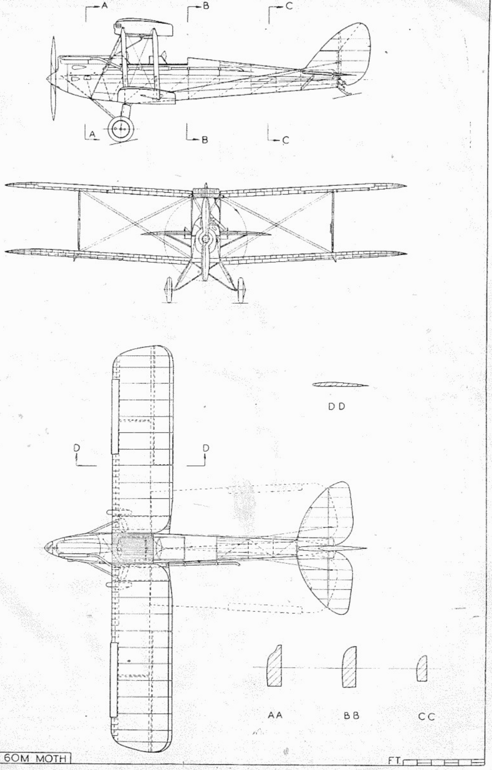
Thereafter, production commenced on D.H. 87 "Hornet Moths," and latterly with D.H. 94 "Moth Minors," to satisfy the more exacting demands of private owners and flying clubs both at home and abroad.

The "Moth" has departed this life, but its direct descendant, the D.H. 82A or "Tiger Moth" is carrying on a great tradition.

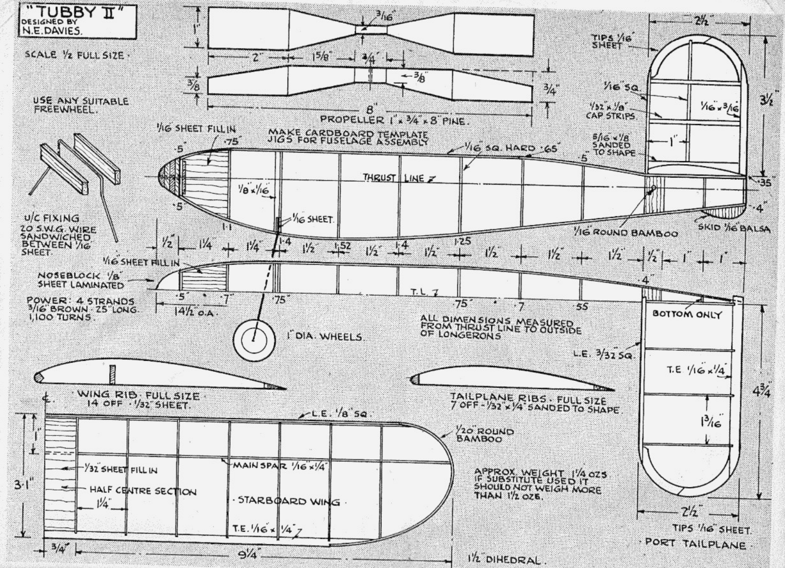
SPECIFICATION.

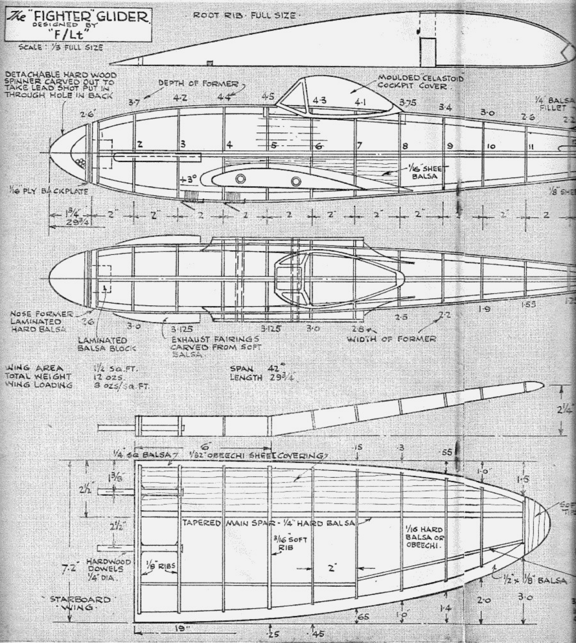
De Havilland 60 "*Moth*" (*D.H.* "*Gipsy*" *engine*).

Span	30 ft.
Chord	4 ft. 4 in.
Length	23 ft. 11 in.
Height	
Wing area	243 sq. ft.
Wing loading	7·2 lb./sq. ft.
Weight (empty)	970 lbs.
Weight (loaded)	1,750 lbs.
Power loading	17·5 lbs./h.p.
Speed (maximum)	98·5 m.p.h.
Speed (cruising)	83 m.p.h.
Speed (landing)	45 m.p.h.
Service ceiling	9,000 ft.
Duration	3½ hours (290 miles).

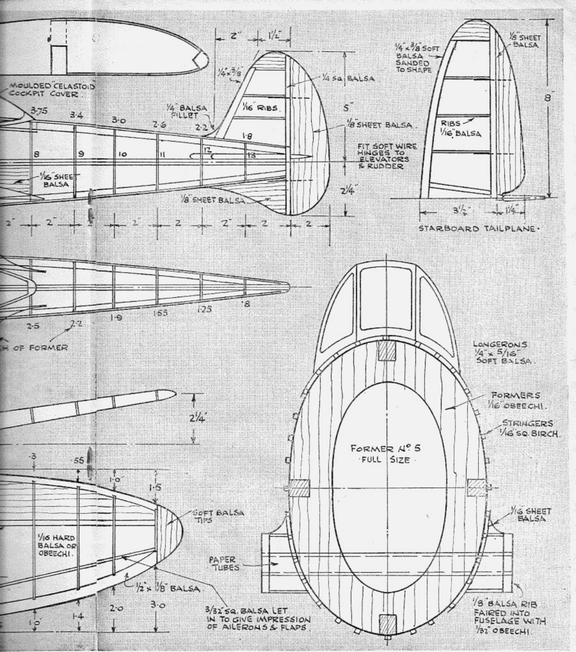


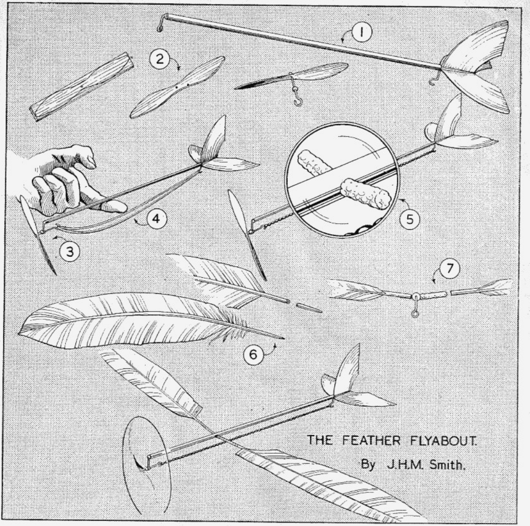
DE HAVILLAND 60M MOTH


"TUBBY II"
DESIGNED BY
N.E. DAVIES.
SCALE ½ FULL SIZE.
USE ANY SUITABLE FREEWHEEL.
U/C FIXING 20 S.W.G. WIRE SANDWICHED BETWEEN 1/16" SHEET.
PROPELLER 1" x ¾" x 8" PINE.
MAKE CARDBOARD TEMPLATE JIGS FOR FUSELAGE ASSEMBLY
1/16" SHEET FILL IN
1/16" SQ. HARD
THRUST LINE
1/8" x 1/16"
1/16" SHEET.
1/16" ROUND BAMBOO
SKID 1/16" BALSA
NOSEBLOCK 1/8" SHEET LAMINATED
POWER: 4 STRANDS 3/16" BROWN .25" LONG. 1,100 TURNS.
14½" O.A.
T.L.
1" DIA. WHEELS.
ALL DIMENSIONS MEASURED FROM THRUST LINE TO OUTSIDE OF LONGERONS
TIPS 1/16" SHEET
1/16" SQ.
1/32" x 1/8" CAP STRIPS
5/16" x 1/8" SANDED TO SHAPE
1/16" x 3/16"
BOTTOM ONLY
L.E. 3/32" SQ.
T.E. 1/16" x 1/4"
WING RIB. FULL SIZE 14 OFF. 1/32" SHEET.
TAILPLANE RIBS. FULL SIZE 7 OFF - 1/32" x 1/4" SANDED TO SHAPE.
L.E. 1/8" SQ.
1/20" ROUND BAMBOO
1/32" SHEET FILL IN
HALF CENTRE SECTION
MAIN SPAR 1/16" x 1/4"
STARBOARD WING
T.E. 1/16" x 1/4"
APPROX. WEIGHT 1¼ OZS. IF SUBSTITUTE USED IT SHOULD NOT WEIGH MORE THAN 1½ OZS.
1½" DIHEDRAL.
TIPS 1/16" SHEET.
PORT TAILPLANE



The "FIGHTER" GLIDER
DESIGNED BY
"F/Lt"
SCALE: 1/3 FULL SIZE
ROOT RIB · FULL SIZE
DETACHABLE HARD WOOD SPINNER CARVED OUT TO TAKE LEAD SHOT PUT IN THROUGH HOLE IN BACK
DEPTH OF FORMER
MOULDED CELASTOID COCKPIT COVER
1/4 BALSA FILLET
1/16" SHEET BALSA
1/16 PLY BACKPLATE
1/8" SHEET
+3°
1 3/4
29 3/4
NOSE FORMER LAMINATED HARD BALSA
LAMINATED BALSA BLOCK
EXHAUST FAIRINGS CARVED FROM SOFT BALSA
WIDTH OF FORMER
WING AREA 1 1/2 SQ.FT.
TOTAL WEIGHT 12 OZS.
WING LOADING 8 OZS/SQ.FT.
SPAN 42"
LENGTH 29 3/4
1/4 SQ BALSA
1/32" OBEECHI SHEET COVERING
TAPERED MAIN SPAR - 1/4" HARD BALSA
3/16 SOFT RIB
1/16 HARD BALSA OR OBEECHI.
HARDWOOD DOWELS 1/4 DIA.
1/8" RIBS
1/2" x 1/8" BALSA
STARBOARD WING


MOULDED "CELASTOID" COCKPIT COVER
3·75
3·4
3·0
2·6
2·2
1·8
8
9
10
11
12
13
2"
1½"
¼"x⅜"
¼ sq. BALSA
¼" BALSA FILLET
1/16" RIBS
5"
⅛" SHEET BALSA
FIT SOFT WIRE HINGES TO ELEVATORS & RUDDER
1/16" SHEET BALSA
⅛" SHEET BALSA
2¼"
2"
2
¼" x ⅜" SOFT BALSA SANDED TO SHAPE
⅛" SHEET BALSA
8"
RIBS 1/16" BALSA
3½"
1¼"
STARBOARD TAILPLANE
2·5
2·2
1·9
1·55
1·25
·8
OF FORMER
LONGERONS ¼" x 5/16" SOFT BALSA
FORMERS 1/16" OBEECHI
STRINGERS 1/16" SQ. BIRCH
FORMER No. 5 FULL SIZE
1/16 SHEET BALSA
PAPER TUBES
⅛" BALSA RIB FAIRED INTO FUSELAGE WITH 1/32" OBEECHI
2¼"
·3
·55
1·0
1·5
SOFT BALSA TIPS
1/16 HARD BALSA OR OBEECHI
½" x ⅛" BALSA
3/32" SQ. BALSA LET IN TO GIVE IMPRESSION OF AILERONS & FLAPS
2·0
3·0
1·4
1·0



Motor Stick.—Any suitable stiff stick. Straw is best.

Airscrew.—Spill, from the tobacconist.

Wings.—A matched pair (right and left) of tail feathers from any good flying bird.

Tail.—A centre tail feather.

Bearing.—Any suitable material—wood, celluloid, etc.

Shaft and Hook.—A few inches of thin wire (my supplies are robbed from old pieces of Bowden cable).

Rubber.—A loop of 1/32 in. square, or as required.

Wing attachment.—A short length of pipe cleaner.

Method of Construction. (The sequence is important.)

1. Build motor stick complete with tail unit and fin, rear hook and front bearing.

2. Select suitable spill for airscrew (grain parallel with edges), cut to half included wing span and shape to your favourite airscrew outline. Rub in cement or dope with fingers and twist to normal pitch. Hold till cement is set. Attach to shaft and form hook.

3. Assemble airscrew in place and attach rubber motor to hooks.

Trimming and Flying.

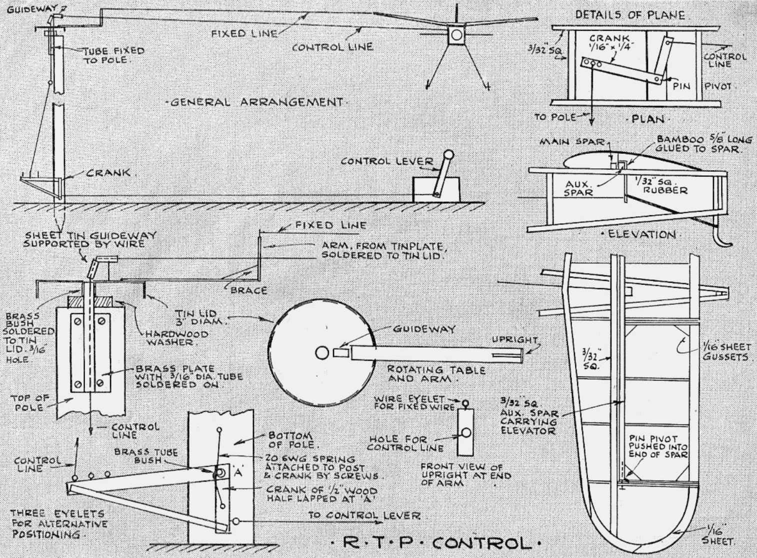
4. Balance on finger to find C.G.

5. At C.G., or slightly in front, pierce stick and push through a short length (1 in.) of pipe cleaner. Cement in place.

6. Trim fluff and down from wing feathers, cut to identical outline and cut off root end of quill 1/4 in. to 1/2 in. from end of surface area left after trimming.

7. Clean out growth from interior of quills and push on to ends of pipe cleaner. Cement strongly. Set dihedral and incidence. Building time, 45 minutes to 1 hour.

The dihedral and incidence of the wings having been built in as the glue was setting the next point to check is the tail. It may be badly curled. If it is the curl may be removed by ironing. For flying trim, bend wings backwards or forwards to alter the centre of lift. For aerobatics use a narrow high speed aircsrew and tail heavy trim. Result—good upward rolls. For endurance use accurate trim and wide blade, slow-moving airscrew.


GUIDEWAY
FIXED LINE
CONTROL LINE
TUBE FIXED TO POLE.
·GENERAL ARRANGEMENT·
CRANK.
CONTROL LEVER
DETAILS OF PLANE.
CRANK 1/16" × 1/4"
3/32" SQ.
CONTROL LINE
PIN
PIVOT.
TO POLE
·PLAN·
MAIN SPAR
BAMBOO 5/8" LONG GLUED TO SPAR.
AUX. SPAR
1/32" SQ. RUBBER
·ELEVATION·
SHEET TIN GUIDEWAY SUPPORTED BY WIRE
FIXED LINE
ARM, FROM TINPLATE, SOLDERED TO TIN LID.
BRACE
BRASS BUSH SOLDERED TO TIN LID. 3/16" HOLE.
TIN LID 3" DIAM.
HARDWOOD WASHER.
GUIDEWAY
UPRIGHT
BRASS PLATE WITH 3/16" DIA. TUBE SOLDERED ON.
ROTATING TABLE AND ARM.
TOP OF POLE
CONTROL LINE
WIRE EYELET FOR FIXED WIRE
HOLE FOR CONTROL LINE
FRONT VIEW OF UPRIGHT AT END OF ARM.
BOTTOM OF POLE.
BRASS TUBE BUSH
CONTROL LINE
20 SWG SPRING ATTACHED TO POST & CRANK BY SCREWS.
'A'
CRANK OF 1/2" WOOD HALF LAPPED AT 'A'
TO CONTROL LEVER
THREE EYELETS FOR ALTERNATIVE POSITIONING.
3/32" SQ.
1/16 SHEET GUSSETS.
3/32 SQ. AUX. SPAR CARRYING ELEVATOR
PIN PIVOT PUSHED INTO END OF SPAR
1/16" SHEET.

·R·T·P· CONTROL·

R. T. P. CONTROL

BY J · D · JENKINS

THE article on page 1042 of the September AERO MODELLER on control-line flying prompts me to send details of a similar device which I have made for rubber-driven models.

Early in the spring of 1942, owing to the small number of days suitable for field flying, I was forced to fall back on r.t.p. flying on the lawn, which is very sheltered by trees, etc., and is about 36 feet across. I always test glide my models on the lawn before carrying to the field. However, r.t.p. flying became a bit monotonous, and I evolved a system of elevator control and fitted an Achilles, 24 in. span, with movable elevators, and erected all the other stuff needed. It was a failure: true it flew, but the control was delayed action in operation, and then not very positive. After about two months experimenting and fiddling, first with the plane, then the pole, and then crashing the plane on its first flight I built an Ajax (the orthodox Ajax was the best r.t.p. flyer I ever had), with elevators, a bigger and longer fuselage and strengthened undercart. This was in every way successful, and has given many hours of enjoyment.

The system of control can be divided into three units:

1. The Plane.

The elevators were built as shown on the drawing and are really quite strong. They must be free-working and carefully fitted. The bamboo arm must be glued, not cemented, to the elevator spar. The return "spring" for the elevators is of 1/32 in. square rubber.

There is an easy method of cutting flat rubber into 1/32 in. square strips for this; first the flat rubber is glued (non-waterproof glue) to a bit of flat wood. When set, cut into strips 1/32 in. wide, then soak for an hour or so in water, and there are your 1/32 in. square strips. The drawing explains the crank inside the fuselage just under the wing. A removable hatch here is an advantage but not necessary. The only remaining point in connection with the plane is that the rudder should be given about 5 degrees offset toward the outside of the circle.

2. The Pole.

This member of the apparatus was the one which gave the most trouble at the beginning, but after considerable experimenting, it is now 100 per cent. efficient. At the top of the pole is a disc of metal (e.g. a tin lid) with a brass bush in it. Also soldered to it is an arm about 4 in. long bent up at the end to take the line. The bush in the middle of the disc fits over a piece of tube attached to the pole.

Thus it will be seen that the line goes up the centre of the tube, over a small guide and out along the arm to the plane (see general arrangement drawing). At the bottom of the pole is a crank (made of wood and bushed at the pivot) which is connected to the control line, and by a line to the control lever or "joystick." It should be noted that a spring of 20 s.w.g. spring wire should be fitted to take its weight off the control line.

3. The Control Lever of "Joystick".

This can be anything from a couple of strips pivoted together and one stuck into the ground, to an elaborate box with a handle, and a comfortable knob attached. On mine, a separate lever provided for the bomb release, to be worked by a third line; it was, however, not successful; the lines kept becoming entangled, and usually the bombs were dropped on raising the elevators, after the take-off.

Little can be said about flying the model, the main thing is practice, and a gentle touch on the joystick. A friend to launch the model is a great help, but beware of friends who think they know how to fly the model and then smash it up when they try. I have had two broken props and an undercart anchorage fixing torn out by well-meaning, but heavy-handed friends.

Note: Elevator movement should be about 3/16 in. up and 5/16 in. down, maximum.

A PROBLEM OF POWER

BY R · P · WARREN

FOR some time past I have been trying to solve a problem which to my mind anyway is a very important one. Namely, for a given machine with a given layout, what is the ratio between the weight of the motor and the weight of the whole machine to give optimum duration? For instance, if you put ½ oz. of rubber in a Wakefield machine it would not have a very good duration; likewise with 100 ozs. of rubber (assuming this possible). Somewhere in between is a value which will give the best duration. Well, I have managed to solve this at last, and the result is rather startling at first sight.

I have used the normal symbols but the following are unusual. All units are either feet, pounds or seconds.

w = wt. of rubber motor.
E = overall efficiency from engine horse-power to thrust horse-power.
t = time of motor run.
d = total duration.
M = wt. of machine without motor.
a, c, k are constants.

Now one lb. of rubber stores 2,000 ft. lbs. of energy at 80 per cent. breaking turns, so we have $\frac{2000\ w}{550\ t}$ brake horse-power available. That is $\frac{2000\ w}{550\ t} \times E$ thrust horse-power. The horse-power required for level flight is $\frac{D.V.}{550}$, so extra horse-power available for climbing is

$$\frac{2000\ w\ E - D.V.\ t}{550\ t}$$

$$R/C = E.H.P. \times \frac{500}{W}\ ft./sec.$$

$$= \frac{2000\ w\ E - D.V.t}{W\ t}$$

$$\therefore \text{height reached} = \frac{2000\ w\ E - D.V.\ t}{W}$$

(Continued overleaf.)

Now the sinking speed $= \frac{V.D.}{L} = \frac{V.D.}{W}$ ($\frac{1}{2}$ per cent. approximation), and the duration of the glide $= \frac{\text{height reached}}{\text{sinking speed}}$

$$= \frac{2000\ w\ E - D.V.\ t}{D.V.}$$

∴ total duration is this + the motor run " t ",

$$\text{so } d = \frac{2{,}000\ w\ E - D.V.\ t}{D.V.} + t$$

$$d = \frac{2000\ w\ E}{D.V.} \quad \ldots\ldots (1)$$

And please notice it is independent of the length of motor run.

Now α being the angle of climb, $\sin \alpha = \frac{\text{height reached}}{\text{distance travelled}}$, the distance travelled being $t \times V$.

$$\text{hence } \sin \alpha = \frac{2000\ w\ E - D.V.\ t}{W\ t\ V}$$

The thrust necessary from the airscrew during the climb is $W \sin \alpha + D$.

$$\text{Hence the thrust } T = \frac{2000\ w\ E - D.V.\ t}{t\ V} + D.$$

$$T = \frac{2000\ w\ E}{t\ V} \quad \ldots\ldots (2)$$

Now dividing (1) by (2) we get

$$\frac{T}{d} = \frac{t}{D} \text{ or } T \times t = D \times d \quad \ldots\ldots (3)$$

i.e., the thrust × motor run = the drag × duration, which is the energy given out = work done on machine or energy used up by the machine. That is what you would expect. However, this is digressing from the point, although I find these two formulæ interesting.

To resume :—

$$d = \frac{2000\ w\ E}{V.D.} \qquad \text{but } D = k\ V^2$$

$$\text{so } d = \frac{2000\ w\ E}{k\ V^3}$$

Now V^2 is proportional to W, so V^3 is proportional to $W^{\frac{3}{2}}$ and $k\ V^3$ will equal another constant $\times W^{\frac{3}{2}} = C.W^{\frac{3}{2}}$.

$$\text{hence } d = \frac{2000\ w\ E}{C.W^{\frac{3}{2}}}$$

$$\text{but } W = M + w.$$

$$\text{so } d = \frac{2000\ w\ E}{C\,(M + w)^{\frac{3}{2}}} = \frac{2000\ E}{C} \times \frac{W}{(M + w)^{\frac{3}{2}}}$$

Now everything in this expression is constant *except* " d " and " w ", and we want to find the value of " w " that will give a maximum value for " d ".

Differentiating with respect to " w " and equating the expression to zero will give this optimum value for " w ".

$$d = \frac{2000\ E}{C}\left\{\frac{w}{(M + w)^{+\frac{3}{2}}}\right\} = \frac{2000\ E}{C}\left\{w\,(M + w)^{-\frac{3}{2}}\right\}$$

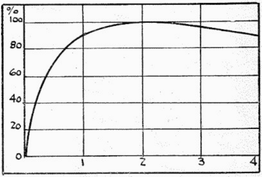
$$\therefore \frac{dd}{dw} = \frac{2000\ E}{C}\left\{(M + w)^{-\frac{3}{2}} - \frac{3}{2}\,w(M + w)^{-\frac{5}{2}}\right\} = 0.$$

$$\text{Simplifying we get } 1 - \frac{3}{2}\left(\frac{1}{M + w}\right) = 0 \text{ or } 2M + 2w = 3w.$$

$$\text{Hence } w = 2M.$$

This value is rather high for practical purposes but if we plot percentage possible duration against " K " where w = KM, a curve is obtained as shown in the diagram. Let us examine the effect on a Wakefield model having, say, 3 ozs. of rubber and an all-up weight of 8 ozs. That is w = 3 and M = 5, so K = 0·6. This gives 66 per cent. of the possible duration. By re-building so that M = 4 and putting in another ounce of rubber gives (at K = 1) an efficiency of 90 per cent. maximum duration. Now by adding another two ounces of rubber K = 1·5 and this gives a value of 98 per cent. of the possible duration. The speed is increased admittedly but only in the ratio of $\sqrt{\frac{10}{8}}$, that is 1·12 to 1, which is little to pay for the increased duration.

Now don't get me wrong. You cannot just gaily slap a couple more ounces of rubber into your model and expect to get a better duration. For one thing the propeller will have to be re-designed to allow for the increase in speed necessary and to take up the extra power, and there will be a change in the C.G. of the 'plane. But I do maintain that if when designing a machine you bear in mind a value for " K " of about 1·5 you will get a better duration.



FINDING THE WEIGHT OF WING RIBS

(*continued from page 83*)

Sum of Products = C[4(·0918 + ·117 + ·1052 + ·0735 + ·028) + 2 (·1133 + ·114 + ·0915 + ·0522) + ·0012] = 2·4052C

$$\therefore \text{Area} = \frac{2{\cdot}4052C \times C}{30}$$

$$= {\cdot}08017C^2 \qquad \therefore K = {\cdot}08017.$$

Here are a few constants for other airfoils :—

Clark Y	= .08017	Eiffel 400	= .0774
R.A.F. 32	= .08433	Gött 436	= .0747
R.A.F. 30	= .08365	Gött 387	= .09507

If a percentage of the ordinates of an airfoil is taken e.g., 75 per cent., Gött 436 for tailplane section, K decreases in the same proportion.

Now to find the total area of ribs in a wing.

Obviously in a parallel chord wing this is found by the formula :—

$A^T = NKC^2$ where N = No. of ribs. A_T = Total rib area.

For a tapered wing the following formula is used : —

$$A_T = NK\left(\frac{3x^2 + 3r^2 + 2xr}{8}\right)$$

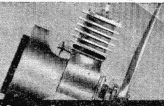
where x = Root chord

r = Tip chord.

N.B. This is only if ribs are of constant taper.

Now that we have the area, we can multiply this by the thickness and the density in order to find the weight.

PETROL TOPICS



DR. J. F. P. FORSTER.

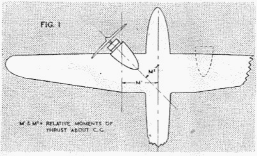
I HOPE all readers of Topics spent a Merry Christmas and may it be the last one for which we are "grounded." I say this feelingly, for having unwisely wandered out of my element in September "Topics" into the realms of theory, I've bitten off about as much as I can chew!! The cat is now definitely among the pigeons!

I asked for correspondence "however derisive"—well, I've had it! To begin with I've got it hot and strong from the other Scotsman—readers may recall that all this twin engine stuff arose from an argument north of the border. It now appears that originally the argument was concerned with the old bogey "downthrust," so it appears that even Scotsmen can't always stick to the point! The other Scot, Mr. J. H. Maxwell, warns me of the dangers of getting mixed up in a clan feud, so I'd better agree to see that there *is* some connection between downthrust and the use of toed-in fins. He is very incensed because I omitted to refer to side thrust as a contributory cure for engine failure.

The editor has a blue pencil and a limited supply of paper and as the dodge of side thrust on twin-engined machines was a well known and not entirely satisfactory solution of the problem, used since the earliest aero-modelling twin stick days, and on at least one full-size machine, I decided to confine the discussion to, and later tried my experiment on, the possibility of *fully* counteracting the yawing tendency of each engine by its own toed-in fin.

It seemed to me that toeing *out* the engine was not going to control matters until its thrust line passes nearly through the model's C.G. and in this position the props. will be cutting gashes in the L.E. of the wing (Fig. 1).

FIG. 1



Even in the position drawn, the thrust is still "about" the model's C.G., and with the starboard engine dead the model still tends to swing to the right.

However, I overlooked the effect of the slipstream on the fuselage and fin, and Maxwell contends that this is sufficient to equalise the reduced thrust moment about the C.G. I felt that the reduction of the engine's moment about the model's C.G. is negligible until the angle becomes impracticable, as in Fig. 1. However, the effect on the fin of quite small angles of offset is far from negligible.

I have proved to my own satisfaction that an ordinary streamlined fin has to be set at nearly 45 degrees to the c/l for its maximum rudder effect. Using a reasonably toed-out engine is only going to reduce this angle by 5 or 10 degrees and according to my findings we still haven't completely equalised the thrust moment. Nevertheless it is of course a step in the right direction of practicability.

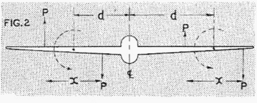
Unfortunately, offsetting the engine increases the crabbing tendency, so that the model presents a three-quarter front view to the air flow. Though the wing presents more drag (helping the fin) it also unfortunately produces more lift (unless completely stalled), and the result seems likely to be a bank to the right while crabbing to the left, with cumulative increase in the angle of attack of the port main plane until it stalls, when, if the model has not already hit the deck, it will certainly do so now!!

Another letter from E. J. A. Edwards follows much the same line of thought, except that he suggests making the slipstreams from both offset engines converge to a central fin fitted with a double-acting Handley Page slot or disrupter in front of its L.E. The disadvantage of a single fin is that it must be parallel to the c/l and therefore his device relies *entirely* on engine offset, which cannot alone be sufficient to deal with complete engine failure in one engine.

One practical suggestion comes from B. G. Green of Sutton, who suggests using twin pushers so as to get maximum slipstream effect uninterrupted by the wing. He also remarks that the best known full-size twin pusher unfortunately has only one fin, and naïvely suggests we should tell Boeings to remedy this!! Who said modelling had no influence on full-size design!!!

Having been badly shaken up by the clan feud, I then received a *coup de grâce* from N. K. Walker, B.Sc., who declares that the torque effect is independent of the position of the nacelle, and proceeds to prove it by the following diagram and equation:—

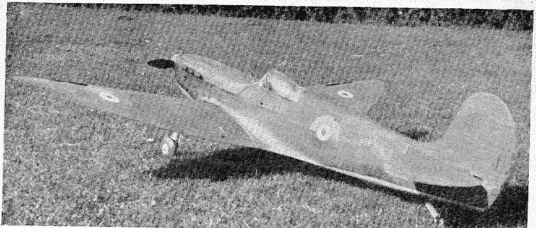
FIG. 2



Moment of one prop. = Px.

Moment of all forces about c/l $= P\left(d+\frac{x}{2}\right)+P\left(d+\frac{x}{2}\right)-P\left(d-\frac{x}{2}\right)-P\left(d-\frac{x}{2}\right) = 2Px$

i.e., the sum of prop. moments about their axes!!!

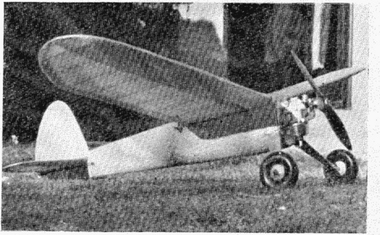


Now, I don't mind an occasional pink elephant on my ceiling—this sort of thing doesn't keep *me* awake for long—but when the sheets become smothered in algebraic formulæ, life for me becomes definitely unpleasant. Mr. Walker follows this up with a six-page article seething in the beastly things, with a list at the end of twenty-three symbols used throughout.

This has got me floored and I give up—in future I stick to practical experiments!! It appears that the force on the fin during a static test such as mine is only three-fifths of that in free flight and that compensation should therefore be good even with complete failure of one engine, using specially slotted toed-in fins. Also torque *can* be controlled, using contra rotating props. and, as I intended trying, having the starboard prop. rotating clockwise viewed from the front. If only I'd stuck to my practical experiments and got as far as my flying field I might have discovered this without all these sleepless nights resulting from Walker's equations! As far as I can see, however, *he* still hasn't answered my original question—is the correcting tendency *proportional* to the variation in thrust from an engine behaving irregularly? He seems to have proved that it *can* be made to equal the thrust. The point is, is this setting good at any revs. Maybe he *has* answered this, but I wouldn't know!! The article is now in the Editor's safe keeping. For all the good it can do me it might as well remain in the Editor's *safe!* However, I trust that others may be made to suffer as I have suffered, and maybe readers can tell me what it's all about. I believe Mr. Walker has a kind heart and has tried to let me down lightly, but the snag is I still wouldn't know, till he stops talking in figures and algebra!!! I'm off, to do some rumbling! When you people have settled your theoretical argument I'll let you know the results in practice at the earliest opportunity after the ban is lifted.

Here, as a consolation to others who shy at the sight of figures, is evidence of something practical. A reminder of the good old days when balsa was 3d. a sheet and "Topics" was full of "real life stories"! The model is a little baby three-footer, recently constructed by Corp. P. E. Norman, R.A.F., powered with a baby engine (which I'm glad to see is the right way up!), of his own design and construction. The cowling is removed revealing a downdraught Rotary Inlet valve, easy to choke, and it looks to me as if the tank lies immediately below the needle valve under the crank-shaft—a position I suggested in my book as being accessible and eliminating variation of mixture in steep dives or climbs. Total weight at the time of writing was 17 ozs., but it's still coming down!! Very soon I hope it will go up—mine too—the model, I mean, not my weight!

The other photo is of my Spitfire II—an overflow from the description which appeared in the Christmas issue.



"MY ENGINE"

(IN ITS FINAL FORM)* — BY LAWRENCE · H · SPAREY

SOME readers may remember that some time ago details were published in this paper of a preliminary design for a 6 c.c. aero engine. Since that time I have had opportunity to reconsider my rough draft, and to "clean up," as I promised to do, many of the unusual features. As the publication of my proposals seems to have aroused interest, readers may like to see the design that I have finally settled upon.

A glance at the illustration in Fig. 1 will show that the main features remain essentially the same. These include twin plugs, rotary inlet valve, cast-iron bearings and an underfitting anchorage for the gudgeon pin. However, the drawing shows that the bearings for the main shaft and auxiliary shaft are now each in two portions. This was done because the parts will now be easier to make, and because the small gap between the two portions of the bearings will provide an oil reservoir, which may be fed from the oilways in the casting. The drawing still shows that two piston rings are fitted to an alloy piston, but as I stated before, I have a slight preference for a cast-iron piston lapped to a fit within the bore, and the engine will incorporate that arrangement.

So much for the main features. Most alterations, however, have been made to the arrangement of the contact breaker, both in its design and position on the engine, and in the arrangement of the carburetter. In the first place, the whole of the contact breaker mechanism has been transferred from its position behind the propeller boss to the auxiliary shaft of the rotary valve. My reason for not placing it in this most obvious position in the first instance was because of the presence of the carburetter; the rear face of the crankcase is only $1\frac{1}{4}$ in. in diameter, and as the opening for the rotary valve is only 13/32 in. from the centre line, I could not see, at first, just how the two components could function in so cramped a space, or even how they were to be got in. But more of this later.

The push rod system of operation has been abandoned, and in its place has been substituted a long rocker arm, which pivots in a small fork on the contact breaker casting. This is much neater in appearance than the push rod system, is lighter, and should be more reliable in operation. At the same time, my object in keeping the points well away from the oil which inevitably finds its way out of the bearing ends has been maintained.

While the drawing in Fig. 1 shows the arrangement quite well, I feel that the little free-hand sketch in Fig. 2 will make the matter clearer for most readers, besides affording some amusement for Mr. Rupert Moore and, possibly, Freddie. Disregarding the artistic merits of the sketch, readers will see something of the actual shape of the contact breaker casting, and it will be noted that the fork in which the rocker pivots is integral with the casting, which is held to the rear bearing-housing by means of a split collar and bolt. Contact of the lower part of the rocker arm upon the cam is maintained by a stiff spring (marked x), while the rocker arm itself passes through a hole in the long ignition lever. Taking it all round, I think that the arrangement provides everything that we may look for in a contact breaker.

The placing of the breaker at the rear of the engine necessitated a complete re-designing of the carburetter, and in toying with various ideas it was early impressed upon me that the main body of the carburetter would have to form part of the casting of the crankcase-rear-cover. (I trust that readers will forgive the use of these long, compound terms, which savour too muoh of the German language!)

Accordingly, this was done, and the carburetter body was made to occupy the position along the side of the auxiliary shaft-housing. The drawing (Fig. 1) cannot, therefore, show the carburetter, as this drawing depicts a vertical cross-section of the engine through its centre line. Components which lie outside this plane must be shown in separate detail, so I have prepared a series of drawings, traced off my original detail drawing, giving the necessary particulars.

Before referring to these, we may again glance at my sketch in Fig. 2, which shows how the carburetter casting and the shaft-housing are integral with the rear cover of the crankcase. This sketch does, in fact, depict the manner in which the carburetter and petrol tank are attached to the engine, while Fig. 3 gives details of the casting. This is a plan view of the component, viewed as if looking from the top of the engine. Fig. 4 is the end view of the casting, where it will be noted that the carburetter portion has two circular lugs on the top and bottom. The matter is amplified by the drawing (Fig. 5) of a section taken on a line (A), (A). Here, it will be seen that the hole for the inlet valve in the crankcase back has been continued to form a venturi-shaped opening for the air intake of the carburetter, while a vertical hole provides a housing for the body of the carburetter itself.

This brings us to the actual carburetter assembly as shown in Fig. 6. The portion marked (1) is, of course, the section of the main housing shown in Fig. 5. In this drawing (Fig. 6) is shown, however, the body of the carburetter held in the housing. The body is marked (4). It consists of a plain, cylindrical turning, with a small collar turned near one end. The arrow leading from the figure (4) is actually pointing to this collar. The top part of the body is threaded for a short distance, while the remainder is made a push fit in the housing. The body is also drilled along its length, and the top portion of this hole threaded to take the adjusting needle. Into the lower bore is pushed a small length of brass tubing, into the top of which is soldered the jet. This tubing is marked (6).

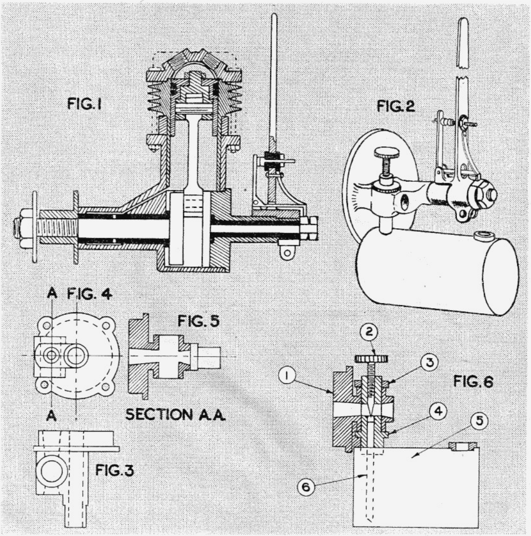
The lower end of the carburetter body is sweated into the petrol tank, and the whole is retained in the housing by means of the nut, marked (3). On inspection, it will be appreciated that this provides a very simple means of reversing the carburetter and tank. All that is required to remove the needle (2), unscrew the nut (3), withdraw the body of the carburetter (4), (together with the petrol tank), and push the body back into the housing (1), but this time from the opposite side. On replacing the needle valve and the nut (3), the whole carburetter assembly assumes a reverse position in the housing, and

* This article of Mr. Sparey's was written prior to that of Dr. Forster's (November "Aero Modeller"), in which the latter offered criticisms and comments. A further article from Mr. Sparey will appear in the February issue, in which he will reply to Dr. Forster. Much useful data will undoubtedly come to light when two such experienced "petroleers" get together!

the engine may then be run inverted. In the construction it will, of course, be provided that the hole which runs through the body will exactly register with the venturi-shaped hole in (1), in either upright or reversed position.

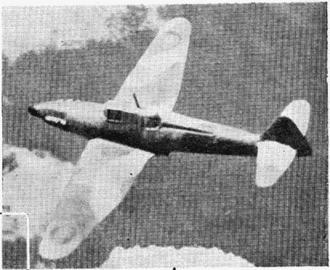
When the engine is mounted in the 'plane in an inverted position, the long ignition lever will, of course, protrude from the bottom of the 'plane, if assembled as shown in Fig. 1. To avoid this awkward position, the timing cam on the auxiliary shaft will be set in such a manner as to allow the ignition lever to protrude sideways, instead of vertically. This means that it may protrude from the side of the aeroplane through a small slot in the engine cowling, in a very convenient manner. On reversing the engine, no alteration need thus be made in the contact breaker, as the only result of turning the engine upside-down will be that the lever will protrude from the opposite side of the cowling.

From the above brief notes it is hoped that some idea may be had of the lines upon which the preliminary design has been modified. The engine does, in fact, contain other unusual features which I cannot disclose at the moment. An experimental model has already been constructed, and its performance and general convenience have been very good, so much so, in fact, that arrangements have been made for the engine, in a commercial form, to be produced and marketed by a well-known firm after the war. In conclusion, I should like to make acknowledgments to Mr. Edgar T. Westbury, the well-known designer of model petrol engines, whose published experiments have been a constant source of inspiration over a number of years.



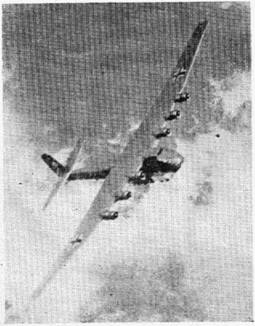
"SOLID" MODELLING IN CARDBOARD

BY P · R · DOUDNE



The two models shown in this article are the Defiant and the Me 323, both of which are excellent examples of this comparatively new method of "solid" modelling. (I quote "solid," for it seems to me that we can no longer loosely apply this term in these days of various built-up constructions.—Ed.)

A NUMBER of varieties of cardboard have been used during the development of this form of "shell construction" of Non-Flying Scale Models of which Bristol Board has proved to be the best. The highly glazed surface takes an excellent finish, while if bent firmly, it retains its curvature, unlike other card, which tends to straighten out before it is glued down. Slight



double curvature can be impressed into small panels of Bristol Board by placing them on a soft, but firm surface, and rubbing hard with the rounded end of a metal or hardwood rod.

All seams and joints in wings and fuselages, except the wing trailing edge, are connected with an internal strap, having an overlap of about 1/8" either side.

Wing spars should be continuous from tip to tip, and must not be broken where the wing passes through the fuselage, unless a strong fuselage structure is fitted at that point, otherwise distressing variations in dihedral may result.

Fuselages with strong double curvature in all views, such as the Marauder and Commando, are difficult, and no really satisfactory method of construction has yet been found. Small sections of high curvature, such as the nose of a Defiant, or Mosquito fuselage, may be made of a straight tube of card with a plastic fairing.

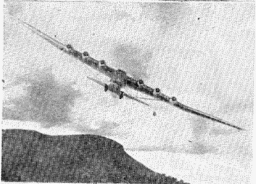
Wings.

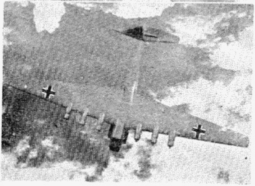
The wing envelope folded around the leading-edge is basic, while the internal structure can be varied considerably, but is always built upon the inside of the lower surface. Sparless wings, as described by D. M. Hald in the September AERO MODELLER, were used on two early models in 1940, but were given up in favour of the more rigid-sparred type. They have certain advantages in trueness of section, however, and may be preferable in special cases.

Spars are of wood, or if card, with tabs along the edges forming a channel section, and may vary in number from two for small wings, of up to 1½ in. root chord, three for 2 to 2½ in. chord, and four for any size above this.

Ribs are of balsa or card, and may sometimes be dispensed with in the nose of the wing which will keep the section well, whereas the flatter trailing portion always needs ribs. (See Fig. 1.)

The wing envelope is divided at each change in dihedral, but if the aerofoil section is flat-bottomed, it can have a continuous under surface, the upper surface being





trimmed at each change in dihedral. Control surfaces should be scored heavily on the outside, *before* glueing the top surface down, while any prominent corrugations may be represented by scoring heavily on the *inside*, resting the card on a soft surface. Split flaps are made by fitting a spar just in front of the flap, scoring the flap line so that it will bend up and down easily, and leaving the trailing edge unglued.

Hardwood pivot points, for retracting undercarriages, are fitted if necessary, and any other necessary fittings, strengthening attachments for struts, etc., are installed before the top surface is glued down.

Tailplanes and fins are made in the same way as small wings. Where the leading edge is elliptical, top and bottom surfaces are made separately, and a shaped balsa leading edge fitted. This procedure may work for wings with elliptical leading edges also, but has not been attempted so far.

Fuselage and Nacelles.

Very few fuselages can be made in one piece, and are normally divided into sections for every change in angle of the top or bottom lines, each section being tubular, with balsa formers at the joints. For each section the length and perimeter at the ends are known, the latter being determined by wrapping a strip of card around the previously cut formers, a good margin being left at the ends. Seams are usually along either the top or bottom centre-line, but in an early model of a Dornier Do. 17, in which wing and fuselage merge gradually into each other, the fuselage was split along either side, and the bottom sections carried out to ribs at the end of a stub centre-section. (See Fig. 2.)

By the careful use of cut-outs, straight tubes may be gently curved to a fuselage outline. A Mosquito fuselage was made as a straight tube from the tail to the wing trailing edge. The portion over the wing was curved around by cutting out the wing slot, bomb doors, dinghy stowage hatch, and cabin. The nose section was a straight tube faired with plastic wood. (See Fig. 3.) The Mosquito nacelle was dealt with similarly, by cutting out around the air-intake and undercarriage doors.

Rectangular section fuselages appear to be ideal for cardboard modelling, but, while easy to make, soon sag badly between supporting formers and look very poor. The best solution found so far was used on a Me. 323, and consists of a concertina-like strip of formers running from nose to tail, carefully positioned to avoid all windows. (See Fig. 4.) Fuselages with flat sides, top and bottom, but rounded corners, which are curved in both plan and side elevation may be fitted with rounded balsa strip edges, bent around the completed cardboard structure, as shown in Fig. 5.

In view of the tendency to fit air intakes in the leading edge of radial engine cowlings, now in evidence by American designers, a simple method of making such nose-entries in card is useful. As applied to the Liberator III, a circular cardboard ring with two curved strips for the outer edges of the intakes are glued to the former at the front of the elliptical main cowling, and the space around filled with plastic woods. (See Fig. 6.)

While not claiming that this method of construction is either new, or easier than wood modelling, it offers more scope for ingenuity and is capable of much development. In this latter connection it is now being extended into a very detailed form in which the actual structure of the full size aircraft is copied, and the card lapses into a covering for metal or plywood parts of the real machine, while the paper is used for fabric-covered parts, with a wood and card sub-structure. 1/48th scale permits of much detail including the fitting of movable controls actuated from the cockpit.

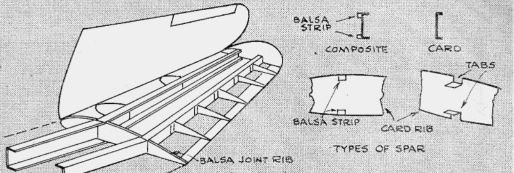


FIG 1. WING STRUCTURE

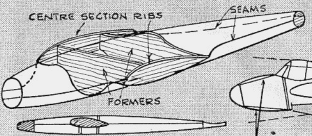


FIG 2. DORNIER 17 FUSELAGE.

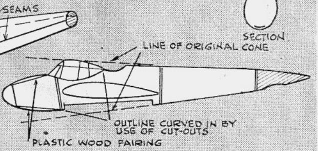


FIG 3. MOSQUITO FUSELAGE.

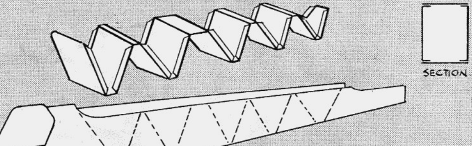


FIG 4. ME. 323 FUSELAGE BRACING STRIP.

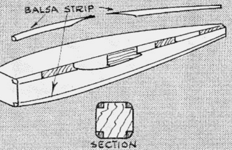


FIG 5. RECTANGULAR FUSELAGE WITH ROUNDED CORNERS.

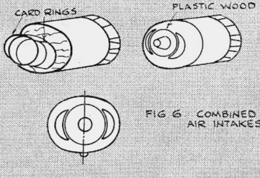
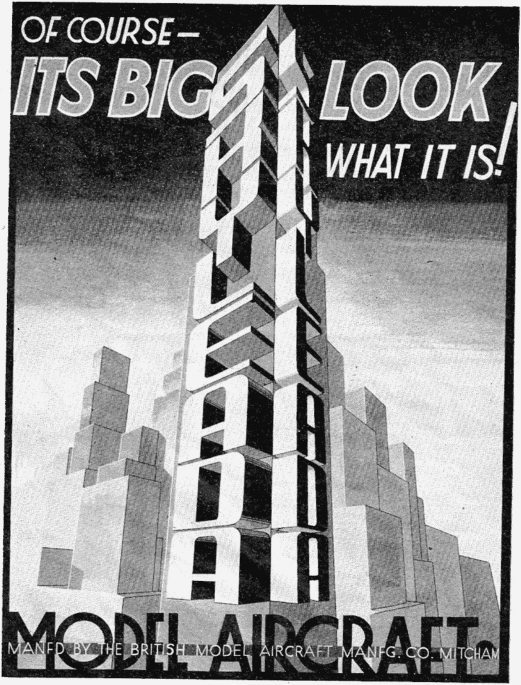


FIG 6. COMBINED AIR INTAKES


OF COURSE—
ITS BIG LOOK
WHAT IT IS!
MODEL AIRCRAFT
MANFD BY THE BRITISH MODEL AIRCRAFT MANFG. CO. MITCHAM

MONTHLY MEMORANDA

By O · G · THETFORD


A particularly good 1/72 scale Thunderbolt, built with an eye to detail, by A. H. Butler, of Tottenham.

New F.A.A. Types for 1944.

Extensive re-equipment and expansion of the Fleet Air Arm in the latter half of 1943 has made the Royal Navy second-to-none in air activities and many heavy blows will doubtless be delivered against the enemy both in the West and the East during 1944. Two new American fighters, the Vought-Sikorsky Corsair and the Grumman Hellcat have gone into service with the F.A.A. to supplement the British Seafires and the new Fairey Barracuda torpedo-bomber monoplane which replaced many Swordfish and Albacore biplanes in 1943, is supplemented by the American Grumman Tarpon. Hundreds of Kingfisher and Seamew reconnaissance float-planes, built by Vought-Sikorsky and Curtiss respectively, are serving with catapult units, on shore stations and in training establishments. Another new type of trainer used by the Royal Navy for navigational and radio instruction is the Stinson Reliant. The F.A.A. Reliant I is virtually the same as the well-known civil version which was flown over here before the war, except that it has a longer fuselage and internal equipment alterations. The training Reliants are sea-camouflaged on the upper surfaces and have training yellow under-surfaces. The name "Royal Navy" is painted on the rear fuselage and the usual national insignia is carried. The serial number is painted in black beneath the wings in addition to on the fuselage, and some of the machines at present in service are numbered between FK 814 and FK 876.

The Hellcat is descended from the Wildcat fighter which did so well against the Japanese in the Pacific in 1942 and 1943 and has served with the F.A.A. as the Martlet. It has the same general layout as its predecessor, but has a much more powerful Wright Double Cyclone motor in place of the Twin Wasp or single-row Cyclone, and an undercarriage which retracts backwards into a flat centre-section, the dihedral commencing at the outer panels. The Corsair, Hellcat and Tarpon are all painted in the standard F.A.A. pattern for operational types, i.e., dark slate grey and dark sea grey on the upper surfaces and sea grey medium underneath. "Royal Navy" is painted in black on the rear fuselage and the usual national roundels are painted on the wings and fuselage, in addition to the fin "flash."

Radial Battles.

A hundred or more Fairey Battles used in Canada for target-towing duties were converted at the end of 1943 to take the Wright Cyclone radial motor in place of the Rolls-Royce Merlin. These Cyclone motors were originally ordered for the Canadian-built Bolingbroke bombers (version of Blenheim), but other motors have been used in the bombers, leaving the motors surplus. A slight increase in speed is probably obtained in the Cyclone-Battle. Most of the Cyclone-Battles are of the Trainer type, with divided cockpits on the Wellesley plan instead of the original continuous greenhouse, although a few are believed to be flying with the original type of cockpits. These Battles are painted training yellow all over, across which are painted diagonal black stripes to indicate the target duties on which they are engaged.

"Mossie" Variants.

By the close of 1943 *fifteen* different versions of the D. H. Mosquito were in service with the R.A.F. and British Overseas Airways. As a result many different varieties of markings are seen on the type, and are tabulated below for the convenience of modellers.

(1) Day fighter for long-range patrol over the sea. Mk. II version with L. R. tanks below wings. In service with Coastal Command. Sea green and sea grey medium above and sea grey medium underneath.

(2) Home defence night fighter in service with Fighter Command. Mk. II version with or without L. R. tanks. Soot black all over upper and lower surfaces. Numbers and letters in dull red.

(3) Long-range night fighter for use over enemy territory. Mk. II. Dark green and sea grey medium on upper surfaces and soot black underneath.

(4) Daylight intruder-bomber. Mk. II version. Dark green and sea grey medium on upper surfaces and sea grey medium underneath.

(5) Night intruder-bomber. Mk. II version. Soot black all over with red letters and numbers.

(6) Medium day bomber for high or low attack. Mk. IV version. In service with Bomber Command. Painted as (4) with duck-egg blue or pale grey code letters and black serial number.

(7) Fast night-bomber for low or high attack. Mk. IV version. In service with Bomber Command. Painted as (3).

(8) Daylight photographic reconnaissance (PRU) at low and medium altitude or high altitude. Azure blue with high gloss finish all over. Red and blue cockade on fuselage sides. Normal insignia elsewhere.

(9) Operational training aeroplane in use with Training Command as the Mk. III. Painted as either day fighter or bomber on the upper surfaces and training yellow underneath.

(10) Mk. III and Mk. IV (converted) transport versions in service with British Overseas Airways. Dark green and sea grey medium on the upper surfaces and silver underneath. Civil registration letters on wings and fuselage, outlined in silver on the upper surfaces and black underneath. Red, white and blue stripes beneath letters below wings and on fuselage; red and blue stripes below letters above the wings. Fin flash. One converted Mk. IV registered G-AGFV.

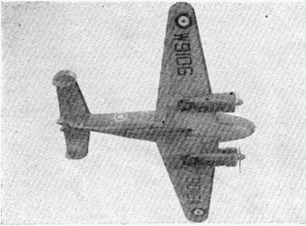


Photo by courtesy of " The Aeroplane."

AEROPLANES DESCRIBED—XII

THE LOCKHEED ELECTRA

BY H · J · COOPER

Next Month : The D.H.9A

IN 1936 British Civil Aviation was faced with a famine in up-to-date air-liners, much as it is at the present time, and this country's air-line operators were forced to import airplanes from across the Atlantic to fill the gaps in their fleets. We had nothing in the fast ten-seat monoplane category, our designers and manufacturers having their hands full in supplying the Royal Air Force with aeroplanes under the Panic Expansion Scheme.

In America the Lockheed Electra held a prominent position as a medium-sized air-liner with a high performance, and for some time had been operating successfully on many air-lines in that country and in Canada.

In November, 1936, British Airways Ltd. (successors to the old Hillman's Airways, and predecessors of the present Airways Corporation), announced their intention of purchasing a number of Electras, and the first was delivered in March of the following year. Three others followed soon after. They were left in their natural aluminium colouring, and bore civilian registrations in black. Their letters were G-AEPN, PO, PP and PR, and over the Home Counties all were to become familiar sights on the Viking Royal Mail Express Service, which had been operated by D.H.86As. A machine left Heston at 9.0 a.m. every week-day, and cruising eastwards at 175 m.p.h. would leave the coast at Clacton, pick up the continent at Amsterdam, and would arrive at Hamburg, its first stop, at one o'clock. It reached Copenhagen, via Malmö, at 2.30, and was at Stockholm by 6 p.m. and the incoming machine would be at Heston at the same time. Electras were also operated on the daily service to Paris, carrying out as many as six flights each way during the summer months. The journey was made in ninety minutes.

Three more Electras (G-AESY, AFCS and AFEB) were later added to the fleet, and at the outbreak of war five were still flying. G-AEPP was wrecked in this country in 1937, and ESY went into the sea at Copenhagen in 1939. G-AEPR and FCS are still on the Civil Register and the remaining three, EPN, EPO and FEB, were impressed for service with the Royal Air Force as communications aircraft. They now carry the serial numbers W9104, 9105 and 9106.

Electras are also operated on the internal air-lines of Australia and New Zealand, and equipped the air services of some of the Balkan States.

Military versions known as the C-36 and C-37 are used by the U.S. Army as " cargo " machines, and a U.S. Navy personnel transport is known as the R20-1.

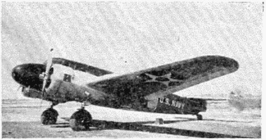
The Electra was first produced in 1934, but the model as now known did not appear until the following year. Motors usually fitted are Pratt & Whitney Wasp-Juniors each of 400 h.p.. but the C-37 has Wright Whirlwinds of 420 h.p. Two- or three-bladed airscrews are fitted.

British Airways' machines were fitted to accommodate ten passengers as well as the pilot and radio-operator, and had a maximum speed of just over 200 m.p.h. at 5,000 ft. Performance figures for all the variations are much the same, and the landing speed is 65 m.p.h. ; the range at cruising speed is 700 miles, and the service ceiling 19,000 ft.

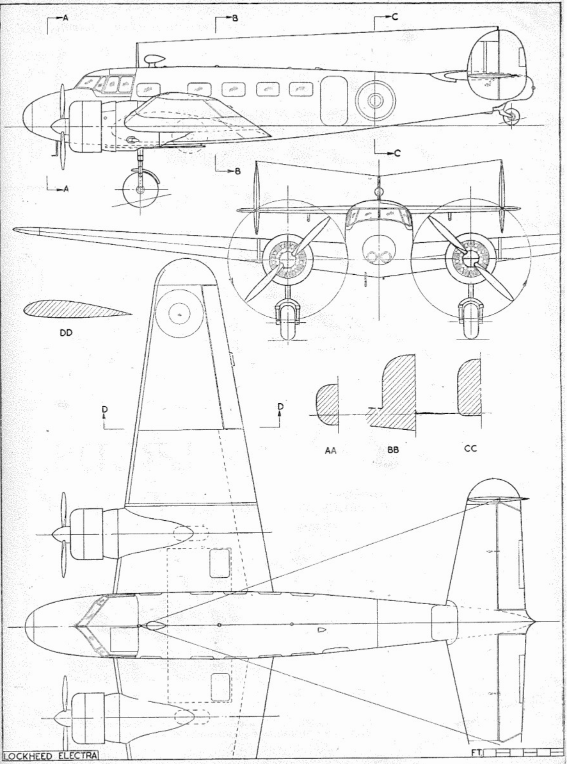
The fuselage of the Electra is an all-metal monocoque structure with light alloy skin. The wing and tail-unit are likewise all-metal structures with metal skin covering, except for fabric-covering of movable control surfaces.

Main dimensions are : Span, 55 ft. ; length, 38 ft. 7 in. ; height (tail up), 13 ft. 2 in. ; root chord, 12 ft. 1 in. ; tip chord, 4 ft. ; tailplane span, 21 ft. 3 in. ; tailplane root chord, 6 ft. ; track, 13 ft. 7 in. ; airscrew diameter, 9 ft.

" PN." Photo by courtesy of " Flight."



The R20-1. Photo by courtesy of Gordon S. Williams.



A
B
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D
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LOCKHEED ELECTRA
FT.

Club News

BY CLUBMAN

SOME time ago the Blackpool & Fylde M.A.S. put a number of proposals to the Council of the S.M.A.E., and in view of their interesting nature, I am reproducing here in part the main points from their memorandum. Naturally, one Society's (or person's) ideas will not meet with universal approval, but at any rate they give the basis or outline of a scheme that can be usefully discussed and amplified to the benefit of the movement generally.

The first proposal is in connection with the allocation of Plugge Cup points—always a sore bone of contention since the introduction of a "balancing" scheme some time ago. To quote :—

"The system of allocating Plugge Cup points, although better than the original system, is not truly representative of respective efforts by the competitors. The following two methods are completely fair, and are as truly representative of efforts as it seems possible to achieve. However, it is quite possible that discussion would bring forth improvements.

SYSTEM 'A' based on DURATION of flights in each contest.

The number of seconds duration of each competitor shall be expressed as a percentage of the winner's duration, and the percentages so obtained shall become the Plugge Cup points for the respective competitor.

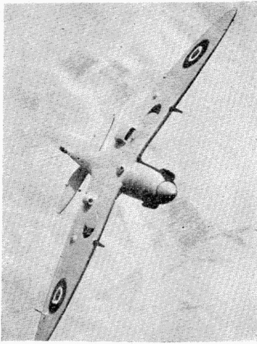
Example result would be :—

Competitor.	Duration.	Plugge Points.
A	521 secs.	100
B	498 ,,	95·59
C	327 ,,	62·76
D	251 ,,	48·18
E	250·5 ,,	48·08
F	220·5 ,,	42·32
G	206 ,,	39·55
H	206 ,,	39·55
I	130·25 ,,	25

It can be seen immediately that the number of Plugge points awarded in each contest is not dependent on the varying number of entries in the contest. The points are, therefore, a direct indication of competitors efforts. All contests would be on an equal basis, the competitors being 'compared' with the winner of their respective event.

SYSTEM 'B' based on competitor's POSITION in each contest.

The numerical positions of the competitors on the finishing list shall be reversed and the number then representing each competitor shall be expressed as a percentage of the total number of competitors. This percentage shall be the Plugge Cup score. Taking the same example as in system 'A' above, the result would be :—



"Victory Roll." A Spitfire VB built by A. Greenwood and photographed by H. R. Mathews. A combination that certainly produces first class results.

		Position.	Reversed.	Plugge Points.
A	521 secs.	1st	9	100
B	498 ,,	2nd	8	88·8
C	327 ,,	3rd	7	77·7
D	251 ,,	4th	6	66·6
E	250·5 ,,	5th	5	55·5
F	220·5 ,,	6th	4	44·4
G	206 ,,	7th	3 } Highest number	33·3
H	206 ,,	7th	2 } taken, i.e. 3.	33·3
I	130·25 ,,	9th	1	11·1

It can be seen that with either of the systems, if the total number of competitions qualifying in Plugge points is known, then the maximum possible points score is also known, i.e. 10 competitions give a maximum total of 1,000 points.

A much better indication of the progress of the various Clubs could be given. (These systems, of course, apply also to Thurston Individual Cup.)"

Another proposal is that different age classes should be instituted in connection with National Records, the age groups to follow the present American N.A.A. system of "Junior," "Senior" and "Open" classes, and be allocated as follows :—

JUNIOR Class :	Up to 16 years of age.
SENIOR Class :	16 to 21 years of age.
OPEN Class :	21 and over.

Yet a further proposal is that Microfilm contests could be organised to run concurrently with the S.M.A.E. r.t.p. contests. With regard to the timing of microfilm models, they suggest that the duration should terminate on the model coming to final rest—*not* as soon as the model touches a solid object. This would allow a better chance for models to be flown in a restricted space.

A. D. Piggott with his "Wakefield" weighing 3.8 ozs. Rubber for same weighs 4.4 ozs. He says the result is a terrific climb! Presumably the wings catch the fuselage up somewhere at the peak of said climb! Photo sent by J. A. J. Marett.

Well, there are one or two plums for you to chew over, and I shall be pleased to have the views of readers on the above suggestions. There are plenty of argumentive points I know, but it is through such discussions that we arrive at better systems and conditions, so don't hesitate to write. Unfortunately, far too many modellers grumble and grouse about regulations, but do nothing off their own bat to help modify matters. No system is perfect—that is well known, but by a general collective discussion, something good is bound to arise, so get to it.

The EBBW VALE M.F.C. held a Welsh Rally earlier this season, with competitors from Cardiff, Mountain Ash, and Newport. Cardiff won the event hands down, best time of the day being set up by M. Morgan with 2 : 06 for rubber-driven models, while J. A. Lewis made best glider time with 1 : 10.

Later the CARDIFF M.A.C. held a Decentralised "War-time Cup" contest, when the weather was very windy and showery. T. A. Lewis won the event with an aggregate of 3 : 58, T. Rollinson of Newport coming second with 3 : 39·1, and E. May of Ynysbwl third with 3 : 12. Lewis holds the club glider record (tow line) with 2 : 50, but G. Ferris was very unlucky when making a flight of 8 minutes o.o.s.—but no official timekeepers were available! How many times does that happen in the course of a season? No prizes for the answer.

The STEWARTON M.A.C. glider trophy has been won by R. Burns, who aggregated 2 : 39·4 for three flights. A keen struggle for second place went to 13-year-old J. McDonald who put up 2 : 02·4, while G. Sims placed third with 1 : 46·6. This club arranged a gala day on the 25th September, erected tents, provided large numbers of officials—and then only had six visitors turn up!! 'Eartbreaking I calls it. Russel of Stirling won the duration event with 4 : 15, Burns the glider event with 2 : 36, while Leask of Glasgow won the nomination event.

Another club to stage a Rally was the WEST YORKSHIRE M.A.S., held on October 4th. Weather was as near perfect as possible at this time of the year, and the Leeds lads had a real day out, wiping the floor completely with the glider events. Altogether 45 competitors took part, the results being as follows :—

H.L. Duration.	
N. Lees (Halifax)	5 : 40·8 aggregate.
C. Furse (Leeds)	4 : 41 ,,
H. Austwick (Halifax)	4 : 26·9 ,,
Tow Launch Glider.	
B. Crocker (Leeds)	3 : 38·4 ,,
C. Furse (Leeds)	3 : 33·9 ,,
R. Mann (Leeds)	2 : 18·8 ,,
H.L. Glider.	
C. Furse (Leeds)	3 : 33·5 ,,
B. Crocker (Leeds)	2 : 11·1 ,,
H Tubbs (Leeds)	1 : 45·8 ,,

Best times of the day were put up by B. Crocker (glider) with 2 : 03·9, and N. Lees (rubber-driven) with 2 : 05.

The BUSHY PARK M.F.C.—winners for the second year in succession of the Plugge Cup—were beaten by the Blackheath Club in the first round of the London Cup. In order to find out whether this was a normal state of affairs, a return match was arranged, and the Bushy Club had their revenge well and truly. Weather was dull, but some reasonable times were put up, the Bushy total being 926·05 seconds against the Blackheath total of 514·75. Best totals of the day were put up by M. A. Wright who totalled 348·25 seconds with his rubber-driven model, while A. H. Taylor took the honours with his glider to total 209·7 seconds.

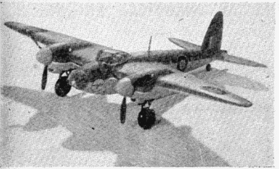
NORTHERN HEIGHTS M.F.C. had an interesting visit from some American aero-modellers, and one gave a very interesting lecture on flying in the States, and particularly of control line flying. Bob Copland brought along a partly finished one-inch to the foot scale Typhoon Mk. I, fitted with petrol engine. The scale is as exact as possible, even to the three-bladed V.P. airscrew, and the cabin with removable doors. Of monocoque construction, the estimated complete weight is 21 ounces, with an estimated control line speed of 52 m.p.h.

For the first time since the outbreak of hostilities the Northern Heights Model Flying Club held a dinner and dance on Thursday evening, November 25th, the chief guests being Mr. D. A. Russell, M.I.Mech.E., Managing Director of the AERO MODELLER and Mrs. Russell. Also present were Mr. A. F. Houlberg, Chairman and Fellow of the S.M.A.E.; Mr. F. J. Camm, representing George Newnes; Mr. Yoxall, representing "Flight"; Mr. Sparey, representing the "Model Engineer" and several other officials of the S.M.A.E.

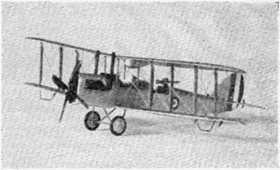
I was glad to see our old friend, Flying Officer Eddie Cosh present, together with his wife, Eddie looking as flourishing and benign as ever! "Old Man Rip" (or perhaps I ought to say Mr. C. A. Rippon, F.S.M.A.E., President of the Northern Heights Club) was in the chair, and introduced the various speakers.

Lack of space prevents me from describing in full all that was said, but certainly the speeches were interesting and descriptive.

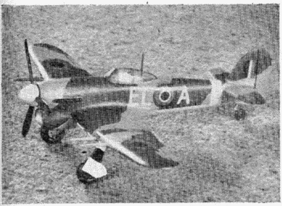
The dinner was well supported by friends of the N. H. Club, including, of course, a strong contingent from their "Competitors," Blackheath, and altogether there were over 120 persons present.



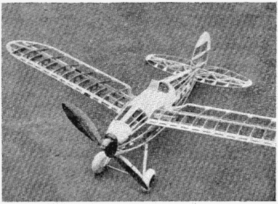
A 1/72 scale Mosquito with such details as retracting under-carriage, opening bomb-doors containing bombs and a fully detailed "office" with dashboard, pilot and joystick, etc. Sent by J. Sweeting of Fulham.



D.H.4. Complete with "chimneys"—good modelling and photography by G Brookes of Cardiff.



1/72 scale Typhoon IB built from Aeromodeller Plans Service plans by J. N. Keyte, R.A.F.



A well constructed "Viper" also built from Aeromodeller Plans Service plans by T. Keech of Kempston.

The event of the evening was, of course, the presentation of the London League Contest Challenge Cup by Mrs. Russell to Mr. M. W. White, who received it on behalf of the Blackheath Club. A pretty incident prior to the presentation of the cup, and also prizes to the winners of each of the rounds of the Competition, was the presentation to Mrs. Russell of a bouquet by Mrs. Tansley on behalf of the London Clubs.

All speakers paid tribute to the enterprise shown by the N. H. Club, and those others which had supported it, resulting in a really interesting competition, which I hope will be even more widely supported next year.

In his speech Mr. Russell pointed out that he had had the foresight to have fixed twelve shields to the pedestal on which the cup reposed, and it was now up to the London Clubs, during the next eleven years, to get their names in turn engraved thereon!

I understand that the S.M.A.E. officials, apart from being there to enjoy themselves, were there to "observe" the response to a meeting of this sort, with a view to arranging a S.M.A.E. dinner (or luncheon) in the New Year, if they thought there would be sufficient support to justify organising it. From what I saw and heard, there is no doubt that the sooner the S.M.A.E. get a move on, the better.

The NORTH BIRMINGHAM M.A.C. have had quite a good season, with club records standing at the moment to the credit of A. Penn (R.O.G. Duration), 1 : 10; O. Reilly (Glider), 4 : 15; and A. Pann (R.T.P.), 1 : 30.

The LEEDS M.F.C., following their successes at the West Yorks. Rally, held a glider contest on their own ground, when C. Furse won with an aggregate of 261·4 seconds, followed by P. Holt, 228·4, and B. Crocker, 209·9. Flights were made with a 150 ft. line from a running launch.

In the October S.M.A.E. r.t.p. contests, the AYLESTONE M.F.C. club record was broken a number of times, final honours going to W. Jones whose model clocked 1 : 37·2. This was broken later on by a junior member, Peter Jones, whose model flew for 1 : 45·3. Recent outdoor competitions were won by D. Bourne (Senior) with 2 : 28, and J. Bones (Junior) with 2 : 08·5.

On Saturday, November 13th, the BIRMINGHAM M.A.C. staged an inter-club indoor meeting for clubs in the Midlands. After a practice hour, the contest began in earnest, with competitors from Leicester, and the several Birmingham clubs. G. Dunmore of Leicester carried off the Cup for the 1 ounce class, but honours must go to eleven-year-old R. Oliver of the King's

THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

ANNUAL GENERAL MEETING.

We understand that, arising out of matters discussed at a previous Council Meeting, the possibility of a card vote for the election of officers at the next A.G.M. was mooted. It was pointed out that such a step must come from that meeting itself. However, as a move in the right direction, invitations have been sent out to all the Clubs, asking them to send in nominations for the various offices. Council members thought that some of the smaller Clubs might not be aware of their rights to nominate officials, even if such officials could not be present at the A.G.M., and we hope that a goodly number of nominations will be received, and that the appropriate resolution will be put forward, as, in our opinion, we feel that every member of the S.M.A.E. should have a vote when elections of officers are taking place.

WINGS FOR VICTORY

This matter is now entering into its final phase and should be settled definitely in the next week or so. The Council has nominated three judges to decide the National winners from the Regional winners now lodged, or to be deposited, in London. These will be Mr. M. W. White, a Regional Judge in the Eliminating Contest; Mr. H. J. Towner, Hon. Comp. Secretary; and Miss M. A. Green, Hon. Secretary of the Croydon and District M.A.C.

THE 1944 COMPETITION PROGRAMME

In response to requests for early publication of next year's competition programme, and, with the assistance of a questionnaire recently circulated per the S.M.A.E. News, we are able to publish below the S.M.A.E. provisional Competition Programme for 1944. This programme must, of course, be ratified at the next A.G.M., but, as it has been drawn up generally in accordance with the wishes of Clubs throughout the country, its acceptance in substantially the form as set out is more or less assured. It may be noted that all contests, with the exception of the Gutteridge and Thurston Glider Competitions, are now open events, whilst the K. & M.A.A. Biplane Contest has been modified to allow of any biplane being entered, provided the lower wing area is at least half that of the upper wing area. Team events have been eliminated.

A new competition is for the S.M.A.E. Cup. It was felt that the absence of a " Society " Cup competition was to be deplored, and so one is now to be brought into being. Apparently the competition is to be open to both gliders and rubber-powered models; in fact, anything which has wings may be entered! Now that rubber is becoming more and more unobtainable, and with the bettering performances available from gliders, it seems that the latter can, at least under war-time conditions, hold their own with rubber-powered models, and it looks as if this novel " free for all " event should provide some fun! In addition to the usual Individual Championship, there will be the new Junior Championship, details of which will be left to the A.G.M.

All events will be eligible for Plugge Points, but as there has been considerable controversy over the basis of allocation, and many Clubs have sent in varying suggestions, a final decision must await the A.G.M.; when we understand that the Hon. Comp. Secretary will put up some pet scheme of his own, which he promises will not be "a mathematician's nightmare."

S.M.A.E. Provisional Competition Programme 1944 Season

	Event	*Date*	*Description*
1	Gamage Cup	April 23rd	Open Rubber
2	Weston Cup	May 14th	Open Glider
3	M.E. No. 2	June 4th	Open Rubber
4	National Cup	June 18th	Open Rubber
5	Pilcher Cup	July 2nd	Open Glider
6	Flight Cup	July 16th	Open Rubber
7	Gutteridge Cup	July 30th	Wakefield Type Rubber
8	M.E. No. 1	August 13th	Open Glider
9	K. & M.A.A. Cup	August 27th	Open Biplane Rubber, no restriction except that area of lower plane must be at least 50 per cent. of upper plane.
10	Women's Challenge Cup	August 27th	Open Rubber (Ladies only)
11	Thurston Glider Cup	September 10th	F.A.I. Formula Glider
12	S.M.A.E. Cup	September 17th	Open Rubber *and* Glider. " Anything with wings."

ALL EVENTS eligible for Plugge Points and Individual Championship Points.

INDIVIDUAL CHAMPIONSHIPS

We are pleased to announce Mr. J. Buckeridge as the individual champion for 1943.

INDOOR R.T.P. CONTESTS

Results so far show that not many Clubs have yet got into their stride. It is to be hoped that as we get deeper into the winter more indoor competitions and galas will be held and that in the early months of next year we shall be able to publish some interesting times.

S.M.A.E. Individual Championship Placings for 1943 based on aggregate of points:

Place	*Name*	*Club*	*Points*
1	J. Buckeridge	Pharos	733
2	M. A. Wright	Bushy Park	669
3	J. Marshall	Hayes	663
4	A. T. Taylor	Bushy Park	644
5	I. S. Cameron	Merseyside	640
6	W. Jones	Aylestone	565
7	R. F. L. Gosling	Merseyside	519
8	M. Farthing	Croydon	501
9	D. Blair	Birmingham	500
10	J. L. Pitcher	Croydon	479
11	F. H. Briggs	Cheam	440
12	B. Alder	Walthamstow	438
13	Mrs. Buckeridge	Pharos	435
14	R. Sylvester	Bushy Park	434
15	G. W. Harris	Croydon	428
16	A. H. Taylor	Bushy Park	423
17	L. Brown	Hayes	402
18	K. Ballisat	Cheam	392
19	N. G. Davies	Merseyside	383
20	P. H. Tanner	Luton	378
21	J. Wassell	Hayes	376
22	P. Pearce	Stratford-on-Avon	372
23	F. Ivory	Merseyside	365
24	D. Butler	Surbiton	359
25	J. Hill	Thames Valley	355
25	C. Lloyd	Merseyside	355
26	A. H. Lee	Bristol	351
27	D. H. Harrison	Birmingham	331
28	D. Bourne	Aylestone	330
29	F. Johnson	Sale	327
30	P. E. Williams	Sale	326
31	A. T. Gow	Harrow	323
32	P. Jones	Aylestone	321
33	M. Garnet	Bristol	319
34	C. Doughty	Birmingham	318
35	D. Lofts	Northern Heights	310
36	G. Armes	Pharos	309
37	R. A. Hinks	Luton	305
40	W. T. Coe	Pharos	304
41	M. E. Davison	Merseyside	303
42	D. Perkins	Walthamstow	294
43	K. Marsh	Walthamstow	292
44	J. R. Lewis	Carlisle Park	282
44	D. Parmenter	Sale	282
45	R. Double	Stratford-on-Avon	281
46	P. Tyrell	Sale	280
47	R. Shingler	Sale	273
48	F. Houchin	Pharos	271
49	C. H. Saunders	Blackheath	266
50	L. Massam	Walthamstow	264
51	W. Davies	Leicester	258
52	N. Gregory	Harrow	253
53	W. Hulme	Sale	251
54	P. Sharp	Walthamstow	250
55	Mrs. S. Clark	Luton	247
56	J. Hardman	Rhyl	243
57	K. Tomlinson	Aylestone	239
58	J. Pribyl	Streatham	233
59	A. Wilson	Hayes	230
60	J. Weber	Bristol	228
61	— Sutherland	Walthamstow	225
61	J. M. Hardman	Rhyl	225

Placings of the balance of the entries numbering over two hundred has not yet been completed, but will be published in the "Journal" in due course.

ROUND THE POLE RESULTS. OCTOBER 1943

Aggregate of 3 Best Flights (All Class A)

Position	*Club*	*No. of entries*	*Agg. of 3 flight*
1	Aylestone	6	288.1 secs.
2	Pharos	5	259.2 „
3	Blackpool	1 (2 Flights)	250 „
4	Cheam	2	223 „
5	Blackheath	1 (2 Flights)	210.6 „

Best Individual Flight of Month

R. V. Bentley, of Blackpool and Fylde M.A.S. 140.75 secs. Class A.

Heath M.A.C., who showed some of the older chaps how to go about things. Full results were :—

Free Flying Class.

R. Oliver (King's Heath)	80·4	secs.
G. Bradwell (Birmingham M.A.C.)	71·5	,,
G. Dunmore (Leicester)	70·7	,,

1 ounce R.T.P.

G. Dunmore (Leicester)	81·7	,,
— Ward (Penn M.A.C.)	71·5	,,
D. Jennings (East Birmingham)	71·4	,,

2 ounce R.T.P.

G. Bradwell (Birmingham M.A.C.)	79·6	,,
— Hickling (Birmingham M.A.C.)	77·5	,,
R. Monks (Birmingham M.A.C.)	75·15	,,

A movement is on foot to form a Scottish Federation of model clubs, and this has the backing of the S.M.A.E. (How this will be affected by the proposed setting up of National Committees remains to be seen.) In the meantime, G. Shiels, Hon. Sec. of the Edinburgh M.F.C., would like Scottish clubs not yet contacted to get in touch with him at his address, 35, Stenhouse Avenue, Edinburgh.

More new clubs than ever are starting up, and this month's list is pretty formidable. Here they are, and those living in the districts named are requested to get in touch with these new groups and help to keep things going.

ASHFORD M.F.C.
L. J. Coomber, 8, Prospect Place, Ashford, Kent.

WELLS M.A.C.
R. Allen, Deanery Cottage, Wells, Somerset.

RUGBY M.A.C.
A. G. Pearson, 19, York Street, Rugby.

RUABON M.A.C.
L. Williams, 8, Foresters Terrace, Ruabon, Wrexham.

MARTON M.A.C.
W. F. Holmes, 657, Marton Road, Middlesbrough, Yorkshire.

MAGDALEN COLLEGE SCHOOL A.S.
B. S. Glyde, 62, Holywell, Oxford.

This month's list of "wants and disposals" is also well above average, so you might find something here you want :—

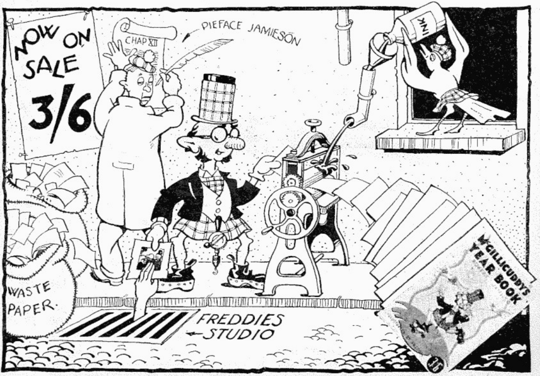
DISPOSALS : 4 vols. Newnes "Aeronautics," from A. P. Colclough, 31, Zena Street, Robroyston, Glasgow. Bound vols. AERO MODELLER for 1936, 37, 38, 39, 40, also "Popular Flying," for 1935, 36, from R. McMallan, 103, Byron Street, Loughborough, Leicester. Super Buccaneer with Brown Junior Engine, air wheels, timer, etc. Nearest offer to £20. Replies c/o the Editor.

WANTED : Model of either Korda, Wakefield, Isis, Hotspur II, write to Sub.-Lt. G. C. Butler, R.N.V.R., H.M.S. "Agamemnon," c/o G.P.O., London.

Well, there are not many reports this month, and I can only assume that clubs are enjoying (!) a period of somnolence after the outdoor season, and will come to life again shortly ! Get those reports in to time, and let's hear more of what you are doing. Don't forget it is *news* that other readers want, and give all the necessary details when sending in reports.

And now, as this is the issue starting off a New Year, may I wish all my readers all the best for 1944, with plenty of thermals and no lost models.

Yours truly,
THE CLUBMAN.



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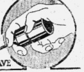

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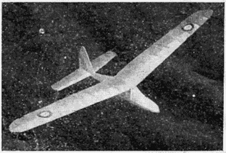

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