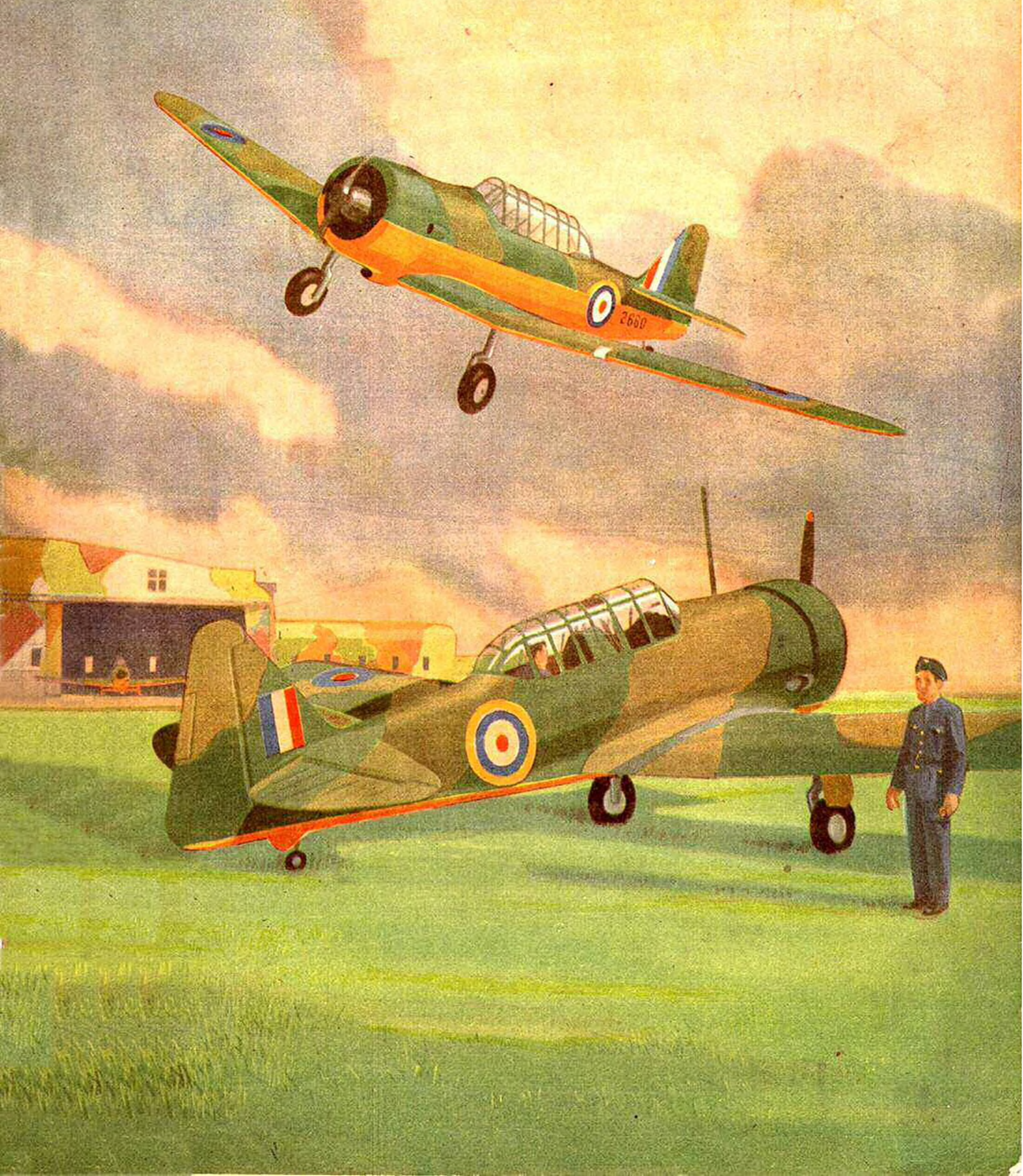
VOL. 8. No. 86 ONE SHILLING JAN 1943

AERO MODELLER

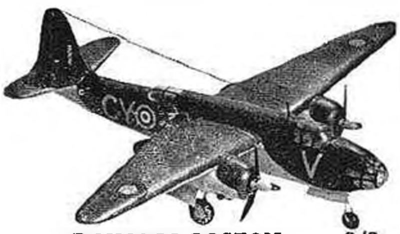


MODELS OF THE MOMENT

C.M.A. SOLID SCALE MODEL KITS

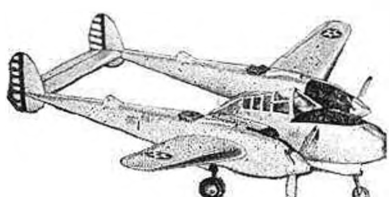
SCALE ¼ in.—1 ft.

Kits contain all parts cut to shape, seats, cement, correct transfer insignia, three bottles of dope, sandpaper, fully detailed blue-print, and complete instructions.



DOUGLAS BOSTON 8/3

BEAUFIGHTER. 7/11



LOCKHEED P.38. 8/9

CAPRONI RE. 2000 6/-

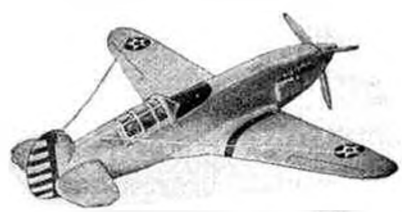
WESTLAND LYSANDER. 6/-

RATA 1—16 5/3

SUPERMARINE SPITFIRE. 5/3

MODELS NOT ILLUSTRATED

S.E.5	4/11
PFALZ D.12	4/11
MESSERSCHMITT B.F.109	4/11
MORANE SAULNIER 405	5/3
BRISTOL FIGHTER	5/3
HAWKER HURRICANE	5/3
D. H. DRAGONFLY	5/6
FAIREY BATTLE	5/6
BELL AIRACOBRA	6/3



CURTISS P.37 6/3

BLACKBURN SKUA 6/9

WHOLESALE ONLY

POSITIVELY NO RETAIL ORDERS ENTERTAINED

Manufactured by

CHINGFORD MODEL AERODROME LTD.

155, Station Rd., LONDON, E.4.

WESTLAND WHIRLWIND 6/6

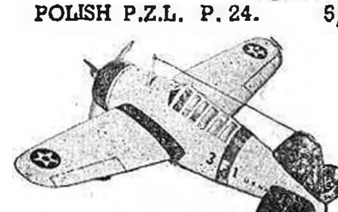
FOKKER G.1. (DUTCH) 8/11

BRISTOL BLENHEIM. 6/11

MESSERSCHMITT M.E.110. 6/11

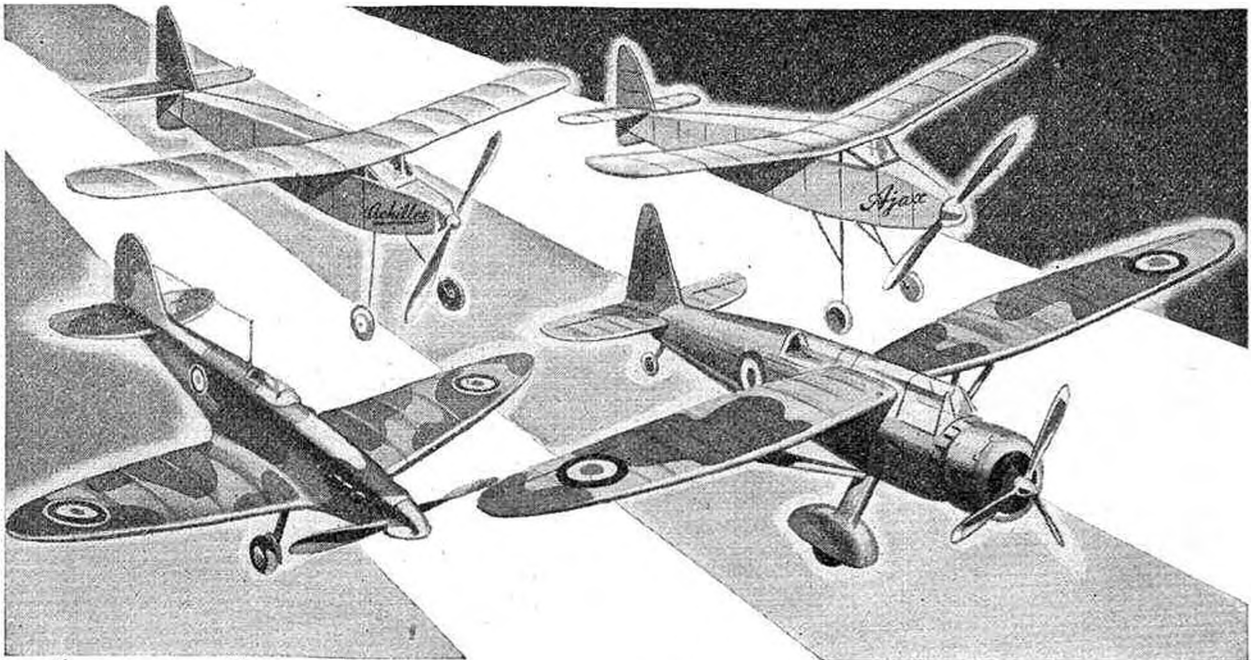
BOULTON PAUL DEFIANT. 6/9

POLISH P.Z.L. P. 24. 5/3



BREWSTER BUFFALO. 6/9


BRITISH MODEL AIRCRAFT MANFG. CO MITCHAM SURREY—
SKYROVA
EMOS


Achilles
Ajax

SKYLEADA

THE FOUR ACES FOR FLYING MODEL "ACES"

M.S.S. "LYNX"

M. S. S. COMPLETE KITS

"LYNX" 40½ In. Span
"LYNX CUB" 30 In. Span
"PANDA" 38 In. Span
"GREYHOUND" 22 In. Span

ALL BEST MAKES OF KITS STOCKED
"SKYLEADA" "SKYROVA" "KEILKRAFT"
"TOWER" "BRITANNIA" "ASTRAL," Etc.

Now Ready—" NORITH " Series Transfers
In Sheets to suit all 1/72nd British and German Models.
Sheet contains complete set Roundels, Tail Strip, Squadron Letters. 8d. per sheet.

"SKYLEADA" FLYING (DURATION) KITS.
"Falcon" 20 In. 3/6 "Hawk" 24 In. 4/6
Post 6d. extra.

M S S Model Supply Stores

17 BRAZENNOSE STREET MANCHESTER 2

SKYROVA

MODEL SUPPLY STORES
MARKET SUPREME SOLIDS

*We are—and proud of it too—***NORTHERN FACTORS** *of the famous series of*

"SKYLEADA" SOLID SCALE KITS 1/6 and 1/9 each, complete.

AND NOW

"SKYROVA" SOLID SCALE KITS 3/- each, complete.

"THE" MULTI-ENGINED BOMBER KITS
MANCHESTER - HALIFAX - FORTRESS
LIBERATOR - STIRLING

Stocks available for immediate despatch.

Try your Local Dealer first—if he cannot supply, show him this advert—then send direct to us, but include 4d. extra for postage.

2½d. stamp for complete lists
New "Balsa" substitute woods and all materials in plenty. The best of everything for flying and solid enthusiasts.
Always obtainable at M.S.S.

M.S.S. "PANDA"

SKYROVA

SKYLEADA

SLICK

MODEL AIRCRAFT PRODUCTS

A First-Class Material—For a First-Class Job
Approved by all the Leading Model Constructors

NEW SELLING PRICES

Manufacturers to the Trade only.

CLEAR FABRIC DOPE for Wings (has extraordinary tightening properties) in 8d. and 1/4 size tins

COLOURED DOPE for wings and fuselage in 8d. and 1/4 size tins

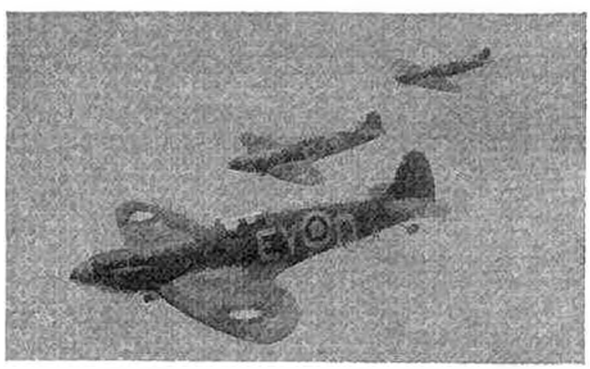
SILVER DOPE, in 9d. and 1/5 size tins

CAMOUFLAGE DOPE, brown and green, in 8d. size tins

BALSA PLASTIC WOOD, in 8d. and 1/4 size tubes

THOROUGHLY TESTED

HIGHLY RECOMMENDED



HIGH-GLOSS WATERPROOF FINISHING DOPE
in 7½d. and 1/2 size bottles

SPECIAL QUOTATIONS TO BULK BUYERS *also*
MANUFACTURERS OF SMALL SIZES FOR USE IN KIT PACK

Write and ask for full particulars and best Export terms

Liberal discount to the Trade.

BANANA OIL No. 1, thick, in 8d. and 1/4 size bottles

BANANA OIL No. 2, thin, in 8d. and 1/4 size bottles

BALSA WOOD CEMENT (both ordinary and field drying) in 5d. and 8d. size tubes

RUBBER LUBRICANT, in 5d. and 8d. size tubes

SPECIAL ADHESIVE PASTE, in large 5d. tubes.

MODEL AIRCRAFT TRADE ASSOCIATION

Manufactured by:— **SLICK BRANDS LTD., Waddon, Croydon, SURREY**

"QUICK—IS IT ONE OF OURS?"

Photo by Frank W. Lane

Contents of this issue.

THE AERO MODELLER

(INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR") Established in 1936

(Proprietors: Model Aeronautical Press, Ltd.)

THE MODEL AERONAUTICAL JOURNAL OF THE BRITISH EMPIRE

Vol. VIII - No. 86 JANUARY, 1943

Editor: C. S. Rushbrooke. *Managing Editor:* D. A. Russell, *M.I.Mech.E.* *Technical Editor:* R. H. Warring.

ALLEN HOUSE, NEWARKE ST., LEICESTER

EDITORIAL

AT an extraordinary General Meeting of the Society of Model Aeronautical Engineers held last month important decisions were made, which, it is hoped, will have far-reaching effects on aero-modelling in this country.

During recent months the Council have been giving serious consideration to extending the membership of the Society so as to embrace all those many enthusiastic aero-modellers scattered throughout the length and breadth of the country who, for one or several reasons, are unable to join their local club.

First consideration was given to the great body of "Solid" enthusiasts. At the meeting, a resolution was unanimously passed that a new grade of membership be created, viz., that of "Associate Member," the annual subscription to the society to be 1s. The Council had suggested that two important trophies could be put up for competition amongst "Solid" enthusiasts, and be known as the "National Solids Trophies No. 1 and No. 2." Mr. D. A. Russell, on behalf of THE AERO-MODELLER, offered the sum of fifty guineas to provide the two trophies, which offer was enthusiastically accepted by the meeting.

We hope to publish early in 1943 full particulars of the competitions to be organised for these trophies.

Another new class of membership decided upon was that of "Country Member." This is open to any aero-modeller in the country who is unable to belong to a local club, but wishes to benefit from membership of the Society and to enter the Society's competitions, which he will be able to do on payment of the appropriate entrance fees. We trust that due notice will be taken of this announcement and that many aero-modellers will avail themselves of the opportunity to join the Society. Full particulars of it may be obtained from the Hon. Sec., Mr. A. G. Bell, 70, Nelson Road, Hornsey, N.19.

"Wings for Victory" exhibitions.

"Wings for Victory" exhibitions are to be organised throughout the country during the months of March, April, May and June, 1943. The country will be divided into 12 zones, and exhibitions will be held in the principal towns of each zone. We understand that a total of over 200 exhibitions is contemplated. A leading feature of all these exhibitions will be a display of model aircraft, and the Society of Model Aeronautical Engineers has been officially requested by the National Savings Committee to arrange for models to be made available for these exhibitions. No greater proof of the standing of the Society has before been given, and it now remains for the members to co-operate and show that the faith placed in them is justified. We understand that facilities for the provision of building materials are being arranged and that privately subscribed prizes will be presented for the best models displayed at each exhibition. Again full particulars may be obtained from Mr. A. G. Bell who, we understand, is working in very close co-operation with the National Savings Committee. We would, however, point out that Mr. Bell is a very busy man and thus where possible applications for further information should be made through club secretaries and not as individuals as far as possible.

"Solid" opportunity.

And so now solid model fans who hitherto have felt that they have received but little recognition are now in the happy position of having three great opportunities literally pounding on their doors! Firstly Associate Membership of the S.M.A.E.; secondly the National Trophies to be competed for annually; and thirdly the "Wings for Victory" exhibition. The latter is of course open to *all* classes of models—but it is to be expected that quite a large proportion will be solid models.

We hope, too, to publish from time to time constructional details for building non-flying scale models of various modern machines. The first model will be that of the "Mosquito." A description of this machine—at least, as much as we are at present allowed to publish under censorship regulations—is given on page 672 of this issue, together with a 1/72nd scale plan.

A fly in the ointment!

The "insect" in question is the latest product of the de Havilland Aircraft Company and has already proved itself no mean "pest" to our enemies and the *Luftwaffe* in particular. Although no official performance figures have yet been released, certain Swiss sources credit the "Mosquito" with a top speed approaching 430 m.p.h.—sufficient to leave enemy fighter opposition behind when the need occurs.

The experienced solid builders will, no doubt, wish to start their model right away and so we have reproduced the plans as soon as possible. The article on the model we hope to include in the February issue, the model itself now being in the course of production.

"Twins run in the family."

We have had numerous letters in connection with the 1 in. to the foot flying scale "Blenheim," published in the Christmas issue, that we feel a few more notes on this subject would be opportune. Next month we are featuring the " Scion," another 1 in. to the foot flying scale model by C. R. Moore, again featuring the " Moore Patent Drive." This model should appeal to all scale enthusiasts, and at the same time we are arranging to put out full-size working drawings—the " Scion " being a far less difficult machine to construct than the " Blenheim."

To complete the present family of twins this will be followed in the *March* issue by a twin pusher Wakefield model, making, we are tempted to add, twins available to all!

Scale model aircraft that fly.

The book of the above title has proved extremely popular and so our plan of one flying scale model per issue is continuing. Such completed forms of the ballot, published in the December issue, which have been received to date, more than confirm this view and so the Harvard II, by H. J. Towner, should satisfy their requirements. This is the latest machine from the hands of an aero-modeller who has been building and flying scale types since balsa was first introduced into this country—and probably before that. We *need* say no more, but we will point out that flights of 35–45 secs. are quite possible with this model.

Push or pull?

The doors of the more important business premises and similar establishments are often respectively labelled " push " and " pull," not that these instructions are always obeyed to the letter.

Some inveterate " pullers " pull both the " push " and the " pull "—others do the reverse. And so it is with aero-modellers, although the great majority prefer to " pull," i.e., employ the tractor layout rather than investigate the field of pushers. This latter type of aircraft with the propeller, used in the true sense of the word, situated at the rear of the fuselage, possesses great possibilities. Thus the letter from a pusher follower should invoke interest amongst the fliers and, not wishing to commit ourselves at the moment, we leave readers to form their own opinions.

Using up those engines.

Or, at least, keeping them running whilst the present ban on the flying of petrol-driven model aircraft is in force. We mean, of course, model race cars. In response to several requests we are extending the closing date for the two Ten-guinea Competitions, originally closing on December 31st, to *February 28th*, 1943, to enable those builders who have started models but, owing to the many calls upon their spare time, will be unable to complete them in time to get results before the original closing date. Remember, then, the closing date has been advanced two months—and there are two prizes of ten guineas each to be won. Full details and rules were given in the September issue and entry forms may be obtained on application to these offices.

D. A. R.

A SELECTION FROM THE FEBRUARY ISSUE

A 1 inch to the foot FLYING SCALE SHORT "SCION," featuring the " Moore Patent Drive," by C. R. Moore.

The 1942 GAMAGE CUP WINNER—a Super Wakefield, by Sam Collins.

AND SEVERAL OTHER MODELS.

Also features of general interest, a "Solid" article, another Scale Plan, etc., etc., etc.

LEFT, FLEXIBLE DRIVE PUSHER. FLEW FOR THREE YEARS (1938)

RIGHT "TATIN" TYPE PUSHER. BUILT FOR WAKEFIELD TRIALS. WEIGHT 11oz (1937)

ABOVE, PROBABLY THE FIRST RUBBER MODEL TO BE FITTED WITH FLEXIBLE DRIVES, TWIN PUSHER TYPE, WEIGHT 1 LB (1925)

SOME NOTES ON PUSHERS

By C. A. RIPPON

I was very interested to read Mr. Dean's article on the "Pusher" type of 'plane in the current issue of THE AERO-MODELLER, having for many years taken a keen practical part in experiments with pushers, including the "Tatin" type (layout as Mr. Dean's), the "Farman" type, and including many with flexible drives, the latter being very fascinating and successful, and I believe that I have eliminated all the "bugs" from flexible drives to airscrews in the mechanical sense. Unfortunately, not sufficient practical interest has been taken in the pusher design by the mass of aero-modellers to produce the best from the type and I feel that if half the enthusiasm and experiment that has been showered upon the tractor models had been used upon developing the pushers, many more of them would have left their mark in the competition field and many people would have at least been saved broken airscrews and have completed their three flights in competitions!

Therefore I am glad to note that one of the younger school of thought has had the courage and confidence to try his hand at the pusher type and I believe that good sound foolproof Wakefield type models can be developed as pushers.

In 1935, when the Wakefield models were between 4–5 ozs. in weight, I developed a "Tatin" pusher on the lines of the "Duraplane" that put up a very good time of 3 mins. which was quite good for the period with any model, the reason as to just why I did not fly this model in the trials the day after is a different story and has been told before in these pages and casts no reflection whatever on the pusher design.

Again in 1938 I developed a streamlined version which, shame to state, was only completed on the morning of the trials and made its first R.O.G. flights actually in the competition. It weighed 11½ ozs., nevertheless it averaged somewhere about 75 seconds. The extra weight was the direct result of the first experiments with wound laminated fuselage formers, with which I had been experimenting for some months and these original ones were wound from ·8mm. plywood. This was the very first model to be fitted with wound formers, and afterwards Bob Copland experimented with balsa ones, with the result that it is now one of the most satisfactory methods of constructing a fuselage known, for round and elliptical shapes.

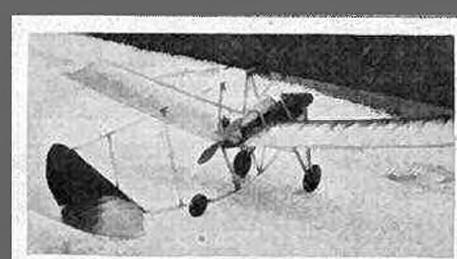
However, I have wandered from the subject and I will go on to state that competitions for pusher models have been a feature of Northern Heights contests for some years and these have produced excellent results both in design and performance.

They have all been built to "Flight" Cup formula and the best timed performance to date is one of 5 mins. R.O.G., by Mr. L. Ryde, who won the trophy for the type two years in succession. The average performance of the type is 70–90 seconds.

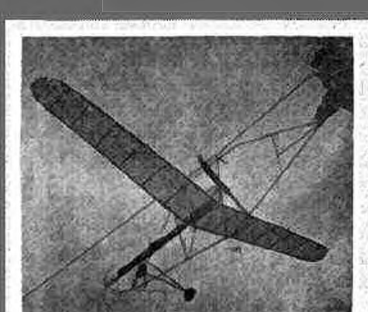
I feel that with more development interest would be increased, and to this end I suggest that some of the more enterprising clubs might do as we have done and offer some practical encouragement in the way of a contest to "Flight" Cup formula, and as a final word I would point out to Mr. Dean and others who seem to possess an inferiority complex about an ounce of rubber, that models built to the "Flight" Cup specification do perform well on only that amount and what is more continue to do so, and curiously enough that models with increased weight of rubber do not have an improved performance, in fact adding rubber sets up a vicious circle which upsets the whole job. In these days of treasured stores of rubber, a model that flies well on a small amount of rubber is not to be despised. This applies to tractors and pushers alike.

BELOW "FARMEN" TYPE PUSHER CONSTUCTION MAINLY BAMBOO WITH WIRE TAIL BUILT FOR AN S.M.A.E CONTEST (1923)

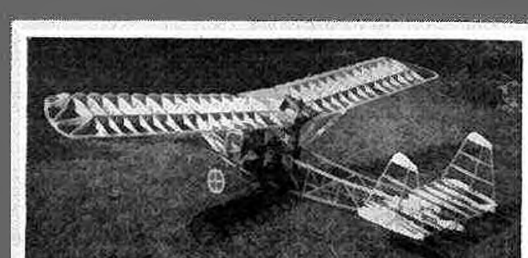
ABOVE, SINGLE FLEXIBLE DRIVE PUSHER. WEIGHT 8oz. (1931 - 1932)

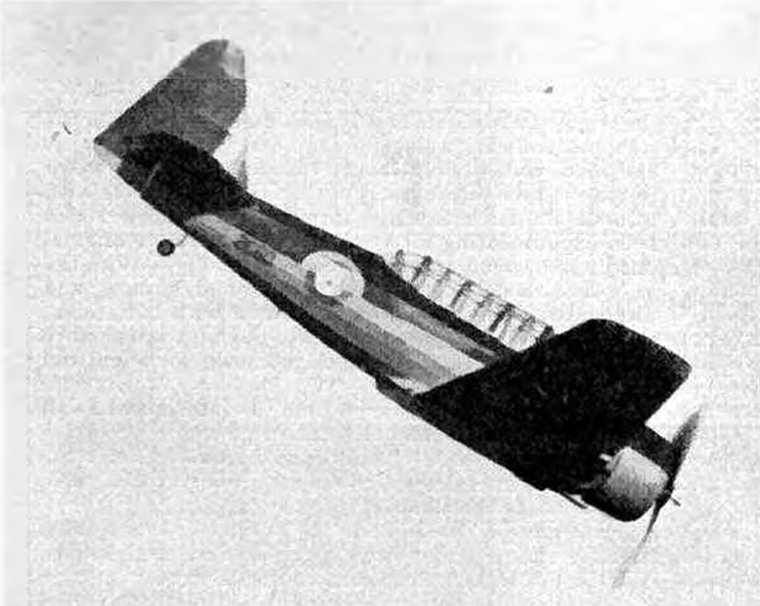


ABOVE PETROL VERSION OF THE "FARMEN" TYPE BUILT BY C.A.RIPPON AND E.H. COOTE (1935 - 5)



RIGHT PUSHER PETROL MODEL BUILT BY MR WIGDOR. WEIGHT 5½ LBS. BROWN 8' SPAN (1934 - 5)





A 1-IN. TO THE FOOT FLYING SCALE HARVARD II

By H. J. TOWNER

This month's flying scale model is contributed by one of the country's leading authorities on the type. It has been thoroughly flight tested, giving an excellent performance, and has proved itself very robust.

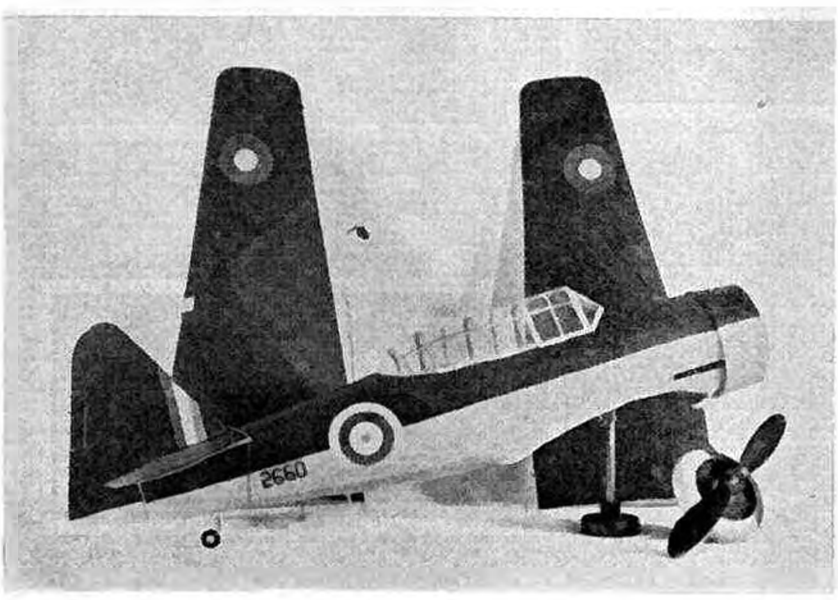
FULL SIZE WORKING DRAWINGS ARE AVAILABLE FROM THE AERO-MODELLER OFFICES, PRICE 5/6 POST FREE.

THE Harvard II is a revised version of the Harvard I designated NA-16-3 by its makers, the North American Aviation Incorporated, and is a two-seater advanced trainer used extensively in this country and Canada and is equipped to accustom the pupil to modern fighter practice.

It is powered with a 600 h.p. Pratt & Witney Wasp motor and the top speed is in excess of 200 m.p.h.

Bearing this in mind, the builder will expect his model to have a performance on these lines, and consequently the model is sturdily constructed and will stand a tremendous amount of rough handling.

However, to suit all builders there are two versions of this model, the fully detailed type, *i.e.*, with gearbox and retracting undercarriage which of course is heavier and therefore faster, and the simpler type with a straight drive motor and no undercart (this



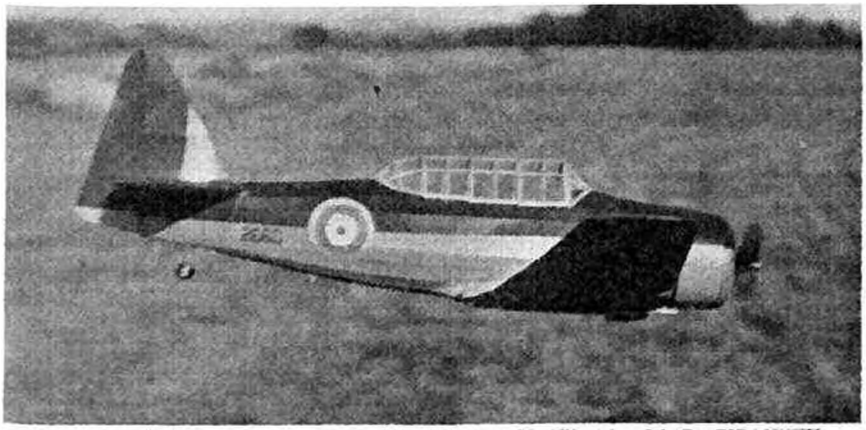
gives the effect of a retracted undercarriage in flight), each version giving a good account of themselves.

It must be remembered, however, that neither type model can be just thrown into the air, but must be properly flown and their respective performances will be in strict proportion to the ability of the pilot, but naturally the lighter job will give the longer duration.

The only controllable surfaces are the elevators and rudder and these are only controlled by trimming tabs.

The tab on the rudder is to correct any turning tendency in the glide or to make the model circle if desired, while the tabs on the elevators are chiefly to allow for any warping which may occur, most tailplanes being very bad in this respect.

The direction and altitude under power



are controlled by the front portion of the model which carries the propeller. It will be noticed in both the geared and ungeared versions that the crankcase is fitted to the distance piece and is independent of the front, packing pieces being inserted so that this central unit can be set at any desired angle in relation to the centre line of the model. This arrangement remains " put " and does away with the very bad practice of putting in bits of balsa or stalks of grass to give the correct thrust setting.

It will be appreciated that a clearance of about 1/16 in. must be left between the crankcase and the rest of the front to allow for this movement.

To amplify the drawings on the plan, AA is the front, AC the crankcase, BP the backplate, DP the distance piece, and BB the bearing block.

The gears are assembled on BB, allowing a slight clearance between the teeth and the centres marked on the block, which is drilled and bushed and the gears fitted on their shafts.

DP is now screwed to this block, having previously cut away portions to clear the cup washers on the ends of the " lagshafts."

When all is running free, remove DP and screw the crankcase on to this distance piece ensuring the line up is correct and reassemble. A slight amount of fitting may be necessary to allow for a true running shaft and you will be surprised how very easily the whole assembly will run.

On the original, thin brass gears of 1/16 in. across the teeth and 34 teeth per wheel were used, which gave quite a scream when revolving under power, and in no small way reproduced the characteristic whine of the prototype.

The gears were obtained from the scrapbox of the local watchmaker, who kindly bored out the centres and riveted and sweated bushes about $\frac{1}{4}$ in. long by $\frac{1}{8}$ in. dia., which in turn were soldered to the shafts. The cost was 2s. 6d.

Undercarriage.

As previously mentioned the simpler version of the Harvard has no retracting undercarriage but plug-in legs can be made for display purposes, and, of course, should be omitted for flying.

All landings are on its " tummy," hence there are no such things as " nose overs " and cracked up fins and rudders.

The original model was designed for automatic retracting undercarriage, but eventually it was decided to cut it out and use a manually operated one instead, as the flying speed is high, and in the event of a landing with the undercarriage down the said undercarriage would be promptly written off besides ripping out a lot of the centre section.

The system used is quite simple if carefully carried out and consists of a crank on each leg connected by a wire 18 g. " link rod " to a gear wheel, so that the rod is on dead centres with the gear in either the up or down position.

Care must be taken to see that the distance travelled by the crank equals the distance between the two dead centres on the gear. A screw forms the shaft of the gear, the head of which is used to rotate the gear and thus lower or raise the undercarriage.

As both wing halves take apart, gears were used which mesh with one another, and should the wing halves separate the gears merely unmesh as each wing half contains its own retracting unit.

However, in practice the wing halves do not separate much owing to the following system of wing fixing.

Wing Fixing.

An arch is formed under the fuselage to house the two centre sections, which are dowelled together with 16 g. wire and suitable brass tubing, the front ends of which are supported by the air scoop carved from solid, which should just pinch the L.E. sufficiently to hold it in place, but also allow it to knock out if necessary.

The T.E. is retained by rubber bands hooked on to the fuselage fairings.

In a real bad crash the rubber bands just snap and the whole wing flies off, and up to the present no damage has ever accrued to either the wing or fuselage.

Wing Construction.

The wheel wells in either model called for a lot of planning to make them simple and although the simpler type has only an external shape, it was decided to build both to a common scheme.

The centre sections are completed with the $\frac{1}{8}$ in. square L.E. on edge inserted through ribs 1 and 2. The fairing in front is then built up by covering the space between ribs 2 and 3, as far back as the main spar, with 1/32 in. sheet balsa top and bottom.

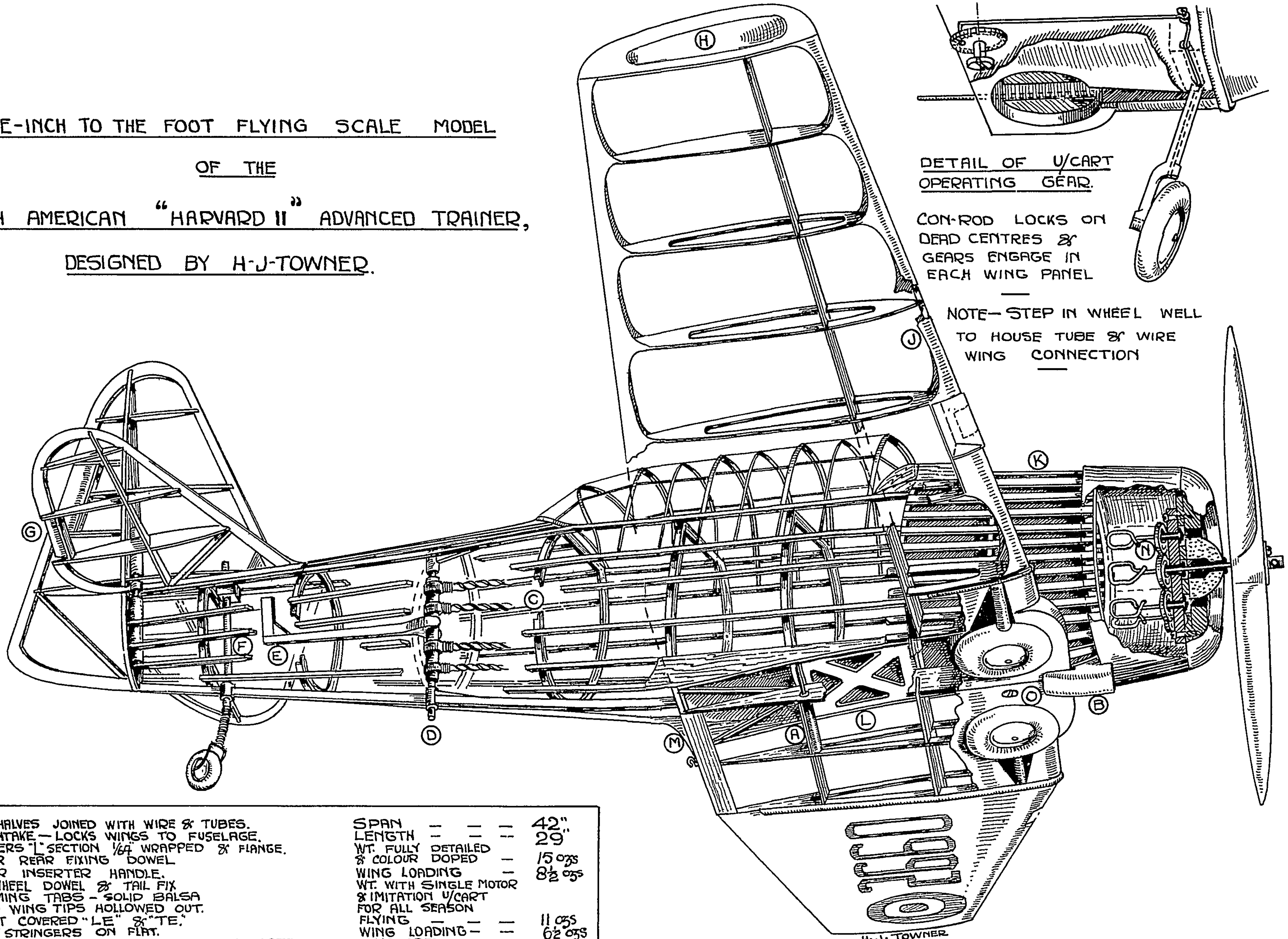
Then the spaces between ribs 1 and 2 are similarly treated, but with the 1/32 in. sheet forming part of the wheel well

A ONE-INCH TO THE FOOT FLYING SCALE MODEL OF THE NORTH AMERICAN "HARVARD II" ADVANCED TRAINER, DESIGNED BY H-J-TOWNER.

DETAIL OF U/CART OPERATING GEAR.

CON-ROD LOCKS ON DEAD CENTRES & GEARS ENGAGE IN EACH WING PANEL

NOTE— STEP IN WHEEL WELL TO HOUSE TUBE & WIRE WING CONNECTION



A	WING HALVES JOINED WITH WIRE & TUBES.	SPAN — — —	42"
B	AIR INTAKE — LOCKS WINGS TO FUSELAGE.	LENGTH — — —	29"
C	FORMERS "L" SECTION 1/64" WRAPPED & FLANGE.	WT. FULLY DETAILED & COLOUR DOPED —	15 OZS
D	MOTOR REAR FIXING DOWEL	WING LOADING —	8½ OZS
E	MOTOR INSERTER HANDLE.	WT. WITH SINGLE MOTOR & IMITATION U/CART FOR ALL SEASON FLYING — — —	11 OZS
F	TAILWHEEL DOWEL & TAIL FIX	WING LOADING — —	6½ OZS
G	TRIMMING TABS - SOLID BALSA	WING AREA — — —	250 □"
H	SOLID WING TIPS HOLLOWED OUT.	POWER WITH 16 STRANDS 3/16" FOR SINGLE MOTOR WITH 12" PROP OR 4 STRANDS 3/16" PER MOTOR 10" P.	
J	SHEET COVERED "LE" & "TE."		
K	1/16" x 1/8" STRINGERS ON FLAT.		
L	3 PLY MAIN BRACE ON UNDERSIDE OF FUSELAGE.		
M	RUBBER BAND HOLDS "TE" TO FUSELAGE.		
N	GEARBOX ADJUSTABLE FOR SIDE & DOWN THRUST.		
O	U/CART OPERATING SCREW		

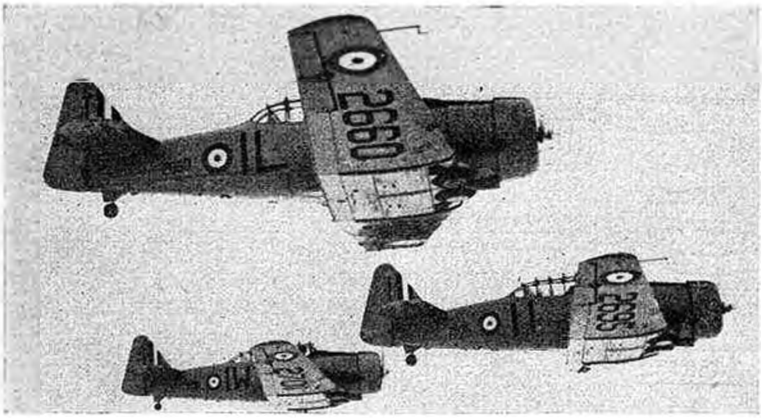


Photo: Fox Photos, Ltd.

which curves over the space between 2 and 3 already covered.

The open space between the top and bottom 1/32 in. covering just added is then filled in with scrap and sanded to shape and a simple wheel shape added on the simpler version to give the correct appearance.

With the detailed version, the top 1/32 in. covering is left to last and the wheel well completed and filled into place when the top covering can be added.

In making the well, a step must be allowed to cover the brass tube or wire fixing, therefore the remaining part of the base or really top, is made of 1/16 in. sheet and the sides built of 1/16 in. sheet in small sections with the grain running vertically.

It is as well to lay out these sections in a length equal to the circumference of the well, neglecting the part where the step occurs and back these segments with a strip of gummed paper or A.R.P. paper. They can then be easily curved round the base and fitted into place.

The correct incidence and dihedral are automatically built into the job, but when spraying the wings or doping, it is as well to give the tips about 3° negative in relation to the main part of the wings by packing up the T.E. at rib 9 while the centre section is held flat.

Fuselage Construction.

The formers of the fuselage follow latest Wakefield practice in that they are wound strips of 1/64 in., 3/16 in. wide. In addition, however, they are wound around an inner former of 1/16 in. flat and when completed make an " L " former. The inner former is made first and then without removing from the board the outer ring is wound on, sticking pins around the outside until the glue is set.

The word glue is used here as it is supposed that some of the newer hard light woods will be used when, of course, balsa cement will not be of much use, although, of course, if balsa is available so much the better.

Having completed all the formers a longitudinal jig is obtained, say 1 in. by ½ in., by a few inches longer than the fuselage. Four pieces of 1/16 in. by ⅛ in. scrap are lightly attached to the formers in such a way that they embrace the jig on all four sides.

Great care must be exercised here to make sure the jig is in the correct position so that all the formers line up properly. No particular size of jig is stipulated but depends upon what size is available so long as it is rigid. The jig section should be carefully drawn on the plan on each former in the correct place as indicated on the drawing, and the former laid on the plan when the jury or temporary four pieces can be lightly cemented into place.

It will be seen that these formers can now be threaded upon the jig whilst former M is pinned to one end. Formers A and A1 need not be treated this way, as the complete cowl can be made separately and added afterwards.

The stringers, all of which are 1/16 in. by ⅛ in., are now added, those between formers B and D are laid flat on their sides about 3/16 in. apart whilst those from D to the rear are on edge. These are then sanded to an even contour and the jig removed when the jury pieces are easily taken out, as the hand can be inserted nearly the length of the fuselage from the front.

The cane for the cabin is either steamed or bent around a hot soldering iron and each end will be seen to go through two rows of stringers.

The celluloid is best fitted by cutting into sections that go right across and adding gummed paper to the edges, similar to passe-partout picture frames.

These sections are then glued into place starting from the rear end, so that each one overlaps the previous one. If desired a strip of 1/32 in. can be inserted between the laps so that the top of each section is distinctly higher than that of the previous one, giving the effect of a sliding cabin top.

Perhaps some ambitious builders will make the sections slide, and as has already been pointed out the model will not nose over, so that the structure should not come to any harm.

An ⅛ in. dowel is used to locate the elevator and rudder to the fuselage whilst a further dowel forward of this holds all in place.

This latter dowel carries the tail wheel and can be used as an alternative rear motor fixing as a fore and aft trimming device.

The forward rear motor fixing consists of a paper tube around which the motors are looped through which a further ⅛ in. dowel is inserted. A further short length of paper tube is fitted to both the top and bottom of the fuselage to anchor the ⅛ in. dowel.

This system is very handy for inserting motors especially if a handle is mounted on the central paper tube.

The power used is the same in either version, that is, the same amount of rubber.

In the simpler type, 16 strands of 1/32 in. rubber 20 in. long drive a 12 in. prop., with a blade width of 1 5/16 in. across its widest part, and a pitch of 16. 400 turns can be comfortably put on to this motor.

The detailed version has four motors of four strands each, 3/16 in. rubber 20 in. long and will take 800 turns, the power being expended through a 10 in. prop., 13 in. pitch and 1⅛ in. across the widest part of the blades.

As the model has plenty of power and plenty of torque, side thrust is needed and the aircraft should be launched 45° to the right of the eye of the wind. That is to say the wind should tend to turn the model to the right and will counteract some of the torque in the early stages and the model should climb well. Don't be afraid of a little wind—the model likes it.

Well, fellows, build the trainer and train yourselves to fly it like pilots, don't be afraid of it, you can treat it rough.

THE "IVORY GULL II"

By R. F. L. GOSLING

A particularly attractive glider model, designed and built by a well-known aeromodeller of many years' standing. The photograph shows the "Heron," another model from the same stable.

THIS glider is a development of the Ivory Gull I from which it only differs in minor details, which have been incorporated as the result of a great deal of flying with the original and which culminated in a flight of 5 mins. 21 secs. out of sight in the M.E. Cup Competition in 1939, when it was lost. Automatic rudder control was used on this flight and was found to be very effective when tow-launching. The original model was also flown H.L. with considerable success when slope soaring, in this case with the auto rudder control out of action and the rudder set central.

Fuselage,

The two sides are built in the usual way on the side elevation of the full-size plans. The longerons are first steamed to the correct shape before the uprights are cemented into position. This is specially necessary if hardwood is used. The two sides are then placed upside down on the plan and the cross pieces cemented into position, starting at the centre. When these have set, triangular pieces of 1/16 in. sheet are cut and cemented on to these cross pieces, except where formers F.1, F.4 and F.6 are due to be inserted. The fuselage is now lifted from the plan and the above-mentioned formers, which can be either cut from 1/16 in. hard sheet or 1/16 in. 3-ply, are now inserted and cemented into position.. The other formers and nose block are then added. The keel, which is cut from ⅛ in. sheet, is now cemented into position after the cross pieces have been cut away at the centre in the second and third bays. The remaining stringers are now added as can be seen from the drawings. The fuselage is now ready for covering, but before doing this the combined towing hook and auto rudder control are made, and bound and cemented into position. The wire connecting this to the rudder is also put into position. The covering of the fuselage is done with 1/16 in. sheet, the sides being cemented on first, then the bottom and top, the cabin being covered with sheet celluloid. A small piece of the upper deck between the nose block and former F.1 is cut out afterwards so that weight can be added in this bay in the form of plasticine and/or lead shot. Two small lengths of aluminium tube are cemented to the fuselage in front of the tail position to engage the pegs of the tail plane, also a paper tube to take the dowel to hold the rudder in position. Two 1/16 in. round lengths of bamboo to act as pegs are then cemented into position under the wing mount and strengthened by ⅛ in. gussets ; these are for the rubber bands which hold the main plane in position.

The fuselage is now carefully sanded, the corners being slightly rounded off. When smooth it is given two coats of banana oil with a light sanding between each coat, then the whole fuselage is finished with a coat of cream enamel.

Wing.

The construction of this is quite straightforward and should present no difficulties. There are two breaks for dihedral in each panel and these are well gusseted. There are two spars one above the other and it will be noted that these spars are lighter in the outer panel than in the rest of the wing. The two halves of the wing are joined in the usual way by two loose birch dowels fitted into paper tubes with plugged ends, so that the dowels can be replaced if they should be broken.

Tail.

This again is quite orthodox and should not present any difficulties. The two bamboo pegs for holding the leading-edge on to the fuselage should be left till last and when cementing into position see that the tail is in true alignment with the main plane when the latter is in position on the wing mount.

Rudder.

This is built as usual, the trimming tab being built separately and fitted with wire prongs to engage the aluminium tubes which are let into the rudder. See that it is an easy fit and there is no friction when turning the tab. A piece of wire, bent as shown on the drawing, is cemented on to the lower rib of the rudder tab. When in position on the fuselage this will engage the wire from the towing hook, the opposite side having a small rubber band hooked over it and thence to a small hook on the side of the fuselage. The tension on this should only be sufficient to just bring the tab over to the right. A stop of balsa is cemented to the rudder on this side and will have to be adjusted by trial and error to find the correct amount of rudder required to give a circle of 200/300 ft. A stop on the opposite side prevents the tab from going past the central position while the glider is going up on the tow line.

Covering.

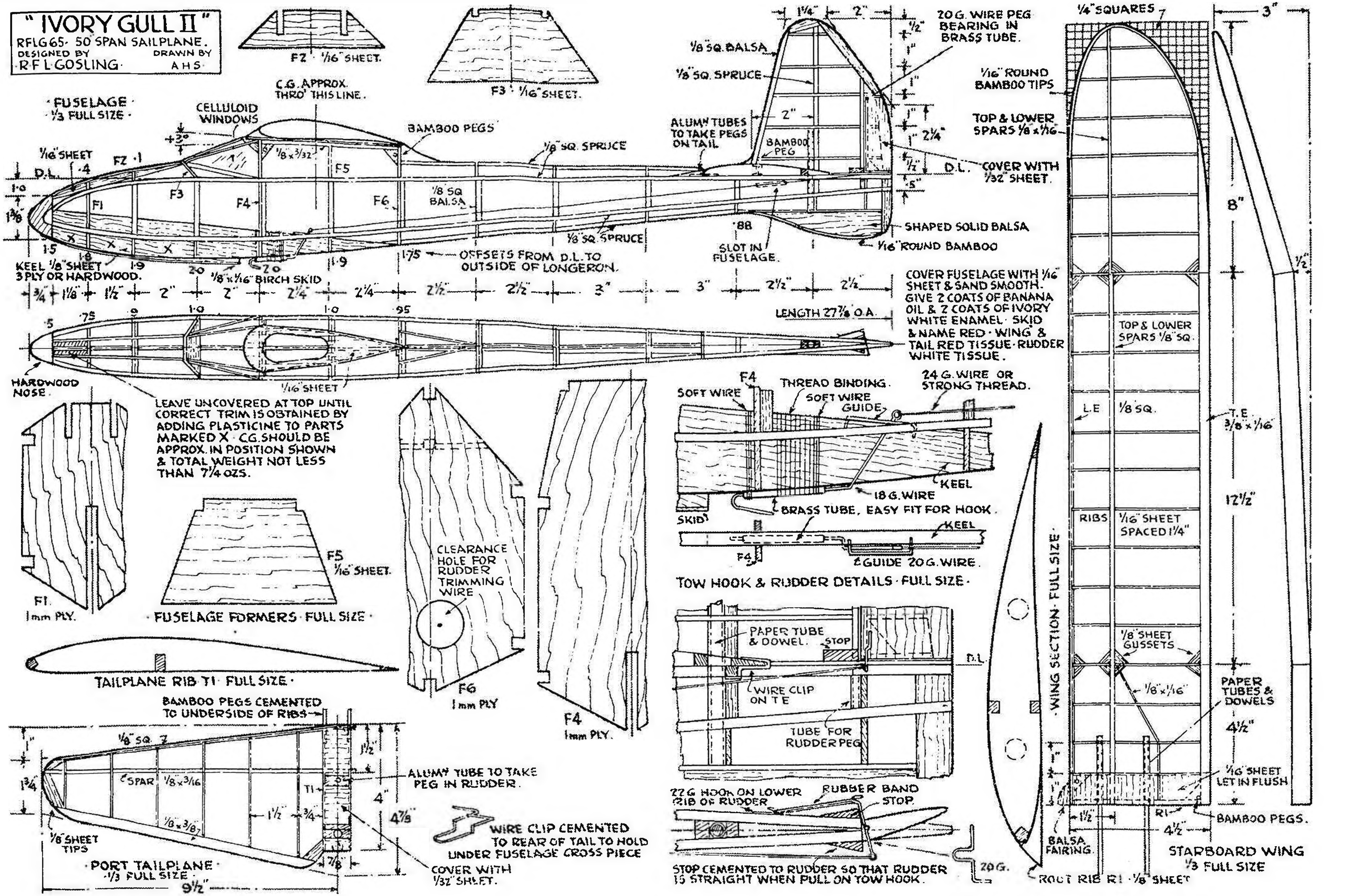
The wings and tail are covered with light bamboo paper, red on the lower surface and white on top, the rudder being all white. After spraying with water and shrinking they are given two coats of dope. See that the wings are perfectly true while the dope is drying. It is best to leave the wing in some sort of jig for 24 hours afterwards to prevent any warping.

Weight.

Weight is now added to the nose after the model is assembled until the C.G. is approximately 50 per cent. along the wing chord.

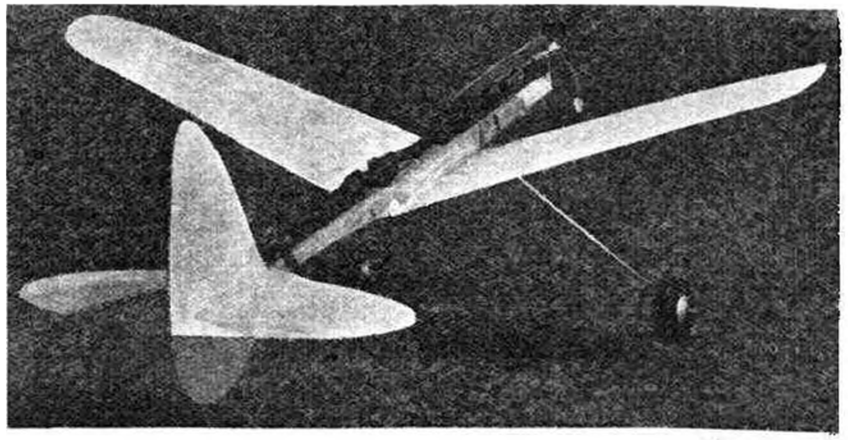
Flying.

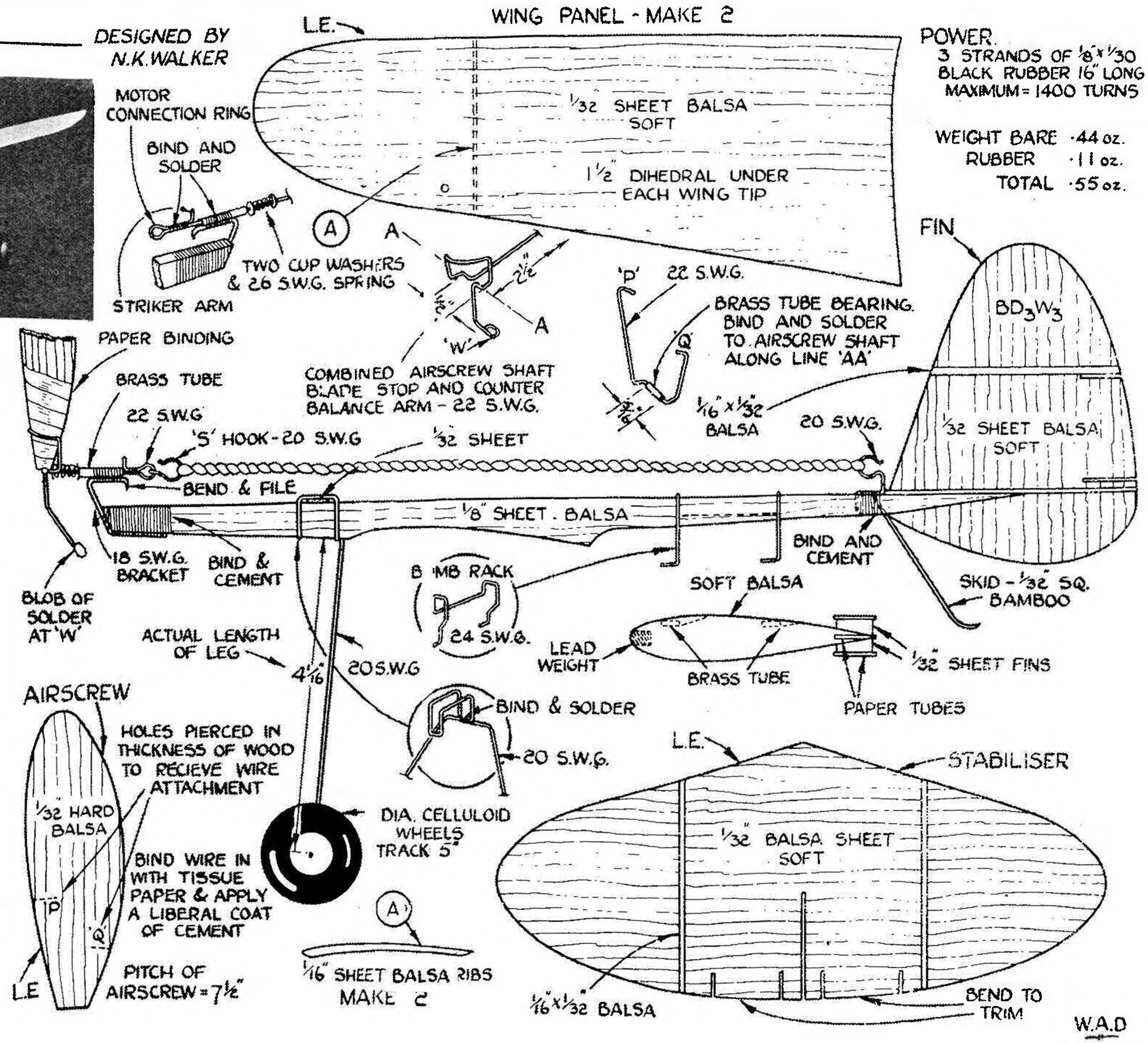
First test the model by hand-launching on level ground on a day when there is just a very gentle breeze, launching into wind and throwing the model downwards in its natural gliding angle and judging the power of the throw so that it is just airborne when leaving the hand. The rudder tab is of course disconnected and left in the neutral position. Weight is now added or taken from the nose bay until the best gliding angle is found, and the model makes a steady glide with no tendency to stall and lands gently on its skid.



"IVORY GULL II"
RFLG65 · 50" SPAN SAILPLANE.
DESIGNED BY R·F·L·GOSLING · DRAWN BY A·H·S
F2 · 1/16" SHEET.
F3 · 1/16" SHEET.
FUSELAGE · 1/3 FULL SIZE ·
C.G. APPROX. THRO' THIS LINE.
CELLULOID WINDOWS
BAMBOO PEGS
1/16" SHEET
1/8"x3/32"
1/8" SQ. SPRUCE
1/8" SQ BALSA
1/8" SQ. SPRUCE
KEEL 1/8" SHEET 3 PLY OR HARDWOOD.
1/8"x1/16" BIRCH SKID
OFFSETS FROM D.L. TO OUTSIDE OF LONGERON.
1/8" SQ. BALSA
1/8" SQ. SPRUCE
ALUMN TUBES TO TAKE PEGS ON TAIL
BAMBOO PEG
20 G. WIRE PEG BEARING IN BRASS TUBE.
COVER WITH 1/32" SHEET.
SHAPED SOLID BALSA
SLOT IN FUSELAGE.
1/16" ROUND BAMBOO
COVER FUSELAGE WITH 1/16" SHEET & SAND SMOOTH. GIVE 2 COATS OF BANANA OIL & 2 COATS OF IVORY WHITE ENAMEL · SKID & NAME RED · WING & TAIL RED TISSUE · RUDDER WHITE TISSUE.
LENGTH 27 7/8" O.A.
HARDWOOD NOSE.
1/16" SHEET
LEAVE UNCOVERED AT TOP UNTIL CORRECT TRIM IS OBTAINED BY ADDING PLASTICINE TO PARTS MARKED X · CG. SHOULD BE APPROX. IN POSITION SHOWN & TOTAL WEIGHT NOT LESS THAN 7 1/4 OZS.
F1 1mm PLY.
F5 1/16" SHEET.
FUSELAGE FORMERS · FULL SIZE ·
CLEARANCE HOLE FOR RUDDER TRIMMING WIRE
F6 1mm PLY
F4 1mm PLY.
SOFT WIRE
THREAD BINDING.
SOFT WIRE GUIDE.
24 G. WIRE OR STRONG THREAD.
KEEL
18 G. WIRE
BRASS TUBE, EASY FIT FOR HOOK.
SKID
GUIDE 20 G. WIRE.
TOW HOOK & RUDDER DETAILS · FULL SIZE ·
PAPER TUBE & DOWEL.
STOP
WIRE CLIP ON T.E
TUBE FOR RUDDER PEG
22 G. HOOK ON LOWER RIB OF RUDDER
RUBBER BAND STOP.
STOP CEMENTED TO RUDDER SO THAT RUDDER IS STRAIGHT WHEN PULL ON TOW HOOK.
20 G.
TAILPLANE RIB T1 · FULL SIZE ·
BAMBOO PEGS CEMENTED TO UNDERSIDE OF RIBS
1/8" SQ.
SPAR 1/8"x3/16
1/8"x3/8"
1/8" SHEET TIPS
ALUMY TUBE TO TAKE PEG IN RUDDER.
PORT TAILPLANE · 1/3 FULL SIZE ·
COVER WITH 1/32" SHEET.
WIRE CLIP CEMENTED TO REAR OF TAIL TO HOLD UNDER FUSELAGE CROSS PIECE
WING SECTION · FULL SIZE ·
ROOT RIB R1 · 1/8" SHEET
BALSA FAIRING.
1/4" SQUARES
1/16" ROUND BAMBOO TIPS
TOP & LOWER SPARS 1/8"x1/16"
TOP & LOWER SPARS 1/8" SQ.
L.E 1/8" SQ.
T.E. 3/8"x1/16"
RIBS 1/16" SHEET SPACED 1 1/4"
1/8" SHEET GUSSETS
1/8"x1/16"
PAPER TUBES & DOWELS
1/16" SHEET LET IN FLUSH
BAMBOO PEGS.
STARBOARD WING 1/3 FULL SIZE

BABY DURATION —— *DESIGNED BY N.K. WALKER*





This month we have pleasure in presenting yet another flying solid, which will make your hands just itch to unlock the "Balsa Box." The "Baby Duration" isn't just an ordinary model—not by a long chalk—apart from turning in five flights in the vicinity of a minute, it can bomb, tow a drogue and darned well do anything in the way of aerobatics that you can conjure up. At the moment a pair of floats are under construction for our own "office version," so you can get a good idea of just how versatile is Mr. Walker's latest brainchild.

Amongst many neat constructional features, the most outstanding is the folding tensioned airscrew assembly—quite unusual in view of the minute span of 13 in. By slightly bending the wire attachment "PQ," the pitch can be varied as found necessary.

Flying trim is obtained by the trimmers on the tail-plane and by sliding the U/C either backward or forward as desired. For the first few flights the motor can be wound by hand, but when the 1,000-turn mark is approached it should be stretch wound by means of the "S" shaped hook, which is detachable for this purpose.

When reasonable flights have been obtained, "bombing-up operations" can be carried out or to, be more concise—just shove the bomb on to the hook set just behind the mainplane and change the motor for two stands of ⅛ in. by 1/30 in. As the extra weight is located well behind the c.g., a steep climb ending in a delightful stall will result.

As soon as the nose drops, the bomb is free to slide off the hook and wreak havoc with your rival's new Wakefield. (N.G.A. Insurance not applicable.—Ed.)

Mr. Walker has brought the standard of his bombing up to a very high pitch—in fact he can hit a five-foot circle every time from twenty-five paces. What nerve! and he doesn't even flinch as he pulls out of the dive at zero feet and goes streaking for home with his flying surfaces full of holes.

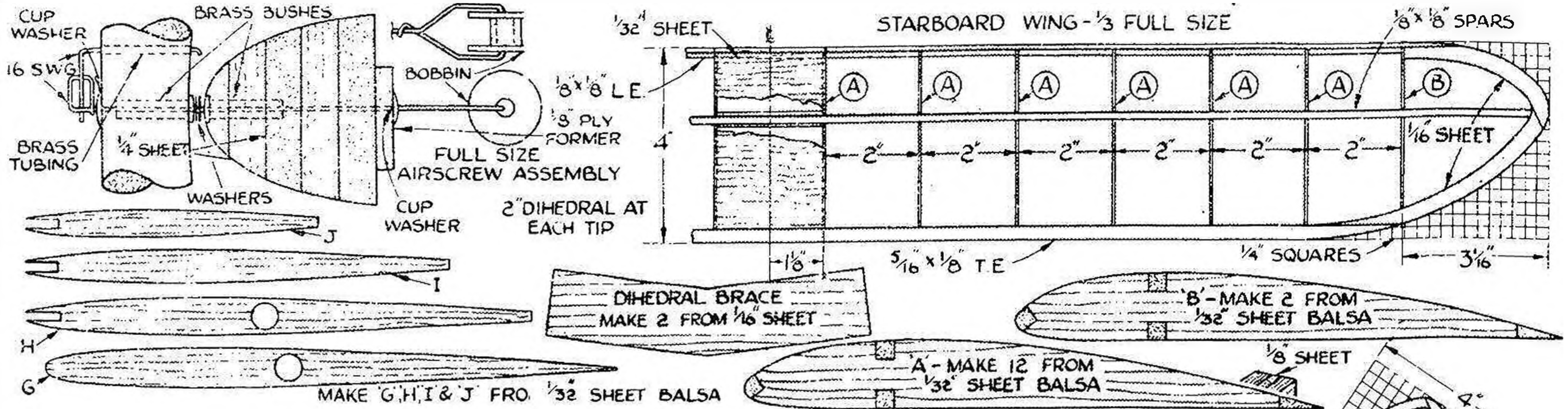
But to come back to earth again (he had to—his motor ran out.—Ed.), this little job is well worth the few evenings it takes to build. All the parts are drawn full size, so it only remains to trace or pin-prick them through on to some sheet balsa—if you've got any!

The average duration, with the rubber motor specified on the plan, is about 45 seconds, whilst on absolute maximum turns, flights of 50-55 secs. have been made.

W. A. D.

THE STORK

By W. A. DEAN



AS its name implies, this little job has only one leg to stand on—or to be more exact, a mono-wheel undercarriage is employed.

This type of model is becoming increasingly popular of late. In fact, several examples can usually be seen flying even at the smaller club meetings and competitions.

There are four main advantages in using a single leg. Less weight, less drag, less material and last but not least, less work! Taking into consideration the fact that the take-off is just as good as with the conventional type, the argument in favour of the mono-wheel is quite overwhelming.

The ideal "Stork" should have both a retracting undercarriage and a folding prop. "Stork II" will incorporate both of these refinements.

Probably the first thing that one notices about the "Stork" is the long slender fuselage. As a friend once remarked, "It's almost a stick model." By keeping down the cross-sectional area, it was possible to construct a long sheet-covered fuselage of a very high strength/weight ratio.

This is the only member in which any constructional difficulties are likely to crop up, so all of the building instruction will be devoted to it.

The Fuselage.

The first step is to cut out the formers and fasten them lightly to a piece of 1/8 in. square birch. (Detailed instructions on jig building appeared in the October, 1942, AERO-MODELLER.) Cement the basic pieces of 1/16 in. by 3/16 in. in place and allow to set. In the meantime make the undercarriage assembly and cement it in position as shown on the adjoining sketch. The holes for the rubber anchorage dowel are burnt with a red-hot needle and then reinforced with pieces of 1/8 in. sheet.

The remaining portions of the sheet covering can now be completed—using eight long strips in all. Sand down the sheet to 1/32 in. thickness and cement a 1/16 in. ply facing to the first former.

The wing pylon pieces are cemented over their respective formers, followed by the 1/32 in. sheet wing mount. The pylon is completed by covering the vertical parts with sheet.

Lastly, a scrap of block balsa is cemented to former No. 19 and then shaped so that it joins up with the fin contour.

Covering.

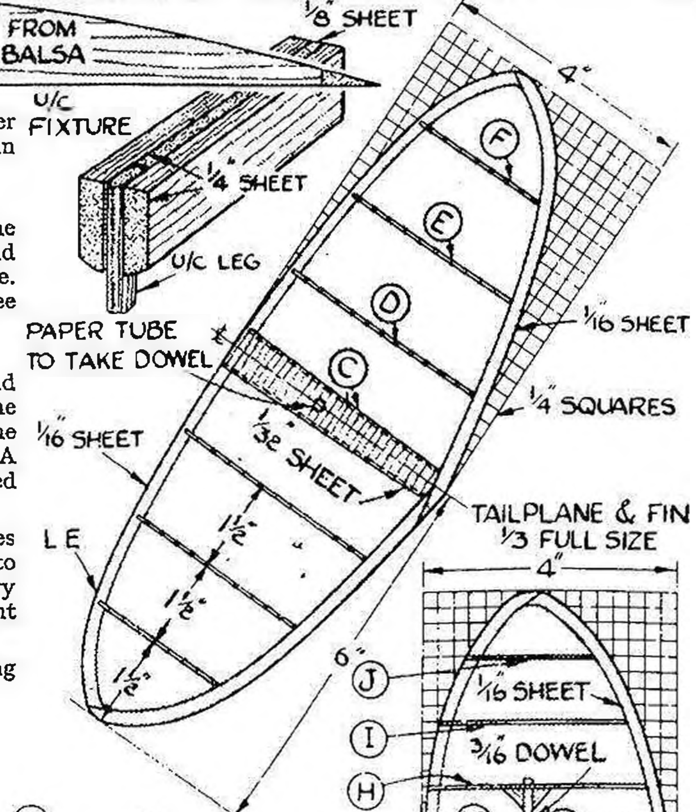
Use light-weight tissue with the grain following the length of the parts being covered. Water spray and then give the flying surfaces two coats of clear dope. The fuselage and airscrew assembly are given three coats of banana oil—sanding in between each coat.

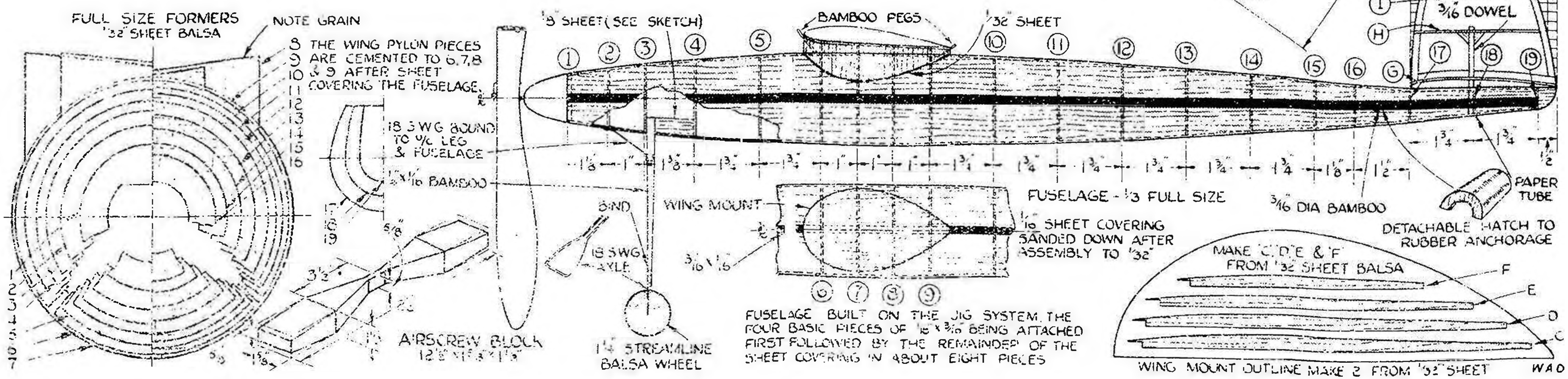
Assembly and Flying.

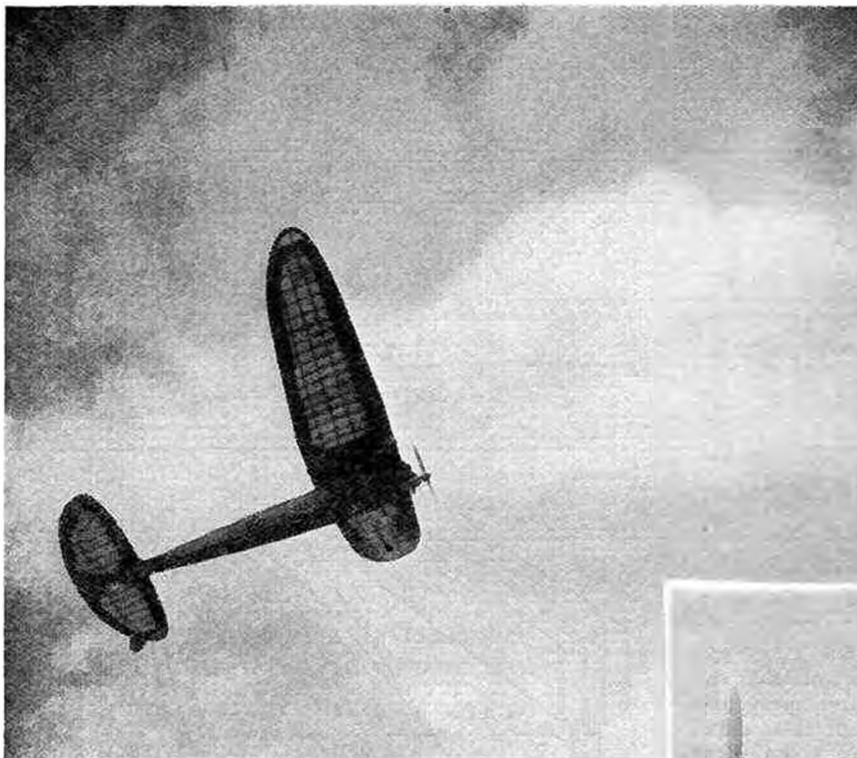
The wing is kept in place by a single rubber band stretched between the two bamboo pegs fitted to the wing pylon. The fin dowel passes through the tailplane and then into the paper tube set in the fuselage. A rubber band is passed over the tailplane to a pin pushed into the tail block.

Ten strands of 3/16 in. by 1/30 in. rubber provides the "Stork" with plenty of power with which to relieve the weight on its only leg. The climb is very "American"—and goes on for quite a time, on account of the long motor that can be used with this model.

Try to obtain the correct trim by varying the wing incidence and/or adding slight downthrust.



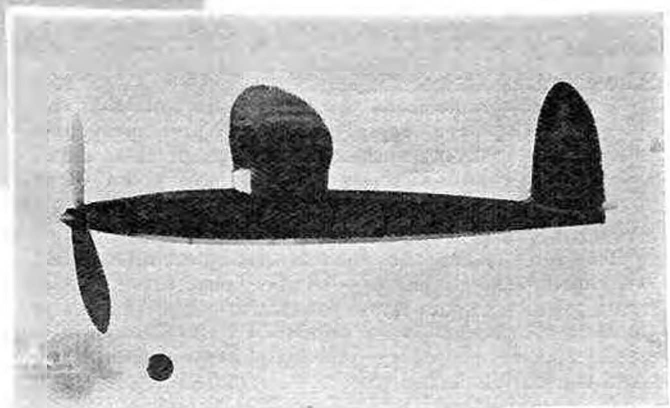




PEG-LEGS

By J. LAMBERT

An informative article upon a subject which has ever been the model designer's headache! There is no doubt, however, that in certain spheres the single leg undercarriage has found great favour and the photographs show, (left) a well-known American "gas" model, the Comet "Sailplane" with single leg and wheel; and (below) "Wattle," the model fully described in the Christmas issue.



JUST now, when aero-modellers are exploring every avenue for increased efficiency, I am surprised to find so few models incorporating the mono-wheel undercarriage. Yet, after using them for two years, during which I have had several hundred R.O.G. flights, I have note only of a few occasions when my model cartwheeled. In every case this was due to the take-off run being too long.

This points to the first essential. The take-off MUST be quick (not more than three lengths of the model), and ample power should be used to hold it into the wind. It would seem then that the rocket type of 'plane is indicated. I have found that the best layout for this is a well streamlined machine with the wing in a parasol position. This has the added advantage that, if the model banks steeply while still on the ground, the wing-tip is less likely to catch. By observing the following points, however, this latter difficulty can easily be overcome.

(i) The wheel should have a rubber tyre to prevent skidding on a wet board. A broad elastic band cemented round the rim serves the purpose admirably. (ii) The tailplane should have an aspect ratio of not less than 4.5. Twin rudders are essential and the area of these should be carefully calculated. (iii) Use some kind of stabilising device, such as sweep-back, slots, or disruptors—according to the size of the model. I have found the latter most efficient. (iv) A "ground angle" of not more than 20 degrees is advised so that the model literally jumps off the ground from three points of support. The danger of it slipping a wing is greatest on the last few inches of the take-off when it is balancing on the wheel only. (v) Streamline every component as much as possible.

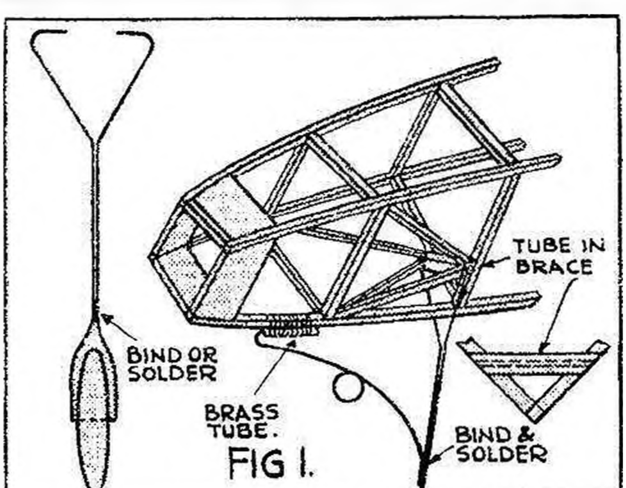


FIG I.

So much for aerodynamic considerations, now for structural difficulties. (i) The undercarriage should be as simple and as light as possible. Drag must be kept at a minimum. (ii) There must be no dangerous weakening of the structure by cutting away important formers. It should be carefully crossbraced. (iii) The complete attachment may be detachable for carrying purposes, but it can be made to fold close up underneath the fuselage. (iv) Both undercarriage *and* tailplane must be sufficiently shock absorbing. (v) The tail should be as light as is consistent with strength in order to keep the C.G. well forward. Little is to be gained by having a greater aspect ration than 6.

In Fig. 1 is shown a type of undercart suitable for a fuselage on which it would be unwise to cut away the lower longeron, e.g. diamond or master stringer type; I do not think it is worth while fitting an ordinary slabsider with a peg-leg. I have found this particular attachment very satisfactory although the drag is rather

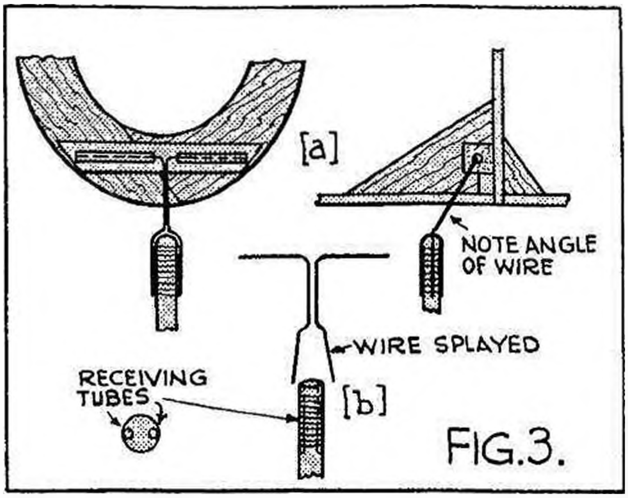


FIG.3.

more than it is in the other types which I will describe. If you use a bamboo leg, the shock absorber can simply be bound firmly with thread and cemented, but if the all-wire type is adopted, it will be necessary to use solder. To detach for carrying, pull the shock-absorbing wire forward out of the front tube, pull the " prongs " at the top of the leg apart, and the undercart is off.

N.B.—It is essential that strong tubing be used for the front tube. Aluminium will rip on the first heavy landing.

A rather more streamlined idea is sketched in Fig. 2. This is ideal for the forward leg of a scale model incorporating the tricycle undercarriage now being used by American designers. A wide balsa fairing would enhance the appearance considerably. For free-lance models, spats could be used. Note that, if desired, landing shocks can be absorbed inside the spats.

The third type is admirable for streamlined models. Here again you have the option of an all-wire or a bamboo leg. If you use the former, bend the wire at the top as shown in order that the undercarriage may fold back along the fuselage for carrying.

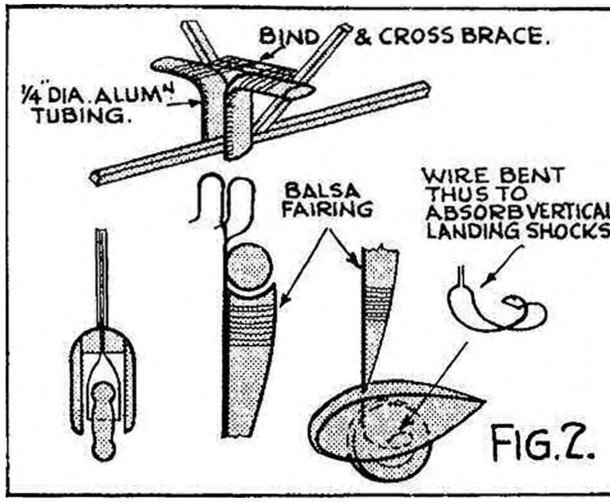


FIG.2.

The bamboo is rather more complicated. The two prongs should be set at a slight acute angle so that when inserted in the receiving tubes, they will press against the sides and so prevent the leg from slipping off, when the 'plane is in flight. The method of construction is as follows :—

Cut the bamboo to the correct size and shape, then make two slots at the top so that they will be a tight fit for the receiving tubes. Cement in the tubes and bind firmly with small gauge wire. A better method is to use a small metal collar. These can be purchased in Woolworth's Stores, ¼ in. long and with an inside diameter of ¼ in.

If desired, a rubber band enclosed in a paper tube may be used for a shock absorber, but I would not advise this on models weighing over four ounces. It is definitely unsuitable for Wakefields.

Now for the tail unit. The big trouble here is, of course, to fix the fins satisfactorily. At first sight it would seem that great extra weight would be incurred in order that the landing shocks would be amply absorbed. Actually this is not the case, since on a two-wheeler the tailplane must be reinforced in case the machine heels over on the ground. The easiest and best method is to make the rudders a fixture, but this is not always possible and so we must search around for some means of either folding or detaching them.

Figs. 4, 5 and 6, show methods of folding twin fins.

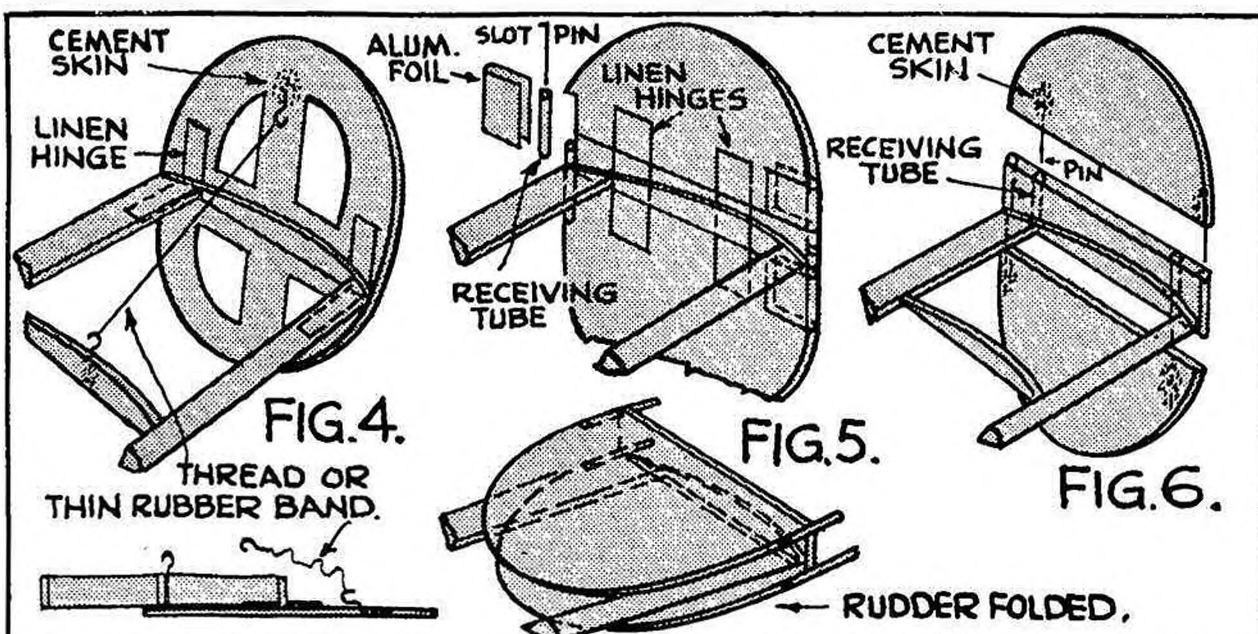
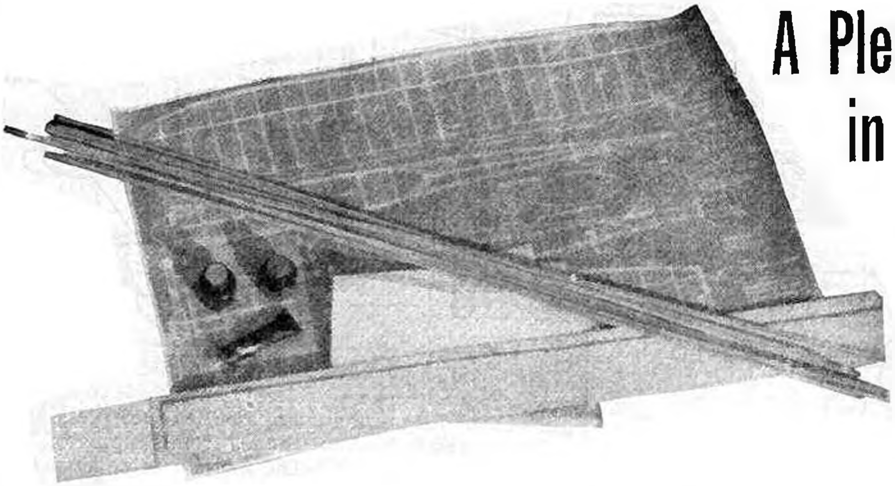


FIG.4. FIG.5. FIG.6.



A Plea to Beginners in Aeromodelling

By C. K. COGHILL

New-comers to the hobby, and possibly some of the old hands, may find many points of interest in this short article on the correct approach of selecting and building their first model.

A FEW of you, reading the above title, will say " Oh this article can't do me any good; I've been building model aeroplanes ever since the outbreak of war," and turn over the page, firmly convinced you are full-blown experts in model aeronautics, and that nothing I can say will do you any good. Very well; we'll let them turn over. We'll let them go on their respective ways rejoicing in their ignorance, for it was with the object in view of trying to give a helping hand to those other two chaps who I hope are reading this, and who are honest enough to admit that they are beginners, or at least novices, that this article was written.

Experience (my own) shows that almost the first thing you will do when choosing a kit—and it is best to start with a kit of well-known make—is to buy one which looks good, hardly giving a thought to whether or not the model is a good flier. Nearly 95 per cent. of all newcomers to our hobby select a scale model for their first attempt, usually with disastrous results either in the building or the flying of the finished job. They do not realise that the building of scale models, especially small ones of around the 18 inch span mark, is exceedingly tricky to unaccustomed hands, and that one has to have a certain amount of experience before attempting to construct a *successful* scale model. In other words, please don't try to run before you can walk, as a simple model chosen with care will give you far more satisfaction than a complicated one for your first try-out.

I am not going to say anything about the constructional side of model aeroplanes, as there are several very good text books already on the market dealing with this among other things, one of the best being " An A.B.C. of Model Aircraft Construction," by C. S. Rushbrooke, a book no beginner should be without.

To continue, I may say that the best possible model for the novice is one that has been designed specially for him, such a model being Mr. Rippon's " Air Cadet," which, although of easy construction, is a very pleasing 'plane when finished.

It was an Air Cadet, built from AERO-MODELLER plans (a boon and a blessing to all mankind, despite what friend Furneaux has to say) that was my first real attempt at a thermal-catcher, and to my surprise, it constantly averaged two minutes, sometimes in the dirtiest flying weather imaginable.

One of the beauties of this hobby is that once you have your text book, kit, and a few razor blades, nothing more is needed, except perhaps a couple of bottles of coloured dope, and a piece of adhesive plaster for cut fingers!

Of course, the pleasure of building and flying model aircraft is best when backed by sound technical knowledge; indeed, some of our leading aircraft designers have started in the right direction by making model aeroplanes in their youth and early manhood, Geoffrey de Havilland and Sidney Camm, who designed the Hurricane, being good examples of how the humble balsa-butcher can rise to fame!

Another bit of advice to budding aircraft designers—join a club. It really increases the joys of modelling by half. For the modest annual subscription you get invaluable hints and tips from more experienced members; you meet new friends and have the advantage of being able to enter competitions, first for novices like yourself, and later on the nation-wide events for the more advanced type of model.

Now a word about painting the finished job. Far too many people, after finishing the 'plane, simply plaster it with various dopes until the model looks more like an advert. for coloured distemper than a flying machine. If the model is not a scale one, and therefore the colour scheme is not controlled by the prototype, the best way to colour it is to cover the fuselage, etc., with coloured tissue, when only the application of water and banana oil is necessary to complete the model.

To sum up. We have learned to buy kits with discretion, not to attempt a too difficult model for a start, to provide ourselves with a good text book, to join a club whenever possible, not to put too much dope on our models, and lastly, not to take any notice of people like H. C. Furneaux. Or have we?

The following models, full size plans of which are obtainable from these offices, are recommended as suitable for beginners:

The Air Cadet, 38" span	Price 1/3
The A.M. Cabin Monoplane, 23" span ..	Price 1/6
The Kamlet, 31" span	Price 1/6
Percy III, 38½" span	Price 3/-
The Sun Star, 28" span	Price 2/-

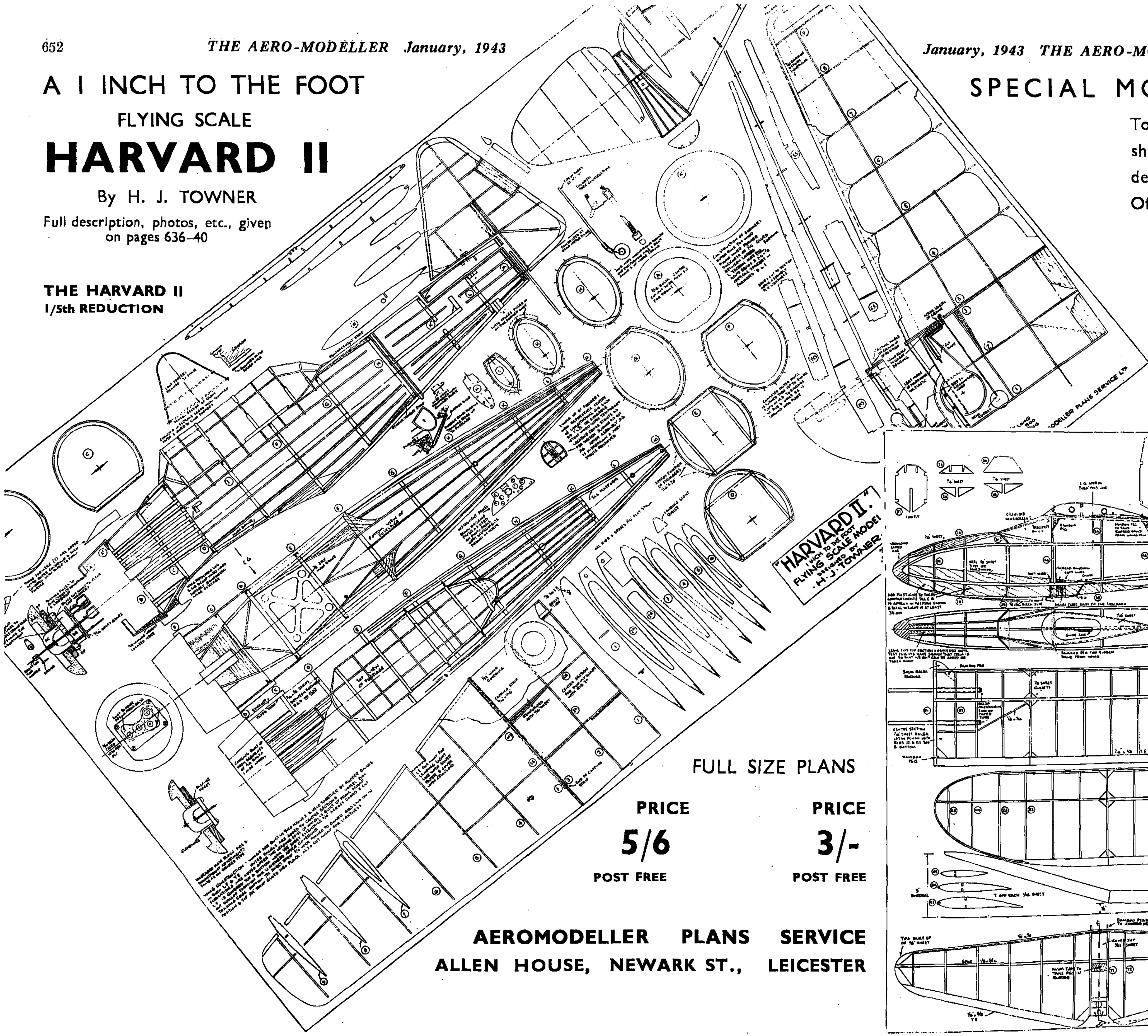

FROG
SCALE
MODEL
AIRCRAFT
TRADE MARK
REGD.
MADE IN ENGLAND BY
INTERNATIONAL MODEL AIRCRAFT LTD
For the sole Concessionaires
LINES BROTHERS LTD · TRI-ANG WORKS · MORDEN ROAD · MERTON · LONDON · S·W·19 · ENG

A 1 INCH TO THE FOOT FLYING SCALE HARVARD II

By H. J. TOWNER

Full description, photos, etc., given on pages 636–40

THE HARVARD II
1/5th REDUCTION



FULL SIZE PLANS

PRICE
5/6
POST FREE

PRICE
3/-
POST FREE

AEROMODELLER PLANS SERVICE
ALLEN HOUSE, NEWARK ST., LEICESTER

SPECIAL MODELS IN THIS ISSUE

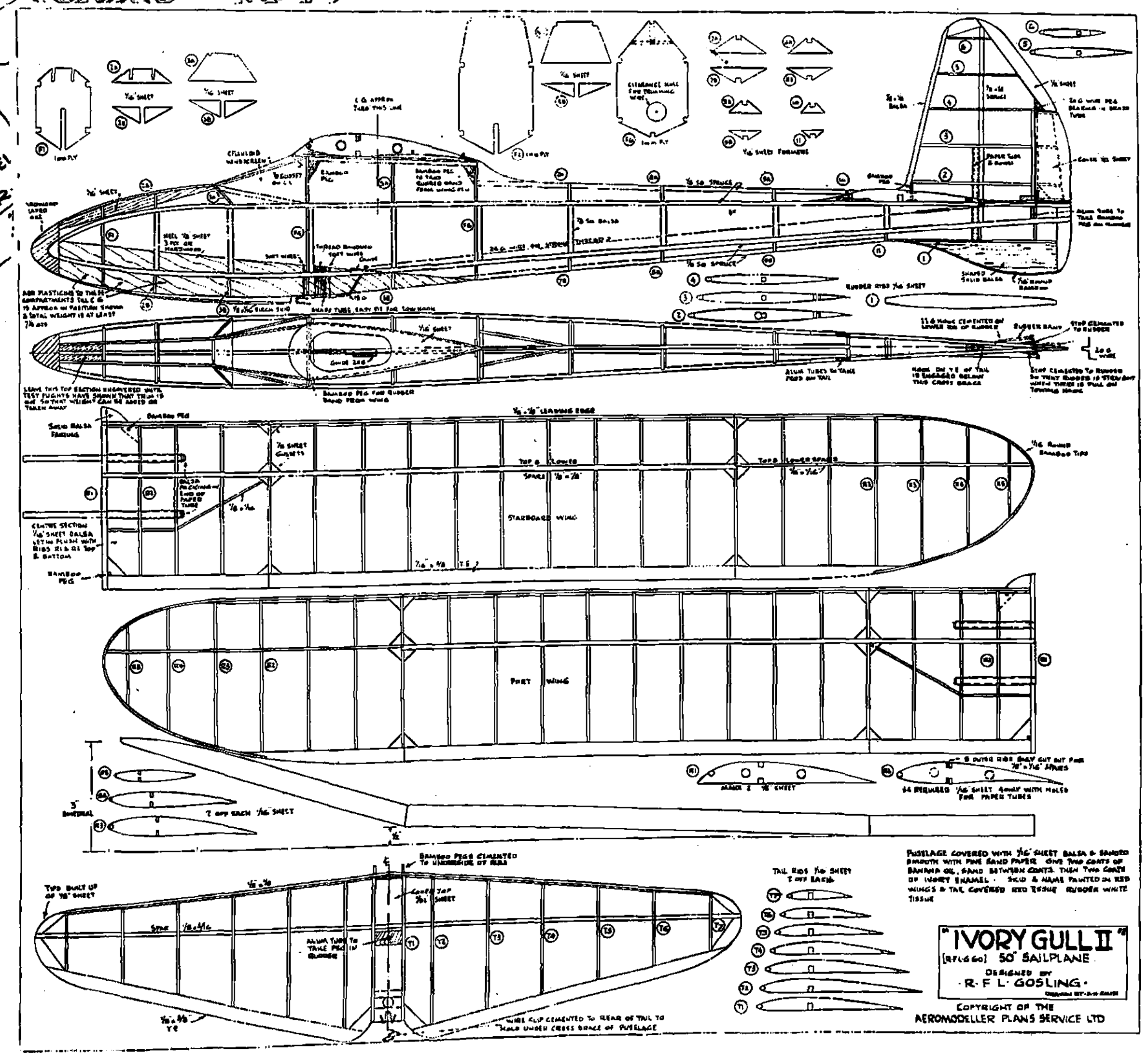
To facilitate building FULL SIZE DRAWINGS, showing every part full size and completely detailed, are available from the Aeromodeller Offices.

●

A super contest TOW-LINE GLIDER designed by R. F. L. Gosling. Fully described on pages 641–3.

IVORY GULL II

1/5th REDUCTION



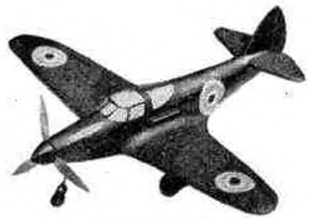
"TRUSCALE"

1/72 Solid Model Kits

ROYAL AIR FORCE
AMERICAN AIR FORCE
and GERMAN WARPLANES


Wellington Price 3/4


Boulton Paul Defiant Price 1/10


Airacobra Price 1/10


Spitfire Price 1/10


Hawker Hurricane Price 1/10

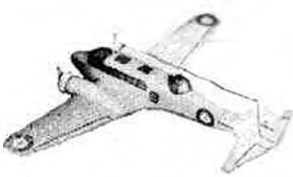
All KITS contain fuselage cut to outline shape, wings cut to shape, tail-plane, rudder, and where necessary nacelles printed on balsa, hardwood cowls and wheels, metal propellers, transfer insignia, cement. Also full-size detailed plan.


Messerschmitt 110 Price 2/5


Westland Lysander Price 2/5


Whirlwind Price 2/5


Blenheim Price 2/5


Avro Anson Price 2/5

SUNDRIES :
Hardwood cowls, 5/8 in., 3/4 in. diameter ... 1d. each.
Plated metal propellers, 2-blade, 2 in. diameter. 1½d. ,,
Plated metal propellers, 3-blade, 2 in. diameter. 2½d. ,,
Plated metal propellers, 3-blade, 1½ in. diameter. 2d. ,,
Targets and swastikas, tail markings, complete set of transfers 3d. ,,
Wheels 1/2 in. and 7/16 in. diameter ... ... ½d. ,,


Heinkel H.E. III K Price 3/1


Handley Page Hampden Price 3/1

ADD 3d. Postage on all Kit Prices.


Tomahawk Price 1/10


Buffalo Price 1/10


Messerschmitt 109 Price 1/10

ADD 2½d. Postage on all Sundry Prices.

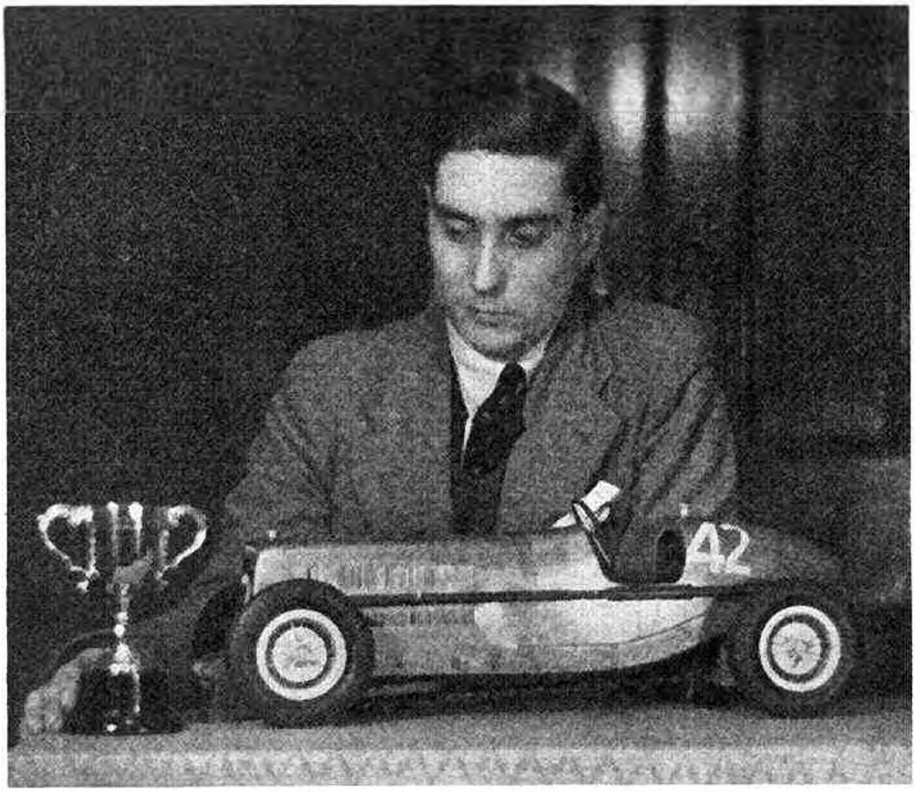
MODEL AIRCRAFT STORES (Bournemouth) LTD.

127b HANKINSON ROAD, BOURNEMOUTH **Phone : 1922 WINTON**

A RUBBER DRIVEN RACE CAR

By E. V. BIRD

Model Race Car enthusiasts—and especially those unable to obtain an engine, will, without doubt, be interested in this short article by a model builder of long standing.



FOLLOWING the articles on petrol-driven cars in recent issues, I thought readers would be interested in a rubber-powered model race car which has quite a remarkable performance.

Those who cannot run to the expense of a petrol motor but can find sufficient rubber, should be particularly interested.

There was in existence before the war, a Model Car Racing Association which held race meetings at the Metropolis Garage near Olympia.

All the cars at these race meetings were rubber powered, with a few exceptions which were driven by gramophone motors. The cars were also replicas of famous makes, and looked very realistic in action.

Races were held over distances of 100 and 150 ft. from a standing start. The getaway these cars had was phenomenal and had to be seen to be believed.

There is endless scope for design and ingenuity in the construction of these models, as various problems of roadholding, wheelspin, springing, steering, and transmission have to be overcome.

Some cars had ingenious systems of independent suspension and others had additional skeins of rubber which automatically came into operation half way down the course, thus giving the car an extra burst of speed.

My own car, of which I enclose a photograph, is a scale model of an E.R.A. It has four-wheel drive and is powered by no less than eight separate skeins of $\frac{1}{4}$ in. by $\frac{1}{4}$ in. rubber, four driving the front wheels and four driving the rear wheels. The drive is transmitted to the road wheels through gearboxes which carry bevel gears. These gearboxes are made from duralumin.

Brass gearboxes were first used but these bent under the pull of the rubber. In order to obtain the greatest possible length of rubber, the gearboxes are set on an angle, and the skeins from the front box pass up and over the rear box on to hooks in the tail of the car. Likewise the skeins from the rear box pass down and under the front box on to hooks fixed to an extension of the car's front dumbirons. This is clearly seen from the photograph.

Steering, which simply consisted of making the car run straight (all races were run on a straight course), was accomplished by two bolts which could be adjusted to swing the rear gearbox bodily to left or right.

Most tyres used on these models were Firestone ashtray tyres, which were scale model rubber tyres supplied for advertisement by the Firestone Tyre Co.

Several models were fitted with twin rear tyres in an effort to eliminate wheelspin.

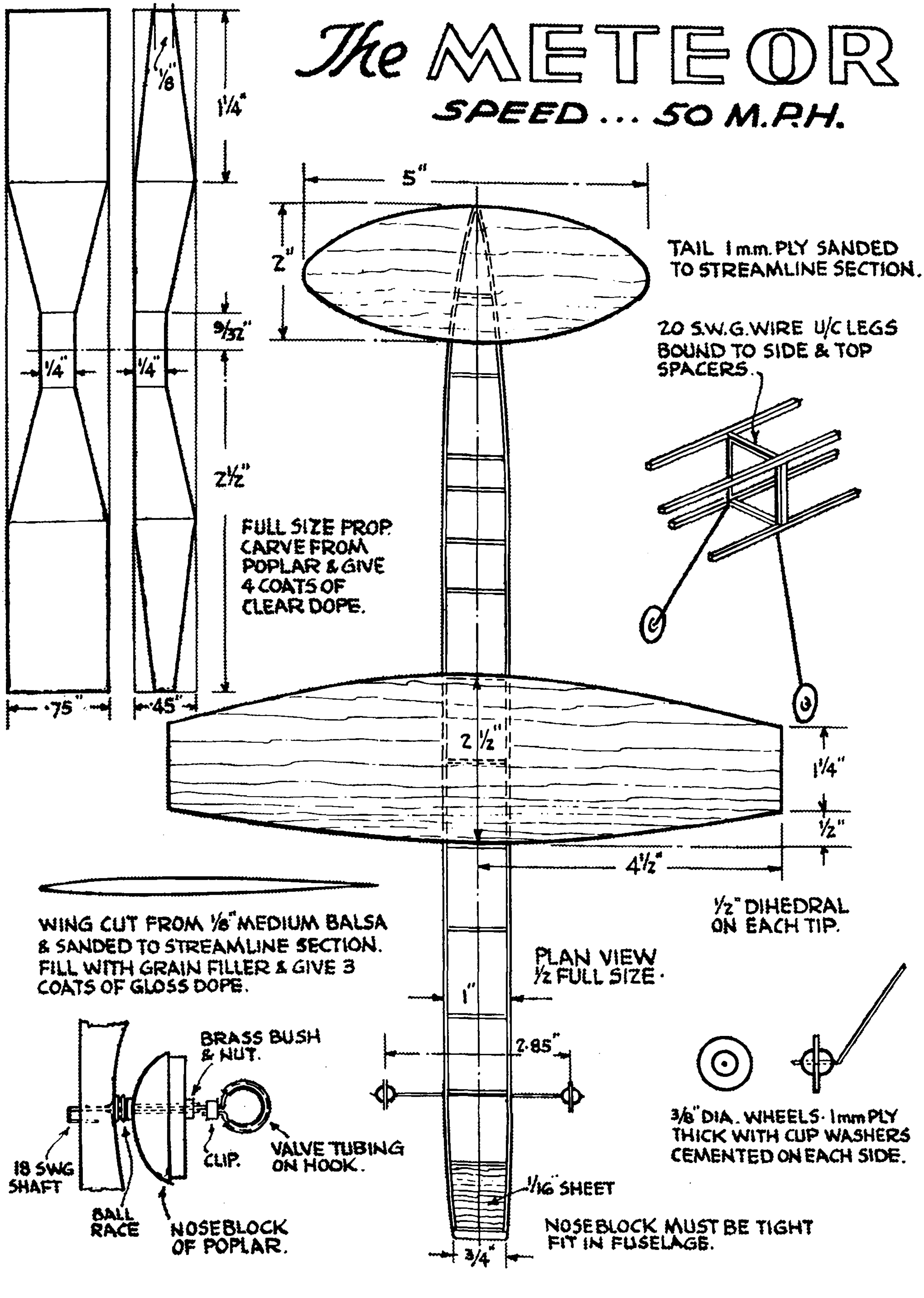
Remarkable speeds were achieved and my E.R.A. was timed to do 50 ft. flying start in 4/5 seconds, which represents a speed of 42 m.p.h.! Not bad going for a small model.

Cars were divided into classes, the only restriction being a maximum overall length. Class A—8 in. long; Class B—16 in. long; Class C—24 in. long; and Class D—of unlimited length. The secret of success lies in finding the best power to weight ratio by experimenting with various gears, too much power and not enough weight causing wheelspin and consequent loss of power.

I trust that this short article will inspire readers to build cars and try out for themselves the fascinating pastime of obtaining the maximum speed from their models.

The METEOR

SPEED ... 50 M.P.H.



HOLDER OF BRITISH SPEED RECORD

DESIGNED BY

M. FARTHING.

POWER: 8-10 STRANDS
1/4" x 1/30" x 10"

THIS model was designed primarily to attack the British speed record, and being the first speed model I have designed, I decided to make it small, thus being cheap to make and modify. There was also the fact that a slab-sided model of small size in America flew at over 90 m.p.h. and if mine only flew at half that speed it would be enough.

Being an ignoramus where speed models were concerned, I thought that if my model was not fast enough, all I had to do was to increase the wing loading, i. e., cutting a piece of each wing tip and increasing the power until it was fast enough.

However, I found out my mistake when I first tested the model. It was quite fast, but the 'plane turned round the prop. and also I could not get it to fly straight over 44 ft. let alone 88 ft. I took the model home disappointed and determined never to make another speed model. Later I changed my mind, altered the prop. size and increased the area of the tail surfaces. These modifications remedied the trouble and the model flew perfectly, clocking 50 m.p.h. over 88 ft. with 6 strands of $\frac{1}{4}$ in. The next week I increased the power to 8 strands and got 60 m.p.h. out of it. Then I cut the wheels off and bent the wire undercart legs back, making skids and thus decreasing the resistance. I again increased the area of the tail surfaces, reduced the wing area and increased the power to 10 strands. The model was faster than ever but it was extremely sensitive and tended to turn round the prop. again.

With regard to building and testing :—

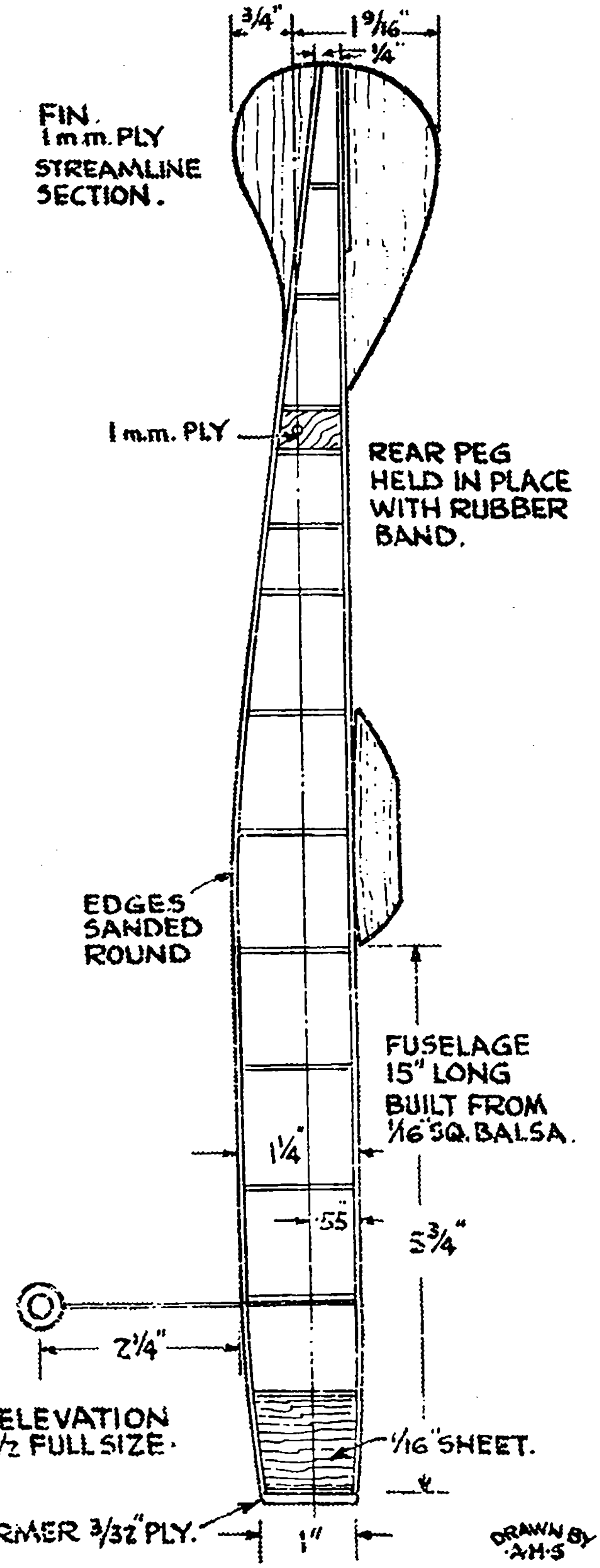
Fuselage.

This is built up as usual of 1/16 in. square hard balsa. The corners are sanded round. The nose former is made of $\frac{1}{8}$ in. ply and the nose block, of poplar, is a tight fit in same. A brass nose bush and nut is used and a ball-bearing washer. The necessity of the latter can be understood, the prop. revving at upwards of 12,000 r.p.m. The prop. shaft has a clip on the hook (which is covered with valve tubing) to prevent the rubber working off. The rear peg is held in place with a rubber band to prevent it flying into the fuselage. The fuselage is covered with coloured tissue, glossy side out, and with the grain running from side to side (not lengthways). It is water-sprayed and given two coats of dope. The prop. is carved from poplar and given four coats clear dope.

Wing and Tail Unit.

The main plane is cut from $\frac{1}{8}$ in. medium balsa and is sanded almost streamline in section, there being little lift. It is filled with grain filler and given three coats of gloss dope.

The tail surfaces are cut from 1 mm. ply, sanded streamline and given three coats of gloss dope. The tail surfaces are cemented to the fuselage and the wing is held on by a *tight* elastic band.



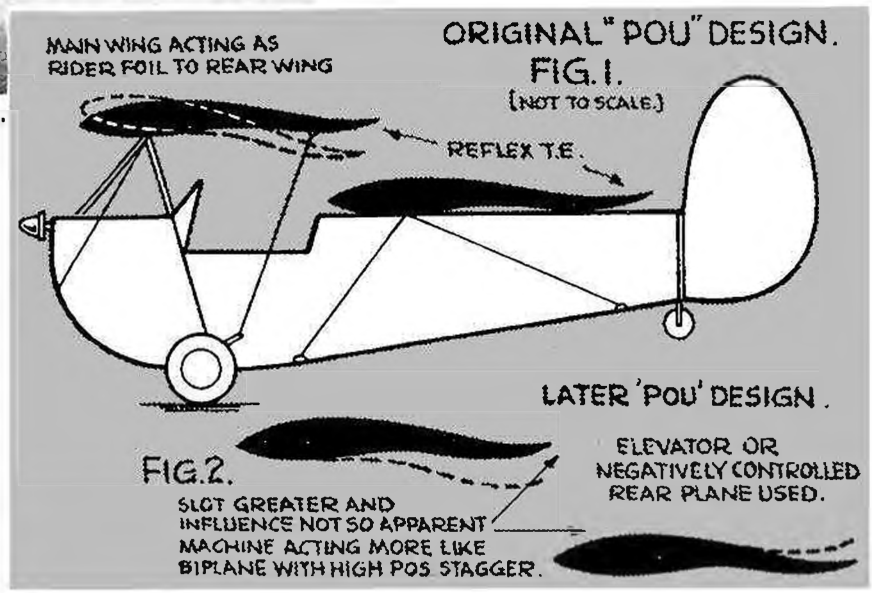
SPEED RANGE

THE BIRD AND THE AEROPLANE

By B. W. MILLICHAMP

The author discusses the essential differences between bird flight and that of the aeroplane, and advances some interesting facts concerning the operation of "natural" slots and slotted wings. The heading photograph shows, of course, the well-known "Flying Flea."

Photo by courtesy of "Flight."



WHEN we look back and study the development of aircraft, and consider the position to-day, it seems that we are now, like many of our politicians, at the end of only one phase of our journey, having made some progress, and many mistakes, but we are, for some unknown reason, moving along a path of almost complete orthodoxy, or regimented, "text book" thought.

As we are mainly concerned with a study of the problems relating to improvements in speed range, we will examine, principally, the longitudinal flight control of birds and aeroplanes, being that which most affects speed.

Firstly, how does the aeroplane pilot control his machine in the longitudinal axis?

When he wishes to climb, he pulls upon the control column, thereby imparting negative incidence to the "elevator" which produces a download on the tail, the moment of this force being taken from the aerodynamic centre of the horizontal tail surfaces to the aerodynamic centre of the wing.

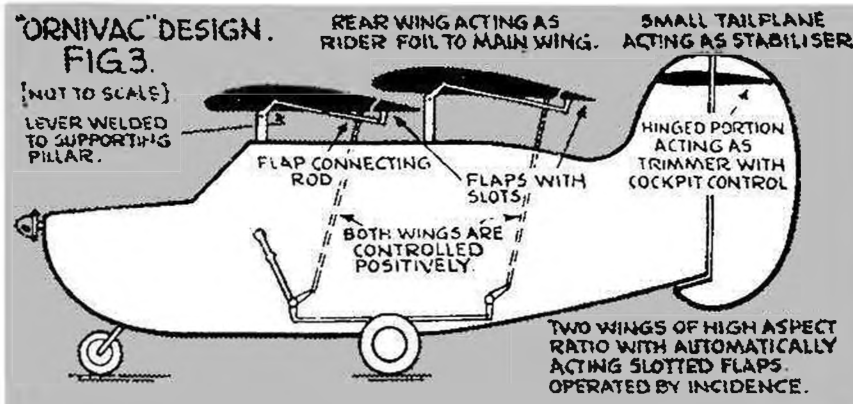
This, in itself, is obviously a parasitic force, as it is downward when we wish to climb, and whoever heard of a bird which climbed with a down load on its tail?

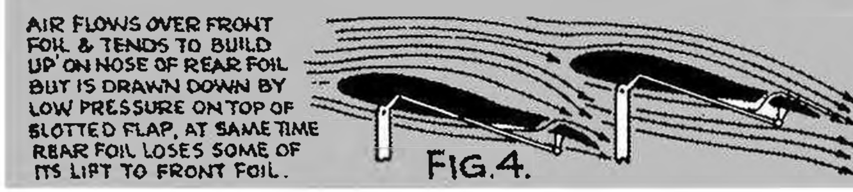
No, the bird, when it wishes to climb (and I will speak here of gliding flight only) inclines its wings at a greater positive angle of incidence, and spreads its wing tip "multi-plane" feathers which have the effect of moving its centre of pressure forward, and it will be noticed that, when in such an attitude, its tail is fanned out and inclined downward, producing a correcting couple. It is agreed that this often results in a stall for the bird, and it has to flap temporarily to regain control, but this is mainly because it has no separate motive force as has the aeroplane, and must rely upon its flap for forward motion as well as sustentation. Often one hears, in connection with aeroplane control, of what is known as "longitudinal dihedral" but the bird has no such longitudinal dihedral, and, where an aircraft is controlled by variable incidence, it does not appear to be so vital.

Now we come to the principle of variable incidence control as applied to aeroplanes, and we recall that it has been tried fairly recently in the little French machine known as the "Pou-du-Ciel" or "Flying Flea."

In this machine, a combination of variable incidence control and slots was used, and the layout actually proved that the "aeroplane wing slot" or "tap off slot" principle is unprogressive, although it also proved that it had a limited value, and I will endeavour to explain this theory more clearly to my readers. Firstly, the machine was designed with the variable incidence control, primarily to avoid using an elevator of the more normal type, and the author agrees that this is a desirable thing if attainable along fundamentally sound aerodynamic lines, together with a reasonably economic engineering method, but we find that, after a great deal of experiment, the designer ultimately reverted to the orthodox method of longitudinal control, and used an elevator, in his later models, and, although the aircraft then had a good range of longitudinal control, it acted more like a bucking steed than an aeroplane, mainly due to the excessive longitudinal dihedral, which was, apparently found necessary, to counter the rearward movement of the aerodynamic centre.

The aeroplane slot shows that the front, or main plane, being the foil which meets the air first actually acts as the "rider foil" to the rear plane, in that it is placed with its trailing edge above and overlapping the rear plane, Fig. 1, and, as one pulled upon the control column, the main plane received positive incidence, and its T.E.





was brought down closer to the top of L.E. of the rear plane. As in the ordinary slotted wing, this caused the air to flow faster through the gap, or slot, and, whilst the machine was under the influence of the thrust of the airscrew, and only required comparatively small positive angles to be imparted to the front wing to continue in stable flight along its longitudinal path, this was quite alright, but, when the engine was throttled down for a glide in, and the angle of attack actually became virtually greater, due to the sink, and the loss of a " low thrust," no amount of pulling upon the control column would induce the machine to bring its nose up again.

It should be noted here that I am speaking of the effects produced when the aircraft was rigged in such a manner that the slot between the two foils was actually affecting its flight to a marked extent, but it was afterwards tried with the front plane placed higher and the rear wing further back, Fig. 2, when the vices were not nearly so pronounced, but the machine then had a poor take-off and general performance, flying more like a rather badly designed bi-plane, with a pronounced positive stagger (I use the words positive stagger in the accepted aeronautical sense).

Henri Mignet, the charming, clever, and rather courageous Frenchman who designed, built, and flew his little machine "Le Pou-du-Ciel" and whose book I must have read at least five times, had the theory that the air that was leaving the front wing had already been partly used, and also "bent down," and therefore its value and influence upon the rear wing was proportionately less when the front wing was at a high positive angle, but, actually, at a point where the slot effect was really becoming a power, the opposite appears to have been the case, as the air leaving the *underside* of the front wing, being the air which mainly affected the rear wing, was compressed, and we know that a foil is more efficient in compressed, or "dense" air, than in partly "exhausted" air, and if one wished this arrangement to be effective when descending, a very high negative angle would have to be imparted to the rear wing.

As in all cases of the use of the aeroplane, or tap off slot, the effect was to produce a condition where greater download was required on the tail, as was apparent in the shape of Mignet's original wing section, with its reflex trailing edge.

The writer recalls another small aircraft, which was built shortly after the "Pou" period, the original "Luton Minor," which had a layout somewhat similar to the Pou, but which was fitted with an elevator, and this design was ultimately abandoned in favour of a more orthodox parasol wing monoplane arrangement.

From numbers of experiments on foils, test rigs, and models, the author has come to the conclusion that, if we are to arrange two or more wings in tandem, as it were, they must be arranged in relation to each other in such a manner that they constitute a system of "negatively staggered" foils, or, in other words, the secondary or auxiliary foil should be the rider foil and *not* the foil which meets the airflow first, Fig. 3.

Now, if we examine this principle closely we see that, as the incidence is increased, Fig. 4, the rear wing is working more and more in air that has already been partly exhausted.

From a close study of the action of the airflow around both wings when thus arranged, it has been found that no tendency to "burbling" occurs in the rear wing, but its lift is gradually lessened as the positive incidence of both wings is increased, whilst, under such conditions, the lift of the front wing is increased, and no breakaway occurs around this wing so long as the rear wing is not placed too low down, but if the leading edge of the rear wing is placed low down on the trailing edge of the front wing, it will suck the air off the top trailing edge of this front wing.

Now, we must revert to the bird again to see quite clearly what occurs when these "thrust slot" feathers are operating.

In flapping flight, and upon the up-stroke, the thrust feathers are momentarily trimmed with their leading edges upward, and the action of the airstream opens them, and here it should be noted that the wings are also moving forward in a sort of sweeping arc, grasping as it were the air in front of them, then, upon the down-stroke, the wings are trimmed with their leading edges downward, when the airstream closes the slots, and because of the "under camber" of the thrust feathers, and the wing, the air is driven both downward and backward as the stroke is completed.

In birds that rely more upon their high aspect ratio wings than upon thrust slots, one may observe that their whole bodies move up and down with the stroke of the wings, going, of course, up on the wing downstroke, and down on the wing upstroke, and this may be best seen in such birds as gulls, whereas, in birds that are well equipped with these slots, this is not nearly so apparent, being almost impossible to perceive with the naked eye.

To take an almost opposite type of bird, but also one that has to effect slow and careful landings, we may consider the common crow. This bird, as we know, lives and moves mainly among trees, and so is equipped with comparatively low aspect ratio wings, but, as a compensation for this "bad" wing shape, it is well equipped with thrust slots, and is almost as good a glider as the gull, and it is certainly a marvel at landing in difficult places, also very often without recourse to a flap or two.

But, and here we again go back to our aeroplane, if we can keep the aerodynamic centre more or less

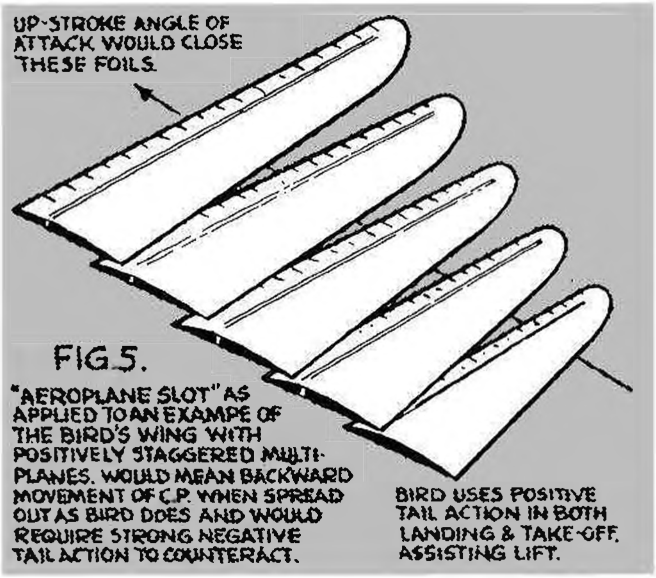


FIG. 5.

"AEROPLANE SLOT" AS APPLIED TO AN EXAMPE OF THE BIRD'S WING WITH POSITIVELY STAGGERED MULTI-PLANES. WOULD MEAN BACKWARD MOVEMENT OF C.P. WHEN SPREAD OUT AS BIRD DOES AND WOULD REQUIRE STRONG NEGATIVE TAIL ACTION TO COUNTERACT.

constant, whilst increasing the angle of positive incidence we shall have made a definite step forward, more especially if we can arrange to increase the incidence of our wings without recourse to inclining the whole bulk of our aircraft as we shall then acquire a higher rate of climb, but at a flatter angle, somewhat similar, in fact, to the climb of an "autogyro" type of machine, enabling us to operate from smaller areas.

From a study of the principle outlined in Figs. 3 and 4 it will be seen that whenever we increase the positive angle we do the following :—Increase the lift and increase the drag.

Now, we come to a final examination of how the bird's thrust slot aerofoils work, when it is coming in to land.

As we can readily observe, by watching a reasonably slow gliding bird such as the crow, when it is landing, its wings gradually assume a higher angle of attack, the while the "multi-plane" feathers move out and back, each "rider plane" moving, in relation to its respective "main plane," into a negative stagger formation, but as they move back they also move up, further away from each other, and this action is proportionately accentuated from the root to tip of these multi-planes, that is, from the "elbow" of the wing to the tip, and, if we visualise for a moment what would happen were these multi-planes positively staggered, in relation to each other, Fig. 5 instead of negatively staggered, Fig. 6, we are forced to the conclusion that they could not possibly work either in flapping, or gliding flight, as, when flapping, the air would be constantly spilled on the downstroke, and there would be compression on the top of the wings on the upstroke, as the slots would then be closed, when one remembers the trim of the wings during these actions, also the slots would be closed for gliding in, and there would, really, be no point in the wing being slotted at all.

Now, it will be seen that we cannot follow the principle of moving our auxiliary wing upward, and backward, away from the main wing, when our aircraft is arranged with variable incidence control, and therefore we must find an alternative compensating force, so that the machine shall not be too critical in control, and suddenly rear its nose up on the slightest pull on the "stick."

In course of experiment, the author has found that, by building our wing with an orthodox slotted flap, at its trailing edge, and arranging to automatically depress this flap, and open its slot, as the positive angle of wing is increased, Figs. 3 and 4, a similar result is obtained, as the increased angle of the thrust slot wing arrangement produces a forward movement of the aerodynamic centre, that is, the mean resultant C.P. of the two wings, whilst the depression of the flap, and opening of slot, produces a partially compensating couple, the important factor to consider here being that the leading edge of the "sider" plane must lap over the point, on the top trailing edge of the main plane, at which the air flows from the slot, formed when the flap is depressed.

With this arrangement, a steady pull is experienced upon the "stick" only slightly increasing as the wing incidence is increased, and a strong airflow over a wide range of angles is observed.

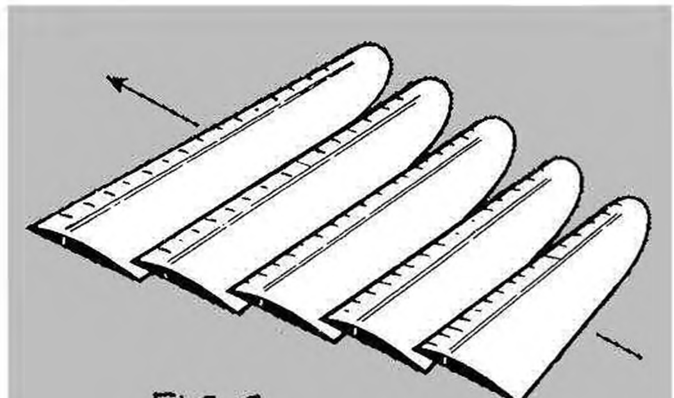
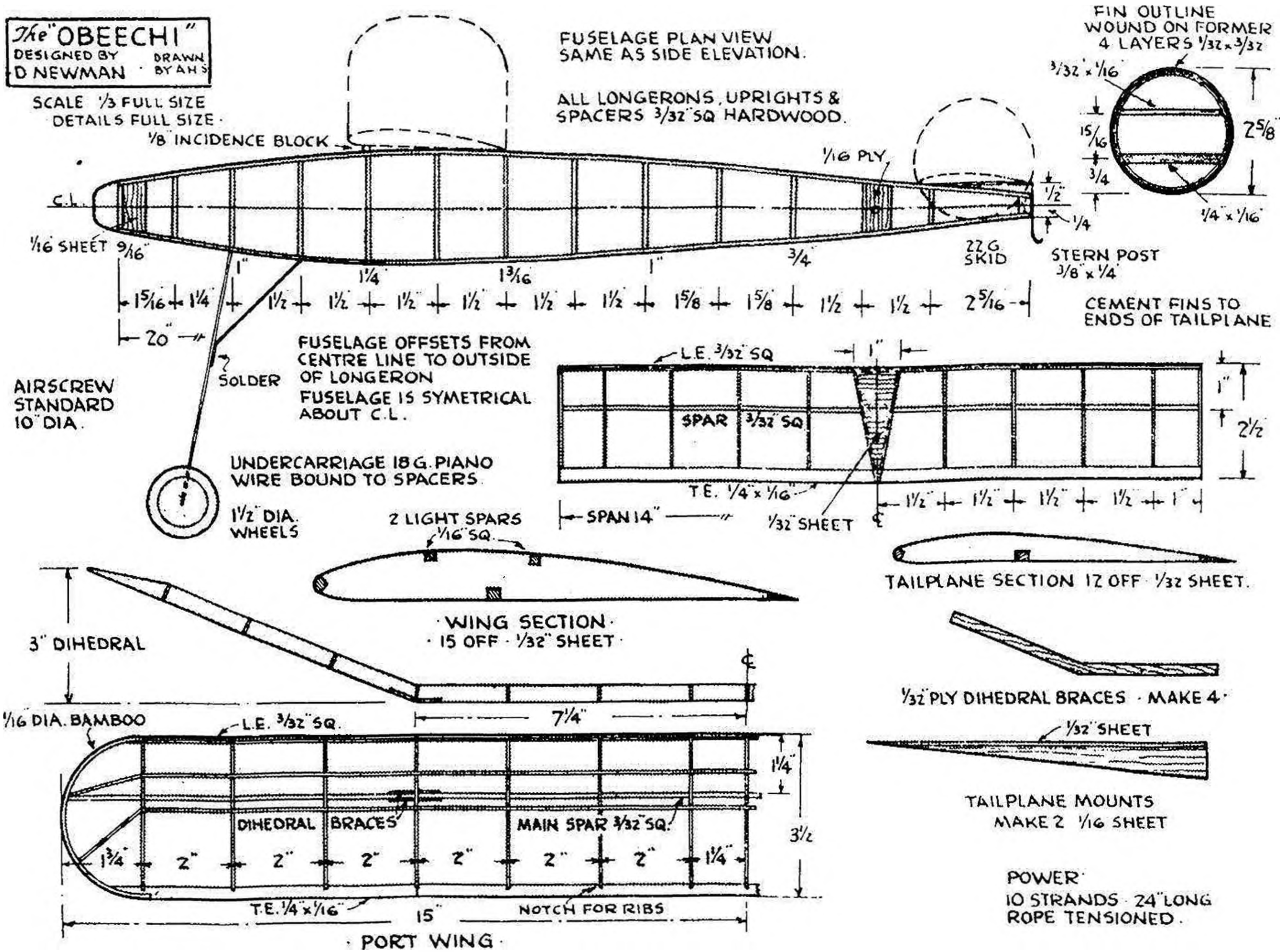


FIG. 6.

CORRECT BIRD "THRUST SLOT" WHICH PRODUCES FORWARD MOVEMENT OF C.P. WHEN SPREAD. EACH "REARWARD" FOIL ACTS AS THE 'RIDER' TO ITS PRECEDING ONE.

To such people as are interested in this type of machine, I would say, for the present, we must all be patient, but it does not necessarily mean that we must also be idle, and whilst the fundamental principles of this layout are patented, other features of refinement that may be incorporated, in due course, in the final job, including one for the control, in a similar automatic manner, of the flaps which are attached to the outer portions of the wings, these outer portions having a dihedral angle, and therefore having to be operated separately from the centre section, will be published at a later date, when the author hopes to have the time to write in booklet form, a complete review of the experiments, and the detailed methods of construction of such a machine, and to play some part in making it possible for a larger number of people to enjoy practical flying.

To sum up :—Everything in nature is fundamentally correct, whereas many of man's inventions are fundamentally incorrect, and often negative, when considered as a whole, in that they demand an excessive expenditure of nervous energy, which tends to largely destroy their real value to mankind, and it seems it is up to us to seek out ways and means of reducing that expenditure in very many ways, if we are to enjoy progress as we were meant to.


The "OBEECHI"
DESIGNED BY D NEWMAN
DRAWN BY A H S
SCALE 1/3 FULL SIZE
DETAILS FULL SIZE
1/8" INCIDENCE BLOCK
FUSELAGE PLAN VIEW SAME AS SIDE ELEVATION.
ALL LONGERONS, UPRIGHTS & SPACERS 3/32" SQ HARDWOOD.
FIN OUTLINE WOUND ON FORMER 4 LAYERS 1/32 x 3/32
3/32 x 1/16
15/16
3/4
2 5/8"
1/4 x 1/16
1/16 PLY
1/2
1/4
C.L.
1/16 SHEET
9/16
1"
1 1/4
1 3/16
1"
3/4
22 G SKID
STERN POST 3/8 x 1/4
1 5/16 1 1/4 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 5/8 1 5/8 1 1/2 1 1/2 2 5/16
20"
CEMENT FINS TO ENDS OF TAILPLANE
SOLDER
FUSELAGE OFFSETS FROM CENTRE LINE TO OUTSIDE OF LONGERON
FUSELAGE IS SYMETRICAL ABOUT C.L.
AIRSCREW STANDARD 10" DIA.
L.E. 3/32" SQ
1"
1"
SPAR 3/32" SQ
2 1/2
UNDERCARRIAGE 18 G. PIANO WIRE BOUND TO SPACERS.
T.E. 1/4" x 1/16"
1 1/2" DIA. WHEELS
1/32" SHEET
1 1/2" 1 1/2" 1 1/2" 1 1/2" 1"
SPAN 14"
2 LIGHT SPARS 1/16" SQ.
TAILPLANE SECTION 12 OFF 1/32 SHEET.
3" DIHEDRAL
WING SECTION 15 OFF 1/32" SHEET
1/32" PLY DIHEDRAL BRACES MAKE 4
7 1/4"
1/16 DIA. BAMBOO
L.E. 3/32" SQ.
1/32" SHEET
1 1/4"
DIHEDRAL BRACES
MAIN SPAR 3/32" SQ.
TAILPLANE MOUNTS MAKE 2 1/16 SHEET
3 1/2
1 3/4 2" 2" 2" 2" 2" 2" 1 1/4"
POWER 10 STRANDS 24" LONG ROPE TENSIONED.
T.E. 1/4" x 1/16"
NOTCH FOR RIBS
15"
PORT WING

MAKING A PRACTICAL THE SCALE AND SEMI-SCALE

Part I of a series of two articles by J. F. P. FORSTER

IT is becoming evident that with the return of petrol-model flying, after the war, the branch of the hobby most likely to appeal to new-comers, and to many old hands too, will be the flying of scale models of full-size aircraft well known and admired by almost every air-minded man and boy—one might almost say throughout the world.

Fig. 1. Col. Bowden's low wing petrol model which, it is suggested, might suffer from wing fixing troubles.

Almost every hobby dealing with modes of transport makes its greatest appeal in the first instance by virtue of its exact replicas in miniature of full-size prototypes, whether model railways, sailing boats or power boats or motor cars.

So it was, at first, with model aircraft except that it might be more accurate, going back to the very beginning of Aeronautics, to say that models preceded the full-size man-carrying machines.

Unfortunately, in spite of the inevitable capturing of model engineers' imagination by the achievement of flight, when it came to copying in miniature a machine requiring control in three dimensions, it soon became evident that if the model was to fly "like the real thing," the problem of getting it safely "on to the deck" again in one piece was at first sight insurmountable.

This, coupled with various other factors such as difficulty of obtaining structural material of sufficient strength and lightness, and of obtaining sufficient power/weight ratio from anything but rubber motors (whose weight distribution was entirely different from the full-size I-C engines), led to the early aero-modellers reluctantly abandoning attempts to build scale models and the "stick," and later, the fuselage or Wakefield duration types made their appearance.

The coming of balsa naturally meant the death of the "stick" model to all intents and purposes. One says "naturally." Why? Surely the real reason was because a "fuselage" model *looked* so much more *like the real thing*. Thus, though duration enthusiasts would have been the last to admit it, they *were* secretly hankering after the long dead idea of the successful flying scale model, and there was for a time after the introduction of balsa a considerable improvement in *appearance*, as well as performance. The search for maximum performance at any price, however, has now led to the abandonment of even symbolical attempts to represent full-size aircraft, viz., no cockpit, etc. The use of gears, putting weight in the nose, also influenced enthusiasts, as it enabled the wing to be placed further forward giving a far more realistic outline to their models—quite apart from the merits or demerits of gears from the point of view of performance (an argument which appears to an ignorant petrol modeller to be still not permanently settled).

With the arrival of the miniature lightweight petrol engine (actually very heavy, by modern standards, of course), it is interesting to note that the early enthusiasts' first reaction was that here at last was the answer to the scale modeller's prayer. Full-size machines for the most part were biplanes in those days (1920–30) and several most realistic-looking models of this type were built, and a few more or less successfully flown by the pioneers of the "petrol game" in this country. One model which comes to most petrol modellers' minds was one of C. E. B.'s early efforts known as Kanga—a strut and wire-braced scale-type biplane of some 8-10 ft. span and powered with an enormous 30 c.c. Atom engine, photos of which adorned the pages of THE AERO-MODELLER on more than one occasion.

Fig. 2. The 'G.O.M.' bent double—not with age, we hope!—over another semi-scale low wing.

Capt. Bowden, as he then was, was among the first to realise, sometimes through bitter experience, that the scale model problem was still very far from being solved, even with petrol engines, and the movement owes him a considerable debt for his early writings setting forth so clearly and rationally his advocacy of crash-proof devices, and suppression of scale tendencies where these detracted from the ability of a model to stand up to repeated good, bad and indifferent landings and weather conditions.

The wisest novices accepted his advice, concentrating always on engine reliability, super.stability and "crash-

PROPOSITION OF
LOW WING TYPE PETROL MODEL

proof-ness," and obtained, as a result, much valuable experience, and many more consistent flying hours than those who ignored his writings. Many of the latter crashed up their first and subsequent models and some were so discouraged that they gave up petrol modelling or returned to the "ranks of rubber"!! (Howls of abuse from these worthies!)

In America, where to our way of thinking they tend to do most things to extremes, the pendulum has swung too far, and their "gas models" have of recent years become more and more freakish in appearance, and in their pursuit of "performance" (so called), they have strayed further and further away from the scale model, not only in aerobatic performance but in appearance as well and apart from streamlining anything that detracts from climb and glide is ruthlessly eliminated, including even cockpit and wheels, in their so-called "models," irrespective of their appearance.

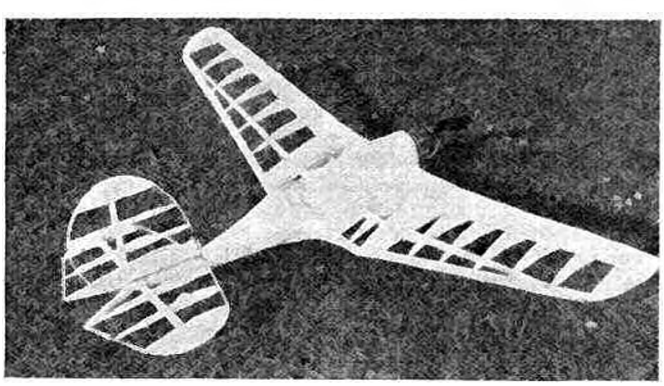
The ban on flying in this country has perhaps saved us from following this unfortunate trend, which, in any case, was always unsuited to our countryside and climate with its comparatively limited flying spaces and prevalent winds. At the same time our attention has been continually rivetted on the sky and we have all become to a greater or lesser degree, aircraft spotters or at least recognisers. We are likely, therefore, to become what might be termed "scale-conscious."

Most of us cannot see or get any pleasure from the performance of full-size aircraft in the stratosphere, and a model flying at more than one or two hundred feet is equally uninteresting. Its realistic appearance and behaviour both on and near the ground, in the writer's opinion, gives more satisfaction and ample repayment for all the time and thought put into its building, than can any other hobby yet thought of.

During the pre-war years, the majority of successful crash-proof models built in this country were high-wing cabin monoplanes. Very few were real attempts at scale models of any known full-size machine, most of them (very wisely) being cantilever, struts and wire bracing having proved unsatisfactory and vulnerable, besides being unnecessary from a structural strength point of view.

In spite of building high-wing models it was still found that an exaggerated dihedral was required for reliable stability, and in spite of raising the engine thrustline as high as practicable and inverting engines, very few models could finally be got stable longitudinally with the engine thrustline parallel to the datum line, and nearly all incorporated *some* degree of downthrust from the originally designed datum line.

Fig. 3. The author's first attempt at a scale-type low wing model.



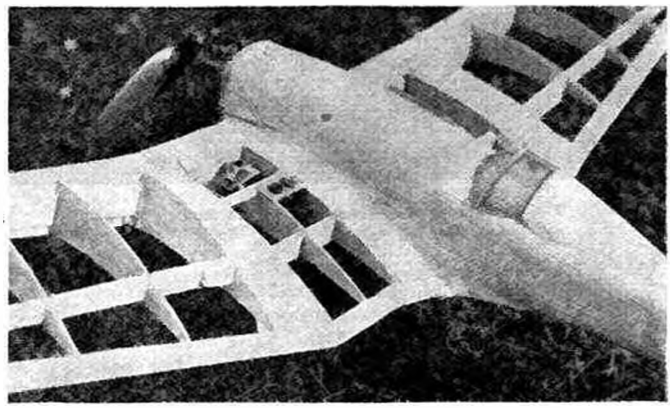


Fig. 4. Detail of wing fairing and centre-section. Note novel positioning of the flight timer, booster plugs, etc.

In view of the high degree of dihedral required for stable high-wing models, it was generally thought that a very much greater degree still would be required for low-wing models if they were to be at all stable (see Fig. 1), and this, together with difficulties of fitting crash-proof wings and perhaps also the lack of realism resulting from mounting the undercarriage in the fuselage in the conventional high-wing manner (see Fig. 2), seems to have frightened modellers and once again discouraged the scale modeller, just at a time when full-size practice has seen the overwhelming preponderance of the low-wing monoplane (or mid-wing in the case of twin engines). Fortunately the coming of slots has permitted a considerable reduction in the minimum safe dihedral.

The writer has never allowed himself to be led *too* far "up the garden path" by all-weather super-stability "freaks," although (probably because of this!) he has seldom omitted, and indeed has put a good deal of thought into ways of improving any feature likely to reduce damage or avoid it if an accident *does* occur (which it always does sooner or later—make no mistake about that!)

One of the primary reasons for the low-wing aeroplane was the ability to utilise the strong centre section of the wing to carry the (and later to conceal the retracted) undercarriage of wide track, and various ways and means were tried by the writer of devising a wing and undercarriage arrangement which could be made to approximate to scale appearance while preserving a sufficiently rigid, yet crash-proof fixing of the wing.

Wing Fairing and Attachment Difficulties.

The common method of having a wing split in the middle and held up into a recess shaped to the upper camber of the centre section by rubber bands, apart from being unsightly, is mechanically unsound, as the

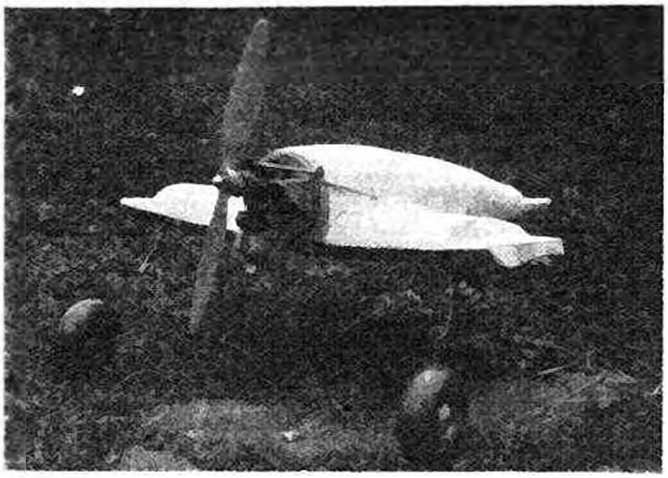


Fig. 5. Three-quarter front view of the author's model.

bands hold the wing at the point of junction with the sides of the fuselage and instead of assisting to take the flying or lift strain as in a high-wing model, they simply increase the tendency for the wing panels to fold up, and enormously strong hooks and rubber bands projecting from the lower sides of the centre ribs are required to overcome the lift strains at great mechanical disadvantage. A single piece cantilever wing is of course *asking* for trouble, even on quite a small model.

Mounting the undercarriage on a split wing is quite *possible*, and photographs of such an experimental model made and flown by the writer appeared in "Petrol Topics" (May, 1940). The disadvantages of this arrangement are twofold, apart from those enumerated above :—The presence of the undercarriage prevents the placing of the wing on a flat surface for "true-ing up" in the event of a warp developing, and while covering with silk when building. Secondly, the presence of external rubber bands over the trailing-edge not only ruins any aerodynamic advantage gained by fairing and filleting this into the fuselage, but is unsound, as either the rubber band tears into the thin fillet or a hook must be fixed into the fillet which is not strong enough to take it in the event of a wing-tip landing or other crash, and in either case the appearance of the fillet is ruined by external bands or hooks.

This matter of fairing in the trailing-edge of a low-wing in a satisfactory manner, yet leaving the wing detachable and "knock off," presents quite a problem if the smooth contour is to remain unbroken, and not prone to damage.

Fig. 1 shows a model of C. E. B.'s in which the fairing is integral with the fuselage, but is broken by rubber hooks which are unlikely to stand up to a severe wrench in a downward direction. C. E. B. has tried to overcome this by mounting them some distance up the side of the fuselage instead of actually in the fillet. Hooks on the *upper* surface of a trailing-edge tear the fillet to pieces in the event of a wing-tip landing in which the whole wing is slewed round a little.

The writer also tried to overcome this fairing damage by building a model with a fixed centre section as far outboard as the undercarriage mountings, and having detachable and knock off outer wing panels. The dowel system seemed too prone to damage to use so far outboard—indeed it is a "perfect curse" to replace fractured long dowels without damage to the wing—and to avoid broken dowels the outer panels were accurately fitted to the centre section depicted in Figs. 5, 6 and 7, resting on a projection or shelf half the vertical thickness of the wing, extending backwards from the leading-edge to 2/3 of the chord. The panels were arranged at the desired dihedral angle to the centre section at this point. (Figs. 3 and 4—Note also flight timer and booster sockets.)

This method, though it looked all right on paper, proved unsatisfactory because of the inordinate tension required on rubber bands and hooks beneath the point of junction, to withstand both flying and landing strains. The result was, if sufficient tension was applied for rigidity, there was not sufficient "give" to withstand wing-tip crashes, so that trailing-edge either of wing or centre section tended to buckle, or the hooks pulled out !

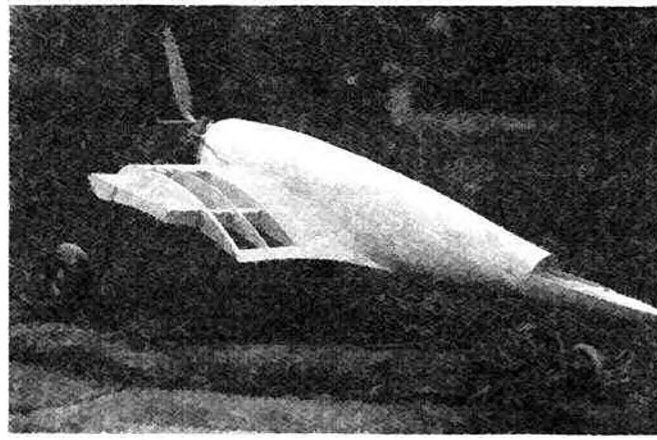


Fig. 6. Three-quarter rear view of author's low wing.

The method has certain merits, however, especially where a perfect, rigid and unbroken reproduction of a full-size 'plane's trailing-edge fairing into the fuselage is desired, but it is very heavy, if given sufficient strength, compared with later methods. Had the model on which it was tried been better designed as a whole, and not so prone to spinning and otherwise misbehaving, the writer's opinion of it might not have been so poor. It might, in more capable hands, yet prove satisfactory, but, as mentioned above, the day will inevitably come sooner or later when even the best model either misbehaves or flies into some obstruction, and the writer feels that this method just "won't take it" more than a very few times. In any case, from the scale modeller's viewpoint, those external rubber bands securing the outer wing panels stretched across the airflow, are alone sufficient to condemn it. In short, while the compound leading-edge and main box spar proved very satisfactory and stood up well to undercart strains, the weakness of the arrangement lay as before, in the *trailing* edge on which all blows ultimately pivot. So much for wing-fixing and fairing difficulties.

Undercarriage and Cowling Difficulties.

Let us turn now to the other two major problems of the practicable low-wing scale model. These in the writer's experience have been the undercarriage mounting in the wing, and cowling of the engine in such a manner that either the "knock off" principle is preserved, or some other means is provided of avoiding damage to the engine (and as far as possible airscrew and cowling).

The writer's final solution of these problems was arrived at by a process of reasoning (based on practice), which involved both simultaneously :—

It has for long been common practice with petrol modellers chiefly to prevent nose-over landings, but also to protect airscrews and engines, to place their undercarriages well forward—even in line with or in front of the airscrew. This did not matter in non-scale models but has got to be altered if any approach is to be made to the scale model. The question arises, therefore, how is the undercarriage to be brought back without risk of damage to the engine, and how far *can* it be brought back with safety ?

Obviously this depends on two things—the smoothness of the landing ground, and the gliding angle of the model. Scale modellers must face up to the fact that except with the use of tricycle "undercarts," they cannot hope to fly and land their models perfectly on as rough terrain as the all-purpose, all-weather, free-lance model. If opportunity and suitable terrain present themselves, they can be reasonably certain of good landings but this must not be allowed to limit the flying of such models to such luxurious places, in other words, models must be able, if the ground proves too rough, to stand up to occasional "nose-over" landings without damage to engine or airscrew. As to the gliding angle, the flatter this can be kept the less likelihood is there of nosing over. Superb streamlining, reasonably light wing-loading, and the use of suitable airfoils at low angles of attack can all be made to assist in this direction. This latter point merits an important digression :—

Wing Incidence.

The use of airfoils at the rather big angles of attack commonly employed in the past, causes serious complications when attempts are made to incorporate them in scale models of full-size machines. If the leading-edge is placed in the position of the L.E. of the full-size wing, the trailing-edge comes some distance below the belly of the fuselage and upsets the whole fairing and filleting and may entail deepening the rear part of the fuselage and departing entirely from the prototypes' outline (B., Fig. 8). Conversely, if the trailing-edge is placed in the correct position relative to the belly of the fuselage or the datum line, the L.E. comes too high, and either the undersides of the engine cowling must be continued back beneath the centre section of the wing giving the appearance at the L.E. of a mid-wing, or the depth of the engine cowling and nose of the machine generally, must be reduced so as to sweep back in line with the under surface of the centre section (C., Fig. 8).

If the speed of the model is to be kept down to within

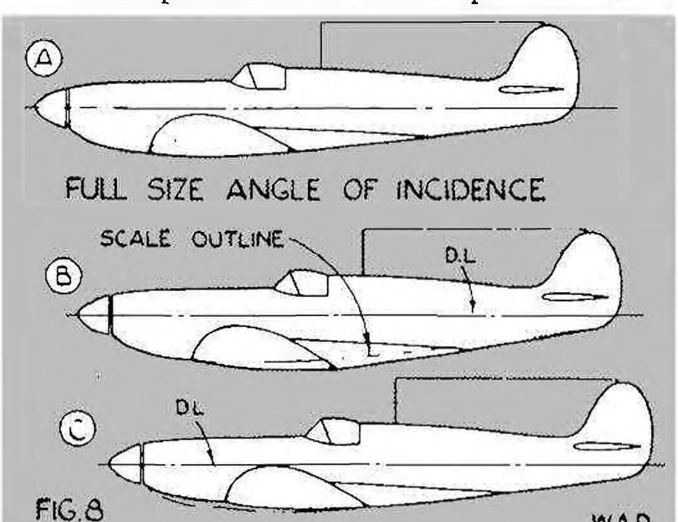


Fig. 7. Underside view of author's semi-scale low wing.

reasonable limits, the use of the usual full-size airfoils with *convex* undercambers is inadvisable and after much experiment the writer has now struck a compromise and uses a foil such as Clark Y with a flat undersurface for the *centre section only*, gradually altering during the inner 3 or 4 inter-rib bays to some other foil such as U.S.A. 35b, with a slight *concave* undercamber, remaining constant for the rest of the span.

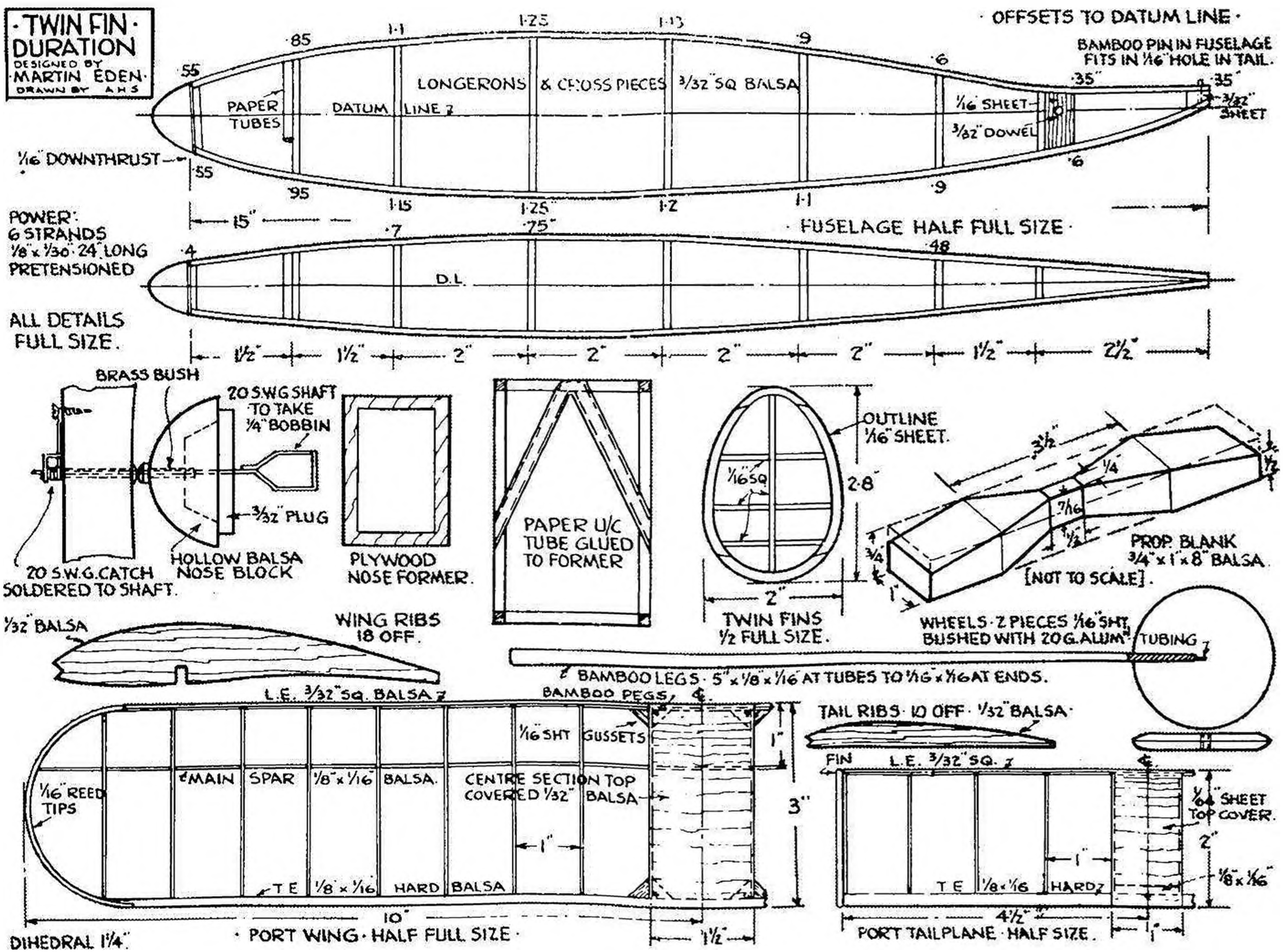
The wing is set at a low angle of attack with the trailing-edge in the correct scale position. The leading-edge is a little higher than that of such prototypes as the Hurricane or Spitfire, and only a very slight departure from scale is necessary in reducing the depth of the underside of the fuselage and engine cowling to coincide with the lower surface of the centre section. Such a model may be disqualified from a scale model competition, but at least it will *fly*, and the writer's model glides flatter than any high-wing model he has ever seen.

Returning, now, to the question of undercarriage and crash-proof engine cowling—the digression is now over!—there has undoubtedly been a tendency for petrol modellers not only to place their undercarriages well forward, but also to foreshorten the noses of their machines bringing the airscrew into the comparative "safety-zone" between the wheels. This has enabled them to bring their batteries and coils well forward, to correct the movement backwards of the C.G., thus grouping all the heaviest components together, which practice has been rightly commended as making for stability and rapid recovery from unfortunate attitudes.

Provided the undercarriage is well forward of the C.G. (i.e. 33⅓ per cent. of wing chord), the *length* of the nose of the machine should not influence either way the tendency to nose-over on landing. The height of the C.G. above the wheels is of far more importance and it should be borne in mind that the momentum of the wing itself is a not inconsiderable factor in the causation of "nose-overs" in high-wing models. The lower the C.G. can be kept and the shorter the undercarriage, the better, sufficient ground clearance for the airscrew being all that is required. To the eye, the longer the nose of the machine, the less out of scale position appears the undercarriage.

Thus in attempting scale-type low-wing models, provided we were prepared to risk long noses with apparently vulnerable "props." and engines unprotected by those unsightly "spider-leg undercarts," there did seem to the writer a real possibility of attaining the goal of an almost exact scale model which would fly and land without damage.

(*To be continued.*)


TWIN FIN DURATION
DESIGNED BY MARTIN EDEN
DRAWN BY A.H.S.
OFFSETS TO DATUM LINE
BAMBOO PIN IN FUSELAGE FITS IN 1/16" HOLE IN TAIL.
LONGERONS & CROSS PIECES 3/32" SQ BALSA
PAPER TUBES
DATUM LINE
1/16" SHEET
3/32" DOWEL
3/32" SHEET
1/16" DOWNTHRUST
POWER: 6 STRANDS 1/8" x 1/30" 24" LONG PRETENSIONED
FUSELAGE HALF FULL SIZE
D.L.
ALL DETAILS FULL SIZE.
BRASS BUSH
20 S.W.G SHAFT TO TAKE 1/4" BOBBIN
3/32" PLUG
20 S.W.G. CATCH SOLDERED TO SHAFT.
HOLLOW BALSA NOSE BLOCK
PLYWOOD NOSE FORMER.
PAPER U/C TUBE GLUED TO FORMER
OUTLINE 1/16" SHEET.
1/16" SQ
TWIN FINS 1/2 FULL SIZE.
PROP. BLANK 3/4" x 1" x 8" BALSA
[NOT TO SCALE].
WHEELS 2 PIECES 1/16" SHT. BUSHED WITH 20 G. ALUM. TUBING
1/32" BALSA
WING RIBS 18 OFF.
BAMBOO LEGS 5" x 1/8" x 1/16" AT TUBES TO 1/16" x 1/16" AT ENDS.
L.E. 3/32" SQ. BALSA
BAMBOO PEGS
1/16" SHT
GUSSETS
MAIN SPAR 1/8" x 1/16" BALSA.
CENTRE SECTION TOP COVERED 1/32" BALSA
1/16" REED TIPS
T E 1/8" x 1/16" HARD BALSA
PORT WING HALF FULL SIZE
DIHEDRAL 1 1/4"
TAIL RIBS 10 OFF 1/32" BALSA
FIN
L.E. 3/32" SQ.
1/64" SHEET TOP COVER.
T E 1/8" x 1/16" HARD
1/8" x 1/16"
PORT TAILPLANE HALF SIZE.

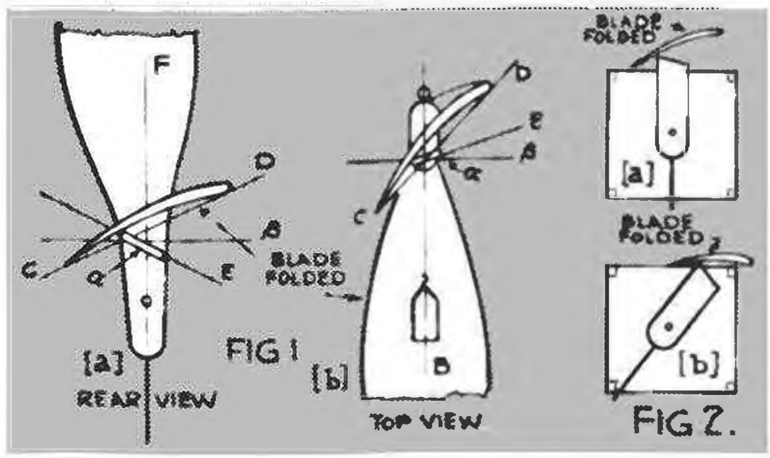
An interesting article outlining the basic difficulties of hinging a folding airscrew with practical notes as to the actual construction of various units.

ALTHOUGH an imperfectly folded propeller will greatly improve the performance of a model, the elimination of many vortices by a really flat propeller would better the glide even more.

The hinge is the link between blade and hub and the hinge line is fixed relative to both.

The first requirement is that the prop. should fold back straight. In Fig. 1 (a) the line $\propto$ F should fold along the shaft line $\propto \beta$ in Fig. 1 (b). That is $\angle F \propto E = \angle \beta \propto E$. This is good enough for many models, if the blade folds as in Fig. 2 (a), a slight rotation to 2 (b) by the motor will fold the blade flat. This is unsuitable for a wind shovel as the blade would then project over a longeron.

The second requirement then is that the blade should fall flat. The $\angle D \propto E$ in Fig. 1 (b) $= \angle D \propto E$ in Fig. 1 (a), and this should $= \angle \beta \propto E$. The blade will then be flat. But $\angle \beta \propto E$ is, in Fig. 2 (b), $\frac{1}{2} \angle D \propto \beta$.



For a prop. to fold perfectly, when viewed from the top the hinge should bisect the average blade angle and be inclined down one half this angle when viewed from the rear. It should be noted that the "fair and square" hinge, $\propto \beta$ satisfies the first requirement.

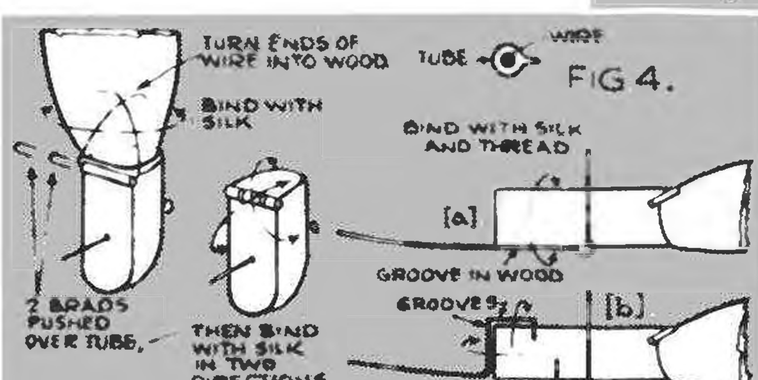
Visual accuracy is sufficient when hinging the propeller, provided you know what you are looking for.

Fig. 3 shows the general hinge layout. I use a 14 s.w.g. tube pinched to fit 18 s.w.g. wire. This prevents the tube wearing loose by revolving in itself, Fig. 4.

Use strips of oiled silk (off an old stick model!) as this prevents unsightly binding, especially at the hub.

The counterweight wire should be integral with the prop. shaft, Fig. 5 (a). If a freewheel is used for winding, Fig. 5 (b) is a sound method of fixing.

Use a stop to ensure the prop. folding in the RIGHT place EVERY time, and remember to fit the hinge far enough out so that the blade will not catch on a stubby nose block.



A NOTE TO DRAUGHTSMEN

By A. H. SMITH

This short article, contributed by " The Aeromodeller " Staff Draughtsman, outlines a few details of general interest to all Model Builders who draw up their own plans with a view to publication. The two curves, full size reproductions of which are given opposite, will be found most useful for all classes of model draughtsmanship.

MANY of you write to the Editor on a variety of model subjects and more letters would be appreciated, especially from readers who have models which give a good all-round performance.

Your designs, ideas, gadgets and results of experiments are all welcome for it is your contributions which make possible the publication of *your* magazine.

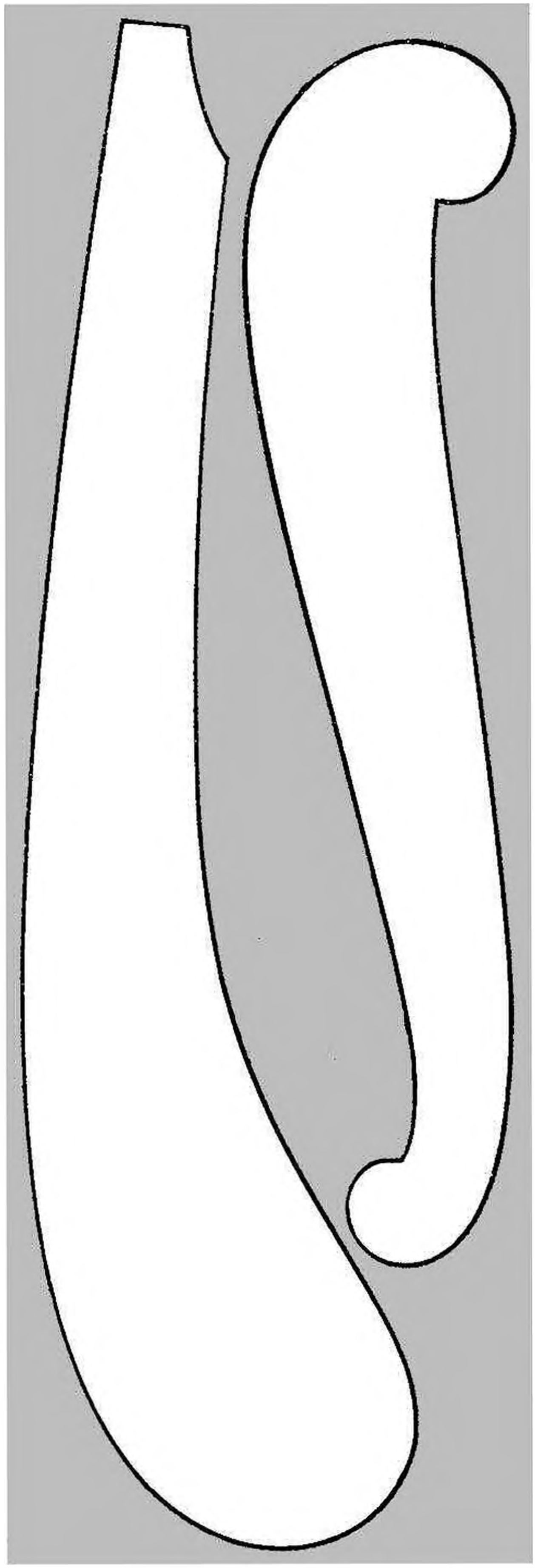
Why not submit your favourite model design and let the Editor have a performance certificate, that is, a signed statement giving an average over three or four flights witnessed by two of your friends.

An *accurate* drawing of the model is not required, just a half-size three-view general arrangement will do, but give as much detailed information as possible, such as wing and tailplane section with incidence, dihedral, etc., and spar and tip construction.

For the fuselage give length from nose block to rear end, indicate former spacing and position of maximum cross-section and give dimensions or outline at this point, also at front end, sizes of longerons, spacers, rigging formers and any stringers should also be given.

Give fin outline, scantlings and any special fixing methods, prop. block sizes, free-wheel and nose block details, undercart particulars and power used.

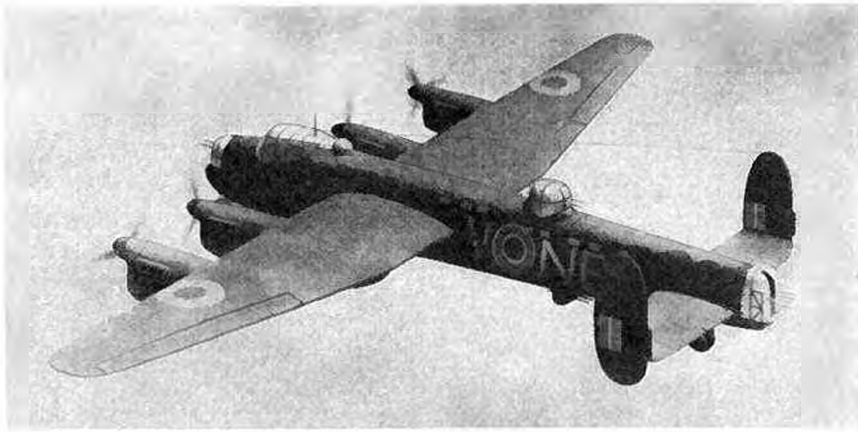
If you have constructed the balance described in a recent issue of THE AERO-MODELLER, give detailed weights of parts of your model as this information is a great help to other designers. To help your drawing, two curves are given which will be found useful for wing sections, tips, fuselage outlines and formers and can be made from pear tree, boxwood, 3-ply, or celluloid about 1/16 in. thick. Don't forget, your ideas and designs will encourage others to write, especially if they think they have something better, so get busy and let us hear from you.



MONTHLY MEMORANDA

No. 11 of series.

By O. G. THETFORD



A fine photograph of a 1/72nd "solid" Lancaster, built by A. Deacon (aged 16) of Leicester.

Evolution of U.S. Army Markings.

Some readers have enquired about the pre-war markings of U.S. Army aeroplanes, and it seems opportune to trace the development of the various colour schemes used by the Air Corps which culminated in the system at present in vogue as described in last month's AERO-MODELLER.

Prior to 1940 and after 1936 all operational aeroplanes of the U.S. Army Air Corps were left a natural aluminium Alclad finish all over. The old form of national insignia comprised of a white star on a blue background with a red disc centre was painted above and below each wingtip and thirteen alternate red and white horizontal stripes and a vertical blue stripe on the rudder. Squadron insignia was carried on the fuselage sides. A code system of lettering and numbering indicative of the squadron, mission and group was painted on the fin and wings, in black. A Northrop A-17A of the Third Attack Bombardment Group, for instance, would carry the letters "AC" on the fin above the machine individual number. "A" indicated "attack" and "C," being the third letter in the alphabet, the "third attack." Pursuit machines were marked "P" and heavy bombers "B." Thus "BG" was Seventh Bombardment Group; "PA" First Pursuit Group and so on. These letters and numbers were painted also beneath the wings ahead of the "Army" beneath the port side. They were both in letters 24 inches high.

A deviation from this system came in 1940 when the first production Curtiss P-40s appeared in drab camouflage on the upper surfaces and light grey underneath. The normal national insignia was retained, also the rudder stripes and code letters. With the exception of a few specially-painted machines used on "war-games" in 1939 (included were the Curtiss P-36 and Boeing B-17B) which were camouflaged in patches of dark green, mauve, white and orange, the P-40s were the first U.S. military aircraft to be camouflaged since 1918 and the system they initiated is still in use.

In March, 1941, the system of camouflage was made general and all tactical types were painted this way. A change was made to the national markings in that they were carried on the sides of the fuselage from this date onwards and removed from the upper starboard and lower port locations on the wings. The rudder stripes were also abolished at this time.

On the outbreak of war with Japan in December, 1941, the code system of squadron lettering and numbering was abandoned and the only marking carried on the fin became the serial number of the machine painted on by the manufacturer in yellow. In May, 1942, the red centre of the national insignia was abolished owing to possible confusion in combat with Japanese aircraft.

From 1939 until May, 1942, primary and basic (elementary and intermediate) trainers of the U.S. Army were painted with light blue fuselages and yellow ochre wings and tail assembly whilst advanced trainers were natural aluminium like tactical types. In May, 1942, all trainers were painted silver including all elementary types.

Latest Revisions to British Service Markings.

Since the summary of British marking schemes for R.A.F. and F.A.A. aeroplanes was published in these columns in March last, a number of changes have been made and entirely new categories of aircraft have been introduced, resulting in new systems being devised. The modified cockade with the narrow white and yellow bands and correspondingly increased blue and red bands is now standard on all types including trainers. The fin flash has also been modified in a similar fashion.

The official description of certain of the camouflage shades employed have undergone revision also. There are now *six* main systems of operational camouflage and *four* systems for trainers. They are as follows:—

Operational: (1) dark green and dark sea grey upper surfaces and sea grey medium lower surfaces. Applicable to day fighters and Army Co-operation Command recco-scouts: (2) matt black on lower and upper surfaces. Applicable to night fighters, night intruder bombers: (3) dark green and dark earth upper surfaces and sky type "S" undersurfaces. Applicable to light and medium day bombers and Army Co-operation types other than recco-scouts: (4) dark green and dark earth upper sides of flying surfaces and fuselage decking matt black under surfaces and sides of fuselage. Applicable to night bombers and night-flying minelaying bombers: (5) dark slate grey and dark sea grey upper surfaces and sky type "S" lower surfaces. Applicable to general reconnaissance landplanes and flying-boats and torpedo-bombers of Coastal Command and Air-Sea Rescue Service amphibians: (6) dark slate grey and dark sea grey upper surfaces and white lower surfaces, sides of fuselage and vertical tail surfaces. Applicable to long-range anti-submarine petrol aircraft of Coastal Command: Naval aircraft are painted as the first-named Coastal Command machines except some fighters which have sea grey medium undersurfaces.

Training: (1) dark green and dark earth upper surfaces and yellow lower surfaces. Serial number in black beneath wings. Applicable to all day-flying elementary trainers, intermediate trainers and advance trainers, single and twin-motor: (2) dark earth and dark green upper surfaces and black lower surfaces. Applicable to all night-flying trainers: (3) dark earth and dark green upper surfaces and yellow under surfaces with black diagonal stripes. Applicable to target-towers and glider-rugs, also glider trainers: (4) dark slate grey and dark sea grey upper surfaces and yellow under surfaces. Applicable to all Naval trainers, including operational trainers. All communications and transport types are painted as (1). Code squadron lettering is painted on aircraft in either light blue, pale grey, duck-egg blue, white or sea grey. Night fighters and heavy bombers have dull red letters.

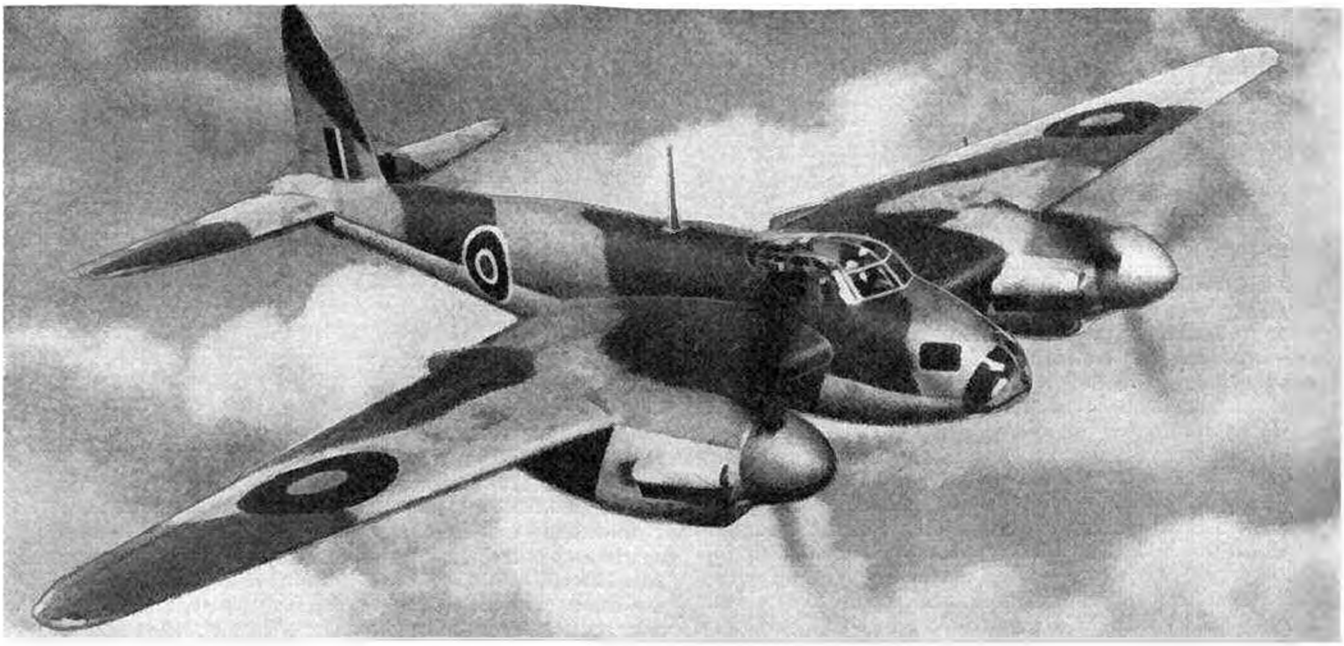


Photo: Air Ministry.

FIGHTING AIRCRAFT OF THE PRESENT WAR—XXIV

THE D. H. 98 MOSQUITO

By H. J. COOPER

THE Mosquito day-bomber, de Havilland's latest product, must be the world's cleanest aeroplane. When eight years ago the D.H. 88 Comet was produced, it was so clean and free of unnecessary excrescences that it has been difficult to improve upon its lines, and the resemblance between it and the new monoplane is significant of the position which the de Havilland design team held in 1934.

After a low-level raid on Oslo on September 25th, 1942, the existence of the Mosquito was made known to that small proportion of the public which had not already observed it in the air. During the raid, the British machines outdistanced the Focke-Wulf Fw 190 fighters sent up to intercept them. The speed of the Fw 190 is around 390 m.p.h., which indicates a speed of at least 420 m.p.h. in the Mosquito.

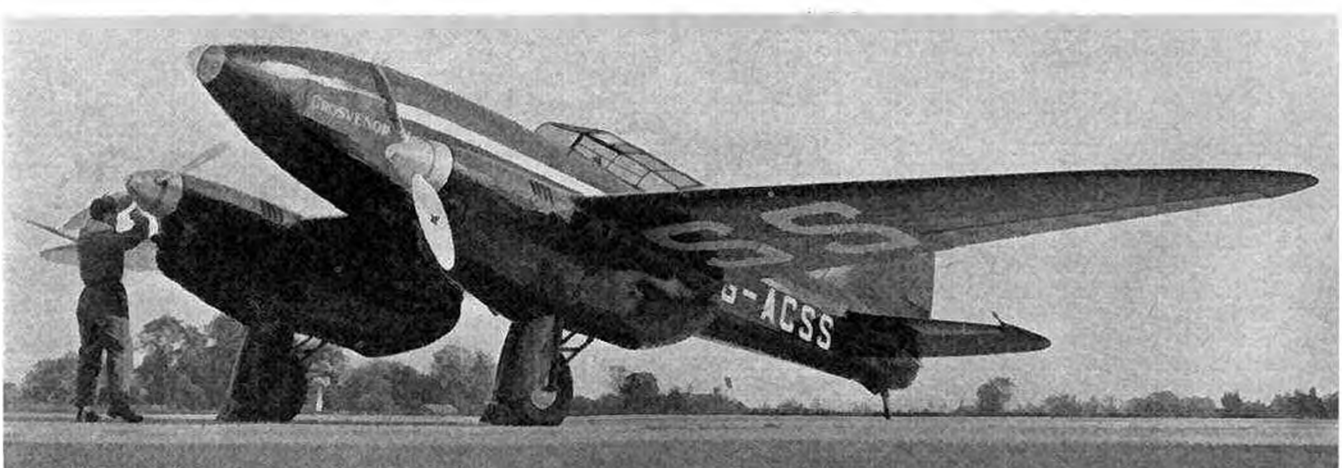
The Comet, with two special Gipsy-Six racing motors, first flew on September 8th, 1934, in the hands of Capt. Hubert S. Broad, who was then the Company's chief test pilot. It was produced specially to participate in the MacRobertson Air Race, and had been completely designed and built since the previous January. How it won the race, piloted by Messrs. C. W. A. Scott and the late Tom Campbell Black, reaching Melbourne on 23rd October, 1934, 71 hours after leaving Mildenhall, Suffolk, was the greatest day-to-day story the press of this country has ever had.

The Comet's maximum speed was 234 m.p.h., and in the race averaged 176·8 m.p.h.

The Mosquito, retaining the same characteristic D.H. lines, is of wooden construction, has two Merlin motors mounted well forward, carries a relatively heavy bomb-load for a long distance at high speed, and can be armed with four cannon and four machine guns. So it is not surprising that it is one of the most remarkable aeroplanes ever built, besides being among the fastest.

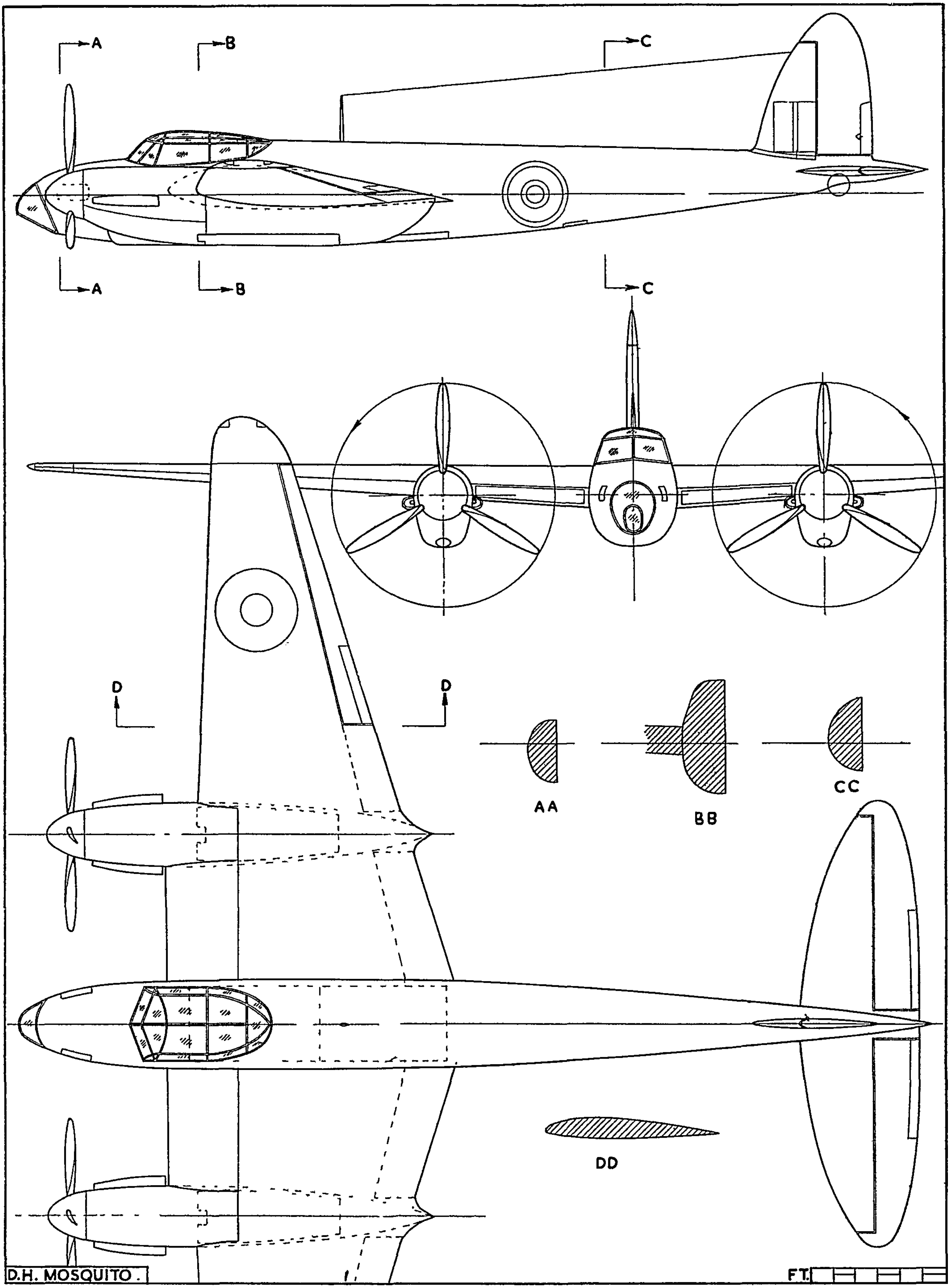
The crew of two sit side-by-side in a nicely-faired cockpit, and the nose is transparent for bomb-aiming. A curious feature of the plan view is the projecting leading-edge between the motor nacelles and the fuselage, where are situated the radiators. This arrangement is as on the Westland Whirlwind.

The Mosquito has a wing-span of 54 ft. 2 ins. and is 40 ft. 9 ins. long.



THE COMET WHICH WON THE MacROBERTSON RACE

Photo: Fox Photos, Ltd.



D.H. MOSQUITO.

The Society of Model Aeronautical Engineers

proudly announce that under the auspices of the

NATIONAL SAVINGS COMMITTEE

they will participate in

"WINGS FOR VICTORY" EXHIBITIONS

during the months of MARCH, APRIL, MAY & JUNE

THE country will, be divided into twelve sections and an exhibition is to be held in the principal towns in each section. Royal Air Force exhibits, photographs and models of all types, petrol driven, flying scale, solids, duration, gliders, etc., will be used for the displays, and the exhibitions are to be provided with ample equipment, *i.e.*, stands, pedestals, wire, etc., in the buildings already allocated for this purpose. Privately subscribed prizes will be presented for the best models exhibited at each exhibition.

Competitors may enter more than one model. Your Council urges you to complete your models for these Exhibitions by the beginning of February and appeals to all members with every confidence for their support. Organise an Exhibition Committee in your club so that they can contact the Section's Headquarters, the addresses of which will be published later.

The Council feel sure that you will realise what a wonderful opportunity is presented to the movement to bring to the notice of the public in general Model Aeronautics.

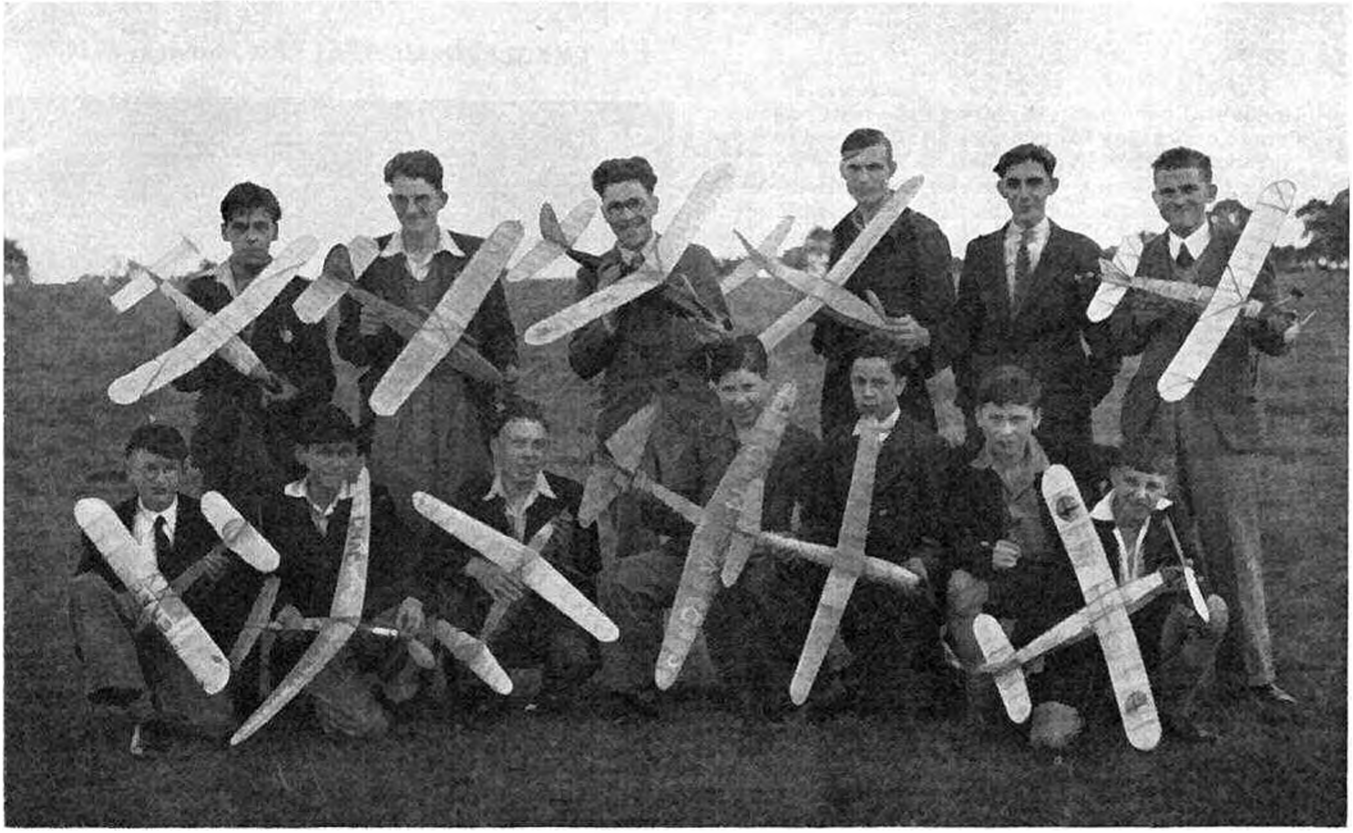
Here is our chance to make aeromodelling the NATIONAL HOBBY NO. 1., and help WAR SAVINGS. Make these Exhibitions a GIGANTIC SUCCESS.

Altogether now.

'UNITED WE ACHIEVE'

A. G. Bell,

Hon. Sec., S.M.A.E.



Club News

By CLUBMAN

A MOST important item of news is to hand this month, and to say it is unique in the history of British aero-modelling is to put it mildly. At long last we have a chance to put aero-modelling really and truly on the map, and I hope that each and every clubite will put his back into the task of putting our hobby in the forefront of sporting activities.

What am I talking about? Oh yes, I suppose it would be better to start at the beginning! The Air Ministry and War Savings Committee are sponsoring a series of exhibitions to be known as "Wings for Victory" shows, at which perhaps the main item of interest will be sections devoted entirely to model aircraft. R.A.F. and similar groups will have their respective sections, but it is up to the clubs all over the country to set up a really good model section.

Exhibitions will be staged in every big town in the country, and a schedule is now in preparation. I understand that sixty-four shows will be staged in the London area alone! Clubs are requested to get down to producing tip-top exhibition models, and when I tell you that some really big money prizes go to the winners in the competition sections, there should be plenty of incentive to get down to producing just that extra bit of effort.

Organisation has been put into the hands of the S.M.A.E., and progress in the right direction has already been made. Realising that the main detriment to building nowadays is the sad lack of materials, the Society has approached the right quarters and arranged for the release of a certain amount of necessary wood, etc. This will be made available to club members via their own groups, applications for materials being made through the secretaries of affiliated clubs. On top of this, a grant of 10s. per model is available. I do not have full details of the arrangements yet, but these will be available through the S.M.A.E.

One thing must be remembered—the Society has an enormous amount of work to do, and it is up to each and every individual not to make their task harder. Applications should be made through the club secretary, and *not* individually, as it will greatly facilitate the work of the committee if they have say 200 clubs to deal with rather than many hundreds of individuals.

May I point out one direction in which this opportunity can be put to good purpose. Obviously, one club cannot carry the burden in any one district, and it will mean co-operation between many groups. This is something I have always tried to foster, and I anticipate a better get-together spirit as a result of these exhibitions. Apart from local areas, it will be a good thing to assist other districts with the loan of special models. I foresee the necessity of a selected number of models to form the nucleus of any particular show, supplemented by the local club's offerings.

I have no idea how the judging of the various types of models is to take, but I do not envy the poor judges! Judging is no sinecure of a job at any time, but this stunt will test the judgment of Solomon.

What has happened to club reports these days? There are very few to hand this month, and I do not think it be that all clubs have hibernated for the winter.

Top: The recently formed GRANTHAM M.A.C. on a field day.

Undoubtedly a number of clubs will be featuring indoor flying this next few months, and I look forward to receiving reports of contests and times.

R. F. L. Gosling of the MERSEYSIDE M.A.C. wound up a successful gliding season by winning the Thurston Glider Cup against all comers. His best flight of the year was 5 : 58 o.o.s. with his "Heron" sailplane from a 100 ft. towline. Allan Topham is turning out some exceptional solid models, his latest effort being a fully detailed Hurricane II. A hall has been secured for indoor flying this winter, and is large enough to allow both class A and B contests to be run at the same time.

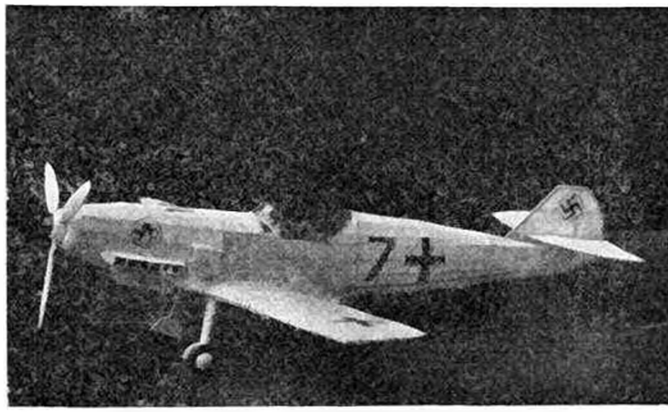
The KODAK RECREATION SOCIETY held a grand exhibition-cum-indoor flying meeting recently, where all types and sizes of models were to be seen. R.T.P. flying results were :—

Class A—

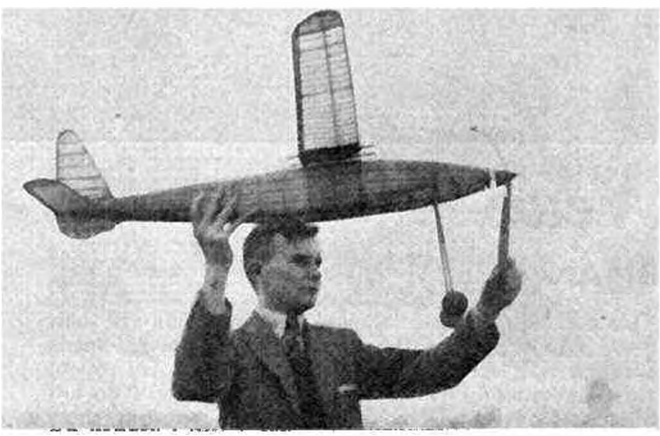
D. Lofts (Northern Heights)	106·5 sec.
J. Case (Harrow M.A.C.)	69 ,,

Class B—

K. Meyer (Kodak)	36 ,,
J. Bradshaw (Edgware)	10 ,,



A flying scale Messerschmidt built by G. Sparling of Methyr Twidfir.



P. Holt of the Leeds M.F.C. poses with his "Flying Minutes" at the Harrogate Rally.

Ian Robertson of the Harrow Club won the prize for the best model in the exhibition section with a 1/72 scale model of the Boeing "Flying Fortress," runner up being F. W. Day (Kodak) with a modified "Fillon Wakefield."

I regret to announce the temporary winding up of the EXETER M.A.C. for the duration of war. This has been brought about by the call up of all officials, and matters have been put into the hands of trustees so that everything is all square for a fresh start in the future.

H. Tubbs of the LEEDS M.F.C. has raised the club R.O.G. record to 1 : 56 with his 'Club Duration,' losing the job a fortnight later after a flip of 3–3½ mins. . . . unfortunately unofficially timed.

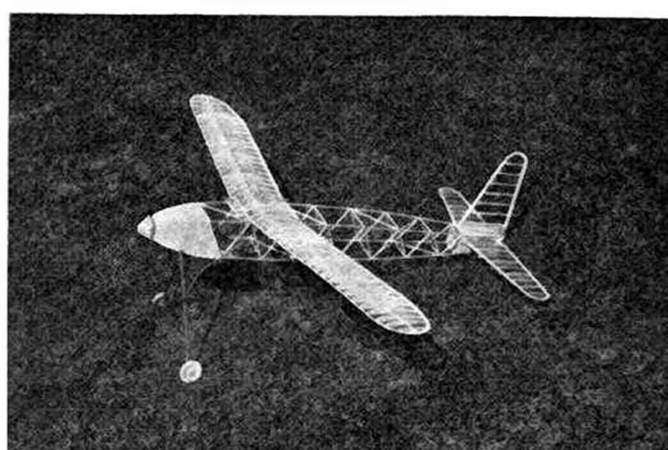
The BLACKPOOL AND FYLDE M.A.S. seems to be well on its feet now, and members are rolling in. Classes on theory and design are being held, and indoor flying, expecially r.t.p., is gaining popularity.

An interesting letter is to hand from a real enthusiast who does most of his modelling at sea. G. A. Walker writes amusingly of his difficulties in both building and storing his models, he being an A.B. in a merchant ship. Having been stationed for the past two years around the East African Coast, he finds no difficulty in obtaining balsa and other necessities, and has built numerous models ranging from a 25 in. span low-wing to petrol models. One of the latter finished its days by flying into a patch of sugar cane! As Walker says, "to give you some idea of what cane is like, imagine a thick wheat field in a valley, about 7–8 ft. high, and covering about 3–4 square miles, and the home of some of Africa's most poisonous snakes!"

He goes on to say, "Conditions on board do not lend themselves to modelling. I share a small cabin (about 12 ft. square) with two other chaps who are not even interested, and we have to house all our gear in this confined space. My wings and wood are lashed up to the deckhead, and a small case keeps my tools, dopes, etc. Fuselages are hung up with the coats!"

"I scrounged a couple of boards for my bunk, and I do my building on these—but everything has to be hidden when the Old Man does his rounds. You should hear what my room mates say when I have the dopes brush on the go!! The only good point they find is that the stink creates a complete absence of cockroaches and other livestock. One other trouble is testing my engine because of the row." Who said a life on the ocean wave?

L. Short of Virginia Water slightly modified his version o the popular "Isis" to allow the use of hard woods. Performance is not impaired.

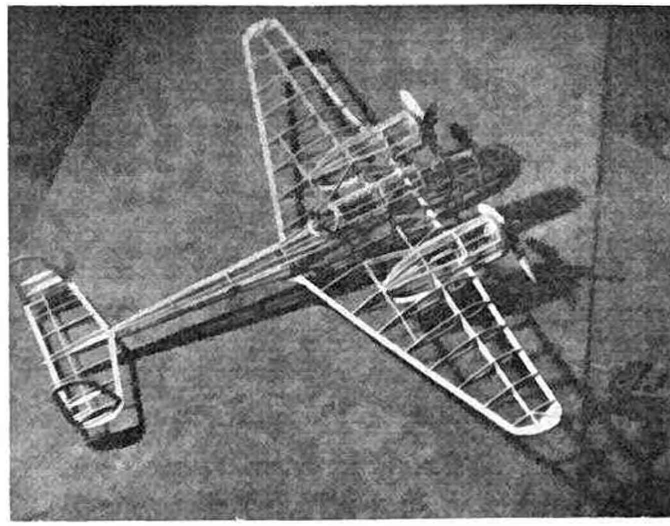


Unattached fliers in the Birmingham district are reminded that the BIRMINGHAM M.A.C. meet at the Friend's Institute, Moseley Road, on the first Saturday in each month, and all are welcome. C. Doughty won the "Arnold Cup" for the best showing in S.M.A.E. contests during the 1942 season, and the club—very bucked by its position in the Plugge Cup—wishes to convey its congratulations to the winners.

Owing to pressure of business, the secretary of the LEICESTER M.A.C. has had to relinquish his post, this being filled by B. A. Germany, of 39, Stretton Road. Indoor meetings are held every Sunday afternoon, and indoor flying, construction classes, designing of a club model, etc., are a few of the many activities scheduled for the winter session.

Owing to the rapid expansion of the Healey and D.M.A.C., it was decided at the recent Annual General Meeting to change the title to the WEST YORK M.A.C. Excellent facilities are available, having access to a large woodworking room, also a very large hall for indoor flying. R.T.P. flying has become a regular feature at club meetings, Mr. Gesson's 30 in. span job making some remarkable flights. I'm told this model flies so slowly that it is possible to pick it out of the air, rewind it, and put it back! Amazing!

Extensive building is under way in the ASHTON & D.M.A.C. J. D. Arden has nearly finished a 60 in. Stinson "Reliant," while H. Ward has completed a peculiar glider! It is a 60 in. scale model of the Russian TB-3 heavy bomber. Preliminary trials are very promising.



Good constructive work by F. Rogers of Woking. The model is of course a "Hampden."

The first of a series of r.t.p. contests held by the BLACKHEATH M.F.C. resulted in a win for C. H. Saunders with an aggregate of 103·3, G. P. Trussler placing second with 82. A Question Box has been started in which the "backward in coming forward"

"WOULD YOU CARE TO MAKE A CONTRIBUTION TO OUR SPITFIRE FUND"?

PLANS ★ PLANS

HAVE YOU USED YOUR VOUCHER COUPONS YET? AVAILABLE UP TO JANUARY 31st, 1943. SEND AT ONCE

★ ★ ★

THE CONSTRUCTION AND FLYING OF MODEL AIRCRAFT IS NOW RECOGNISED AS ONE OF THE BEST MEDIA FOR THE TRAINING OF FUTURE AIRMEN AND AIRCRAFT ENGINEERS. THE RANGE OF flying model plans listed below is unique in that it covers every type of model and all rank amongst the finest in the world:

★ ★ ★

DURATION TYPES

(MONOPLANES)

Air Cadet	38in. span	1/3
A.M. Cabin Monoplane	23in. span	1/6
Big Stuff	68in. span	7/6
Copland's Wakefield	44in. span	1/3
Firefly	34in. span	2/6
Gutteridge Trophy Winner	42in. span	3/6
George	24in. span	2/6
Isis	44in. span	3/6
Jackdaw	35in. span	2/-
Jay	28in. span	2/-
J.B.3	36in. span	2/-
Jeep	28in. span	2/-
Kamlet	31in. span	1/6
Macclesfield Marvel	37in. span	2/6
Percy III.	38½in. span	3/-
Pterodactyl	60in. span	2/-
R.A.H. 37	37in. span	3/6
Stability Baby	26½in. span	2/-
Sparrowhawk	30in. span	1/3
Sunstar	28in. span	2/-
Trike	28½in. span	1/6
Toots II.	26in. span	2/-
Warring's Wakefield	45in. span	3/6
W.A.D. 20	43in. span	3/-
Wattle	35in. span	2/-
X.F.S. 1 (Co-axial)	36in. span	3/-

(BIPLANES)

Beginner's Biplane	26½in. span	1/6
Biplane Sports	29in. span	2/6
Cabin Biplane	29in. span	1/6
Minerva	36in. span	2/6

GLIDERS

Aegeus	42in. span	2/6
Aeolus	48in. span	3/-
Atalanta	52in. span	3/6
A.P.6	72in. span	5/-
Curlew	46in. span	3/-
Hotspur II. (scale)	46in. span	4/-
Ivory Gull	50in. span	3/-
King Falcon	76in. span	5/6
Kirby Kite (scale)	72in. span	3/6
Leander	49in. span	3/6
R.F.L.G.53 (tail-less)	48in. span	2/-
Stother's Glider	60in. span	1/3
Temple Tribute XPS-841	84in. span	6/-
Zeus	82in. span	5/-

INDOOR MODELS

Lazybones, a 25in. span microfilm model	1/6
Baby Microfilm model by Joel Senber	1/6
Baby Microfilm model by J. H. Maxwell	1/3
Baby Microfilm Model (easy construction)	1/3
Simple 16in. span R.T.P. stick	1/-
Simple 16in. span R.T.P. fuselage	1/3
3 min. 43 sec. R.T.P.	1/3
24in. span streamlined R.T.P. model	1/6
16in. span tandem monoplane	1/3
28in. span R.T.P. Pterodactyl	1/3
R.T.P. Canard model	1/3
20in. span R.T.P. Pusher	1/3
Class A.R.T.P. autogiro	1/3
19in. span R.T.P. Ornithopter	1/3
R.T.P. Helicopter	1/3

FLYING SCALE

Airspeed Envoy	52in. span	3/6
Fairey Albacore	50in. span	7/6
Fokker D.VIII	35in. span	2/-
Gloster Gladiator	28in. span	2/6
Harvard II.	42in. span	5/6
Henschel 126 (¾-in.-1ft.)	35in. span	3/6
Henschel 126 (1in.-1ft.)	47½in. span	5/-
Heinkel 112	18½in. span	1/3
Miles Kestrel	39in. span	3/6
Mew Gull	16in. span	1/3
Messerschmitt 109	19½in. span	1/3
Moth Minor	35in. span	2/-
Spencer Larsen	68in. span	6/-
Sopwith Camel	14in. span	1/6
Supermarine Spitfire II.	15in. span	1/3
Westland Lysander	50in. span	5/-

FLYING SEMI-SCALE

Cygnet (solid type)	17½in. span	2/-
Fokker D.23	42in. span	3/6
Skyranger	20in. span	1/6
Viper II.	48in. span	6/-

SEAPLANES and FLYING BOATS

Diasphere	36in. span	2/6
G.B.2 Flying Boat	48in. span	6/-

PETROL DRIVEN

Mermaid (Flying Boat)	72in. span	7/6
Westland Lysander	60in. span	7/6
Vulcan	96in. span	10/6

★ ★ ★

Each plan is drawn full size, every rib and separate part is also shown full size with detailed constructional notes. Thus each plan is absolutely complete, and many include a separate printed sheet of building instructions.

★ ★ ★

SCALE PLANS. In addition to the complete range of all types of flying models listed above the AEROMODELLER PLANS SERVICE has a range of over three hundred accurate 1/72 scale drawings of every type of aircraft. The majority are drawn from the machines employed during the present war, but a large number of 1914-18 machines are also available. This range is right up-to-date and new machines are added as details are released.

PHOTOGRAPHS. Complementary to the range of scale plans, large, clear photographs of each type of aircraft are available. These are beautifully reproduced on art paper and are ideal for framing or for forming the basis of any collection. Full details of the plans and photographs available may be obtained on application to the address below.

Price of plans ... ... 6d. each, 3/- per dozen.
Price of photographs ... ... 3d. each, 1/6 per dozen.

Generous Trade Discounts allowed. ***All Enquiries should be addressed to:***

AEROMODELLER PLANS SERVICE, LTD., ALLEN HOUSE, NEWARKE STREET, LEICESTER

One of the finest snaps we have seen of a model aircraft. The above scene is of R. E. Gage's "Sunderland" posed against a very appropriate background.

fellows drop questions they would like answered, and is proving a success. Some queries are weird and wonderful, but answers are given where possible.

ILKLEY M.A.C. instruction classes are progressing favourably, and are mainly composed of lads too young to join the A.T.C. Members are building a Class A r.t.p. model, designed by the club record holder, J. Townsend, the figure being 2 : 32·9.

A. J. Day, of 62, Newtown Road, Marlow, Bucks., would like to get in touch with petrol 'plane enthusiasts in his neighbourhood.

P. S. Baldwin, of "Miramar," Trinity Avenue, Westcliff-on-Sea would like to form a club in his area; J. Carpenter, "Hillcrest," Barnacle, Shilton Lane, Coventry, would like to do the same; and the same goes for P. M. Pawsey, of "Janekins," Stisted, nr. Braintree. Rally round you chaps, and see if you can't make a go of clubs in these districts.

A new club has been formed at Ayr under the auspices of the Y.M.C.A., and so far numbers 32 members. An old garage was cleaned out and whitewashed by the boys, and fitted up with benches, etc. All enquiries should be made to D. G. Hodinott, at 3, Prestwick Road, Ayr.

Another new group is the WORCESTER M.A.C. with over 50 members, and enquiries here should be made via Mr. A. N. Cutler, of Bridge Street, Worcester.

And so, off to bed for another month, and here's hoping some more clubs wake up and send in news of their activities. Till then, all the best for the New Year, and may it soon bring us more peaceful days.

The CLUBMAN.

New Clubs

CHESHUNT M.A.C.
A. H. Salmon, 3, Hillview Gardens, Cheshunt.
WORCESTER M.A.C.
H. Benson, 8, Oldbury Close, Oldbury Road, Worcester.
WEST YORKSHIRE M.A.S.
C. Westerby, 4, Colbeck Terrace, Healey, Batley.

Secretarial Changes

LEICESTER M.A.C.
B. A. Germany, 39, Stretton Road, Leicester.
READING & D.M.A.C.
D. Garson, "Link View," Kidmore End Road, Camersham, Reading.

A. N. CUTLER

For Dopes, Tissues, Cements, Propellers, etc. In fact all accessories for the Aero-Modeller for solid and flying kits. Stockist of Drome, Studiette, Keilcraft, Astral, Cloudcraft, Skyleada, Truscale, Halfax, C.M.A., etc.

BRIDGE STREET - - - WORCESTER

Phone : WORCESTER 4137

L. F. KIRBY, 606–7–8–9, WASHWOOD HEATH RD., BIRMINGHAM 8

FOR SKYLEADA, SKYROVA, AND FALCON KITS. ALL ACCESSORIES.

SEND FOR OUR 12 ins. FLYING KIT OF CURTISS HAWK AND FOKKER D.8. Only 1/6

Also our 1/52nd Scale Flying Kit of WESTLAND LYSANDER, 2/6
Please include 4d. extra to cover post.

AERO-MODELLERS get your

KITS AND ACCESSORIES

from

HARPER'S CYCLE CO., LTD.

34, Belgrave Gate & 67, Braunstone Gate, LEICESTER
Also at Oakham, Melton Mowbray and Market Harborough

STOCKPORT'S AERO-MODEL SHOP *'Phone STO 4744*

We have Astral, Airyda, Skyleada, Skyrova, Tower, and Keilkraft kits in stock.

All the Harborough & Aeromodeller publications available.
A wide range of flying and solid accessories constantly in stock.
2½d. stamp brings price list.

54, Wellington Road South - - STOCKPORT

JONES BROS.

LARGE STOCK of KITS, DOPES and ACCESSORIES

SPARE PARTS FOR SOLIDS

Send 3d. for list.

56, Turnham Green Terrace - CHISWICK, W.4
'Phone: CHI. 0858

WILMSLOW MODEL AIRCRAFT CO.

PERSONAL ATTENTION MEANS A LOT TO THE AEROMODELLER !

We make a point of advising as well as selling to our customers.

We have a big range of Kits and Accessories, including: Keilcraft, Skyleada, Studiette, Elite, Club, Astral, Airyda, Britannia, C.M.A., Halfax, Tower and many others.

GIVE US A CALL OR DROP A LINE TO:

WATER LANE - . WILMSLOW, CHESHIRE

NOTTINGHAM'S AERO MODEL SPECIALISTS

POSTAL SERVICE

Add 4d. to Kit and alternative to 87, Wilford Road.
All leading makes and accessories stocked
NO LISTS.

RADET ELECTRIC, 21, ARKWRIGHT STREET

NEAR MIDLAND STATION

MODEL MAKERS !

Birch Veneer offcuts 1/40 inch thick.
Packets of useful pieces 2"×3" to 3½"×9"
About 5 sq. ft. 1/11 post paid.
Double size 3/3 post paid.
12 inch strips ½" to 2" wide, about 7 sq. ft., 2/6 post paid.

A. STEPHENSON (WEST HARTLEPOOL) Ltd.

VILLIERS STREET, WEST HARTLEPOOL.

G M G

GREEN MAN GARAGE (WHETSTONE) LTD.
1308, High Road, Whetstone, London, N.20
(OPPOSITE TOTTERIDGE LANE)

We hold the Largest Stocks of Aero Kits and Component Parts in North London

'Phone Hillside 3277 Stamped addressed envelopes for replies.

C. GRUBB, 413, ANLABY ROAD, HULL

Specially selected Balsa substitute.

1/16"×1/8", 1/8"×1/8", 6d. doz. 1/8"×1/4", 1/- doz. 17"-18" long.
Special quality sheet. 2"×1/8"×18" 4d. 3" 6d.
Soft American Pine. Straight grained and easily worked.

Special for Fretworkers.
Special harder quality. 3"×1/8"×18" 6d.

TISSUE PAPER. Pre-war Quality. (Imported.)

SUPERFINE, 20×24 ins. Red, Yellow, Orange, Green.
6 sheets 1/6 ; 12 sheets, 2/10

"SUPERLITE" Light-weight Bamboo Paper. 20×30 ins. Red, Blue, Yellow, Orange, Black, Natural, Green. 6 sheets 2/3 ; 12 sheets 4/4
Any Selection. Post Free.

Licensed Supplier. Ministry of Supply

J. W. KENWORTHY, 295, Charminster Rd., BOURNEMOUTH

HARPER PATENT OVERHEAD HEIGHT CHECK

- Now available fitted with patent sliding cursor which greatly facilitates height registration.
- Gives the height of IDENTIFIED British, American and German aeroplanes flying overhead or almost overhead.

Price with cursor 4/- post free. **FRANK HARPER** Separate cursors 1/- post free.

SOUTHCLIFFE, SELBY ROAD, FULFORD, YORK.

WADE & CO.

For Astral, Keilcraft, Halfax, Skyleada and Cloudcraft Kits. *'Phone : 32053*

Please enclose stamped envelope for enquiries.

40, CHAMBERS STREET - - EDINBURGH 1

STACKS OF KITS at Bromley, Kent

KEILCRAFT all Balsa Kits a speciality. Also Astral, Skyleada, Cloud, Veron, Aeromodels, Truscale, Halfax and C.M.A.

Call now at H. E. HILLS & SON

481, BROMLEY ROAD, DOWNHAM, KENT

Regret no Catalogues available.

LONDON—TOY AND MODEL SHOP

Flying Kits (Cloudcraft, Keilcraft, Astral, Veron, Halfax.)
Solid Kits (Skyleada, Skyrova, Halfax, Grace Airplanes, Airlines, Airyda, Truscale, Skycraft.)
Waterline and Leyden Ship Kits.
Accessories and all Aeromodeller publications stocked.
Balsa Substitute, Spruce, and Obechi for callers only.
Postage must accompany orders and enquiries.

57, SYDENHAM ROAD, LONDON, S.E.26
SYD 8328

SCOTLAND CALLING !

FRANK ROYLE, 54, South Clerk St., EDINBURGH
IS AT YOUR SERVICE

Largest selection of flying and solid kits in Scotland.

Agents for VERON, TRUSCALE, KEILCRAFT, SKYLEADA, C.M.A., AIRYDA, GRACE, HALFAX, etc.

Enquiries must have stamped addressed envelope.

A. A. BAKER, 526, High Road, CHISWICK, W.4

"SPECIAL" SUPER-DETAILED "WING" SERIES SOLID BLUE-PRINTS—MOSQUITO, B.19, B.17, Fw.189, D.H.4, and others.
TRANSFER INSIGNIAS including Greece, Iraq, Jugo-Slavia, etc.—Alphabets, Numerals Black, Grey, Red—½" to 1"
SOLID SCALE KITS—All leading makes.
All Aeromodellers publications and prints.

'Phone Chi. 3816. - - - - Stamp brings reply.

OBSERVE THE ADDRESS !

T. WESTLAKE & CO.,

18, BANK STREET, NEWQUAY, CORNWALL.

Recognised as the shop for all Kits, Plans and Accessories. 1/72 a speciality. Personal service and advice.

TO MANUFACTURERS, ETC — URGENTLY WANTED ACCESSORIES OF ALL DESCRIPTIONS FOR 1/72nd.

Made and printed in Great Britain by Alabaster, Passmore & Sons, Ltd., London and Maidstone, for the Proprietors and Publishers, The Model Aeronautical Press, Ltd., Allen House, Newarke Street, Leicester. Trade Distributors: Horace Marshall & Son, Ltd., Temple House, Tallis Street, London, E.C.4—C1601. Sole Agents for Australia and New Zealand: Gordon & Gotch (Australasia), Ltd. Registered at the G.P.O. for transmission by Canadian Magazine Post.

Kindly mention THE AERO-MODELLER when replying to advertisers.