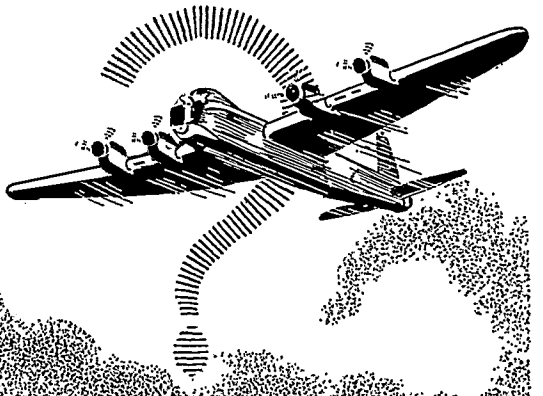
VOL. 8. No. 90. ONE SHILLING MAY- 1943.

AERO MODELLER

Is it FRIENDLY or ENEMY...



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Established in 1936 (Proprietors: Model Aeronautical Press, Ltd.)

ALLEN HOUSE • NEWARKE STREET • LEICESTER

THE MODEL AERONAUTICAL JOURNAL OF THE BRITISH EMPIRE

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EDITORIAL

OUR notes on the trouble that some readers cause our advertisers by not correctly stating their requirements and giving their full name and address when ordering goods, has brought us a number of interesting letters. Most of these are from advertisers recording their appreciation of our editorial notes, and trusting that, as a result of them, they will receive less trouble in future! So far as readers are concerned, we reckon to have had a bad year if we receive as many as half a dozen complaints, which can be justified, in that period; and it seems that readers are much more to blame than advertisers! Typical of the type of letters we have received from advertisers is the undernoted:—

"I read with interest your Editorial regarding the non-sending of names with orders and I do hope it helps to make the lot of the poor retailer much easier.

I have orders lying here for over two years and cannot trace the senders. I have had letters containing money returned to me through the Dead Letter Office, and the greatest fault of all is an old customer who sends an order, and forgets to sign his name or put his address. I must state that out of over two thousand post orders there has been less than 10 complaints and these have been for rough handling by carrier. In only three cases has dissatisfaction been expressed, and I have immediately returned the money without quibble."

While on the question of lack of full postal information, we might add that at the moment we ourselves are holding cheques for Mr. G. F. Webb ("The Firefly," October issue), Ft.-Lt. R. M. Smith ("Elastic Drive," November issue), W. J. Kay ("Avro Manchester," February issue), R. G. Moulton (Photo, February issue), J. M. Laithwaite ("Composite," March issue), and J. S. Thompson ("Cloud Line," March issue). To all these folk are due cheques which have been posted but returned to us marked "Gone Away." If they will write in to our Leicester Office we will let them have their cheques immediately.

What Retracts Up Must Come Down?

The notes on page 802 of our last issue have inspired two readers to write us the following:—

"Sir,

We should like, through the courtesy of your columns, to make a protest against the ever increasing tendency of aero modellers to accept, as a "fait accompli," the landing of a model aircraft on its fuselage. That this is becoming an accepted practice is apparent to anyone who studies THE AERO MODELLER.

In the current issue of THE AERO MODELLER, under the heading "The case for the Tricycle," the writer makes the observation that the two main wheels should retract, and the front wheel, which does not retract, should "succeed in helping the model to make a landing of *sorts*!"

We feel that the S.M.A.E. is largely to blame for this state of affairs. Under its present competition rules it states that a model must take off from the ground, but makes no ruling as to how it should land.

It is obvious from this and club rules, that modellers have taken the easy way, and devised means of retracting the undercarriage after take off, but have buried their heads in the sand in regard to the far more difficult problem of detracting the undercarriage in time for landing.

To the knowledge of the writers, there is no full size aircraft which having landed on its airscrew and "belly" is fit for further flight without servicing!

Yours faithfully,
(Sgd.) P. M. Wright.
D. B. M. Wright."

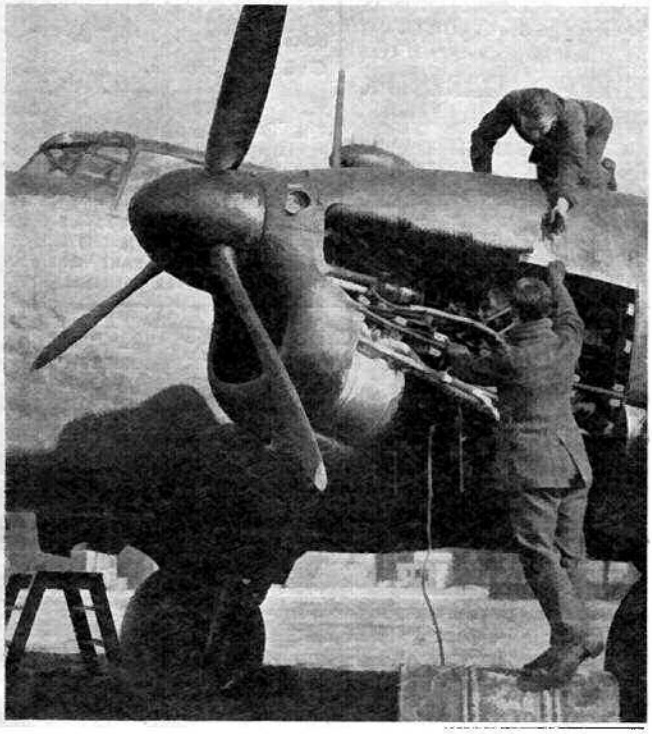
You Have Been Warned!

We would remind readers that many of them have not yet completed their membership application forms to the N.G.A. for Third Party Insurance for the current year. Will they please note that the membership application form is again printed in this issue at the foot of page 884. D.A.R.

CONTENTS OF THIS ISSUE

WHITHER THE PETROL PLANE?

By D. A. RUSSELL, *M.I.Mech.E.*



1 Above is a scene at a Bomber Station "Somewhere in England." R.A.F. personnel are at work on the engine, preparatory to going on a leaflet-dropping raid. (Air Ministry photograph).

2 Here is Mr. Poole's model. Note how the "Wasp" engine is mounted in the inverted position, complete with coil, condenser, etc., all of which fit inside the standard size engine cowling.

It must be clearly understood that the opinions expressed in this article are those held personally by the author, who makes no bones about being in favour of scale models. They do not *represent the editorial policy, for which he is responsible, and which is to cater as fairly as possible for all tastes and shades of opinion.*

NOTE • • • •

Dictionary definitions of the word "model" generally are agreed on it as descriptive of a replica of a reduced-in-size original. Therefore, I maintain that a model aeroplane is, or should be, a replica of the "full-size" aircraft.

That is not to say that I deprecate nay other types of model aircraft, only please let them be designated by names appropriate to their type and performance.

Whilst the Air Ministry ban on the flying of petrol 'planes has tended to restrict the development of this type of model aircraft, certainly it has in no way affected the volume of interest being taken by aero-modellers. The following notes may not, therefore, be out of place. They may, in fact, serve a useful purpose by revealing to the more recent recruits to the hobby of aero-modelling something of the origin of the petrol 'plane, whilst at the same time providing to the "fans" who have forsaken rubber—except for wing attachments and shock absorbers (concealed, *please !*)—some guidance for the future.

Lest it be thought that the petrol 'plane is a recent development, and to be credited to the Americans, it may be recorded that petrol engined model aircraft were being flown as far back as 1909. In the second issue of "Flight," published on May 28th of that year, there appears a letter from a Mr. D. Stanger, describing a large petrol 'plane of which photos (in flight) are shown. This model weighed 21 lb. and was powered by a 4-cylinder engine of 1¼ h.p.

In this same issue of "Flight" is an advertisement, offering ⅛ h.p. model petrol engines, weight 4¼ lb., on behalf of a firm of model aeroplane manufactures in Glasgow !

In both cases it will be seen that engines which are now recognised as really large, and heavy, were the order of the day. No doubt this is one of the main reasons accounting for the small number of early enthusiasts—large engines demanding large models and larger purses !

Gradually the sizes of engines have come to be reduced—mainly, I think, by the spirited efforts of the power boat enthusiasts. Now, most engines range from 2·5 c.c. to 10 c.c. and an engine of 15 or 18 c.c. is considered quite large ; and, incidentally, *too* large for most competitive work (10 c.c. being the maximum allowed).

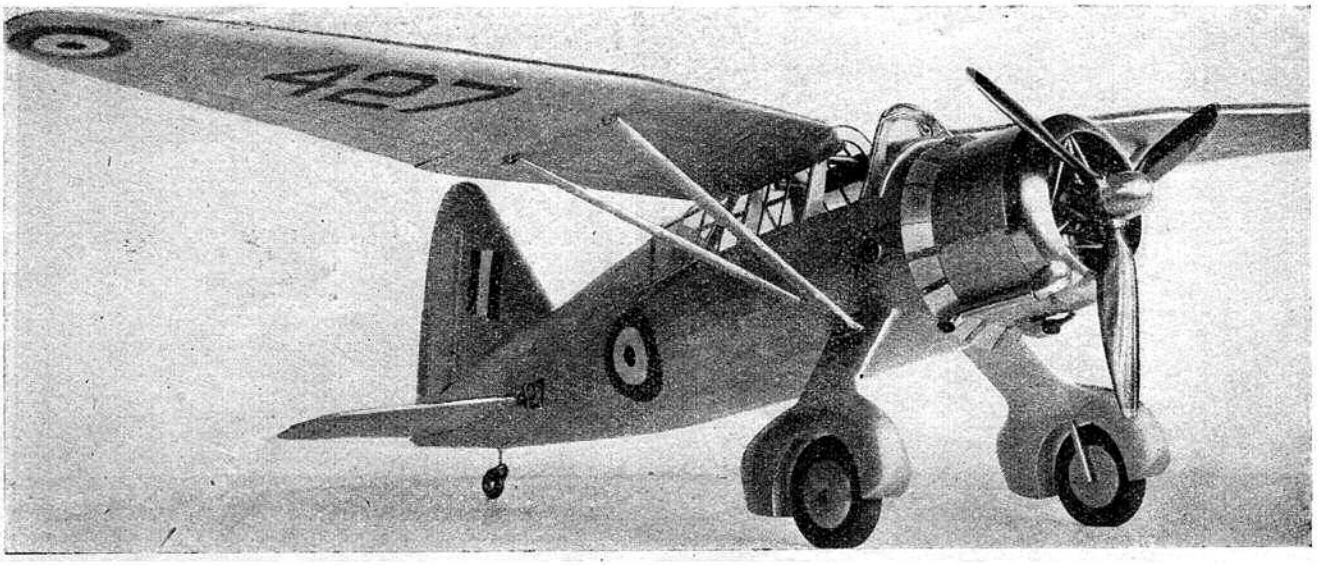
As most petrol 'plane enthusiasts in this country were "graduates" from rubber-driven models, I suppose it was natural that many of the early individually designed petrol 'planes were but "hotted up" large rubber-driven models, or at least incorporated many of their main characteristics. In America—where the petrol 'plane quickly "caught on"—a somewhat wider outlook was taken, resulting in quite recent times in the

3

The Whitley is powered with Merlin engines, giving over 2,000 B.H.P. for take-off. Compare this photograph with that below of Mr. Poole's model, taken from exactly the same angle. (Ministry of Information photograph).

4

Mr. Poole arranged his camera to take exactly the same view of his model as the official photograph above. This photograph was then superimposed on a similar background, with the pleasing result shown.



5

" development " (sic) of the power-assisted-thermal-hunter, which is no more a true model aeroplane than is the picturesque " bag-of-paper-and-sticks " which from time to time achieves, with the aid of several ounces of rubber, some rising up-currents, plenty of sun, and a complete lack of strength, some such performance as O.O.S. 2 hours 3 min ! ! !

In the three or four years preceding the commencement of the present war, development of petrol 'planes in this country was steady and along fairly orthodox lines. Little originality was shown by designers, who, generally speaking, clung to the slab-sided formula and the high-wing type of model with a wire undercarriage. A typical example is shown in photo No. 8, at the foot of page 843. Photo No. 7 above it, is representative of the type of atrocity more recently being turned out in America, on account of which I contend that if little or no progress has been made in the design of petrol-driven model aircraft in this country during the past four years, we have a good deal to be thankful for ! !

The question of building models of " the real thing " is bound up with what the aero-modeller is trying to achieve in building a model at all. If he is out for duration or high-rate-of-claim *per se*, then of course he will have no eye for " good looks," nice fairings or style, and will concentrate on performance to the exclusion of all else. We can leave him with photo No. 7 and good luck to him ! But what a limited outlook to have, and what is gained by striving only after performance as such ? It is this striving after a high-rate-of-claim and/or duration which has, in my opinion, occasioned many a scoff at the hobby of aero-modelling and done anything but improve the breed. This is a strong criticism, I admit, but I feel it is justified, because the prize does not go so much to the cleverest or most skilled designer, but to the aero-modeller who can achieve the greatest power/way ratio. Admitted, if he is a skilled engineer he can tune up his engine to give a greater output than anyone else, and for this he may be given much credit. To defeat him the non-engineer can (much more easily) hold his own by cutting down weight and so obtain an equally high power/way ratio. Whatever the result, it must conform to the " what-goes-up-must-come-down " formula, and my experience has been that what goes up rapidly, often comes down ever more rapidly, and seldom all in one piece ! ! It seems to me that the best that a man can get out of building this type of model is a row of cups, and a set of performance figures to frame and hang on the wall. His model, looking-like-nothing-on-earth and being anything but representative of any known type of aircraft, will arouse no interest or understanding on the part of the general run of folk who may come in contact with it.

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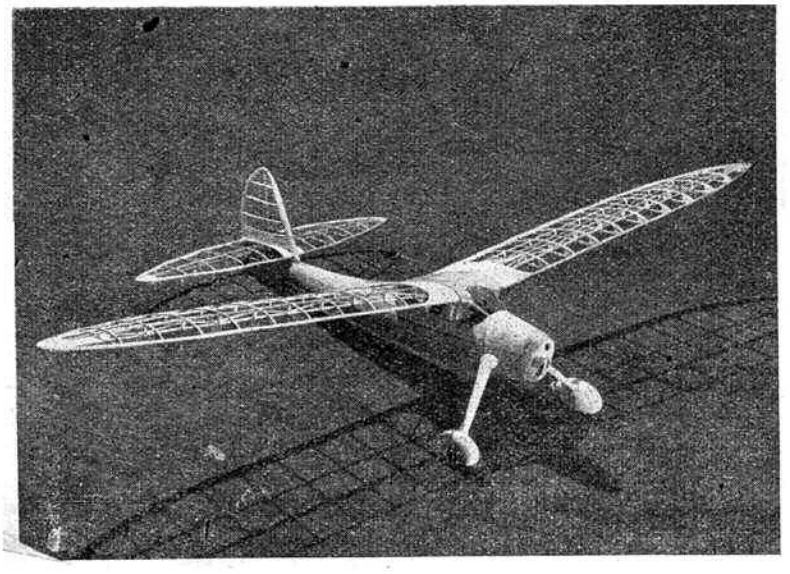
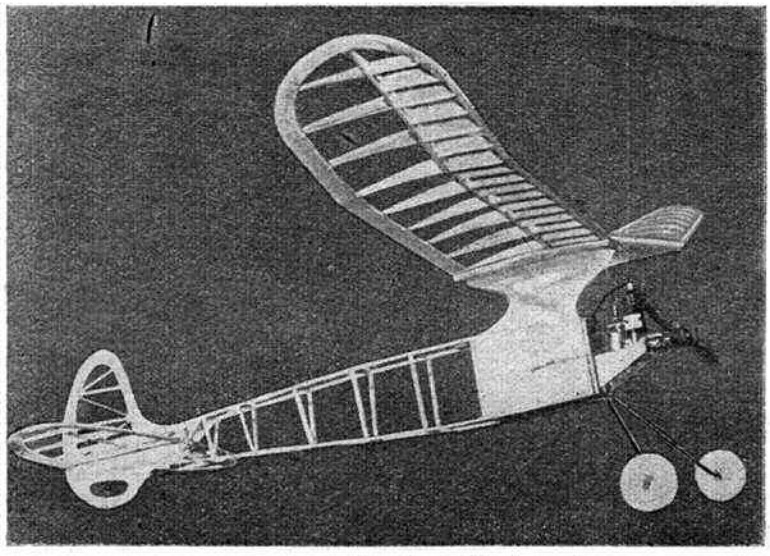


Now let us consider what happens when a replica of a full-sized aircraft is built. Immediately a much wider and a much more " personal " field is opened up. One builds a replica of a " Wellington " or a " Lysander " or a " Spitfire " . . . what you will . . . For a certainty some of the folk who see the model will recognise it for what it is meant to represent ; their faces will lighten up and they say " Ah, I have a brother who is a tail-gunner in one of those " ; or " My father flew one of those in the Second Great War," and so on. Then there is an unlimited field opened up for the ingenuity and skill of not only the builder, but members of his family and his



The excellent scale model shown on the left is of a 1-in. scale Lysander, built by Cpl. Welsberg. This model has made successful R.T.P. flights. Below (left), fig. 6, is a photograph of the semi-scale, high-wing model referred to, and built by Mr. Rosenfeld. At right is shown the "atrocity" to which the author refers (photo No. 7); and underneath is photo No. 8, typical of the trend of British petrol 'plane design at the commencement of the present war.

associates in devising all kinds of dodges for representing the shape of full-sized aircraft. Mother's transparent wool container makes a lovely astrodome; certain types of electric light switches or bell pushes form the nucleus of Townend rings. Certain types of metal ash trays can be adapted quite easily to make engine cowlings of a circular type. When the model is finished it can be posed against realistic backgrounds, model figures may be introduced into the picture, and no end of fun obtained in photographing the model in as lifelike positions as possible. The photographs on pages 840/1 show what can be done. Illustrated are a full-size "Whitley," and a 1 in. to the foot scale model built by Mr. C. M. Poole, of Glasgow. This model is fitted with two 6 c.c. "Wasp" motors, and has an all up weight of 7 lb. The undercarriage is retractable. The two photographs of the full-sized aircraft were sent to Mr. Poole, who posed his model against a similar background, and then photographed it, with the results which are here shown. Surely it will be agreed that there is a thrill obtainable in building, photographing and flying such a model as this, which could never be obtained from flying the non-scale type of model to which I have referred?

In previous articles I have strongly condemned the wire undercart, and I shall continue to do so! From the point of view of strength, nothing less than $\frac{3}{8}$ in. diameter spring steel rod is of any use to a petrol 'plane weighing 6 or 7 lb., if it is not supported with timber; nothing less than 3/16 in. diameter for a wheel axle. Alternatively, provided the end of the leg is sheathed to provide a secure mounting for the axle, the wire leg, as such, can be entirely dispensed with if one is built up from 3-ply and faired with balsa. A rigid leg, properly pivoted so as to move backwards and forwards, and with an amount of rubber incorporated so as to provide a controlled movement on landing, is much to be preferred to a stalk of wire rigidly anchored to the fuselage, from which it projects as a "springy" cantilever!

Photo No. 6, of a high-wing model designed and built by Mr. Rosenfeld, shows what can be achieved from the point of view of general appearance with little effort. Here the wire undercarriage is replaced by (or at least the wire is faired with balsa to form) streamlined struts; and spats are fitted to the wheels. How anybody could claim that this layout compares *un*favourably with that shown in photo No. 7 beats me!

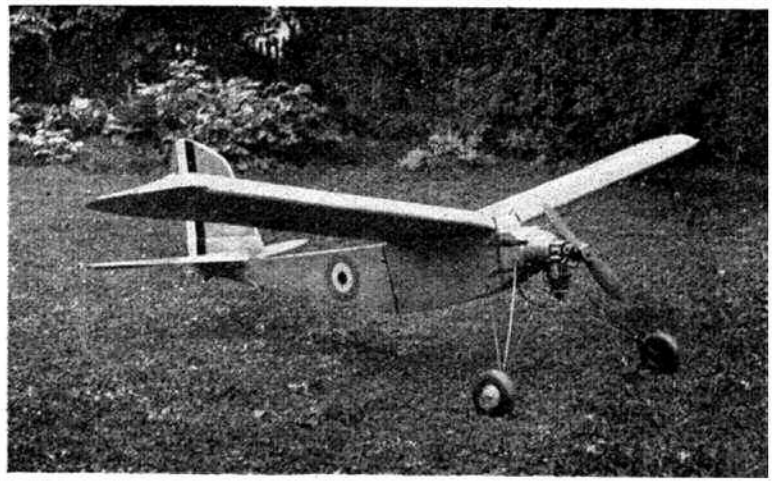
I have sometimes heard objections raised to the cowling in of engines as making them inaccessible. This is a poor excuse because, if engines are in good tune and properly looked after, they should not require all that amount of attention when on the flying field. Provided the throttle and spark control levers are brought out through suitably designed slots in the cowling, no real inconvenience is caused.

This question of cowling appears to cause a fair amount of concern to aero-modellers, on account of possible trouble due to the engine overheating. My experience has been that an engine can be all but totally enclosed and not suffer any harm, provided, of course, adequate lubrication is assured.

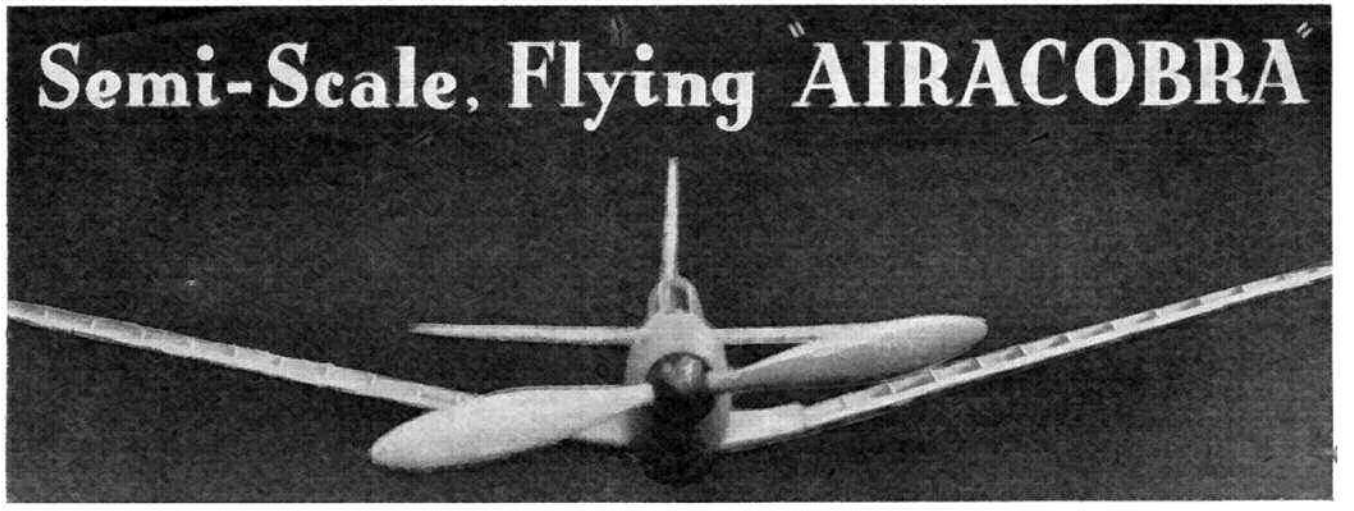
In regard to the mounting of engines, Lieut.-Colonel C. E. Bowden's "knock-off" system is too well known to require further description, and this method can quite easily be incorporated inside the cowling; or, alternatively, the front portion of the cowling itself can incorporate a diaphragm, to which is mounted rigidly the engine, the whole unit being arranged to knock off in the event of a bad landing.

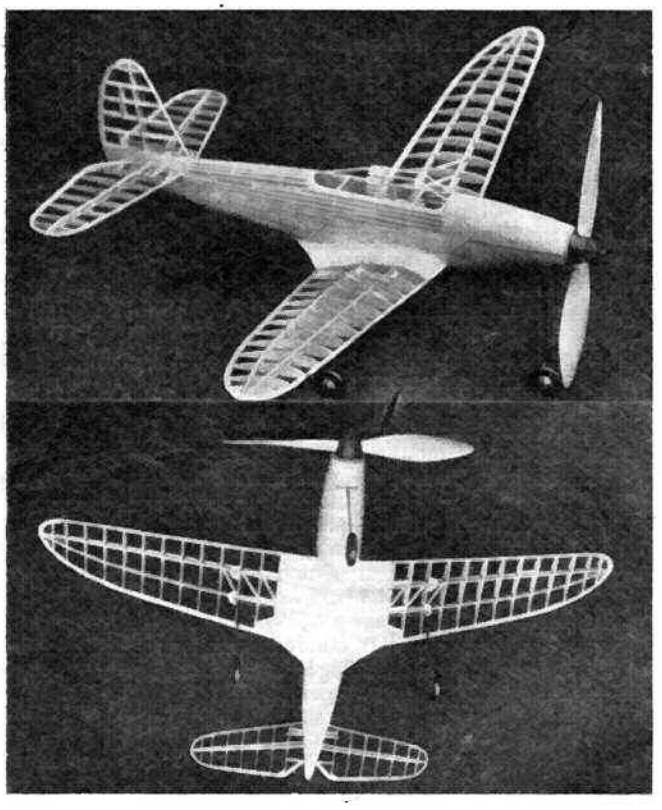
The idea of tying the coil, condenser and petrol tank to different parts of the fuselage, as I have seen in so many cases, is fraught with *many* troubles!

(To be continued.)



Semi-Scale, Flying "AIRACOBRA"





MUCH controversy has been waged over the alleged efficiency or otherwise of the Bell Airacobra. First reports from America, as in the case of the Boeing Fortress boosted the 'Cobra far above its practical performance.

The main reasons for its supposed inferiority are the heavy shaft drive (10 ft. long) necessitated by the placing of the motor behind the pilot's cabin, and the tricycle undercarriage, unique in a single-seat single-motor fighter. High powers of manœuvrability are attained with the motor over the c.g.

At height, there is a marked inferiority in performance compared with British fighters in service. No figures may be quoted, but at its operating height the 'Cobra appears to be superior to Germany's Messerschmitts, though no information is available that it is better than the Focke Wulf Fw 190.

The 'Cobra looks beautiful. Its unspoilt lines are equalled only by the Mosquito's, and low down it is very fast. It is very suitable for fast daylight sweeps, when its 20 m.m. cannon firing through the airscrew box and its six Browning machine-guns can be used to advantage.

Whatever the full-sized machine's performance, we can say that the model is a splendid flyer. From the accompanying photographs it may be observed that it is nearly to scale, and it looks very good in the air.

Detailed plans, semi-scale, are now available through THE AERO MODELLER Plans Service.

●

SEMI-SCALE FLYING AIRACOBRA
PLANS **3/6** POST FREE
OBTAINABLE FROM
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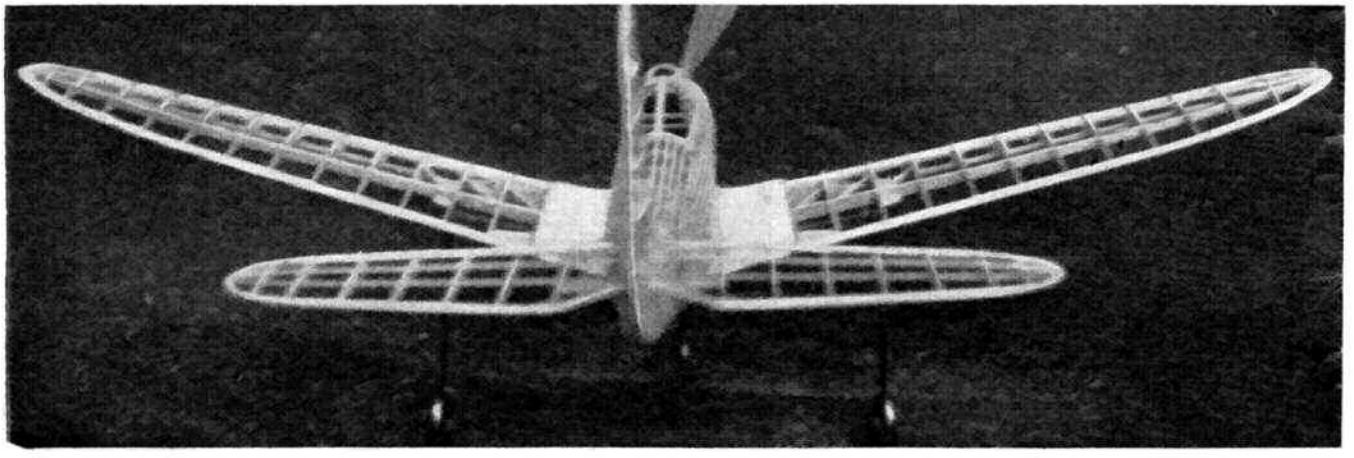
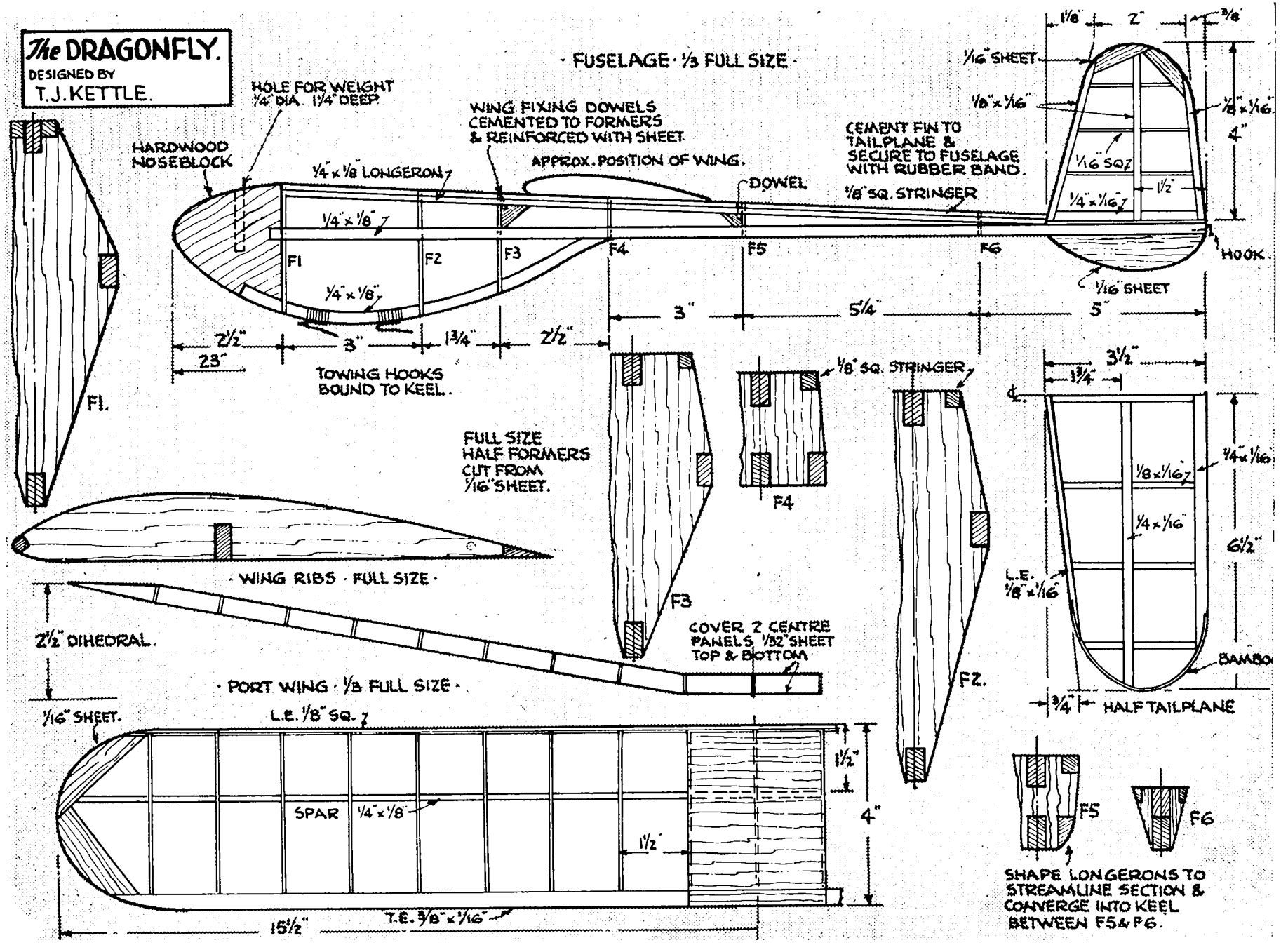


The DRAGONFLY.

DESIGNED BY
T.J. KETTLE.



NATURE'S NIGHT-FIGHTERS

FRANK W. LANE

NATURE has produced two main types of night fighter—the owls and bats. If we could imitate the finer points of both models we should have a night fighter capable of causing almost as much destruction among the Luftwaffe's night squadrons as our daylight fighters did among their day bombers.

First, let us glance at the owls. A striking characteristic of these birds is the huge face. Part of the high efficiency of this natural night fighter is due to this, for an owl's microphonic ears have enormous auditory cavities which half encircle the face. Add to this that an owl is the most silent bird on the wing and it is easy to understand why it can pick up and track down the minutest sounds made by the tiny quarry it is seeking.

But an owl is not solely dependent upon its ears, it has night vision of high efficiency. Scientists have carried out experiments with owl's eyes and have come to the conclusion that they are among the most wonderful of all eyes. In addition to having complete control over the movements of the iris an owl can move the two irises independently of each other. An owl has been seen instantly to contract or relax the iris in accommodating its vision to different objects and varying distances.

Ears, silent flight and wonderful night vision enable an owl to come within striking distance of its prey. Its main and secondary armament then come into action. Gripping the object of its attack in a grip of steel with its talons the owl stabs at it with its hooked beak. Sometimes it wrenches the head clean off a rat. And a man who had the misfortune to be attacked by the talons of a great horned owl had one of his arms completely paralysed.

But for all their interest for the naturalist, owls are not such good parallels to machine-made night fighters as the bats. These small creatures appear to use at least one device which is startlingly like radio-location, and further intensive research into bats' flight mechanisms might well provide other hints on night flying which could be turned to profitable use in the air war. (Readers of THE AERO MODELLER may remember that in my article on "Birds—the Model Aircraft," in the June, 1942, issue, I referred to the experimental work of a German investigator on natural flight. Even in wartime our enemies are not forgetting that vital lessons in flying may be learnt from nature, *verb. sap.*).

For its size I doubt if there is another creature in existence which possesses the wonderful manœuvrability of a bat. Dr. Allen, the American authority on bats, says he has seen swifts (no mean flyers themselves) and bats flying together and it was difficult to distinguish them in flight. But the bats could make sudden short dives and other aerial manœuvres that seemed beyond the powers of the birds.

Coupled with the air mastery of the bat is what I will venture to call its system of "radio-location." Many bats have conspicuous growths of one sort or another on their heads. Such growths appear to be mostly developed in the insect eating species. It is possible, therefore, that they act as receivers for air vibrations set up by passing insects or reflected from nearby objects.

Writing in "The Australian Museum Magazine," Ellis Troughton says: "It would seem that condensations or slight vibrations of air are set up by acutely receptive nerve-endings in the pointed ear-projections and the fleshy nose-leaves common to many bats, as well as in the coarser 'whisker-hairs' usual in mammals. The reception of such air vibrations could be likened to the action of a radio set with the numerous hairs acting as aerials implanted in the batteries of nerve-charged tissue."

It is interesting to place beside this quotation the following passage from a report of some experiments which have lately been made in the United States. "Some of the newest aviation instruments are believed to use a device similar to the one developed so effectively by nature in the bat. It is expected that the knowledge gained at Harvard (where the experiments were carried out F.W.L.) from the bat may have useful applications in the air armament programme."

The effectiveness of the bat's radio-locators is shown by tests which have been made on its dodging abilities. The American investigator, Walter L. Hahn, suspended a line of thin black wires from the rafters of a room at distances averaging eleven inches apart. Twelve bats were then taken and their eyes were covered with a mixture of lamp black and glue. The little creatures therefore had to "fly blind."

The bats were released in the room and each time one of them approached close to the wires or flew through or appeared to dodge was counted as a trial. In 600 trials the bats hit the wires little over 100 times. In view of the facts that the whole of the flying space was covered with miniature balloon-barrage cables, that twelve bats had to manœuvre in the small space, and were all deprived of eyesight, this was a noteworthy performance.

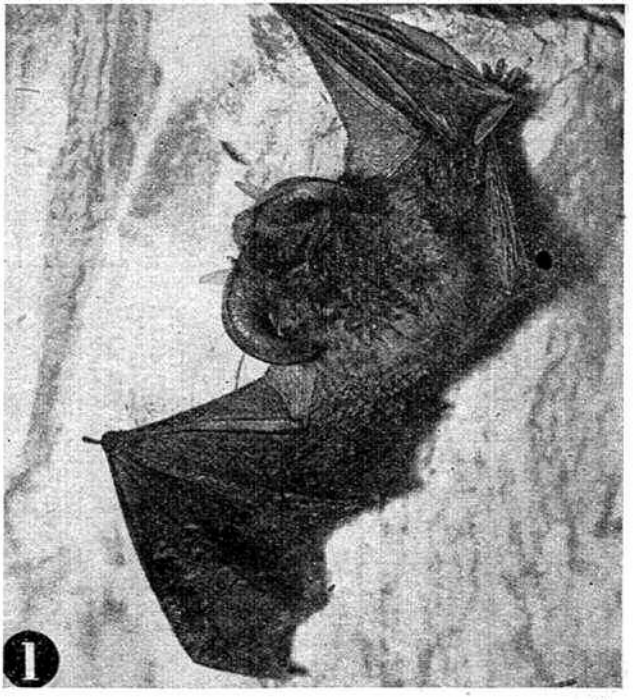
But how efficient is this little night fighter under natural conditions, when unhampered by the paraphernalia of the scientist's laboratory? Fortunately, we can answer this question, at least partially, because of a classic passage in one of the works of the great English naturalist, W. H. Hudson.

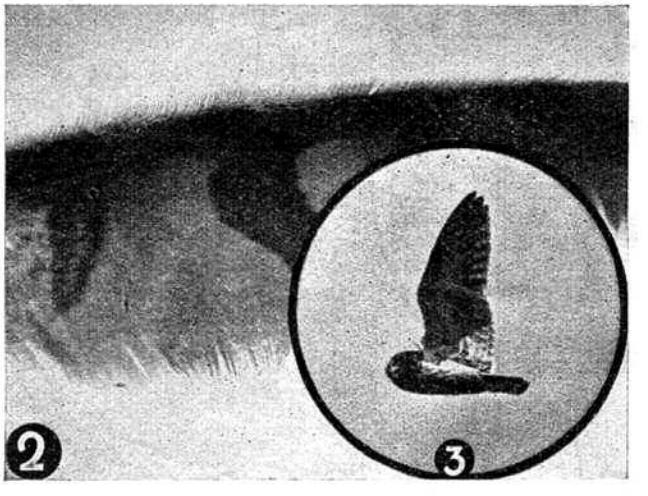
Hudson records that he was once walking down a country lane when two bats started to circle round his head and make vicious little stoops at his cap. Thinking he could easily forestall them Hudson commenced to whirl a light cane above his head so that as he walked he was protected by a funnel-shaped mist caused by the rapidly twirling cane.

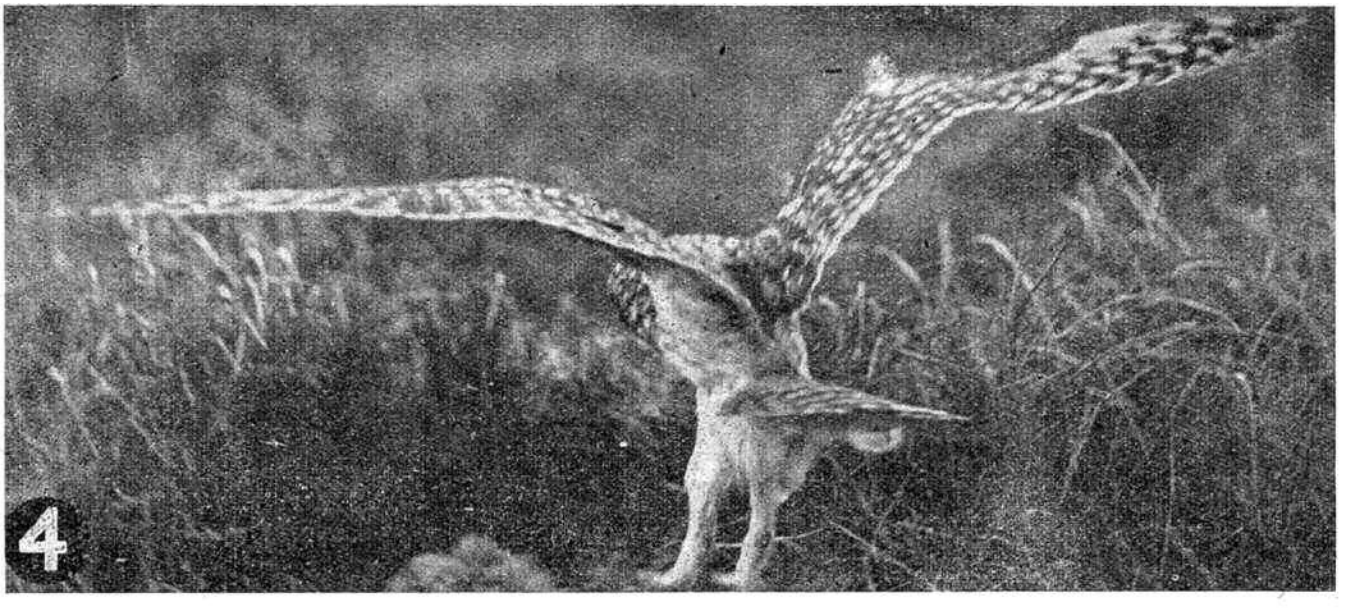
But the stratagem had not the slightest apparent effect on the attacking bats. The first bat came down in a power-dive, timed its attack like a machine-gun firing through a whirling propeller, flickered over Hudson's cap and again ran the gauntlet of the whirling cane to come out again scatheless on the other side.

Hudson writes: "I could hardly credit the evidence of my own eyes, and thought he had escaped a blow by pure luck, and that if he attempted it a second time he would certainly be killed . . . I resumed the whirling of the stick over my head, and in another moment the second bat came along and, like the first, dashed down at my cap, passing in and out of the vortex with perfect ease and safety!"

Yes, I think Nature's night fighters are not unworthy of comparison with the finest machines turned out by the R.A.F.







1. *(Long Eared Bat), The Bat with its skinny wings has always been regarded as a creature of ill-omen and evil reputation.*

2. *Underside view of Owl's Feather looking towards tip. This is believed to contain the mechanism of the Owl's silent flight, but the real secret is as yet unknown to science.*

3. *Short Eared Owl in flight.*

4. *Short Eared Owl alighting at nest:*

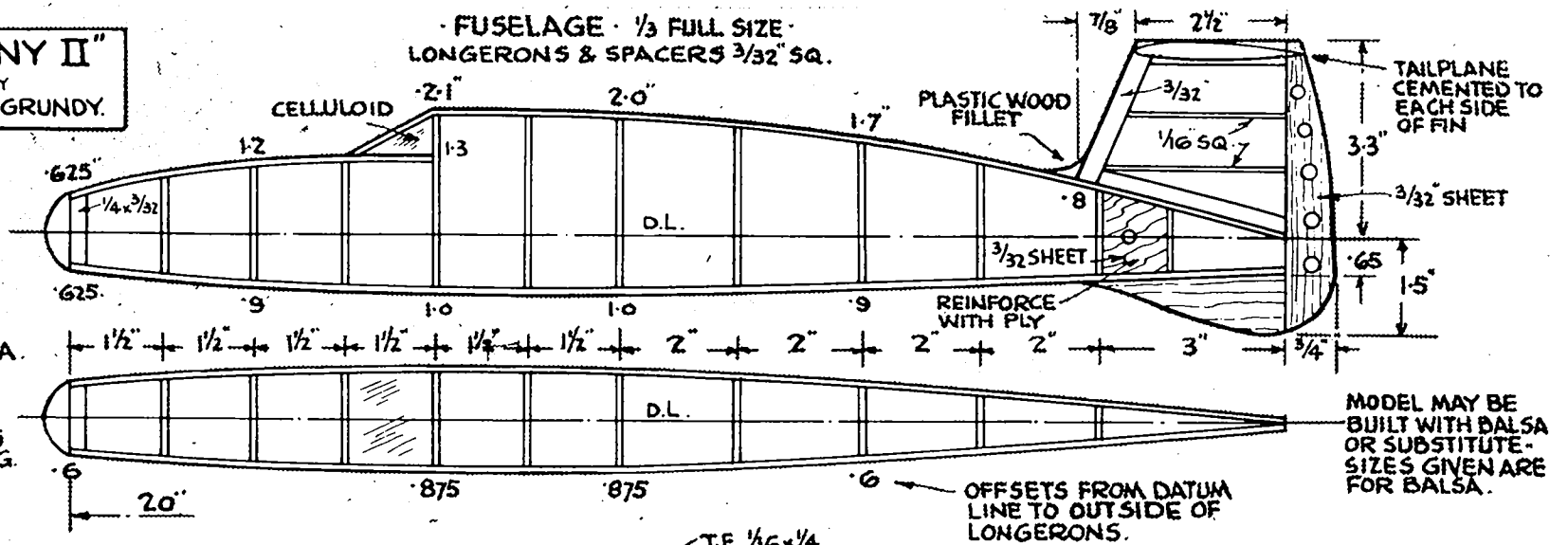
Photos by Eric J. Hosking, F.R.P.S.

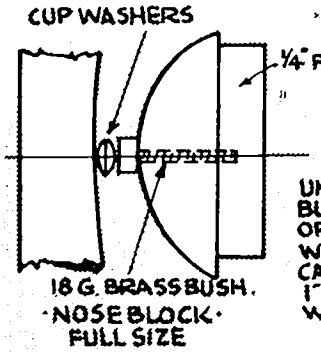
"JOHNNY II"

DESIGNED BY
J GRUNDY.

FUSELAGE · 1/3 FULL SIZE ·

LONGERONS & SPACERS 3/32" SQ.

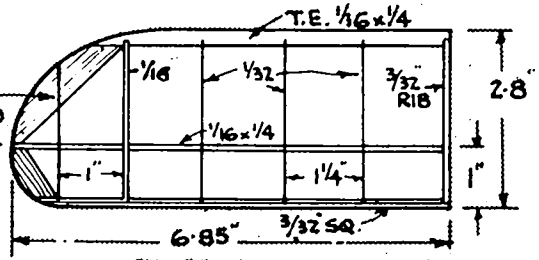




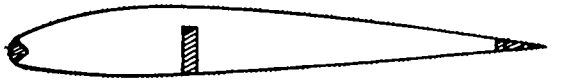
· NOSE BLOCK ·
FULL SIZE

NOTCH THIS RIB TO FIT TIP AS SHOWN

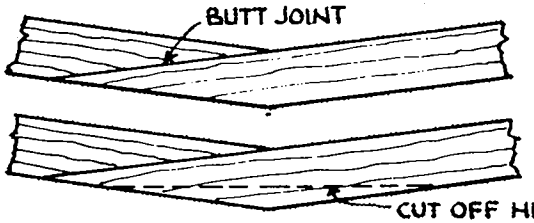
UNDERCARRIAGE AT BUILDER'S PREFERENCE ORIGINAL MODEL FITTED WITH SIMPLE 18 S.W.G. CANTILEVER LEGS WITH 1" DIA. CELLULOID BALLOON WHEELS.

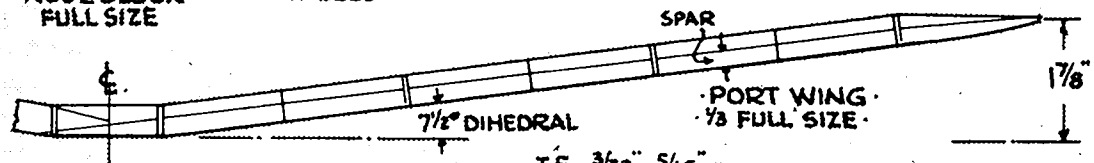


· STARBOARD TAILPLANE ·
· ⅓ FULL SIZE ·



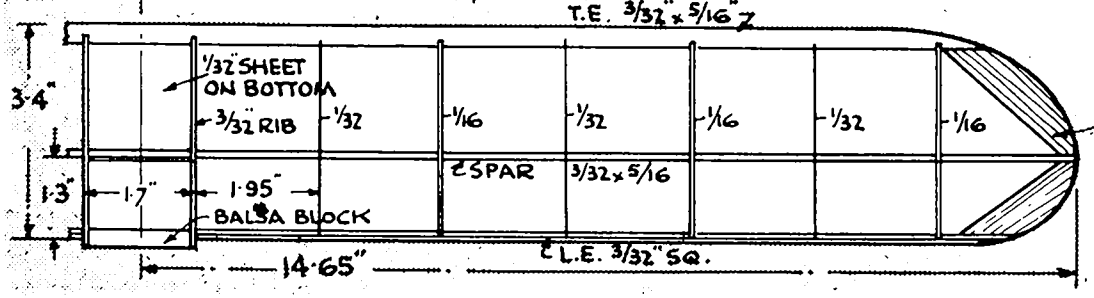
· TAILPLANE RIBS · FULL SIZE ·

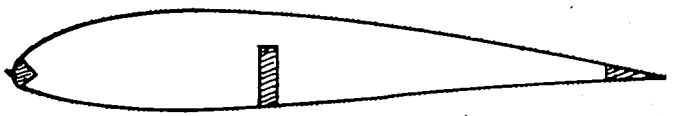




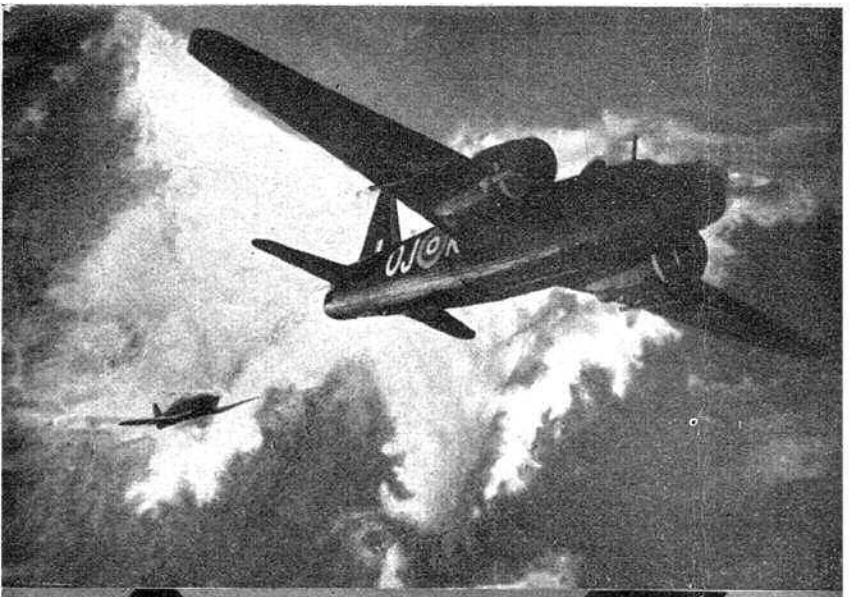
· PORT WING ·
· ⅓ FULL SIZE ·

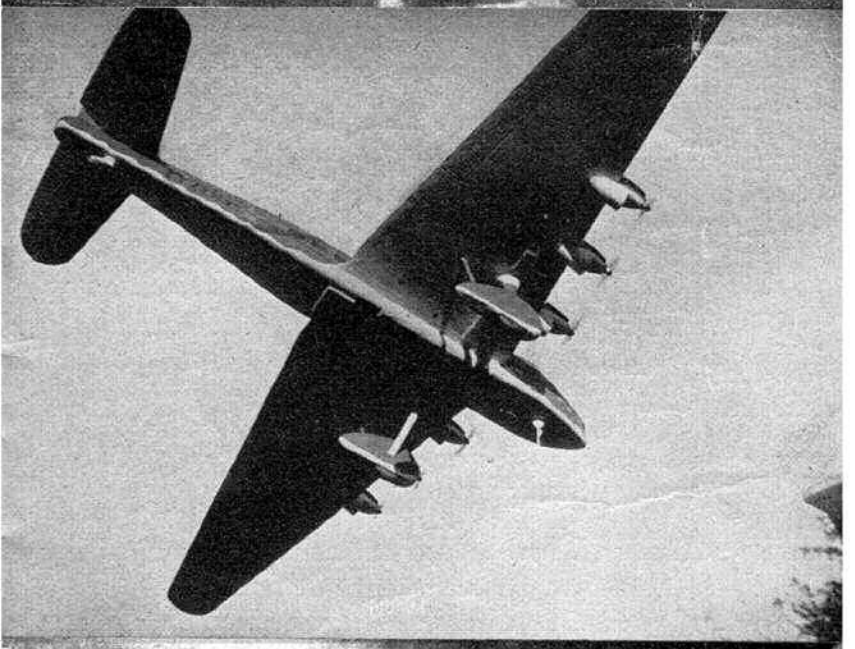
"UNBROKEN SPAR" · FULL SIZE DETAIL ·





· WING SECTION · FULL SIZE ·





BOMBERS AND BACKGROUNDS

By T · H · KNEALE

What better way of recording your various models than the examples shown here? There are no limits to the interesting and varied methods of Photo Montage. Many Aeromodellers will find it a useful and instructive method of passing time during our only too frequent spells of "unflyable" weather.

Three good examples of ingenious model photography are depicted on this page. That of the Wellington 1C and Heinkel 113 is an outstanding example. It shows what can be done with a little ingenuity and well-placed lighting. A good point is the position of the models in relation to the background obtaining a dramatic yet realistic effect. The background for this scene was obtained in the following manner: a glass slide was prepared on to which ink and gum were run together and allowed to dry. This was then projected by means of an enlarger on to a "screen" of tissue paper. The 1/48 in. scale Wellington was suspended by cotton before this screen and the whole then photographed. Finally the Heinkel was printed in from a second negative. The "flying" scene of the 1/48 in. scale L.760 was photographed suspended before a natural sky. Tops of trees or bushes together with the corner of a building, were included so as to give the correct impression of a "take off." The ground scene of the same model with flight of Ratas overhead also called for a little ingenuity. The Ratas were originally accurate silhouettes of black paper stuck on to tissue which was lit from behind and then photographed. These together with the negative of the L.760 were then overprinted against a natural sky background. Note the small figure giving the impression of dignity and impudence; besides laying stress on the size of the "Russian giant."

1

WELLINGTON Ic and HEINKEL He 113
"Fighter Astern"
(From 1-48th scale models)

2

L 760
Russian 6-motor bomber/transport (M-100 liquid-cooled V motors) seen from ground in flight soon after take-off.
(1-48th scale model)

3

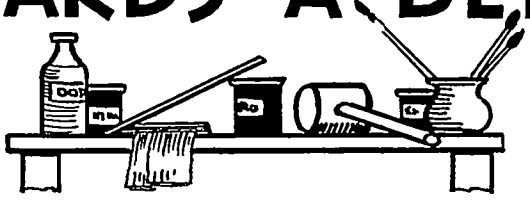
L 760 and 1-16c's

Foreground:
Russian experimental 6-motor transport (now used as bomber/transport) has span of 210 ft., length approx. 120 ft. Six M-100 liquid-cooled V motors, with deep radiators covered by wire mesh (filter?). Max. speed: 186 m.p.h. Shown in "Strength of Our Ally—U.S.S.R." Lawrence & Wishart, 1s. 6d. Other facts in John Stroud's "U.S.S.R. Air Fleet."

Background:
Approaching escort of 1-16c "Rata" fighters (1,100 Double Row Cyclone, built under licence).
(1-48th scale model)

TOWARDS A BETTER FINISH

PART I



by GORDON ALLEN

It is the aim of nearly every aeromodeller, on completing the construction of a machine to impart a perfect finish by means of good covering and doping, etc. From observations made at competitions and elsewhere, however, some do not seem to have mastered the art. This is because they have either not taken the trouble, or have tried and run into difficulties. Those who have not bothered about the finish must learn that it is most essential with respect to appearance and performance. A bad finish often spoils an otherwise perfect machine. On the other hand, those who *have* attempted to produce a first-class job but have failed because of not knowing the correct method will, I hope, find these articles beneficial.

Before going further, we must take for granted that the constructional work is good, thus providing a good base for the covering. All unnecessary projections must be removed by sanding, and all ribs must be flush with the leading edge, etc. Longerons should all be rounded off at their corners.

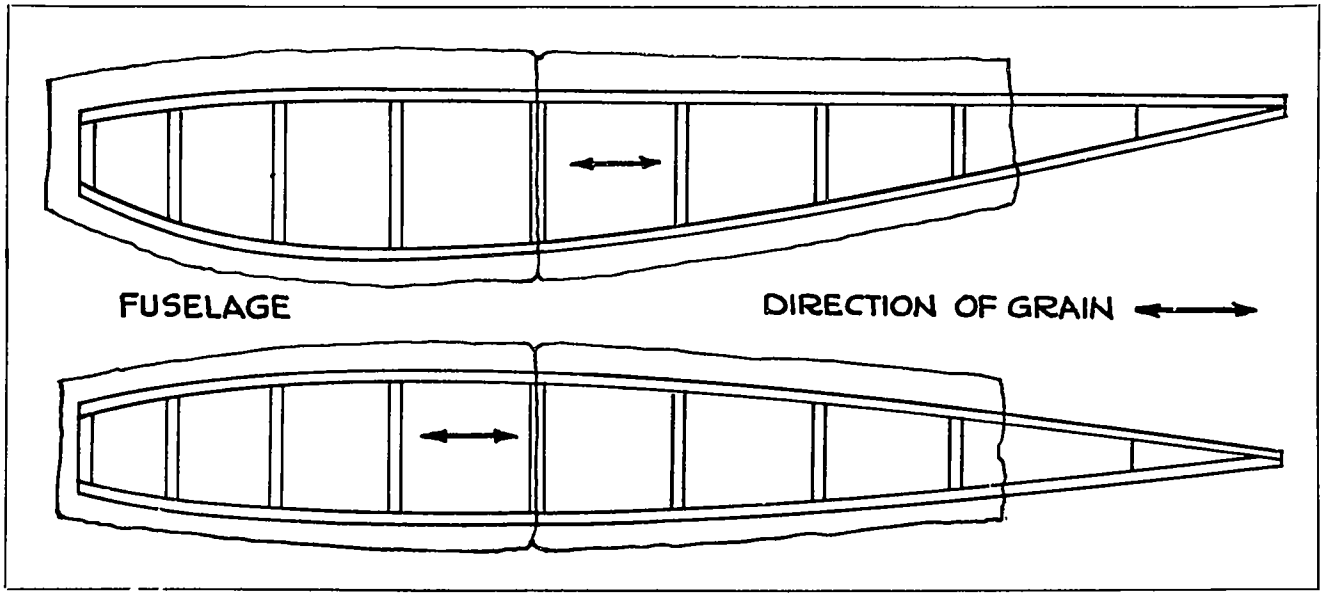
The Fuselage

It is the usual procedure when covering a "slabside" fuselage with Japanese tissue, to apply it in four pieces, one for each side. However, for the beginner this may prove difficult, especially if it is a large model, so an alternative method, and one *always* used by the author, is to use two pieces of tissue for each side.

Starting from the front, a piece of tissue is cut to fit half the number of bays in one side of the fuselage. This should have a quarter of an inch overlap at the sides, and be long enough to cover the nose cross brace to halfway across the width of the middle cross brace of the fuselage. To fix the tissue a strong adhesive paste should be used. Do not use banana oil, for it has a tendency to soak into the wood, and apart from not doing its duty in sticking the tissue, makes the wood brittle. "Grip-fix" is recommended. The fixative is smeared thinly over the front brace (having first whisked it to a thin cream). The front edge of the tissue is then applied with the glossy side of the paper upwards and the grain running from the nose to tail. Having correctly located the tissue, the longerons and half the middle cross brace are likewise pasted and by means of the tissue overlaps at the sides the covering is gently laid down. If the tissue was perfectly flat and smooth at the outset, then there should be no trouble in removing what few wrinkles now appear. This can be done by pulling the overlaps very lightly and evenly *at right angles to the wrinkle.* Having thus removed all creases, the edges are then smoothed with the middle finger and all the excess tissue cut away by means of a razor blade. When this has been done, a similar piece of tissue is cut large enough to cover the remainder of the fuselage side and applied in the same manner, with the first edge of the tissue pasted over the uncovered half of the middle cross brace. This makes an invisible joint in the covering and, incidentally, if the tissue becomes damaged at any time a new piece can be applied without having to strip the whole of the side. In this manner the rest of the fuselage is covered.

If a streamlined fuselage is to be covered—that is, a fuselage of circular or eliptical cross section, then of course a slightly different method has to be adopted.

Strips of tissue are cut the full length of the fuselage and wide enough to cover the spaces in between say, three stringers. Enough tissue is cut to allow for overlaps, and the grain must again run from front to rear of the body. The tissue paste is applied to the nose former of the machine and the first edge of the tissue placed over this and located. After having accomplished this the stringers and the part



of the rear bulkhead upon which the other edges of the covering are to be fastened are smeared with adhesive and the strip fixed in place as before. All ragged edges must be cut away and any remaining ridges pasted and carefully smoothed into place. If the machine is of the Wakefield class and possesses a large fuselage, then numerous pieces will have to be used. Care should be taken, however, to see that the strips are not too wide, otherwise the tissue will have to be fixed over two curves at once, that of the fuselage itself and also the sectional contour. This will always result in bad creases. Some aeromodellists often double cover their fuselage with tissue to increase the strength factor, but this will be mentioned later. Now, before going on to the covering of the lifting surfaces, the covered fuselage should be placed in a warm dry place until the time comes for water-spraying it.

Wing and Tail Surfaces

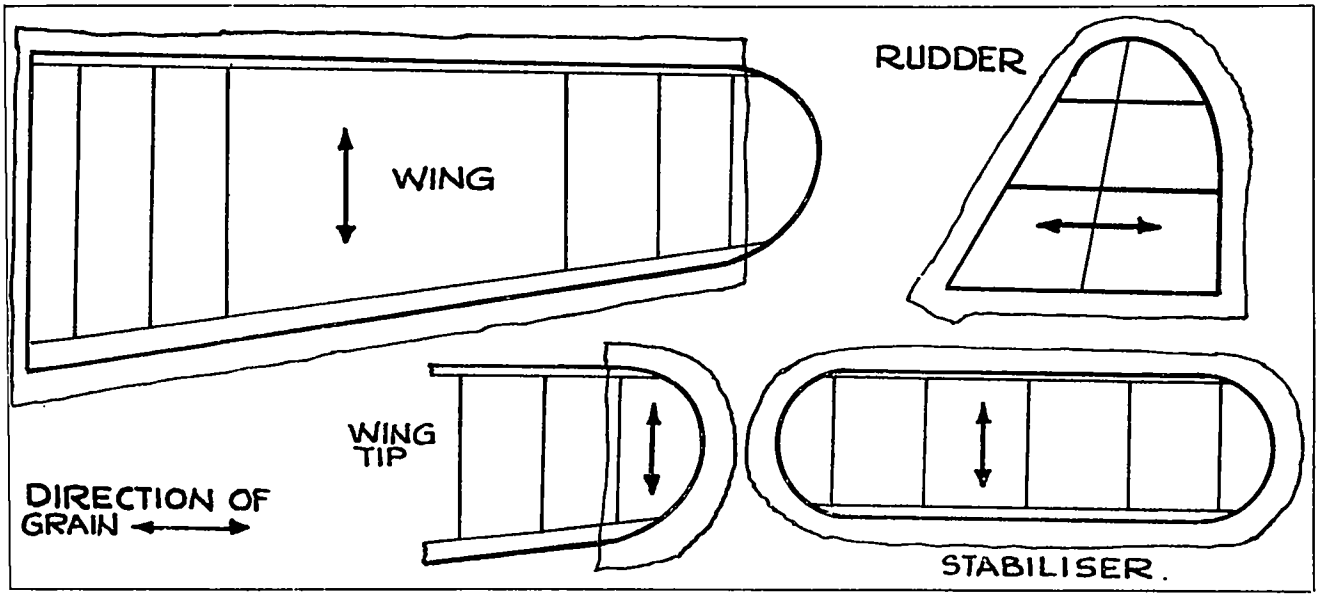
Covering surfaces such as these presents a different problem altogether—and *not* a difficult one, if attempted properly. Let us deal with *half* the wing at a time. A piece of tissue is cut to cover the upper surface of this half-wing, *neglecting the tip*. A separate piece will be used to cover this. Allowance is made here for half an inch of overlap on both leading and trailing edges. There must also be a small overlap over the ribs. The grain of the tissue must now be from leading edge to trailing edge. This is important, because when the tissue shrinks, the shrinking always takes place at right angles to the grain, that is, the grain tends to become closer. Therefore, the surface will not warp, the stress being from root to tip of the wing. On cutting the paper, the leading edge of the wing is smeared evenly with paste, from the root rib to the rib next to the tip. The tissue is then applied with the shiny side uppermost and with the half-inch of overlap extending over the front. Care is taken here to see that there are no wrinkles spreading from the leading edge across the width of the tissue. If any *do* appear, then they must be at once removed before the paste has set. This can be done by gently pressing the tissue at the side of the wrinkle and at right angle to it. On completing this, the outside ribs and the trailing edge are pasted, and the covering laid down. Taking the overlap at the trailing edge between finger and thumb of each hand about six inches apart, the tissue is tightened slightly. All creases are again removed by applying pressure at right angles to them. When this has been done satisfactorily, the edges are smoothed with the middle finger and all overlaps are neatly trimmed with either scissors or a razor blade.

To cover the tip a similar procedure is adopted, the root rib is pasted first and the edge of the tissue laid on it. A border an eighth of an inch wide round the tip is then smeared with paste and the tissue fixed to it. It is then trimmed.

The underside of the wing is easier to cover for the camber is not so pronounced. *All* under edges are pasted, including the tip, and placed over a flat piece of tissue a little bigger than that required to just cover the under panels. The grain will run the same way, and the glossy side of the tissue must be downwards this time. The wing is then inverted and naturally the tissue will have stuck to the underside. The latter is then smoothed as before and all edges trimmed away. The remaining half of the wing is covered in the same manner. All tail surfaces are covered likewise but fewer pieces of tissue are necessary.

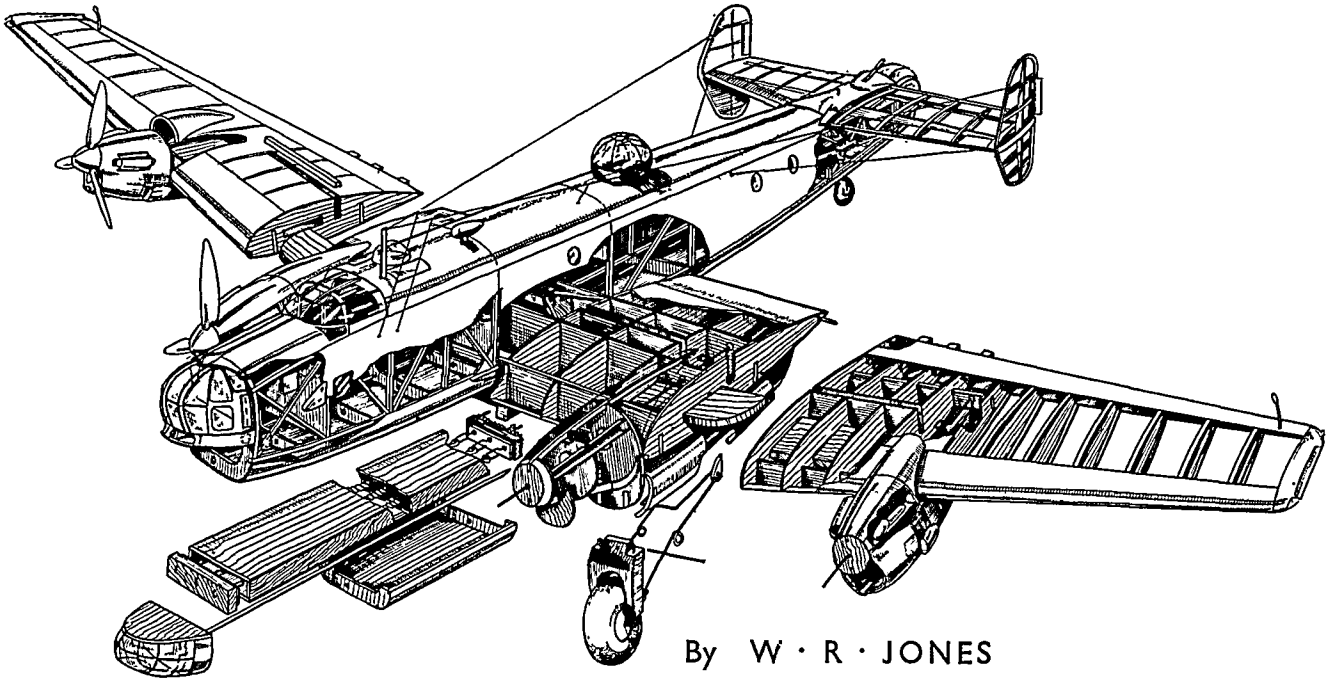
Remember, one of the main secrets of successful covering is to start with a stock of tissue which is perfectly smooth and creaseless. Never use tissue which has been kept a long time in a place where climatic conditions vary. This ruins the fibres in the covering and chances of a good finish are very remote. When you buy the tissue from a reliable model shop it is always perfectly smooth and in good condition. Keep it that way by folding it once and putting it in the middle of a large book in a cool dry place. Above all, never flatten tissue with a hot iron. It certainly flattens it, but proves disastrous later. Well, having covered the surfaces, water-spraying operations can be carried out upon the fuselage, the covering adhesive of which will be quite dry by now.

However, ye Editor is becoming a little perturbed about the space I am using, so I will have to adjourn until next month, when we will deal with the watering, doping and general finishing of the model, so until then—good covering.



THE HANDLEY PAGE "HALIFAX"

FEATURED ON THE FRONT COVER



By W · R · JONES

When I embarked upon the design of this aircraft some nine months ago, I thought that I was attempting a big job quite beyond the bounds of possibility. My venture has, however, been rewarded—in that the Halifax flies—although just how long she continues to do so remains to be seen. Thirty second flights are quite possible—"Not much," you will say to yourself—but I am satisfied. The model has comfortably exceeded this time on several occasions. Owing to the rubber shortage, I planted a towing hook in the right place and tried her as a glider—the results exceeded anything I had dreamed of. The motor drive presented a host of difficulties and will, I am sure, be scorned by many people, but if any builder thinks he can improve upon this method, I wish him luck. The drive seems to stand up to the "revs.," but if that is more by luck than good management, that also remains to be seen. In any case, it was my "brainchild" at the time, and I am sticking to it.

It seems that no matter what one does, the terrific power at the start of a flight does all kinds of queer things to an aeroplane. This is quite pronounced in the "Halifax" so I will dispense with any flying notes and trust that the modeller who possesses the nerve to build a model so impressive, will treat it with due respect, and take the utmost care when flying trials are on the carpet. All this may sound like so much "tripe," so before I get unpopular with the masses, I will endeavour to explain the various constructional features of my pet model.

I should like to say that the only Balsa used in the model was employed on wing ribs and tailplane construction. Everything else was Balsa wood substitute, obtained through the courtesy of a great gentleman in the aeromodelling game, and to whom I shall always be grateful for the numerous favours granted.

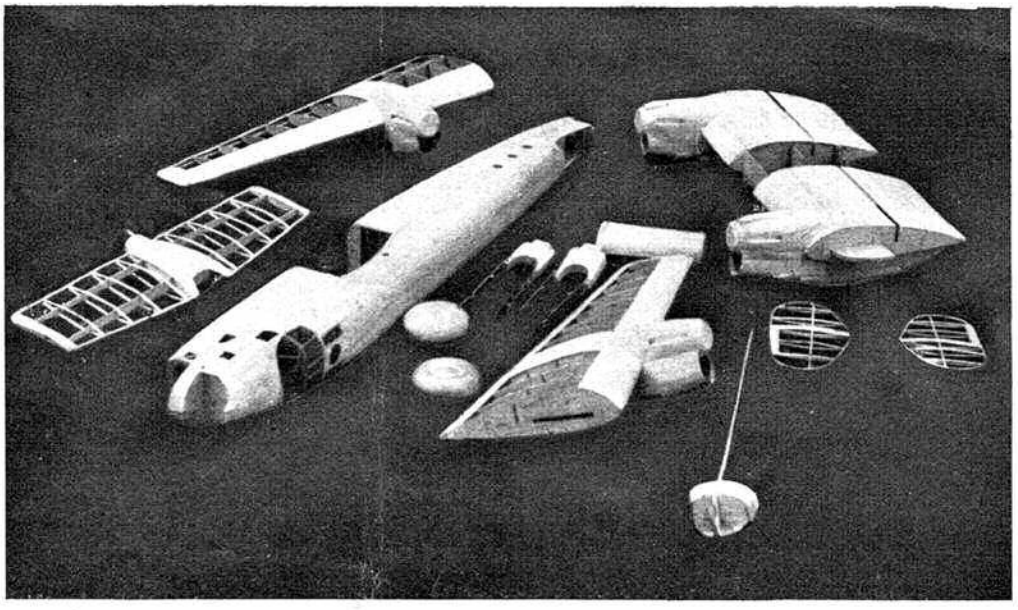
The fuselage construction is quite straightforward and I trust that the exploded view will be a great help in the building of this and other components.

The main frames are first built upon the plan and the various formers are cut out and glued into place. The forward bracing pieces are fixed after the latter operation. Glue on the temporary braces before the fuselage is skinned with wood and cut the lower frames where shown to take the centre section. The lower surface is covered before this is done. Proceed with the fuselage side, covering and cut out to receive the various windows. Sand all the covered part smooth and cover with Japanese tissue, pasted well down.

The centre section spars are now laid down and the ribs glued in place. Note that a centre line must be drawn upon the plan and the spar centre line laid upon this to enable the centre section to be built true—this is most important. The inboard nacelles are now constructed. This may be done, if desired, by cutting the formers in half and building the one-half side first, and then when the glue has dried, removing from plan and glueing the remaining half formers on this side. This applies also to the outboard nacelles. Note that the top rear keel on each nacelle is fitted *after* attachment to centre section and wings.

The plywood bearings fitted on to spars and nacelle formers are to be slotted vertically to enable thrust adjustments to be made. The motor bearing mounting is built up as shown, as are all the connecting rods. All these parts require to be built up with great care, as the slightest inaccuracy will throw the drive all out, and cause a lot of vibration, as the connecting rods will start going in different directions with dire results.

The outer connecting rods may be curved with ad-

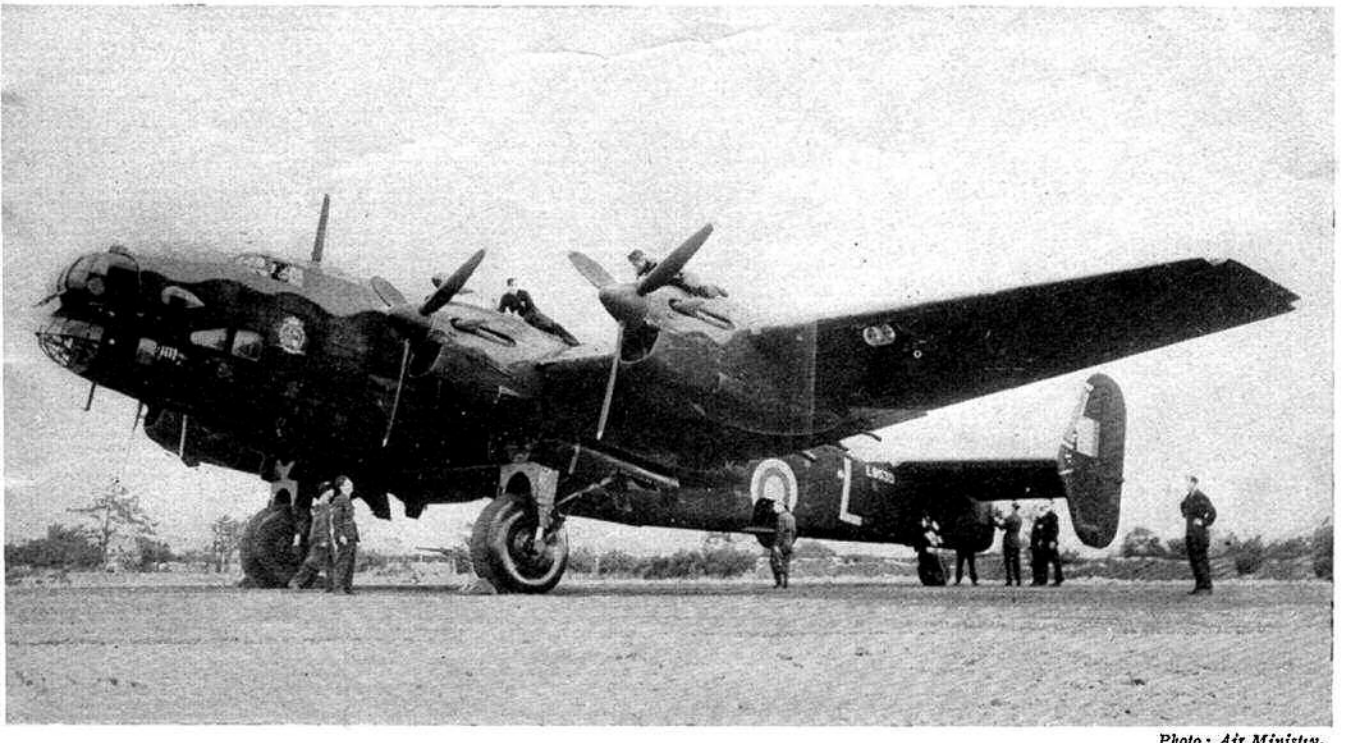


vantage to suit the dihedral angle. The curve need only be slight, just where the outer wing joins the centre section and, as stated on the plan, the outer rods must be pin-jointed here to allow the wing to be knocked off and also to allow the two sections of the wing to be dismantled. The blocks which fit into the connecting rod slots are taken out for this operation. " There *must* be method in the man's madness."

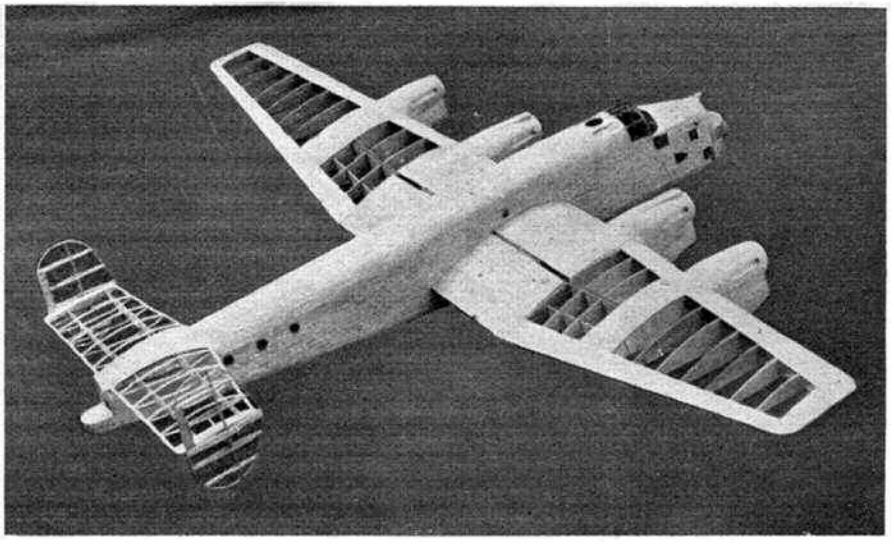
The undercarriage is quite straightforward and is attached to the nacelles with 18 s.w.g. pins. Owing to difficulty in obtaining wheels of a suitable size, the undercarriage was dispensed with when flying the original model (*à la Towner*). The wheels I did get hold of (as shown in the exploded photograph) were made of hard wood (and I mean HARD wood !), much too heavy, in fact, when they were fitted, the plane stood with the bomb-aimer's window nosing into the ground. I rigged up a special undercarriage that would come adrift for flying, and that is how the thing stands now, with a " ton " weight on the tail to hold it down. Enough of this frivolity !

The wing and tailplane construction is quite straightforward and should present no difficulties. A little " washout " on the port wing would not come amiss. I think that the torque trouble I experienced would have been eliminated had I done this in the building stage. After all, it is very difficult to put " washout " into wings such as I have employed in this design. The rudder tabs come in very useful in this respect, although they do not seem to be of a large area when you look at the plan.

The celluloid gun turrets, etc., are the most trying things to form, and it took quite a lot of patience to build these parts. They can, of course, be built up with bits of celluloid glued on to wooden formers fixed in place on fuselage, but I, for one, prefer the hard way of doing it. That is, of course, moulding the celluloid over shaped formers which, by the way, should be of hard wood if



HALIFAX II. *Photo: Air Ministry.*



Assembled Model prior to covering wings and tailplane.

Photo: Air Ministry.

HALIFAX I.

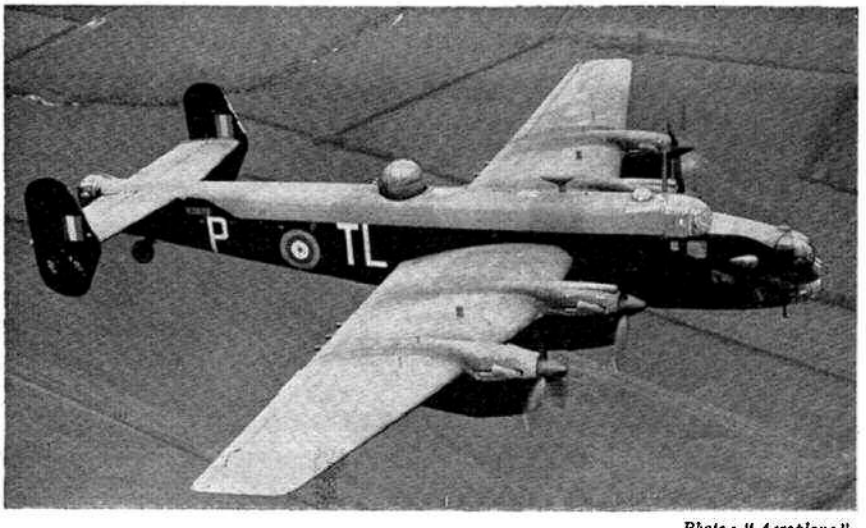


Photo: "Aeroplane."

HALIFAX II.

possible, as the water will raise the grain on the Balsa wood, and cause wrinkles in the celluloid, when the moulding is finished. The instructions for doing all this will be found on the plan and the extra time spent is well repaid. Well, I think that deals with all the snags likely to be found in the construction of the model.

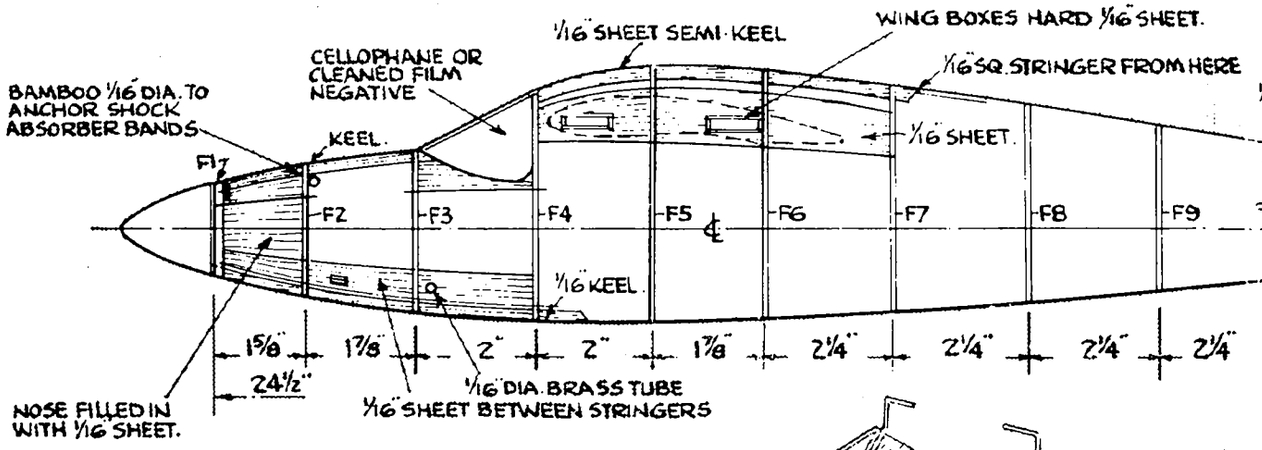
Different builders will, no doubt, have their own pet way of doing things. As I mentioned before, the exploded sketch will be of valuable assistance, as it shows the completed model, shall I say, "As she is built." The photographs are not as clear as they could be owing to the difficulty of obtaining good films. I seem to have been dogged by ill luck in the photographic line with this model, as the first batch taken on a "Pan" film were destroyed in a fire, before they were printed.

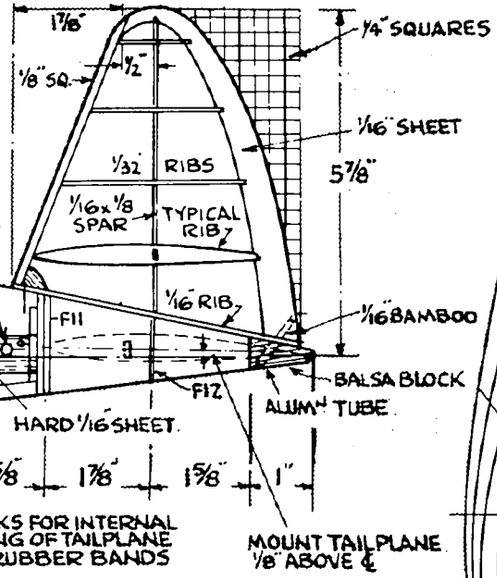
I should, perhaps, include a few notes on the flying of this model. I used 3 loops of 3/16 in. by 1/30 in. rubber 15 in. long on each motor, and the maximum turns have not yet exceeded 600, so I am unable to say just how much the motors will stand. After gliding tests, I put on 175 turns just to see what happened —nothing did! So I put a few more on next time, and so it went on until I was getting quite good flights. I must confess that I like it as a tow-line glider much better. The hook, by the way, is not shown, but is made up from a piece of plywood, glued on to the underside of the fuselage, in which are cut three slots 1 in. apart to hold the ring. The rear hook is 60° from the C.G. which is one-third of the chord back from the leading edge at the centre section—*not* the wing tips.

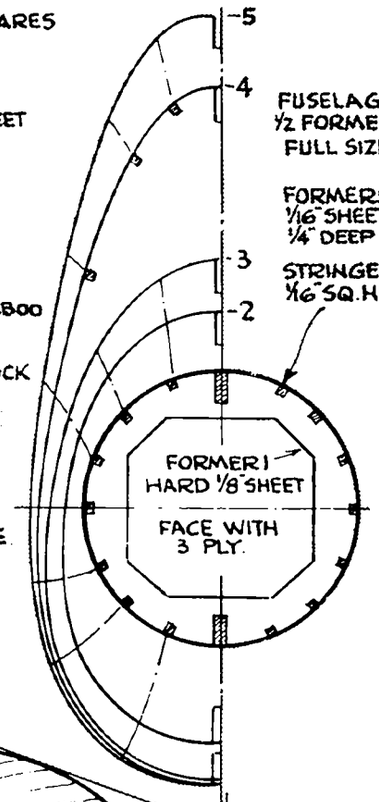
TETRARCH

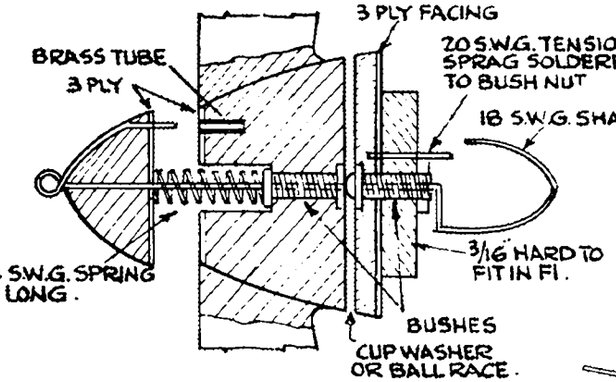
POWER : 14 STRANDS OF 3/16" RUBBER.

FUSELAGE
· 1/3 FULL SIZE

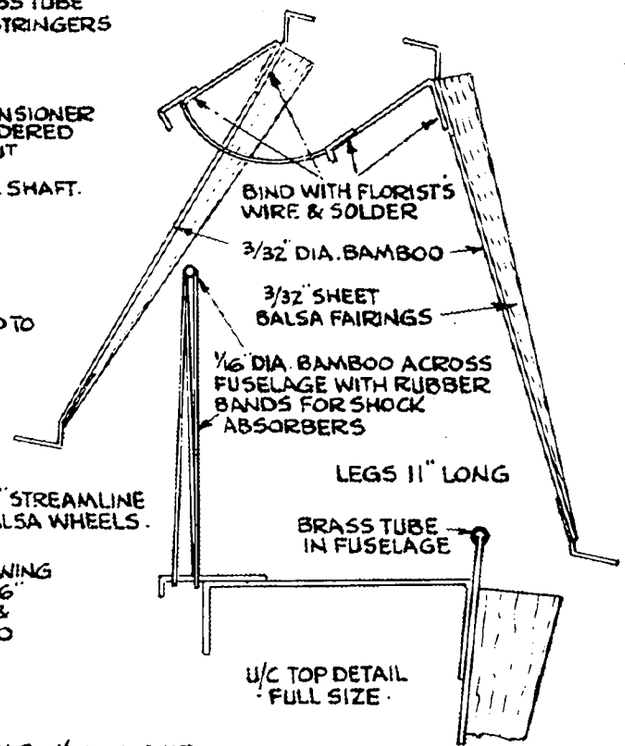




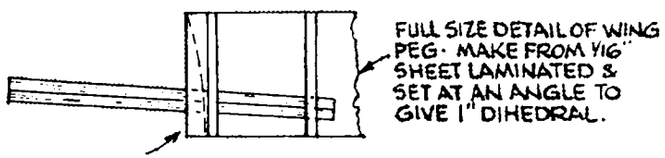


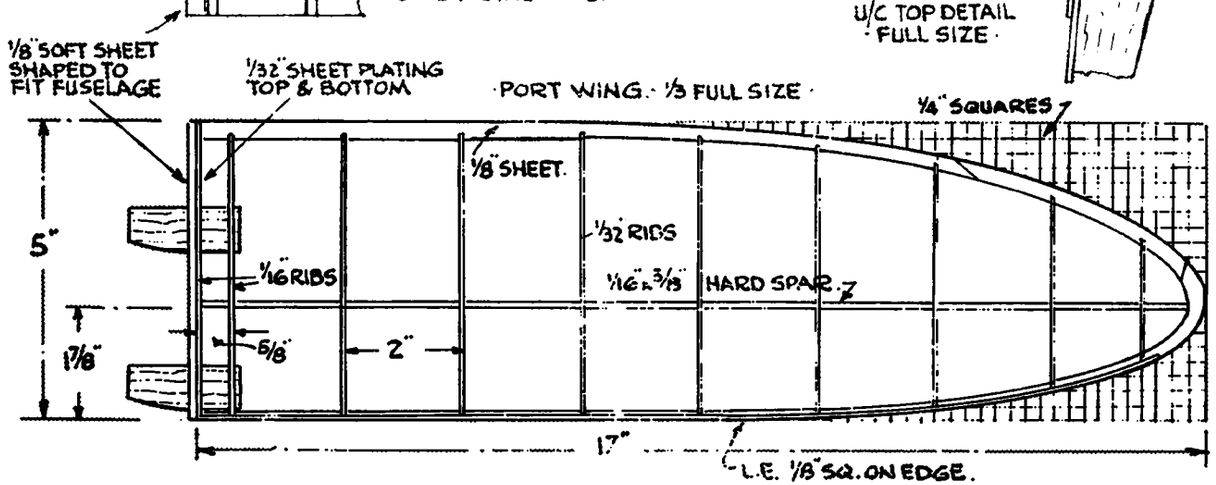


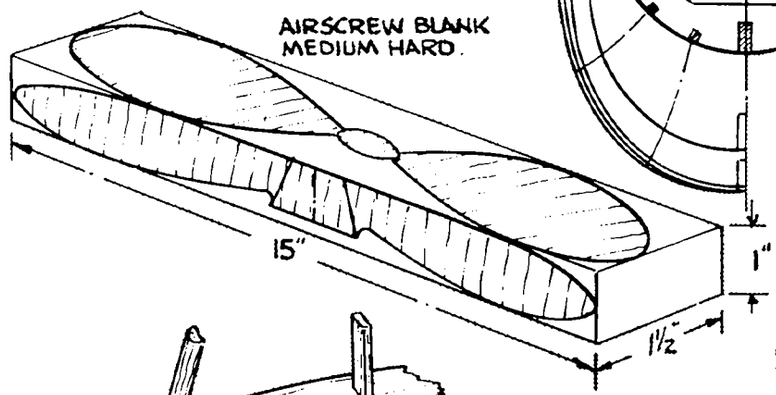
NOSEBLOCK & FREEWHEEL DETAILS
· FULL SIZE ·

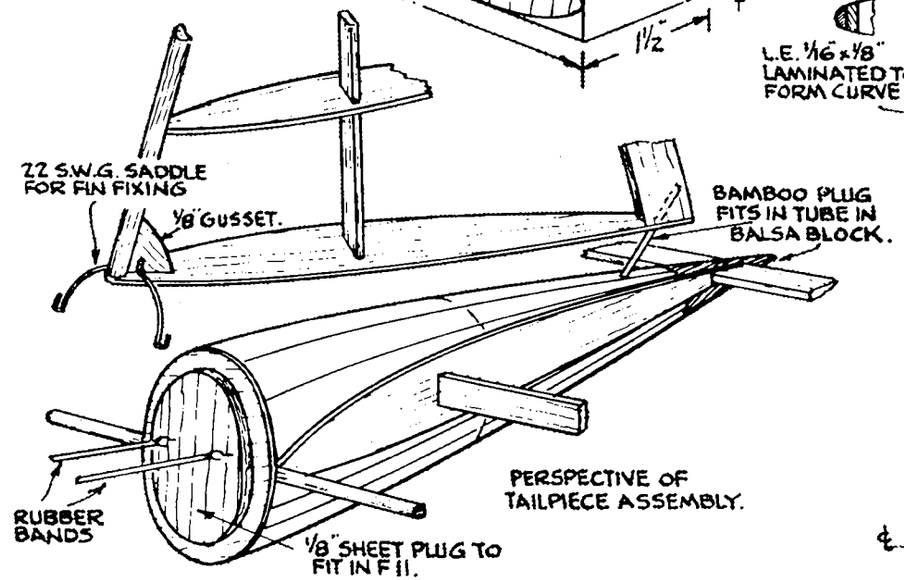


U/C TOP DETAIL
· FULL SIZE ·

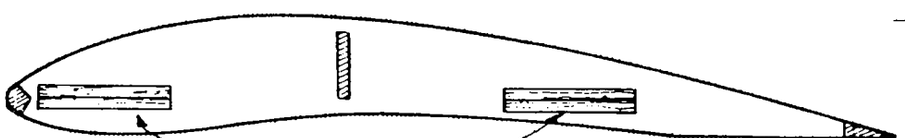


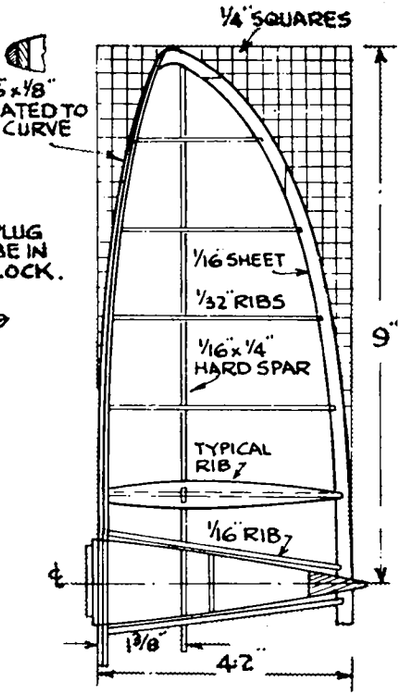






PERSPECTIVE OF TAILPIECE ASSEMBLY.





STARBOARD TAILPLANE
· 1/3 FULL SIZE ·

LIGHTNING LAYOUT

SOME COMMENTS

BY

C. RUPERT MOORE, A.R.C.A.

The article to which Mr. Moore refers appeared on page 794 of the April issue of the "Aero Modeller." It was written by W. A. Dean, until recently a junior member of the "Aero Modeller" staff. We accept no responsibility for his views, or, for that matter, for those expressed by Mr. Moore, whose experience of model aircraft exceeds some twenty years.

THE anonymous author of the article "Lightning Layout" in the April issue is perfectly right in assuming that a Lightning would make a good flying scale model—but he can hardly claim any credit for that! He should thank Messrs. Lockheed for building an aeroplane which can be fitted round the model formula in vogue *circa* 1910 when twin booms were the rule. In his wild tirade, which is mixed up in this great-discovery, he states "Why people always choose the hard way . . . I really don't know." One understands this when the only ingenuity required on this model is the retracting undercarriage, and that has been neither drawn nor mentioned! According to him if I wished to build a Blenheim complete with retracting undercarriage (see Xmas number), I simply build a Lightning!! My reason for writing this is not to discuss his "bright idea"—but really to make clear that his wild statements on flexible drives are devoid of all fact.

* * * *

Dealing firstly with the "Moore Drive" I can state that no one bar myself can have any experience of it (mine is over five years), as the secret has only been released since February; therefore; his opinion can have little foundation on facts or experience.

The Uses and Limits of Flexible Drives.

In duration models with no limit on airscrew size, wing position, and tail area, and with wing loadings below 5 oz. per sq. foot, no "Gadgetry" can be of any help at all. Where gear boxes and multi-screwed aircraft come into their own is with wing loadings above 6 oz. per sq. ft. Scale models where the wing is well forward use gears in place of that inevitable ballast to drive their undersized airscrews for a reasonable time, and flexible drives are the only means of getting reasonable flights from scale multi-engined types other than the "Lightning" type.

Some Facts.

	Viper II.	*Castor.*
Wing Area	298 sq. in.	299 sq. in.
Weight	24 oz.	26 oz.
Airscrew diam.	15 in.	2 ft. 11 in.
Pitch	15 in.	11 in.
Motor	4 skein direct drive.	3 skein step-up 3–2 ratio.
Motor weight	6 oz.	6 oz.

Above are some specifications of two of my models, "Viper II," *single screw*, and "Castor," *a twin*. To find the efficiency of my drive I built "Castor" to the same specification as "Viper II." The motors were so arranged that both took 1,000 turns. By gearing up "Castor," each rubber revolution had a theoretical pitch of 16½ in. to "Viper's" 15 in. Their motor run was the same and what is more important, *so was their duration*. Mr. Leonard Taylor on Hackney Marshes has clocked 72·5 sec. with a replica of "Viper," and "Castor" has done 69 sec. H.L. 54 sec. R.O.G. was *officially* recorded for both. The structure weight of "Castor" was enormous, the fuselage alone weighing 4½ oz., because she was the flying test bed for the first drive and I wanted no structural troubles. My "Blenheim" has 50 per cent. more wing area, yet weighs only 2½ oz. more than "Castor," in spite of a retracting U.C. and scale cowlings. My "Scion" of 225 sq. in., weighs only 12 oz. complete, the drive accounting for ¾ oz. and the gear box ¾ oz. or 12·5 per cent. of the total weight (i.e. the actual drive being 6·25 per cent.). It is interesting to note that "Castor's" two airscrews only weigh 60 per cent. of "Viper's" one, and "Castor's" U.C. 80 per cent. A Wakefield model, a twin pusher, has been made taking advantage of the twin layout. For the cost of 1 oz. (drive and gear box), airscrew weight has been cut to 60 per cent., gull wings give enough airscrew clearance to mount the three wheels half inside the fuselage, saving an undercarriage; and as the airscrews revolve in opposition there is no torque, therefore the tail areas are smaller. The total weight is 8¾ oz.! Which means, for the same weight as an orthodox model, one with no U.C. and reduced airscrew resistance. As to friction, I have already stated that the airscrews freewheel the whole drive when the gear box is removed; that is 8 joints on a twin tractor!

My Claim.

I think the facts above given will show that I am justified in claiming that my drive makes possible the driving of any number of airscrews in any positions where direct drive is impossible. The thrust line can be altered at will even while in motion. The whole of the drive is *internal*. Where the wing loading is 6 oz. per sq. ft. or over, the extra weight can be saved.

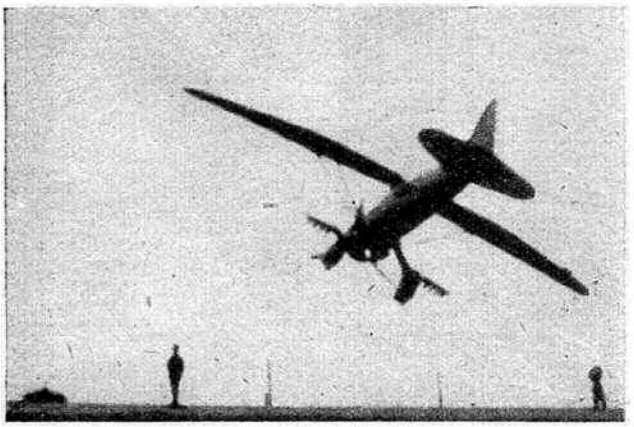
The "Moore Drive" makes possible the powering on *any* layout of single or multi-engined model, tractor pushers or tandem, including flying boats; and what is more, helicopter rotas, allowing the incidence to be change while in motion under full power.

Mr. Rippon's drive being referred to "curtain wire"—I feel I must say a word on his method. His drive is too well known to require description, and that is why I have taken the liberty of concentrating on my own drive. Much of what I have written is applicable to his drive also. He has concentrated on the single pusher type with the airscrew in a nacelle above the top wing, and with a model of 66 in. span weighing 22½ oz. he has put up the remarkable performance of 70 sec. H.L.

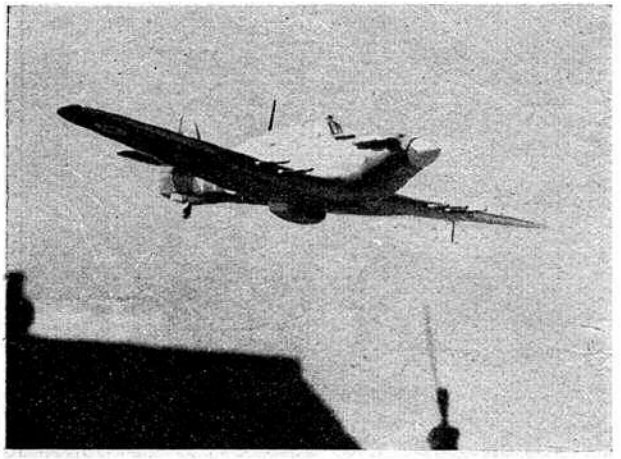
Though I have not consulted him, I am sure Mr. Towner would endorse much of what I have written.

SOLID MODEL TIPS

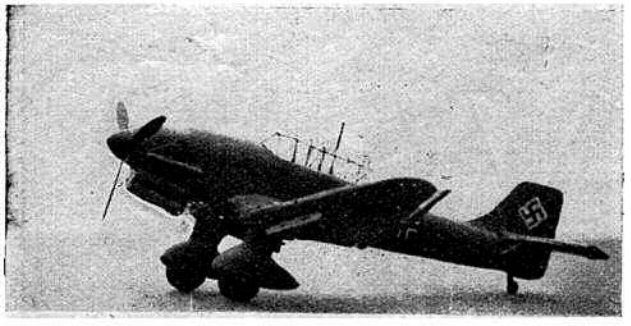
By C · D · ALLEN



Westland Lysander.



Hurricane Mk 2C. By G. R. Woollett.



Junkers 87 B. By Sgt. Pilot P. Montgomery.

OFTEN an excellent solid model is spoilt by a lack of care given to the final details, and yet with a little ingenuity such things as guns, identification lights, spinners, etc., can be easily added to your model.

No. 1 bore airgun slugs can be used in many ways to add realism to a model. They can be used as spinners on small models (e.g. The Owlet), or, if they are sunk about ⅛ in. into the fuselage of a model, the protruding part, when painted, forms an excellent navigation light.

Another use of these slugs is to make portholes. To do this drill a hole in the side of the model and sink a slug into it (do this with the head of the slug pointing inwards). Covers for the portholes can be made by stamping holes in celluloid with a punch of the type used when filing papers, then the pieces of celluloid that come out of the holes form perfect circular covers.

If two pieces of mm. ply are stamped out in the same way, and are then glued together they will make a very accurate tailwheel. Ammunition drums for machine-guns of the Vickers gas-operated type can also be made in a similar way.

Teeth of a comb can be made to represent tapering aerial masts or pitot heads. Gramophone needles with the points filed off will make excellent cannons of the streamlined type as on the Spitfire V. The 20 mm. cannons used on the Hurricane II can be made as follows:—push a big pin into the leading-edge of the model, and fair it in with glue or plastic wood, now bind the next ⅜ in. with fuse wire. The gun is completed by fixing a paper collar about 1/16 in. wide round the barrel ⅛ in. from the end.

D.F. "eggs" can be made of chewing gum or plasticine coated with glue, as can air intakes, fairings and spinners.

Controllable gills for radial engines can be made of a ring of paper with small slits cut in it. Use paper also to make front fairings for retractable under-carriages.

If a modeller is short of celluloid with which to make cabins, a good substitute to use is film negative. To get the gelatine off negatives soak them for a few minutes in hot water, and then the gelatine will rub off easily.

Many people find it difficult to mount their models on stands, but the difficulty may be overcome quite easily. A method that I have used successfully is to drill down a lead pencil about ¾ in. and fix a nail with the head filed off into the hole, then the protruding part of the nail can be pushed into the model, and the whole can be fixed to any suitable base, the pencil when sandpapered and stained forming an admirable mounting pylon.

MY ENGINE

By LAWRENCE H · SPAREY

Continued from April " Aero-Modeller " in which copy the drawing of " Sparey Engine " is illustrated.

10. *Contact Breaker.* This is probably the most unusual feature of the design, and is shown in the form in which I have successfully used it before. It is capable, however, of a considerable cleaning up in design. One of the greatest faults of small engines is the placing of the contact breaker too near the end of the main shaft, in which position it receives almost all the oil which the engine does not want for running purposes. Bad ignition causes about fifty per cent. of small engine troubles, and oiled contacts are not the least of these. My design shows that the actual contact breaker is mounted some way up along the ignition control lever, and is actuated by means of a steel push-rod running in tubular guides. A light, spiral spring retains the push-rod upon the cam. The spring is marked (11). In spite of its unorthodox appearance I have encountered no snags to its working. All the parts are readily accessible for adjustment and for lubrication where *you* want it. I would insist upon a long ignition-lever so that the fingers are well away from the spinning propeller blades. I have painful memories of a finger cut almost to the bone through touching the propeller tip whilst " fiddling about " behind the airscrew with a short ignition lever. In passing, I may remark that I have used a remote control device for the ignition lever, consisting of a Bowden cable arrangement, constructed from a camera cable release.

A flat contact-breaker spring is used, as these are more easily made and replaced than the complicated curved types. I cut my springs from an old hacksaw blade.

12. *Rotary Inlet Valve.* At the rear of the crankcase will be noted a component looking like a small crankshaft. This is the rotary inlet valve, which allows the mixture to be drawn directly into the crankcase from the carburetter tube. The valve consists of a cast iron disc with a central steel shaft which runs in cast iron bearings, in the crankcase backplate. Rotation is given to the disc by means of a small pin which engages in a hole drilled into the crankshaft big-end bearing. In the disc an aperture is cut, and this uncovers the end of the intake tube at a predetermined moment, as the disc revolves. Thus the gas charge is drawn directly into the crankcase. The arrangement is extremely efficient, and will wear for long periods without attention, chiefly due to the fact that it is so well lubricated at all times. The disc is pulled against the rear face of the crankcase cover by means of a spring (13) ; it is thus easy to maintain a gastight joint. Although not shown in the sketch, oilways for the lubrication of the shaft will be provided. Another benefit bestowed by the rotary type of inlet valve lies in the fact that it is not necessary to drill a hole in the cylinder wall for the admission of the gas, as must be done with the usual type of piston operated valve. Anything which obviates the drilling of holes in the cylinder or piston walls is to be recommended because, as previously stated, leakage occurs at these points when the engine begins to wear. This can be easily proved by slowly turning the crankshaft of a worn engine, while holding it near to the ear ; the compressed air will be heard escaping from the ports. If the outsides of the ports be flooded with oil the leakage may be detected by the small bubbles which will form.

14. *Petrol Tank.* There is nothing peculiar about this except its very low position in the assembly. Petrol tanks which are mounted high up are a nuisance, in so far as any petrol spilled in the filling invariably finds its way over the outside of the engine. Petrol and oil have a most destructive effect upon the rubber covering of the ignition leads, which causes weak spark and misfiring. My petrol tank, therefore, must be the lowest component of the assembly.

The engine may be run inverted by a simple alteration of the position of the petrol tank. This is effected by removing the bracket from the nut at the point marked (15), rotating the carburetter tube within its locating hole in the crankcase cover, and rebolting the bracket to the lug marked (16). A small refinement which I require is provided by the small locking device (17) which prevents the needle valve from turning under vibration.

General Remarks

In the front view of the engine the exhaust pipe will be noted as a prominent feature. It is obvious that every item cannot be drawn in detail in such an article as this, so that it must suffice to say that this pipe forms an extension of a collar which encircles the cylinder liner, just beneath the fins, and which is clamped down in the general assembly by the long bolts and nuts. An exhaust pipe is certainly a necessity if the engine is to be of a universal type, such as will be suitable for mounting into any design of 'plane. Some designs will make it necessary for the engine cylinder to be partly enclosed by the fuselage, and I certainly would not favour the belching forth of incandescent exhaust gases within the fuselage, without some means of conducting them away. Many engines ignore this point entirely. Furthermore, the provision of a correct exhaust system may have a marked effect upon the efficiency and even-running of the engine, as I have more than once demonstrated.

The fixing of the engine to the aeroplane is accomplished by means of the two lugs which may be seen in the front view of the engine. These lugs are cast along the sides of the crankcase in the usual manner. In machining, however, I shall consider it a necessary point that the machined surfaces of the lugs lie parallel to the crankshaft. If this is assured, it is an easy matter to arrange for the correct amount of down-thrust, if this is required when mounting the engine. It is only necessary to place the engine bearers of the fuselage at the correct angle.

In conclusion, I would say that the present design should be suitable for engines of 6 c.c. capacity and upwards. In my opinion, these sizes are the most useful for general purposes. There seems to be little point in building the ultra-small petrol driven aeroplane. I will admit that there is something most fascinating in the thoughts of a petrol 'plane which may be packed into a small suitcase, quickly assembled upon the field, and sent soaring into the air with a simple flick of the propeller. This is always the dream of the uninitiated, yet, I am afraid, it must, at present, remain just that. My observation has shown me that the experienced petrol 'plane flyer leans more and more towards the larger engines and aeroplanes, as the essentials of the game are more fully realised.

So, I will leave my proposed design to the tender mercies of the critics, yet I would ask them, before condemning it off-hand, to take a pencil and paper and, ignoring my remarks, sketch out for themselves their own solutions to the problems. It will, I fancy, lead them to grant me a little more of that quality which is not strained.

Making

Firstly we require a tin tray or the use of the bath, in fact any container which will give a sheet of water larger than the size of film required. This should be partially filled with warm water (temperature about 80°F.), to a depth of about 2 in. (See photo 1.)

The surface of the water must then be cleaned by drawing a sheet of newspaper or blotting paper over it as in photo 2. This removes dust, etc., from the surface which would otherwise result in holes in the film.

Next, take a little microfilm solution and shake it up. Pour a little into a spoon on the bottle top and then pour this on to the surface of the water in a sweeping motion from one end to the other—see photo 3. Always pour the solution on in one go, not one blob at each end, or you will get two films which will not join.

The solution should then spread out in an even film over the surface of the water reaching nearly to the edges of the container. In all probability some wrinkling will occur at the edges, but this is quite natural. By breathing on the edges of the film the limits are more clearly shown, the film turning milky at these parts.

Allow about half a minute for the film to harden and then take a wire loop, bent from suitable soft wire, and somewhat larger than the frame to be covered. Lay this gently on to the film—photo 4—and with your free hand turn the overlapping edges of the film over the wire—see photos 5 and 6.

Now lift one corner of the loop off the water and rotate the loop slowly—see photo 7—so that the least stress is put on the film in lifting it. Care should be taken not to get any water on top of the film or it may break.

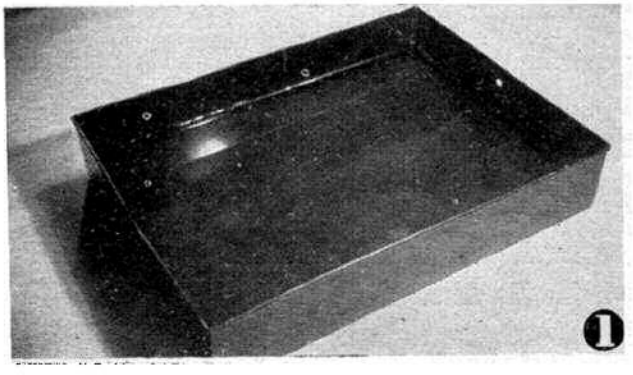
The film may then be lifted right off the water—photo 8—and then hung up to dry.

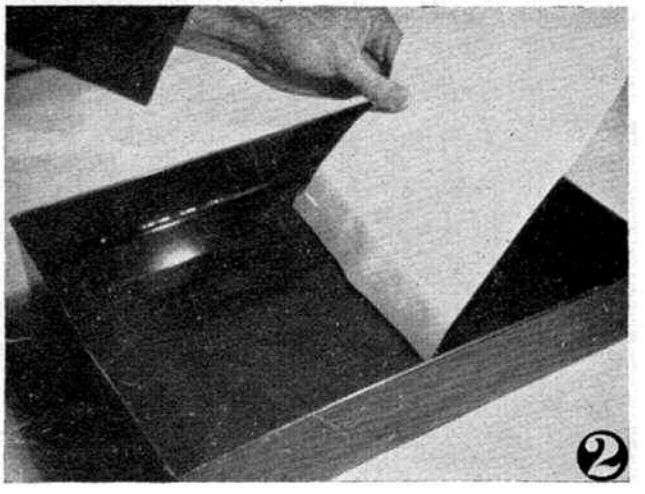
To cover a frame, first moisten the woodwork with saliva or water and press gently down on to the film, making sure that each part of the framework is in contact with the microfilm—photo 9.

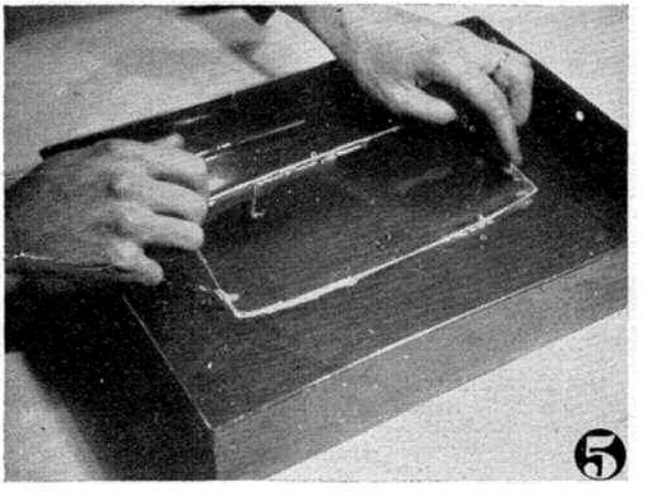
Leave to dry for a few moments and then trim off surplus film by means of a hot wire held about ½ in. from the framework. The film will just melt away from the hot wire and dry to the structure. The wire must be red hot to avoid tearing the film.

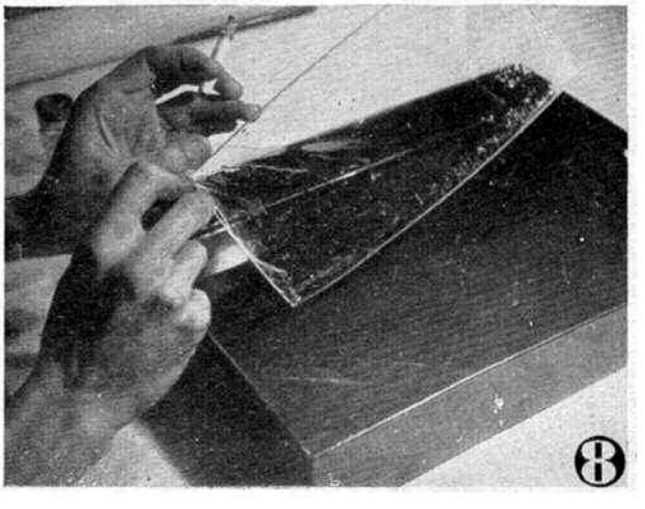
Any wrinkles in the film may be removed by passing a hot wire to and fro above the sheet affected.

Damaged films, or partial films, may be utilised to cover smaller components such as fins and tailpieces—see photo 10—but each frame be covered by a single film.

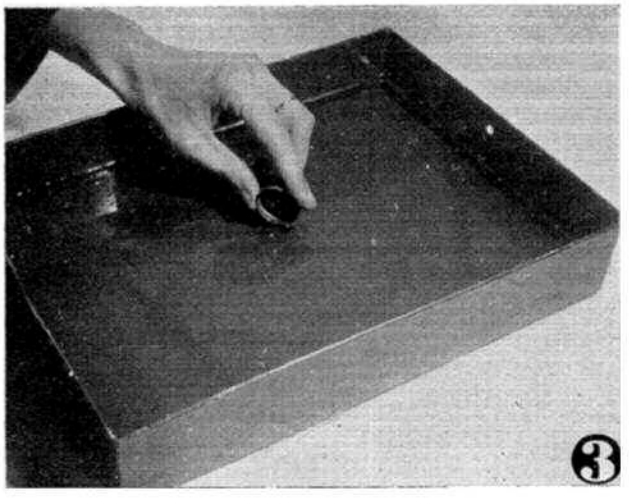


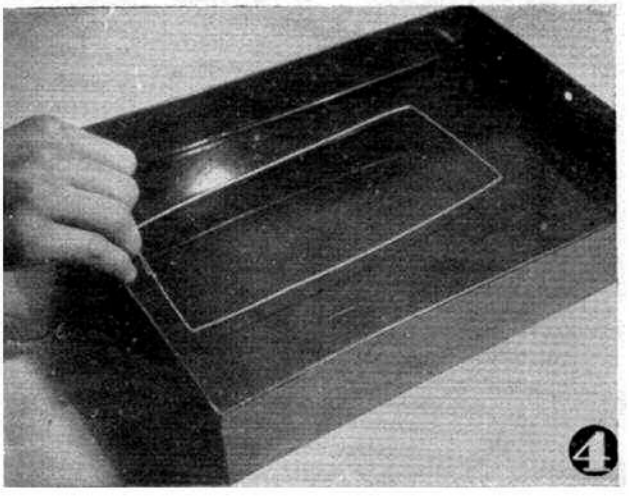


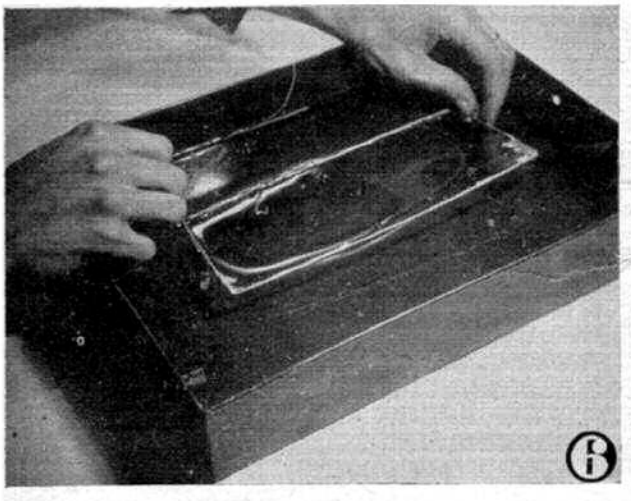


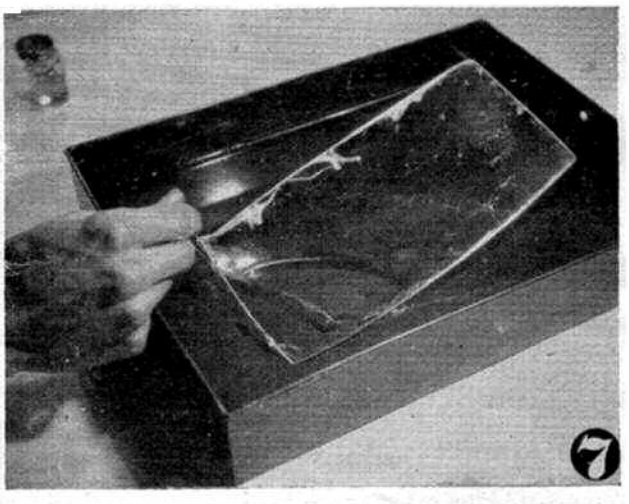


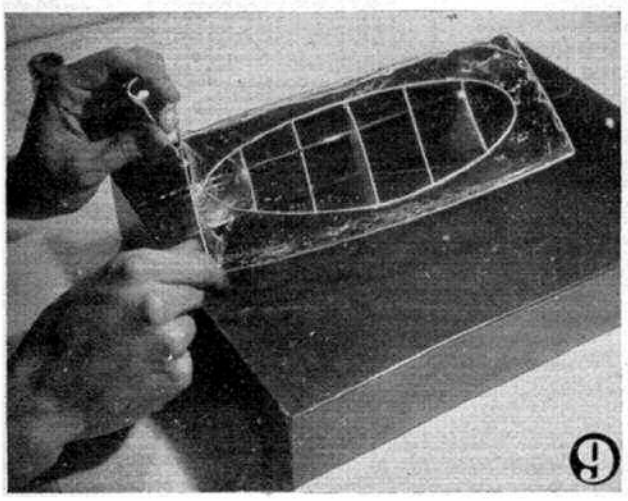
Microfilm

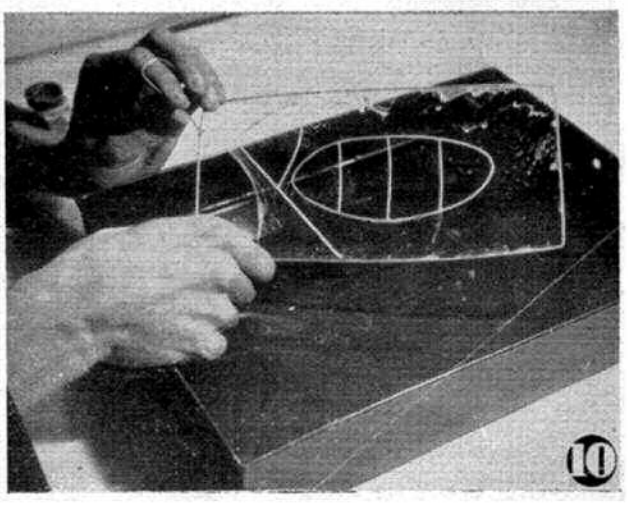




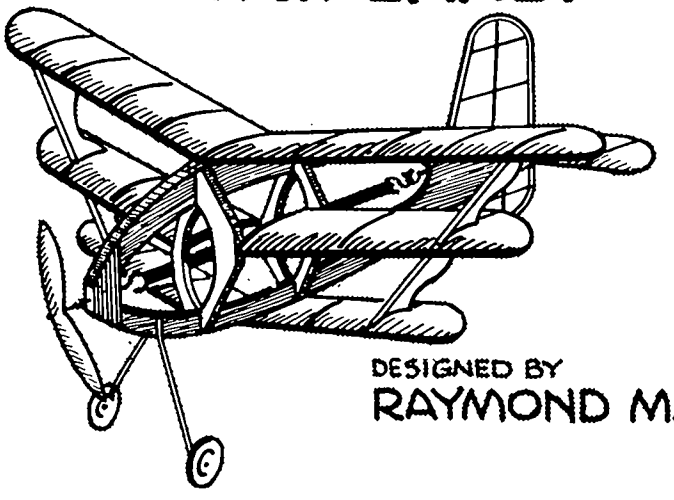




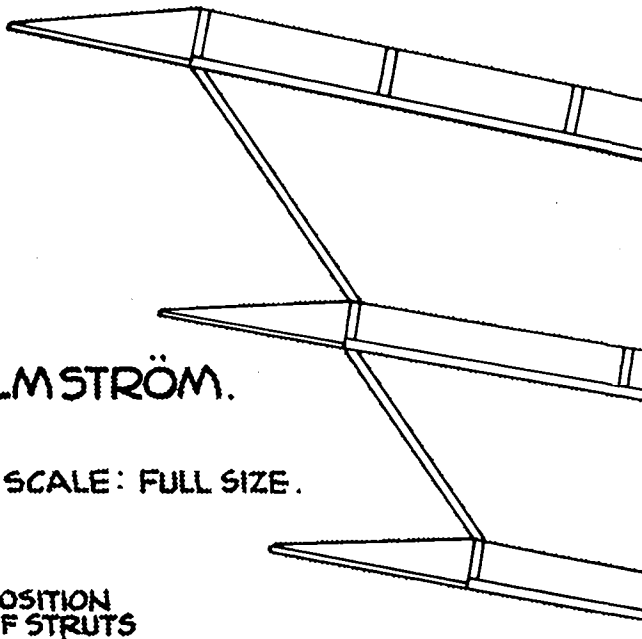




The TOM-TIT TRIPLANE.



DESIGNED BY
RAYMOND MALMSTRÖM.



SCALE: FULL SIZE.

THE "TOM-TIT" TRIPLANE

By RAYMOND MALMSTRÖM, A.T.D.(Lond.)

Besides being the miniature wing-walkers' nightmare, this tiny triplane can be flown indoors, out of doors and R.T.P. In short, for a very little trouble, and even less expenditure of balsa, the builders can possess a vest-pocket model that absolutely fills the bill for a general purpose model.

The Tom-Tit, on 800-900 turns, will consistently perform around the 40-50 secs. mark, and construction of this absorbingly interesting and unique "kite" is simplicity itself.

The "fuselage" is of medium or hard $\frac{1}{8}$ in. balsa sheet. Reinforce the front portion with m/m ply. Bore the hole for the shaft at a slightly negative angle. Fit the undercart with $\frac{3}{4}$ dia. celluloid or balsa wheels. Line up formers 1 and 2 and cut slots for the top and bottom planes.

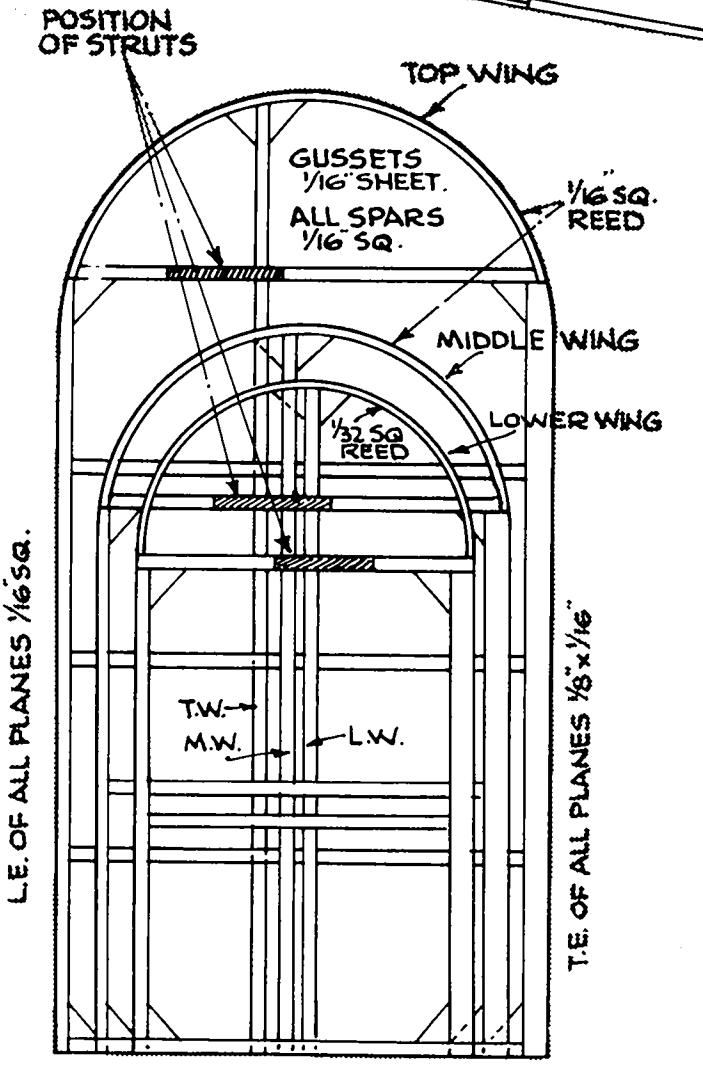
The wings are made up from details on the plan. A reverse tracing of the port wing panels is necessary. Fit the top and lower planes into the slots on the fuselage, *after* imparting the correct dihedral angle by cracking at the centre ribs X and Y and recementing. The middle wing is built in two halves and cemented to the formers. See that these joints are firmly made. Fit interplane struts. These struts impart a pleasing and necessary rigidity to the whole model.

The fin and tailplane need no explanation. Set the tailplane at O° Incidence.

Any propeller (balsa) of $4\frac{1}{2}$ in.—5 in. diameter that may be handy can be used on the Tom-Tit. A slight touch of oil on the shaft considerably helps the smooth running of the "engine." For the more exact builder the dimensions of a balsa propeller are given on the plan. Well lubricated, and stretch round from the *rear* by the means of the 20 S.W.G. "S" hook, the three strands of 1/16 in. flat rubber will take 900 turns, but 750 should be used for all but the most important of flips. If the ship stalls, try adding a little weight to the nose. If the Tom-Tit dives, warp the trailing edge of the tailplane up a little.

The Tom-Tit Triplane may seem a little peculiar to the eyes of a generation fed almost entirely on the old familiar monoplanes and biplanes, but that certainly does not prevent the "tripe" from turning in a sound performance.

Spend an hour or two on the Tom-Tit and give yourself a treat.



UTILITY WHEELS

By D · A · RUSSELL, *M.I.MECH.E.*

Some years ago I tried out the idea of making pneumatic tyres from rubber balls, and had quite an amount of success with it.

Admittedly, the rubber situation is such that rubber balls may not usually be obtainable, but that is better than the situation in regard to air wheels, which are well known to be non-existent ! Following then are instructions for constructing these wheels, in regard to which one, and *only* one, word of warning is necessary :

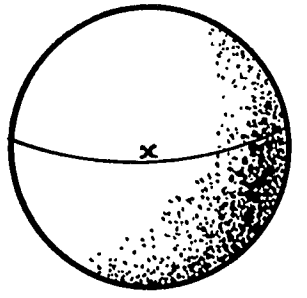
Some rubber balls are apparently manufactured from a flat sheet, moulded to spherical shape, instead of being "blown" and thus being seamless. These latter are by far the best, if they can be obtained. Balls formed from sheet have "seams," and I found that a certain percentage of these would split, usually a day or two after the balls had been compressed into the circular shape as shown in the sketch.

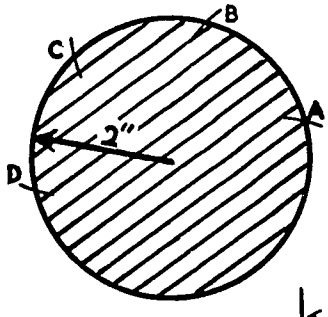
In the main diagram all parts are drawn full size and scale. The axle tube (*a*) should be of steel, the locknuts (*b*) at either end may be of brass or steel. The two discs (*c*) may be of 3-ply or aluminium. The "inner" discs (*d*) may be steel or brass washers about 1/16 in. thick. The collar (*e*) should be of metal, aluminium or brass, and (*h*) is a rubber band (its purpose will be described later). After the two holes have been punched in the ball, the collar (*e*) and the two washers (*d*) are carefully inserted through one of the holes by slightly stretching it. The axle tube (*a*) is then pushed through one hole, a washer and then the collar, and then another washer threaded on to its inner end, which is then pushed through the further hole of the ball, same being compressed between the fingers during this operation. The two outer discs (*c*) are then added, followed by the two locknuts (*b*), which are fairly tightly screwed up. (Before the discs (*c*) are added, it is as well to smear the axle tube with rubber solution, to ensure 100 per cent. air-tight seal.)

• • •

Now, how to pump up this tyre ! Attention is drawn to the hole (*g*) in the axle tube, and the hole (*j*) in the collar (*e*). If one end of the axle tube is blanked off and a pump connected to the other end, air will pass into the tube, through the hole (*g*), into the annular space between the outside of the axle tube and the inside of the collar (*e*), through the hole (*j*), underneath the rubber band and so into the ball. This rubber band which, of course, has been stretched over the collar (*e*) before insertion into the ball, functioning as a non-return valve.

I made wheels of this type for petrol models and they functioned well, and I see no reason why they should not serve for model race cars. I even experimented with quite large rubber balls, about 8 in. in diameter, and fitted a number to children's wheelbarrows ! They functioned well.





Overall diameter of the wheel will be slightly more than that of the spherical ball ; for instance, a 4 in. diameter ball will give a wheel about 4⅜ in. in diameter.

The two axle holes must be exactly opposite each other. The best way to mark off these holes is with the aid of a pair of compasses. Taking any point on the ball, describe a circle round its largest diameter (*x*) ; then, with radius equal to half the diameter of the ball, mark off three times round the circumferential line, thus making two diametrically opposite points (*a*) and (*d*) fig. 2.

A—$\frac{3}{16}$" I/D-$\frac{5}{16}$ O/D tube, 1½" long, $\frac{7}{32}$" thread at either end.

B—$\frac{5}{16}$" Diameter Hexagonal Nuts.

C—$\frac{1}{8}$" Ply Discs—drilled $\frac{5}{16}$" to take tube.

D—$\frac{11}{16}$" Diameter Washers —drilled $\frac{5}{16}$".

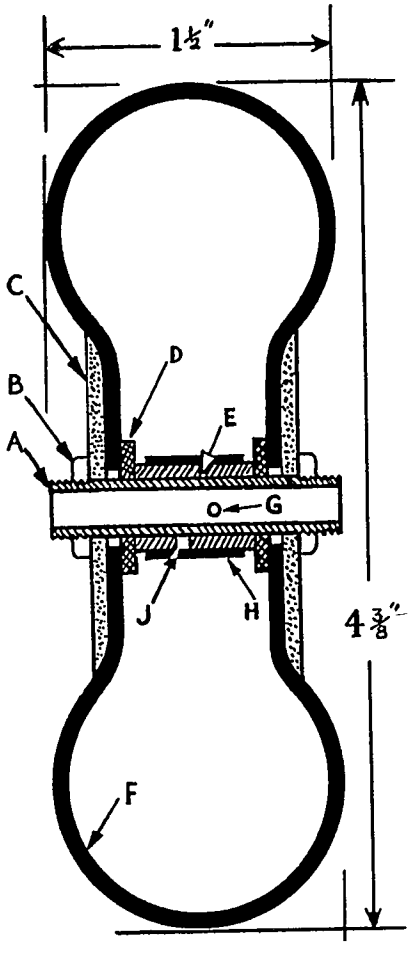
E—$\frac{5}{16}$" I/D Collar ($\frac{1}{16}$" thick.

F—Rubber Ball.

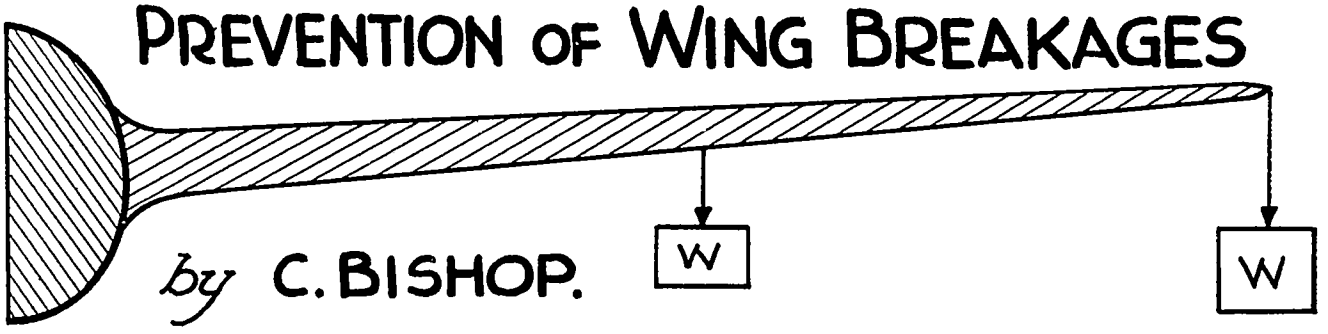
G—$\frac{1}{16}$" Hole in Axle Tube.

H—Rubber Band.

J—$\frac{1}{16}$" Hole in Collar.



PREVENTION OF WING BREAKAGES



by C. BISHOP.

ONE of the most annoying accidents to model aircraft is wing breakage. This often occurs when the tissue gets damp, and slackens off, or splits.

Frequent experience of this trouble has led the author to investigate some of the causes, and to seek possible prevention of the trouble.

Based on these investigations, a few well-known mechanical formulæ have been applied to the resistance of certain sections of spars, leading and trailing edges. The results of these theoretical conclusions were confirmed by practical tests which were carried out as a check.

The following are a few terms which are in some cases unfamiliar with model aeronautics.

(1) Stress.—Is the force in a body when a weight or force is applied. This is designated S and is in lbs./per sq. inch.

(2) Breaking stress.—Is the force in the body at which the body breaks. It is designated B.S. and is in lbs./per sq. inch.

(3) Bending moment.—Is the moment of any section of a beam at which the applied forces tend to turn the portion of the beam on the right or left hand of the section (Fig. 1). It is designated M and is in lbs./ins.

(4) Modulus of section, is the name given to that quantity which divided into the bending moment, gives the stress. The letter Z usually represents the modulus of section.

In the following calculations, the strength of the wing will be worked out without taking the tissue covering into account. If one is only to fly on perfectly dry days the figures will be probably on the high side. The word "wing" will be used to represent only half the wing span, as this will save time in calculating.

If a breakage occurs, there is often a tendency to patch up the wing or to make a stronger spar. In both these cases the result may be that the wing will be strong enough. But on the other hand, it does not get to the cause of the trouble and in all probability will add unnecessary weight. It therefore appears that a few basic rules applied during the course of designing would be of great advantage.

A figure for the breaking stress of medium balsa wood is first required. It was found to be in the region of 3,000 lbs./sq. inch. Allowing a safety factor of 3 the safe stress to which the wood can be subjected is 1,000 lbs./sq. inch. These figures were checked by actual tests, which gave reasonably close figures.

Bending Moment of Wing.

The model to which this article applies, and on which tests were carried out, is 48 in. wing span, 8 ozs. weight, and about 200 sq. inch wing area. The procedure adopted by the author is as follows.

Firstly to assume the highest speed obtained by the model, which in this case is about 30 ft./sec. Then calculate the lift induced on the wing, as the formula for lift is L equals $CL\frac{1}{2}PSV^2$ where CL equals coefficient of lift. P equals Density of Air equals .002378. S equals wing area in square feet. V equals velocity in ft./sec.

The lift can be calculated if CL is taken to be .6 for this model. L equals $\frac{.6 \times .002378 \times .7 \times 900}{2}$ equals .45 lbs.

The lift will be uniformly distributed over the whole length of the wing as in Fig. 2.

The bending moment for this type of loaded beam is similar to that shown in Fig. 2A.

This indicates that the maximum moment occurs at the root of the wing. It is therefore advisable to strengthen the wing at the root.

The next step is to obtain the bending moment in the wing due to the lifting force. For an example of this kind (Fig. 2). The formula is :

M equals $\frac{wl^2}{2}$ where w equals uniform load per unit of length, lb./inch.
" l " length of wing in inches.
" M " maximum bending moment.

substituting values in the above equation.

M equals $\frac{.019 \times 576}{2}$ equals 5.5 lb./inches.

It now appears that a suitable section is required to resist the bending moment. This section is found by choosing a suitable modulus of section. Fig. 3 shows three popular sections and the formula required for

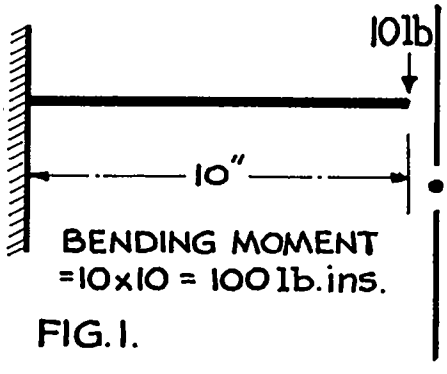


FIG. 1.

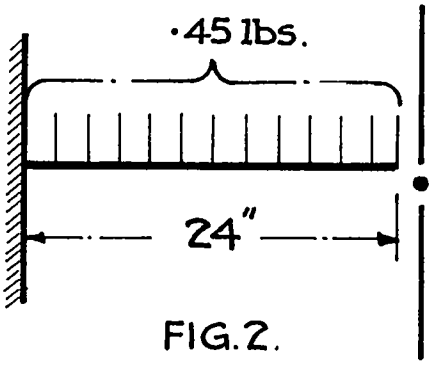


FIG. 2.

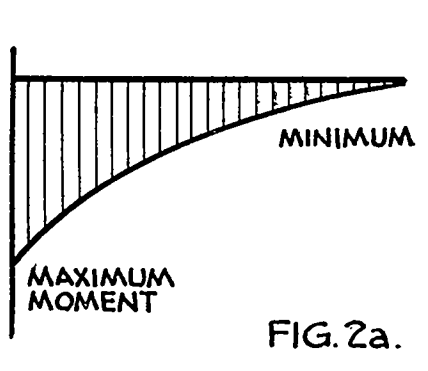
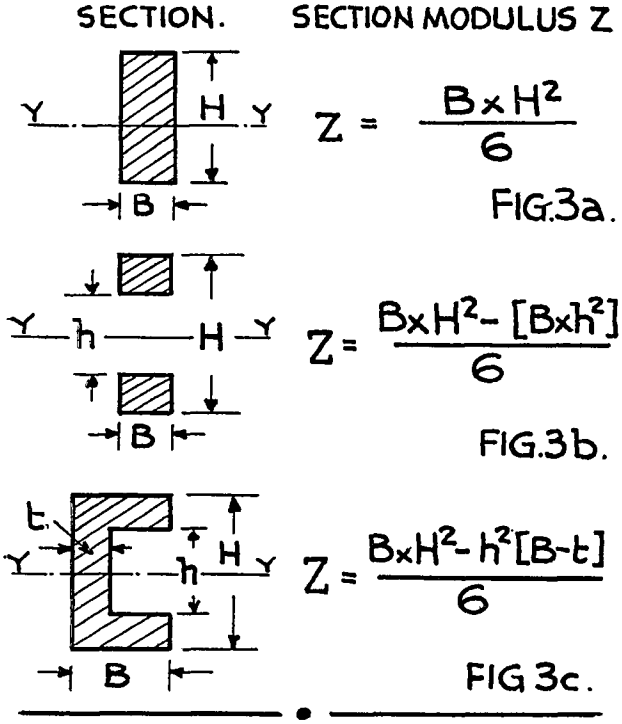
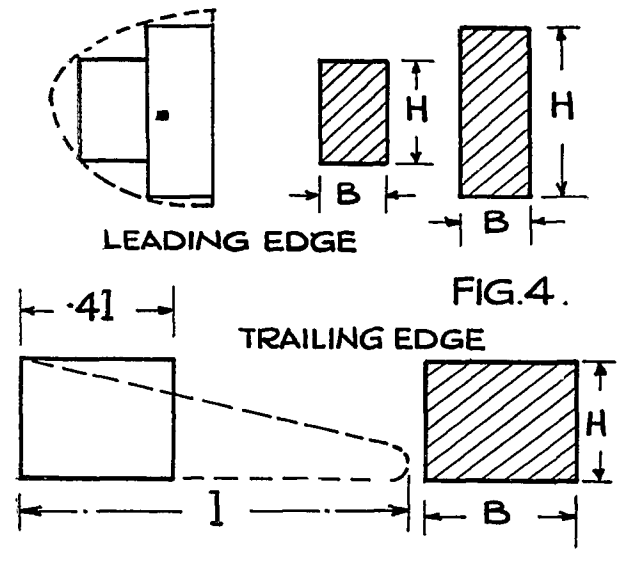
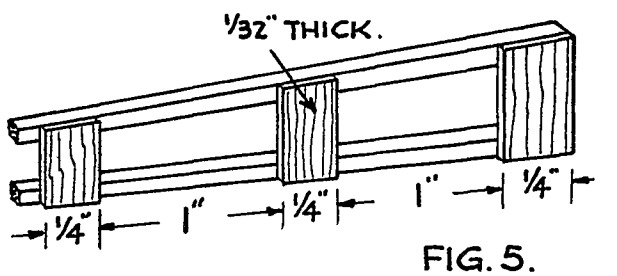


FIG. 2a.







finding Z. All these sections should be placed so that the force, or weight, is applied at right angles to the axis Y–Y. This will utilize the sections to the best advantage.

It is known that bending moment modulus of section equals stress. Therefore as the safe stress must not exceed 1,000 lb./sq. inch :

$\frac{BM}{Z}$ equals 1,000 and as BM equals 5.5

Therefore $\frac{5.5}{1{,}000}$ equals Z

Hence Z equals .0055.

Determination of Spar Sizes.

It appears that a spar with a section modulus of .0055 is needed, but the addition of the leading and trailing edges has so far been neglected. These play an important part in the strengthening of the wing and if their section modulus is found, the spar can be reduced until the sum of the leading and trailing edges, and the spar section moduli is equal to the section modulus required, which in this case is .0055.

The section moduli for the leading and trailing edges can be found by the approximate method (Fig. 4) using the formula for obtaining the section modulus of rectangles (Fig. 3A).

The values of the leading and trailing edges can be subtracted from the section modulus required, leaving the Z required for the spar, i.e. .0055–.0022 equals .0033.

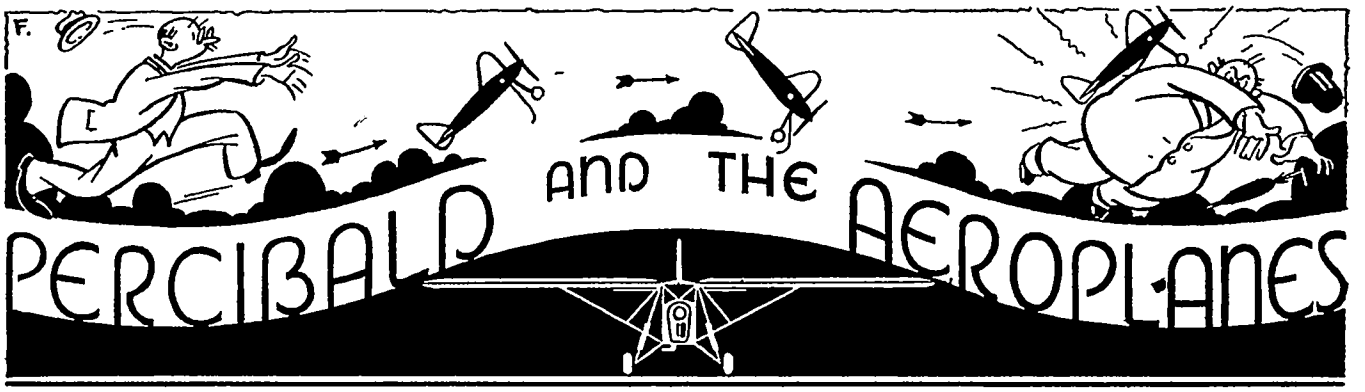
Referring back to Fig. 4A, we find that s section 1/8 in. × 1/2 in. gives a section modulus greater than required. If this section is reduced to 1/16 in. × 1/2 in. it cuts the weight by 50 per cent. but at the same time reduces the strength by half. This value will be then too small. Therefore an investigation of the second arrangement (Fig. 3B) might be profitable. This type of spar with dimensions H equals 1/2 in., h equals 1/4 in., and B equals 1/8 in., will be ideal for our requirements, and at the same time will cut the weight by approximately 50 per cent. The section modulus will be .0037. It is not advisable to make the dimension B (Fig. 3) any smaller than 3/16 in. for this size of model; otherwise the torsional resistance of the wing will be considerably reduced.

It is very important to see that the spars, leading and trailing edges, are securely glued and joined at the root of the wing, and that no part of the spar is weakened by cuts, etc.

The spar is constructed of two pieces of 1/8 in. × 1/8 in. square and should be braced with small flat pieces of about 1/32 in. × 1/4 in. every 1 in. to 1¼ in. (Fig. 5).

The conclusions which can be drawn from the foregoing calculations are : The arrangement of spars shown in Fig. 4B ensures a greater strength to weight ratio than the ordinary rectangular spar. The considerable additional strength given to the wing by the leading and trailing edge. The ease of construction with the recommended spar, and lastly a measure of confidence at the desighing stage.

It should be mentioned that the torsional resistance has been neglected in this article. Tests have shown that the majority of wings break mainly due to bending. Torsional stresses would tend more to influence the flying characteristics, due to the changing angle of attack along the wing.



ONCE upon a time there was a little boy and his name was Percibald. As you can see, this is a compound name which might refer to anyone and still mean nobody in particular and if you like to think that, then don't let me stop you, although you would be wrong; because in point of fact, it does refer to someone, but I would not for the world say who. I might also explain that he was not the youngest of three brothers; that he did not accomplish three deeds of unparalled difficulty and thus did not, in the end, turn out to be a prince in disguise—or under a spell or something—who marries a beautiful princess. No, it is not that sort of "once upon a time" story.

Now when Percibald was at school he was in the same form as twenty-eight other little boys who, somehow or other, always managed to secure the first twenty-eight places in the end-of-term exams. Perhaps this was because Percibald never used to do his homework but spent his evenings in a dream-world identifiable by the noise of Merlin engines "running-up" (only they were Kestrels and Daggers in those days) and the song of the wind in the flying-wires. There was also the smell of burnt engine oil and fresh-sprayed dope; the rumbling "kerdumpf" of a fabric-covered aircraft doing a solid, skid-grinding three-pointer; the breath-taking thrill of being beaten-up by a flight of Bulldogs—all these and many more evidences of those far-away days when there was some Romance still left in flying.

Poor Percibald! You can imagine his surprise when he "woke-up" the following morning to find the "running-up" of engines was the roar of his form-master's voice; the sighing of flying-wires the wicked hiss of a painfully accurate cane in enthusiastic descent; the smell of oil and dope, the varnish of the detention room and the "kerdumpf" resolving itself into the slamming of desks as the other twenty-eight little boys put away their respective School Arithmetics and scurried home to their current copies of the AERO MODELLER.

Still, despite the handicap of not being able to prove Pythagoras or to recognise that A2–B2 was—well, whatever A2–B2 *is*; Percibald, in the course of years, built and flew many aircraft, made many "solids" and generally got a lot of fun out of life. When the war got under way he went into the Army, believing that as a result of a rib-removing operation when he was a very small boy he would not pass an Air Force medical. He got so browned-off with Army life, however, that in desperation lest he should become like the Sergeant-Major—mad, and a damned nuisance—he applied for transfer to the R.A.F. and, very much to his surprise, found himself wearing a blue uniform and collar and tie instead of a khaki battledress. In due course, after going to a ground-school where he wished very hard that he knew how to prove Pythagoras and also what A2–B2 was, he was posted to a flying-school where he learned how to fly.

It was here that he made a most interesting discovery. He found that if you let a full-scale aeroplane glide straight into the deck without checking the descent (as all models do, seeing that you are not in the cockpit to stop them) a horrible crunching noise ensues, the undercart comes up through the floor of the front seat where your instructor sits, and he, shaken to the core, through not being quick enough to stop you, gets faintly exasperated. This led Percibald to believe that none of the aircraft he had built could possibly have made a perfect three-point landing for the very simple reason that there was no-one in them to get the control-column back to bring the tail down—another small point liable to exasperate your instructor if you forget to do it, and have to go round again as a result of the inevitable bounce. This interested him so much that on his next leave he spent two days going through back numbers of the A-M to see how many modellers claimed three pointers for their creations. There were, he found, quite a lot; all of whom he reluctantly classed as wishful thinkers.

Percibald (shall we refer to him as P. from now on?) set to work to experiment with a few ideas he had buzzing around loose in his head, the first of which was a lever projecting down below and between the undercarriage

legs in such a position that it hit the ground before the wheels and, by means of a very simple technique of wires and pulleys, raised the elevators sufficiently to ease the tail down to the ground at the same time as the wheels. This, he discovered, was All Very Well in theory. In practice, it caused a first-class "balloon" usually followed by a stall, the resultant dive pushing the nose block nearly down the fuselage as far as the centre section.

P. then attached the lever to the elevators to produce the opposite result—moving them slightly *down* to keep the wheels on the ground and achieve a steady wheel landing. (He had noticed, you see, that his aircraft always glided straight into the deck because there was no pilot to check the glide and bring the kite level with the ground before it touched down.) This second idea was not so good either because it simply caused an immediate nose over, which usually necessitated a new fin and rudder before the aircraft could be flown again. He tried moving the lever further back down the fuselage so that, although the wheels touched first and the kite tended to bounce, the lever came into operation before the nose had got very high and brought it down again. This arrangement kept the aircraft near the ground, but the landing was very rough with a tendency for the aircraft to bounce up and down until sufficient flying-speed was lost for it to come down permanently.

P. reverted to his original idea of a three-pointer, this time attaching the lever to the fuselage in front of the u/c legs and allowing only a very minor upward movement of the elevators. This was decidedly better and quite a few useful landings were made. It was not a fool-proof installation, however, but it is as far as opportunity (i.e. leave) has allowed P. to experiment with the orthodox two-wheel undercarriage.

He has carried out one or two experiments with the new-fangled "trike" under-cart, connecting the front wheel to the elevators so that, as this wheel touches first when the aircraft is gliding, the kite is levelled sufficiently to bring all three wheels on to the deck together. He has yet to discover the correct amount of elevator movement necessary to produce the required result.

It may be of interest to note that the aircraft which P. used for these experiments were two rubber-powered ex-petrol jobs big enough to take the weight of the control operating mechahism. The flights were not "duration," of course, being merely enough to get the kites "airborne" and give them time to assume their normal glide before landing. P. hopes to experiment one day with a system of running weights in the wing operating the ailerons to maintain lateral stability and allowing less dihedral so that we may produce a scale aircraft which has a truly realistic appearance.

Thus progresses Percibald. He is a flying instructor in the R.A.F. and consequently has a mania for perfectly controlled flight. Yet he has not so far experimented with radio-control. I wonder why? Perhaps he is too engrossed with his latest idea; over which he has developed a terrific "flap." He plans to build a scale Puss Moth incorporating all the ideas described above, together with a Bowden-Forster accumulator, in-built slots and powered with a mere 30 cc. engine. Such faith has he in Percibald's Patent Landing Lever that there will be *no backward travel* to the undercarriage! Definitely a case of :—

"Hold on there, Little Five-barred Gate! Here I come!"

I hope it keeps fine for him! P. C. R.

Calling All Readers!

We are receiving a steadily increasing number of enquiries from readers, asking for the names and addresses of Model Aircraft shops in the district in which they live, or have moved to.

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We have therefore decided to compile a register of Model Shops in England, Scotland, Wales, and Northern Ireland, and invite the assistance of readers by sending us as many names and addresses as possible, of Model Shops in their district.

● ● ●

Help yourself by helping us! One day YOU may move to a new district. Then YOU will be glad enough to write to us and ask for names and addresses of Model Shops in your district—so please help "the other fellow" by sending in your list.

Proprietors of Model Shops will themselves assist, by sending us their names and addresses.

● ● ●

Mark your envelope or postcard, "Register" and address to:—
The Editor, The Aeromodeller, Allen House, Newarke Street, Leicester.

Thank You!
The Editor

MONTHLY MEMORANDA

By

O · G · THETFORD

Oxfords with New Motors.

In addition to the Gipsy-powered Oxford mentioned in Monthly Memoranda No. 10 and the Wasp-powered version also mentioned on that date, there is now a higher-powered Cheetah version. The mark number is not revealed but the motors are Siddeley Cheetah XVs and are provided with Rotol fully-feathering airscrews. The Rotol airscrews have a large spinner over the hub on the prototype, P 1864. This is merely a converted Mk. I airframe. The Wasp-powered Oxford Mk. V has the two-position Hamilton Standard airscrew with no spinner cap and is serially numbered EB 490.

12th Air Force A-20Bs.

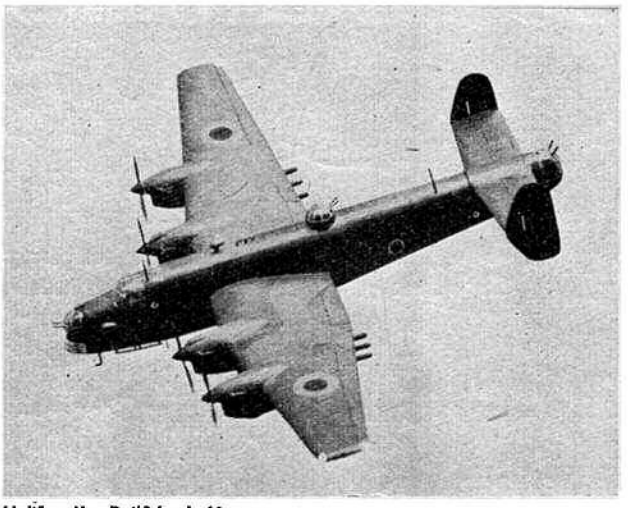
Douglas A-20B attack-bombers of the 12th Air Force, U.S.A.A.F., North Africa, now carry the national star insignia on the nose at either side of the pilot's cockpit in addition to the usual location near the tail. The nose insignia is reproduced in a slightly smaller diameter than the main marking. Further, a large individual identification number is now painted in yellow on the rudder in addition to the factory serial number, also in yellow, on the fin. The rudder number is about three times the size of the fin numbers.

Mosquitoes at Malta.

A famous night-fighter squadron of the Royal Air Force is now operating from a Maltese aerodrome with De Havilland Mosquito fighter-bombers. Many intruder operations have been carried out on enemy aerodromes and bases in the south of Italy and in Sicily with marked success. The night-fighter version of the Mosquito (the "Mark" may not yet be revealed) is the finest of its class in the world and there is no other type to compare with it in the Mediterranean area.

The Mosquitoes stationed at Malta carry the code identification letters "YP" on the fuselage sides ahead of the cockade on the port side and aft on the opposite side. They are not painted as are night-fighters in this country (i.e. entirely soot black) but have the under-surfaces and lower half of the fuselage only black and the rest is painted in the usual day camouflage. The upper surfaces are painted dark green and sea grey medium. The fin and rudder is treated as an "upper surface." Mosquito "D" of this squadron is serially numbered DZ 228, which number is painted on the lower half of the rear fuselage in dull red. The lettering is in pale grey.

This particular Mosquito squadron was one of the first night-fighter squadrons to be formed in the days immediately preceding the outbreak of war in 1939 and was originally equipped with the then new Blenheim fighter version. At first employed defensively, they later turned to an offensive role and after bomb racks had been fitted to the Blenheims (of the Mk. I variety), many daring "intruder" raids were carried out on French and Belgian aerodromes used by German-raiding Heinkels and Junkers. In the spring of 1941 the squadron began to receive the Douglas Havoc I night-fighter-bomber as a replacement for the well-tried Blenheim. Before the squadron changed over to Mosquitoes on going overseas a number of Boston IIIs were also used on night intruder duties.



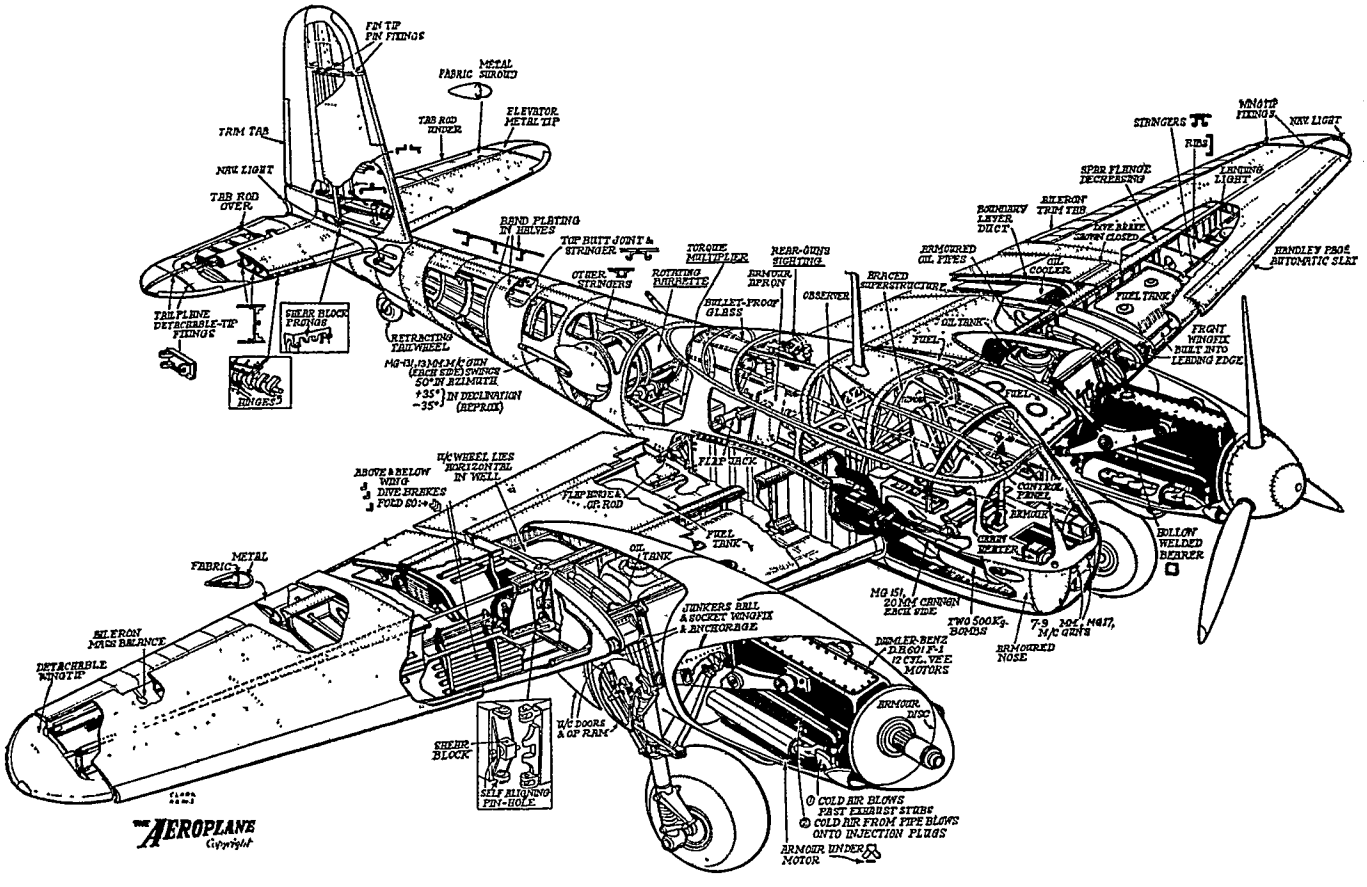
Halifax II. Built by L. Mason.

Names for U.S. Military Aircraft.

Early in March, 1943, it was announced that a common decision had been reached between the U.S. Navy and Army as regards the naming of military aeroplanes in each service. Certain names were abandoned in favour of the original title chosen by the manufacturer, but in many cases the British Service name has been taken over.

The British name has been officially chosen in the case of the P-51 (Mustang); the Lockheed A-29 (Hudson) and Brewster F2A-2 (Buffalo). In other instances the American name has been retained as is the case with the Grumman Wildcat (British Martlet) and Brewster Buccaneer (British Bermuda). Other instances of double nomenclature are as follows: Cessna Bobcat (British Crane); Curtiss Warhawk (British Kittyhawk); Curtiss Seagull (British Seamew); Douglas Bolo (British Digby); Douglas Havoc (British Boston III); Douglas Skytrain (British Dakota I); Douglas Sky-trooper (British Dakota II); Fairchild Forwarder (British Argus) and Vought-Sikorsky Vindicator (British Chesapeake). The name "Atalanta" for the P-38 Lightning has been dropped in favour of the latter name and the Vultee Georgia is now known as the Vengeance to both the U.S. Army and the R.A.F. The Ventura in service with the U.S. Army as the B-34 was formerly named the Lexington, but here again the name has been dropped in favour of the British choice and it is known now as the Ventura. Types which have common names in the U.S. Army, Navy and R.A.F. are the Airacobra; Fortress; Catalina; Coronado; Liberator; Helldiver; Cornell; Hudson; Lightning; Lodestar; Marauder; Mariner; Mitchell; Mustang; Thunder-bolt; Ventura; Kingfisher; Reliant; Vigilant; and Vengeance.

Names have also been chosen for types which are used only by the U.S. Air Forces and not by the R.A.F. and which formerly were known by type designation only. Thus the Aeronca L-3C becomes the Grasshopper; the Beech AT-11, the Kansas; the Beech AT-7, the Navigator; the Beech C-43, the Traveler; the Beech C-45A, the Voyager; the Beech AT-10, the Wichita; the Stearman PT-13 and PT-17, the Caydet; the Boeing AT-15, the Crewmaker; the Curtiss C-76, the Caravan; the Curtiss C-46, the Commando; the Curtiss SNC-1, the Falcon; the Douglas B-23, the Dragon; the Douglas C-54, the Skymaster; the Fairchild AT-13 and AT-14, the Yankee-Doodle; the Lockheed C-69, the Con-stellation; the North American AT-6A, the Texan; the Piper L-4B, the Grasshopper; the Ryan PT-22, the Recruit; the Timm N2T-1, the Tuter; and the Vultee L-5, the Sentinel.



AEROPLANES DESCRIBED—4

The Me 210-A1

By H · J · COOPER

THE Messerschmitt Me 210, although a development of the well-known and once-formidable Me 110, bears very little external and constructional resemblance to the earlier aircraft. The new machine has been in existence for nearly three years, but only in the last few months has it been operated over this country. Several have been destroyed.

The Me 210 is a two-motor fighter-bomber which is heavily armoured underneath for defence while ground strafing.

The low wing is built on a large main spar which passes right through the fuselage, and a secondary spar to which are attached the flaps and ailerons. The whole construction is of light alloy with stressed-skin covering.

The fuselage is of light alloy construction with stressed-skin covering. It is made in two portions joined together on the vertical centre-line.

The tail unit is of metal framework with stressed-skin covering on the fixed surfaces and fabric covering on the rudder and elevators. The elevators have sheet metal tips.

The undercarriage resembles that fitted to the Junkers Ju 88 and consists of two single legs carrying wheels on the inner sides, which swing backwards and twist through 90 degrees so that the wheels lie flat within the motor nacelles.

The Me 210 A-1 is powered by two Daimler-Benz DB 601 F1 liquid-cooled twelve-cylinder inverted vee motors each of 1,395 h.p. VDM three-bladed constant-speed airscrews are fitted. Ducted radiators as on the Me 109F are fitted below each wing outboard of the motor nacelles. There is capacity for about 500 gallons of fuel.

The forward armament of the Me 210 is two 20 mm. Mauser cannons and two 7·9 mm. M.G.17 machine guns mounted in the nose and operated by the pilot. The observer operates a two-gun barbette fitted aft of the cockpit enclosure. These guns are of 13 mm. M.G.131 type and can be swung upwards and downwards and outwards by an ingenious remote control driven by a 1½ h.p. electric motor.

Very heavy armour (2½ in. thick) is fitted below the nose and motors, below and between the cockpits, under the radiators and behind the spinners.

The bomb load of about 2,200 lb. is carried below the floor of the pilot's cockpit.

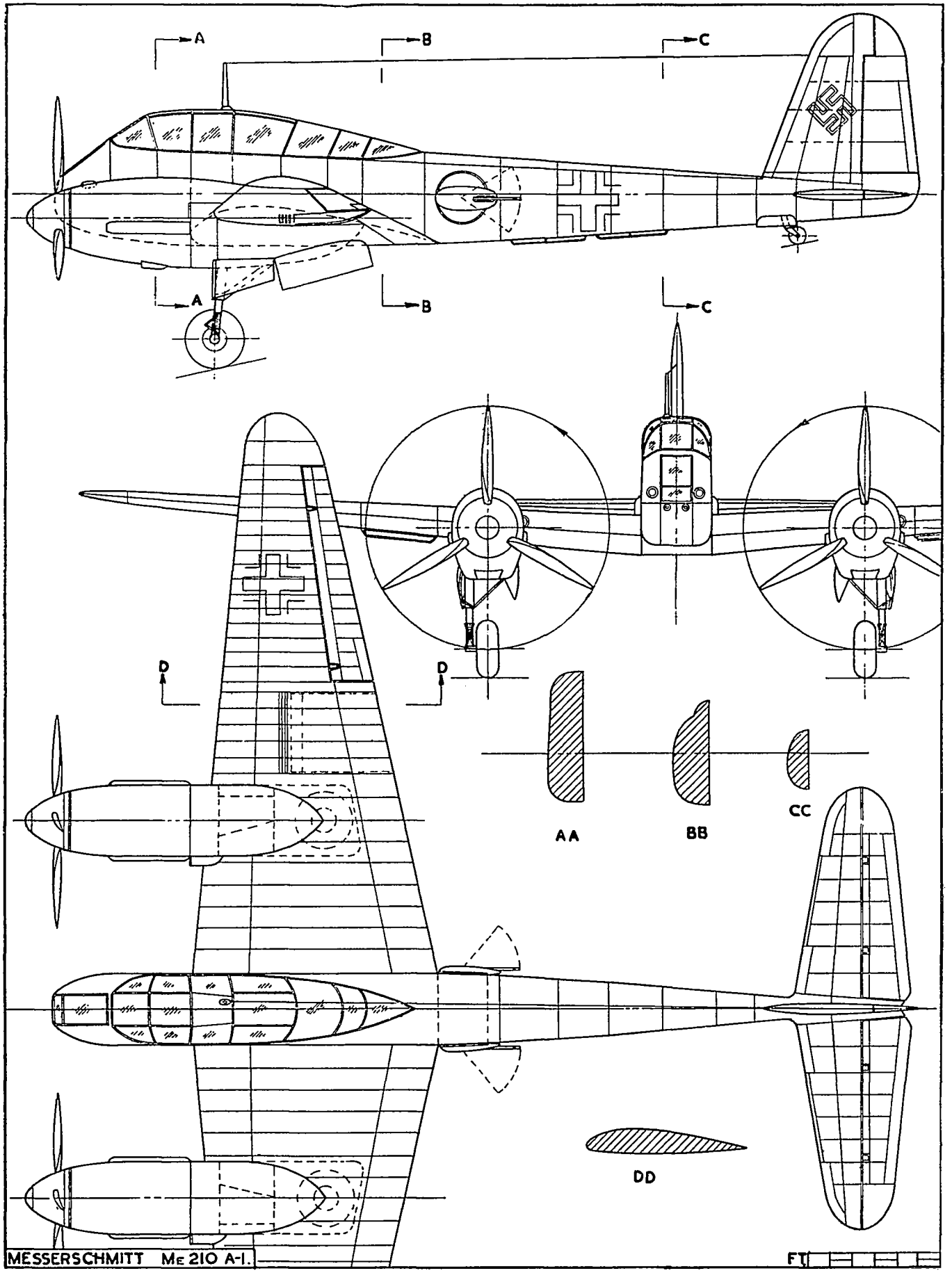
At height the Me 210 resembles the D.H. Mosquito. In the plan or underneath view the sharply tapered wing, the nose in line with the motors and the high aspect-ratio tailplane all promote confusion, but in any other view the differences are readily apparent.

German single- and two-motor fighters are now camouflaged on the sides and upper surfaces with light blue over which is a darker blue mottle. The undersides are of a very light blue-grey colour, almost white. The usual black crosses outlined in white are carried at the wing tips and on each side of the fuselage, and the fin bears a white-outlined black swastika.

Main dimensions of the Me 210 A-1 are: span, 53 ft. 9 in.; length, 40 ft. 8 in.; wing area, 355 sq. ft.

The loaded weight is 21,350 lb. The wing loading is approximately 60 lb./sq. ft. and the power loading 7·625 lb./h.p. The maximum speed is about 375 m.p.h. at 20,000 ft.

Next month: The Henschel Hs 123.



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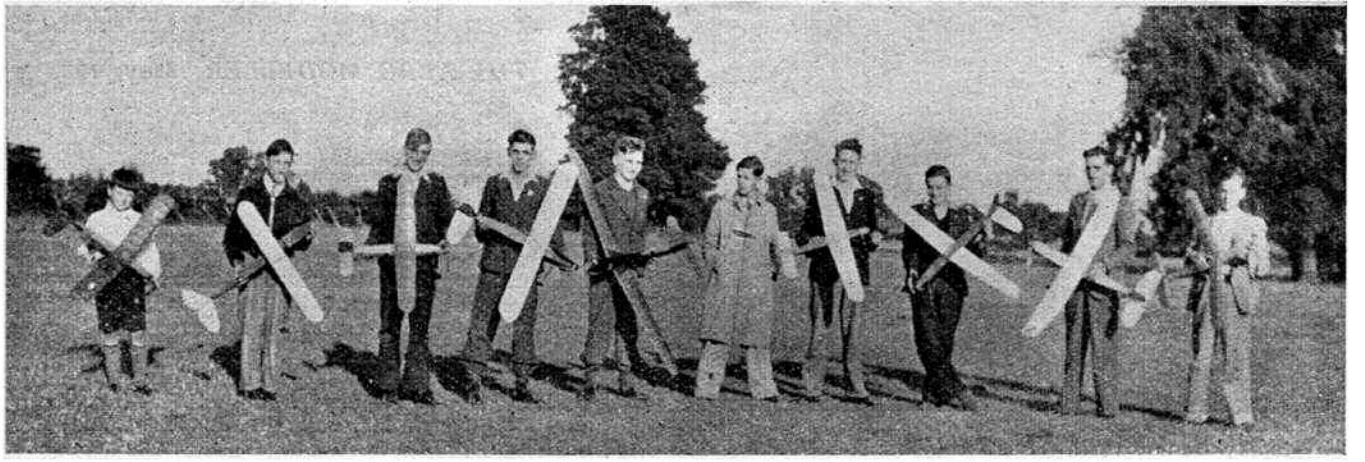


Club News

By CLUBMAN

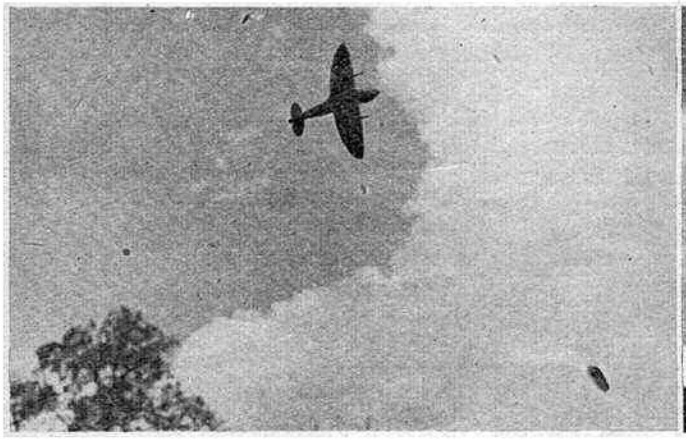
WELL, how are these Wings for Victory shows going? I have not heard a great deal about individual exhibitions so far, but expect that next month will bring a rush of news relevant to these big affairs. Unfortunately, there seems to have been a bit of a mix-up regarding some items connected with the exhibitions, particularly in connection with the class of exhibitions staged in different quarters.

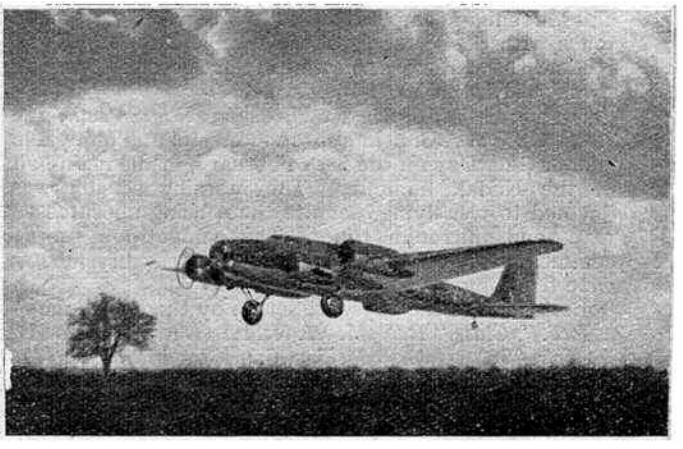
Local Wings for Victory committees have had a choice of show, either including or omitting model sections, and naturally it is disappointing to find that some committees have voted for non-model types. Clubs in these districts have been in an invidious position, particularly when asked by other committees to provide a model section to what is more or less a side-show. This is all the more vexing in view of the strenuous propaganda sent out exhorting the clubs to build and renovate every possible model for the support of these shows, and to find that no exhibition has been scheduled for their district is, to say the least of it, very trying.

I have heard rumours of trouble in the organising groups, but prefer to pass no comment until official intimation is received. I can only say that it is most unfortunate for the model movement generally that things could not have gone smoother. I will say, however, and this from personal experience, that far too many of the Savings Committees in charge of exhibitions have the old "toy" complex to a remarkable degree and unfortunately, so many clubs are nowadays governed by youths in the absence of senior members in the Forces. These youngsters, however experienced they may be in modelling, are treated as kids by the older people on the Savings Committees, and are more or less cried down when voicing the advantages of models in shows of this kind.

We have done a lot of grousing over here about the shortage of supplies, and the lack of various materials usually thought indispensable for the construction of model aircraft. A letter from an American correspondent states that "several companies have had to quit production of kits owing to lack of supplies, while some are selling kits containing pine, bass, pasteboard and Christmas wrapping instead of tissue! I bought one kit, the ribs of which are printed on pasteboard and, believe me, they are some job to cut out. If scissors are used, the board bends and is weakened in consequence."

Well, we have all seen some weird and wonderful substitutes used nowadays, but owing to the apparent stricter paper restrictions over here, I doubt if we shall see ribs printed out on nice paste-board! Not that some of the materials foisted into kits these days could not be improved upon. I am voicing a general complaint when I state that some kits (so called) on the market





Two exceptionally fine shots of solid models posed against an authentic background. The left-hand photo shows a Spitfire built by A. F. Woollett, of Yalding, whilst that on the right is of R. E. Gage's "Fortress I." This latter model, constructed from Aeromodeller plans, is made entirely from mahogany.

Dr. R. E. Sanderson presenting the President's Trophy to the Luton Club veteran, Mr. A. Poulton, at the club's recent prizegiving.

to-day are not worth the box they are packed in. You will remember reading of a member of the Stratford-on-Avon club who constructed a glider from an old tea chest and bits of a blackboard—well, I reckon some kit manufacturers are using the packing cases used to pack the tea-chests. Knots as big as walnuts are as common as blisters on a Tommy's heel at the end of a twenty-mile route march!! I sigh for the return of quality into kits.

I still get numerous requests for information regarding the purchase of petrol engines, and must once again repeat that I am unable to give any assistance in this direction. Naturally, British manufacture has turned over to the production of munitions, and the regulations do not allow the importation of such machinery from America while other far more important goods require the shipping space. Any offers for sale are noted at the end of these monthly columns, and readers must get in touch direct with the seller. Also, while on the subject of readers' requests, will you please forward a stamped addressed envelope when making such requests, as our postage bill is increasing rapidly!! Don't mind, do you?

Two hardy annual events are notified this month, these being the "Clyde Model Dockyard Trophy" and the "Bedfordshire Model Aero Silver Challenge Cup." The former, open to all Scottish clubs, will be held on the 7th August, and is for Wakefield class models as usual. Will intending competitors and club secretary's please get in touch with Mr. G. Leask at 2, Whitefield Terrace, Kirkhill, Cambuslang, Lanarkshire?

The Bedford event, staged as hitherto by the IGRANIC S. & S. Club, will take place on August Bank Holiday Sunday, and will be run under the usual decentralised rules for teams of four. Each member will be allowed three flights, and the total aggregate time of the teams will be counted. Entry fee is 4s. per team, and intending competitive clubs are asked to get in touch with the secretary of the Igranic club, Mr. R. B. Hill, at the earliest opportunity. Last year's winning team was Northern Heights.

By permission of the Kodak Recreation Society, the HARROW M.A.C. held a most successful and enjoyable Indoor Gala Day on the 28th February, in the main hall of the Kodak building. The morning session was devoted to test flying, definite times being allocated to r.t.p. and microfilm types. The competition proper commenced at 2 p.m., and in all, some seventy models were flown by over fifty competitors.

Best times of the day were set up by the following:—

R.T.P. Class "B." M. W. White (B'heath) 2 : 04.
Microfilm. M. Farthing (Croydon) 3 : 09·4.

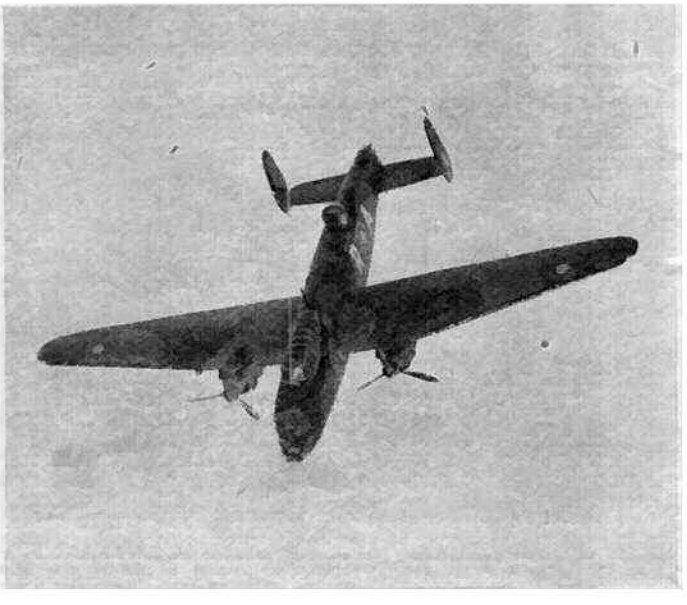
From past experience, the Harrow club had found that the great fault prevailing at most galas (both indoor and outdoor) is the over-running of the time table, with the result that the show tends to become disorganised. This they were able to avoid with the valuable help of a public address system, and the fact that three poles were in use in addition to a test pole. Full contest results were:—

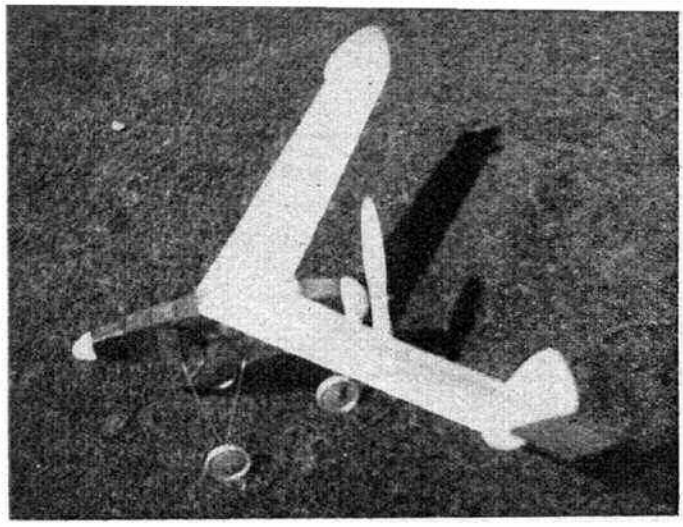
R.T.P. Class "A." D. Lindo (Harrow) 186 aggregate. Marshall (Hayes) 167 aggregate.
R.T.P. Class "B." M. W. White (B'heath) 242 aggregate. S. Bradshaw (Harrow) 166 aggregate.
Microfilm (under 12 in. span). M. Farthing (Croydon) 345 aggregate. G. Tebb (Pharos) 144 aggregate.
Microfilm (open). Hume (Pharos) 290 aggregate. M. Farthing (Croydon) 254 aggregate.
R.T.P. Team. Harrow. 626. Hayes. 588.

The MOUNTAIN ASH M.A.C. opened their 1943 season with a meeting with the Ynysybwl M.A.C. (Will someone tell me how to pronounce that little mouthful?) This was the first time the Ynysybwl boys had tried contest flying, and they proved worthy opponents, all times being very close. G. Leek, of Ynysybwl, had top time with a total of 188·3, the best Mountain Ash chap being T. Horseman with 185·3.

The DOWNHAM & D.M.A.C. in conjunction with the Bromley Solid M.A.C. and the Kent M.E.S. supported an exhibition at Lewisham's Wings for Victory Week, the Bromley lads taking most of the "solid" prizes, and Downham wiping up the flying stuff. The club r.t.p. record is now held by R. Hardinges, time being 54 secs.

A well-detailed solid Manchester constructed by Gunner E. Avery, of London.





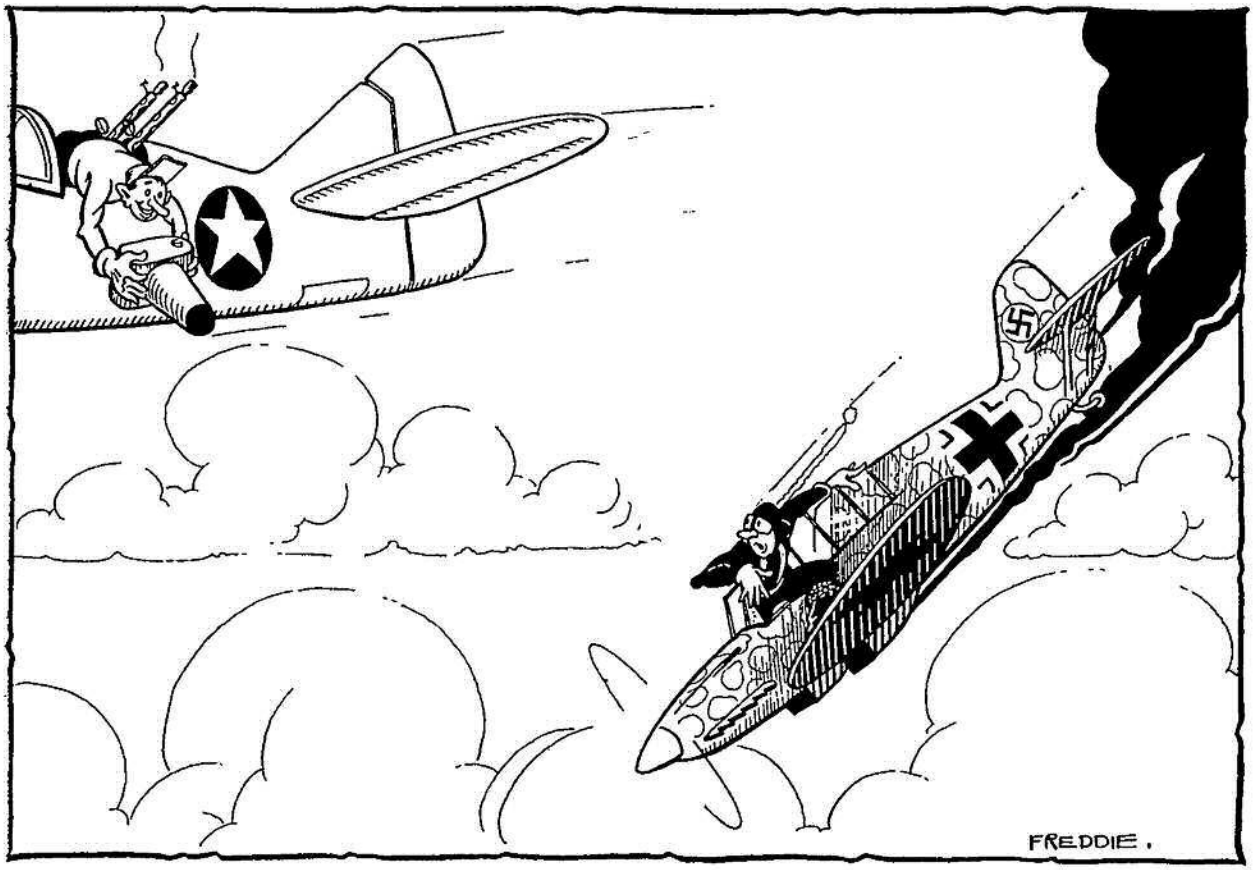
A pterodactyl type of model built from plans that appeared in the April 1940 "Aero Modeller." Constructed by Neville Wells, of Westerham.

The last few weeks have brought better weather to the LEEDS M.F.C., and club records have been broken many times. Peter Holt flew his "Gutteridge Trophy Winner" away after 3 : 55 o.o.s., thus setting up a new H.L. figure. C. Furse, flying a similar model, raised the r.o.g. figure to 2 : 30·4. Among other notable flights last month was a flip of over 8 minutes o.o.s. with an "Isis," unfortunately unofficial, as no one expected the flight to be made! R.T.P. durations have improved quite a bit, C. Furse holding both H.L. and R.O.G. times with 1 : 40·2 and 1 : 44·4 respectively. Entries were made for the S.M.A.E. contests last month, best individual time being C. Furse's 206·1 for two flights, and 301·3 for three flights.

Three sessions of indoor flying are to be given by the BLACKPOOL & FYLDE M.A.S. during the town's Wings for Victory Week, and several promising models are ready. A. Munden has raised the club r.o.g. record to 1 : 46·6 with a streamlined parasol "Peg-leg" job.

Many new models have appeared in the STRATFORD-ON-AVON M.A.C., notable being two stick gliders by P. Pearce (their "tea-chest and blackboard" merchant!). One of these gliders has already done good work by breaking the tow-line record with a time of 1 : 25 and setting up a winch-launch record of 1 : 19. These figures are not likely to stand for long, as most members are concentrating on gliders. The Junior section is now well established, and special junior meetings are held on Thursdays, one or other of the seniors instructing on various subjects.

Word comes from the DUNDEE M.A.C. of an r.t.p. competition with visitors from Forfar, Arbroath, and Carnoustie. This being their first venture into indoor flying, the models were a strange mixture of all sizes and types of outdoor jobs titivated for the occasion.



"WHAT ABOUT SIX ENLARGEMENTS OF YOU BALING OUT FOR $1·50?"

This shot of a simple cabin type of model shows plenty of thought to lighting effect. Builder is V. R. Dubery, of the R.N.V.R.

Mr. Spalding won with a total for two flights of 99·15 secs., runners up being Messrs. Mackie and Craighead with 80·5 and 74 secs respectively.

The WEST YORKSHIRE M.A.S. have acquired a fine flying field at Hastingley Lane, Thornhill, Dewsbury. Prospective members and visitors should take the Thornhill bus from Dewsbury to Frank Lane. Many fine models are on the go in this club, notable being a 9 ft. span petrol powered "Whitley" by G. S. Worfolk, and a 5 ft. span geared "Leopard Moth" by A. Coburn.

On Sunday, March 14th, the AIRCRAFT CLUB, Harrogate, held a joint meeting with the Ripon club at Bilton Fields, a great number of models being in evidence. A notable flight was made by D. Dale's "Kidlet," the model going o.o.s. after 14 : 30 and being recovered from 2 miles away. Other big flights were 4 : 22 by the same model, 3 : 10 by Elliot's "Sunstar," and 3 : 07 by a model built by Harding, of Harrogate.

A Junior Novices Cup has been presented to the OXFORD M.F.C. by the competition secretary, Mr. R. P. Jacques. Contest is for gliders, and eighteen flights must be made by the entrant between May and September. Shortage of supplies is acute in Oxford, and as the shops will only supply kits to holders of N.A.S.C. cards, said holders are doing a roaring trade in loans ! !

A competition held by the AYLESTONE M.F.C. was won by Mr. Law with a total for three flights of 331·4 secs., second being J. Ivory with 159·3 secs. Mr. Jones made an unofficial flight of 3 : 51 o.o.s. with a modified "Mick Farthing Lightweight," the tail incorporating polyhedral. This chap has also broken the club indoor record with a time of 67 secs. r.t.p.

I am informed of the formation of yet another new club, the WARWICK & D.M.A.C., secretary being P. R. Lewis of 34, St. Laurence Avenue, Warwick. During the afternoon of the first flying meeting, P. E. N. Smith was credited with a time of 5 : 30 o.o.s. with a replica of the "Percy III," while W. H. Plant clocked 45 secs. with an 18 in. glider.

A club has also been formed at Otterbourne, and will be known as the OTTERBOURNE M.A.C., secretary, E. C. I. Liversidge, of Oakwood House, Otterbourne, nr. Winchester. Application has been made for affiliation to the S.M.A.E.

Yet another new group is the SURBITON & D.M.A.C., the bloke in charge being N. David, of 134b, Ewell Road, Surbiton, Surrey. Meetings are held every Tuesday and Friday, and the club r.t.p. record to date is held by A. Wormald with a time of 1 : 55 r.o.g.

The R.A.F. HEREFORD M.A.C. was formed on 1st March, 1943, and is to be affiliated to the S.M.A.E. (Bless the P.S.I.). The Station Commander has provided a Club Room and Workshop and as usual with R.A.F. Stations out in the "Blue" flying fields are more or less good. At present there are about 25 modellers with some experience and probable members are—believe it or not—practically unlimited. Invitations have been issued to local A.T.C. Units to compete in Club Competitions. This invitation is also extended to all modellers and Clubs in the area. The first competitions will be held on 4th April and every Sunday throughout the season.

The HALTON M.A.C. has resumed activities, and, being a part of the Halton Society (an organisation for the aircraft apprentices recreation activities) has the support of the A.O.C. and Wing C.O. Membership is just over 100, and is, of course, a Services club. They are lucky in having the use of a hut for meetings, etc., and the playing fields are used for flying.

Indoor flying has had the attention of the BLACKHEATH M.F.C. members recently, with the result that times have greatly improved. Bill White has been the star showman, though he had had bad luck when a meeting was held with the Downham club, Mr. Dickson taking first place with a time of 122·7 secs., Mr. Hibbard placing second with 118·6 secs. The fund created to purchase a trophy in memory of Ron Mackenzie is progressing very satisfactorily.

After great efforts, the EAST BIRMINGHAM M.A.C. have succeeded in beating the Birmingham club r.t.p. record with a time of 1 : 51·8, the flier being Mr. Jennings.

Three new records are reported from the LEICESTER M.A.C. as follows :—

Junior R.T.P. Class A.	J. A. Scattergood, 100 secs.
Free Flying Open.	J. Marsh, 42·4 secs.
Microfilm.	J. Marsh, 58 secs.

D. Haynes, of 29, Palace Avenue, Paignton, Devon, wishes to form a club in that area, and would be pleased if anyone interested would get in touch with him.

Lieut. L. A. W. Haynes, of the 1st Air Landing Squadron, Reconnaissance Corps, Home Forces, is endeavouring to form a model club in his unit, and wishes to obtain a petrol engine around which their efforts will pivot. Will any reader wishing to dispose of a suitable engine get in touch direct with this fellow.

E. S. Bassett, of 39, Buckingham Road, Doncaster, has a 5 ft. 6 in. span cabin monoplane petrol model for sale, complete with Baby Cyclone engine, etc.

Well, I think that's the lot for this month, so with the usual best wishes for good weather and better flying, I leave you to go chasing bits of balsa (and don't ask me where, 'cause I'm not letting on !) and buzz off for another month. Bungho.

The CLUBMAN.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS

The Minutes of the Council Meeting held at The Royal Aero Club on Sunday, March 21st.

In the Chair :—Mr. A. F. Houlberg.

Minutes.

The Meeting opened with the Hon. Secretary reading the minutes of the last Council Meeting. The resolution for adoption was moved by Mr. C. A. Rippon, and seconded by Mr. L. J. Hawkins.

This was carried.

The " Wings for Victory " Report.

The Secretary gave a full report to the Council of the position of our Society and its relations with the " Wings for Victory " exhibitions. He stated that he was no longer fully employed on the exhibitions, having returned to his previous employment. It was his opinion that, everything considered, the displays had been very successful during the London " Week," and suggested that if the Clubs gave of their full support by displaying their members' models in the exhibitions when these visited their localities for the weeks, really fine displays of model aircraft would result. Only good can come from their support, both to the campaign and to the movement in general. Again, if the clubs rallied to support their local displays no further dispatching of models to London would be necessary. He urged all clubs who wished to take part in their local displays to contact their local National Savings Secretary, whose address could be obtained from their Town Halls. The Secretary was sure that helpful co-operation would be gained in this way.

The report was endorsed by the Council.

Following the report, Mr. C. A. Rippon moved, seconded by Mr. G. Temple, " That our clubs be urged to give of their strongest support by displaying their models in the ' Wings for Victory ' exhibitions when these displays arrive in their localities for the ' weeks.' Further, realising the fragile nature of model aircraft as a display exhibit, request the National Savings Committee to withdraw all models at present being displayed on tour, and returned to their owners."

Carried.

London Week Winners.

Class 1. " Power Driven " (other than by elastic). Mr. Norman Lees, Halifax M.A.C.

Class 2. " Duration and General Flying " (elastic driven). Mr. Simmonds, Blackheath M.F.C.

Class 3. Flying Scale Models (any scale elastic driven). Mr. Jeffreys, Northern Heights M.F.C.

Class 4. Gliders (any size). Mr. Pope, Edgware M.A.C.

Class 5. " Solid " Scale Models (any scale). Mr. A. M. Wood, Croydon M.A.C.

Special Junior Prize (under 16 years of age). Mr. Macmillan, Birmingham M.A.C.

Special Note.

Regional Judging Secretaries are kindly requested to forward winning models to Mr. S. Collins, 45, Chase Side, Southgate, London, N.14, who will store the models until the National Final. Some of the London Winners have, by mistake, gone on tour with the exhibitions and Judging Secretaries are invited to return these models to this address when they reach their regions. Transport expenses with the necessary vouchers should be forwarded to our Treasurer, Mr. L. J. Hawkins, who will refund.

Insurance.

This subject was debated by Council because of its inclusion in the original brochure, and the desire of members for this service. As a preliminary to decisions, the Council invited Mr. L. J. Hawkins to approach Messrs. Lloyds *re* third party and property damage, Mr. Hawkins agreed and would report back.

Affiliations.

The following nine clubs were granted affiliation to the Society :—Sunderland M.A.C. Newton Abbot M.A.C. Arts & Craft (R.A.F.). Carlisle M.A.C. Worcester M.A.C. 328 Flight A.T.C. Brentwood M.A.C. 779 Flight A.T.C. and Bromley Solids Club. Bromley is the first all solids club affiliated to the Society.

Indoor Flying Returns.

1. Leeds M.A.C., 301.3. 2. Pharos M.A.C., 244.3. 3. Blackheath M.F.C., 242. 4. Ilkley M.A.C., 214.7. 5. Cheam M.A.C., 175. 6. Eastbourne M.A.C., 105.8. The best Individual Time, Mr. W. M. White, Blackheath M.F.C., 124 sec., with Class " B " machine.

Youth Associations.

The suggestion that the Society should become officially linked with Youth Movements throughout the country was discussed. The Council agreed that much good work was being done by these associations but the time was inopportune for any approach by the Society. It was their opinion that propaganda properly handled, could, to a very great extent, remedy whatever loss of membership there may be to the Society. The Chairman directed that the subject of Propaganda be placed on the Agenda for the next Council Meeting.

Timing Methods for Speed Records.

Mr. A. F. Houlberg, the Technical Secretary, would offer recommendations for timing speed contests to the next meeting. He would also define R.O.G. rules based on those adopted by America.

A Hearty Vote of Thanks to the Chair was moved by A. G. Bell, seconded by Mr. C. A. Rippon, carried and brought the meeting to a close at 6 p.m.

A. G. BELL, *Hon. Sec.*

NEW CLUBS.

HALTON M.A.C.
G. B. Godfrey, Model Aircraft Sub-committee, R.A.F. Halton.

SURBITON & D.M.A.C.
N. David, 134a, Ewell Road, Surbiton.

OTTERBOURNE M.A.C.
E. C. I. Liversidge, Oakwood House, Otterbourne, Winchester.

WARWICK & D.M.A.C.
P. R. Lewis, 34, St. Laurence Avenue, Warwick.

SECRETARIAL CHANGES.

ALDENHAM M.A.C.
H. F. Cocksedge, School House, Aldenham School, Elstree.

N.G.A. MEMBERSHIP FORM FOR 1943

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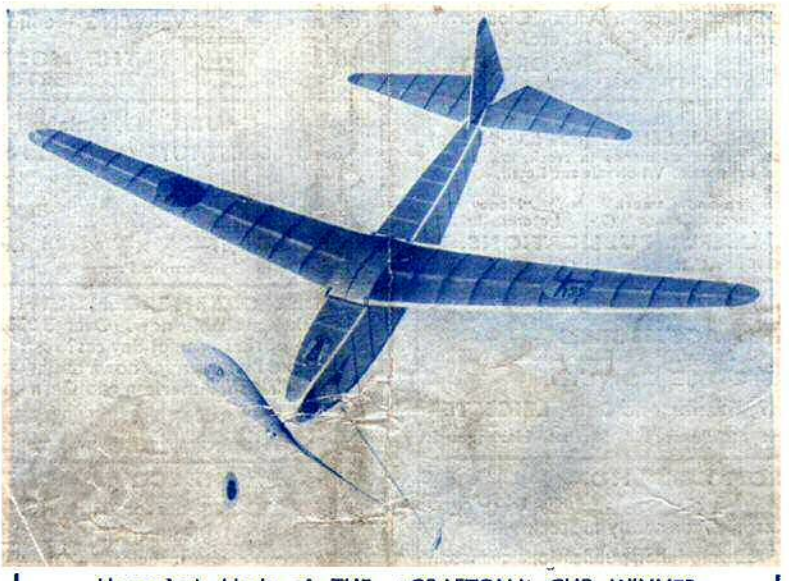

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