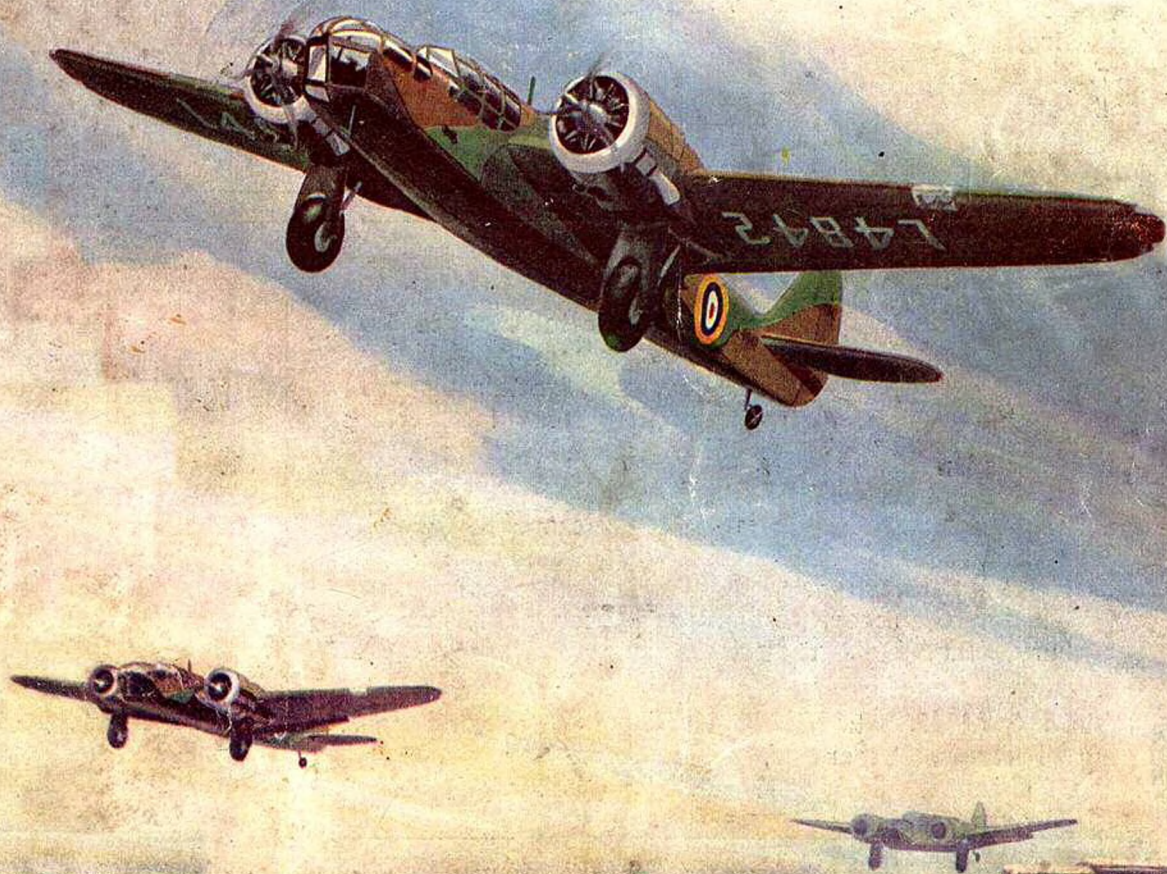


VOL. 8
No. 85

AERO MODELLER 2/-

CHRISTMAS 1942 *NUMBER*

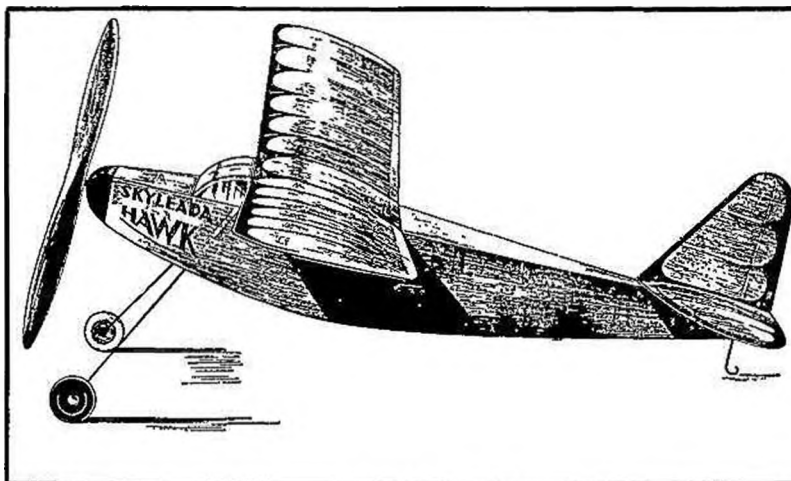


Although supplies of SKYLEADA & SKYROVA kits are becoming even more restricted we wish to convey our assurance that we are doing our very best to meet demands and to effect distribution as fairly as possible.

SKYLEADA "HAWK" 24-in. SPAN ALL-BALSA DURATION FLYING KIT

Contains Balsa printed sheet, Balsa strip, tissue, wheels, wire, Balsa cement, rubber, shaped propeller blank, etc., and fully detailed plan.

Complete
4/6
Kit



SKYLEADA & SKYROVA SOLID SCALE KITS



1/9 Heinkel 113, Russian Rata 1-16, Blackburn Skua, Gloster Gladiator, Grumman Fighter F2F1, Hawker Fury, B.P. Defiant, Bell Airacobra, Henschel 126.

SKYLEADA solid kits to 1/72 scale. Contain semi-finished fuselage, wings, etc., & other necessary parts, with building instructions and fully detailed drawings.

Lysander, Hurricane, Fairey Battle, Me.109F., Spitfire, Hell Diver,

SKYROVA MULTI-ENGINE KITS, (8-9 inch wing span).

Boeing Fortress, Liberator, Manchester, Halifax, Stirling, Catalina, Lancaster, Condor Kurier.

3/-

CATALINA
KURIER
LANCASTER

*Three new
models now
ready in the
SKYROVA
series.*

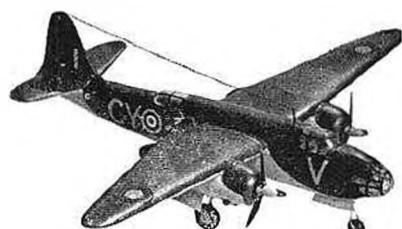
Ask your local stockist first for these kits but if you have to write direct tell us his name and address and please include postage; 4d. extra for solids, 5d. for "Hawk." If possible also state alternative models should you order Skylead or Skyrova solid kits.

A. HUNT (Croydon) LTD., 5 & 7, SOUTH END, CROYDON.

THE FAMOUS SOLID SCALE C.M.A. MODEL KITS

SCALE $\frac{1}{4}$ in.—1 ft.

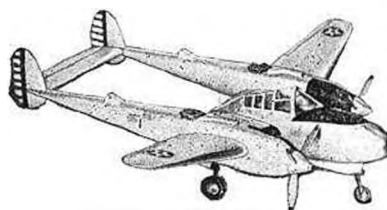
Kits contain all parts cut to shape, seats, cement, correct transfer insignia, three bottles of dope, sandpaper, fully detailed blue-print, and complete instructions.



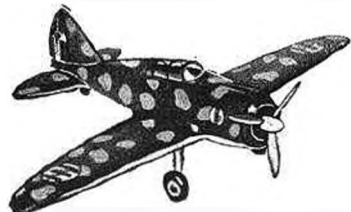
DOUGLAS BOSTON 8/3



BEAUFIGHTER. 7/11



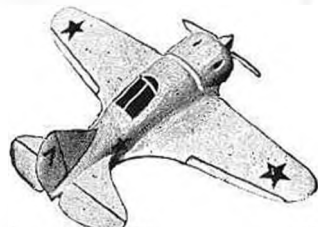
LOCKHEED P.38. 8/9



CAPRONI RE. 2000 6/-



WESTLAND LYSANDER. 6/-



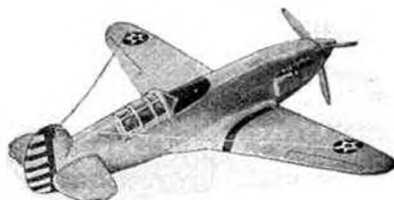
RATA 1-16 5/3



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



WESTLAND WHIRLWIND 6/6



FOKKER G.I. (DUTCH) 8/11



BRISTOL BLENHEIM. 6/11



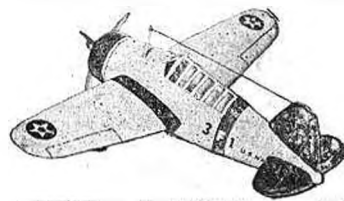
MESSERSCHMITT M.E.110. 6/11



BOULTON PAUL DEFIANT. 6/9



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



BREWSTER BUFFALO. 6/9

WHOLESALE ONLY
POSITIVELY NO RETAIL
ORDERS ENTERTAINED

Manufactured by

**CHINGFORD MODEL
AERODROME LTD.**

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

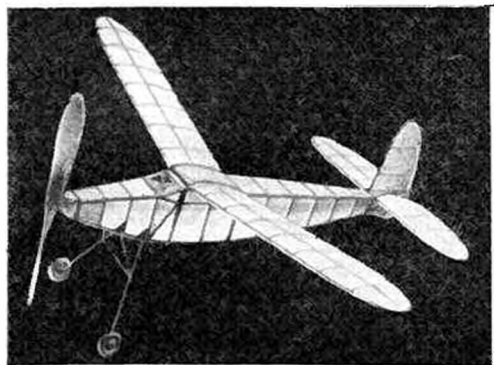
Kindly mention THE AERO-MODELLER when replying to advertisers.



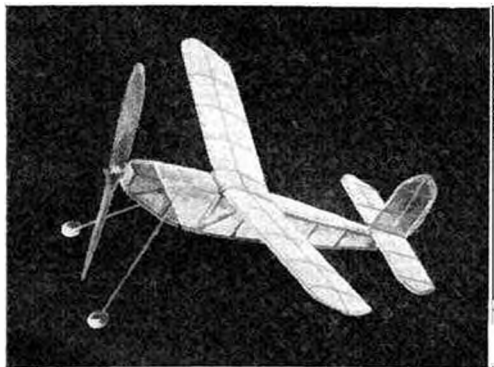
BRISTOL "SIMPLEX" DURATION KITS

STILL IN PRODUCTION

WE GIVE YOU—Balsa wood (not substitute), correct amount of Rubber, Genuine Jap Tissue, Real Blue Print, Shrinking Dope, Turned Wheels, ample amounts of other materials, and a **READY CARVED PROPELLER IN EVERY KIT.**



"LINNET" KIT 9/10 Post 7d. extra.

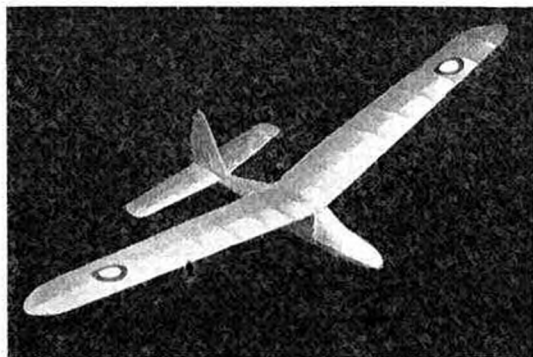


"JUNIOR" KIT 5/- Post 7d. extra.



"SETTER" KIT 14/- Post 7d. extra.

OUR LATEST DESIGN



BEAU GLIDER. No. 2. KIT 9/8 POST 7d.
(NO RUBBER OR PROPS WITH GLIDERS)

LIST OF "SIMPLEX" KITS

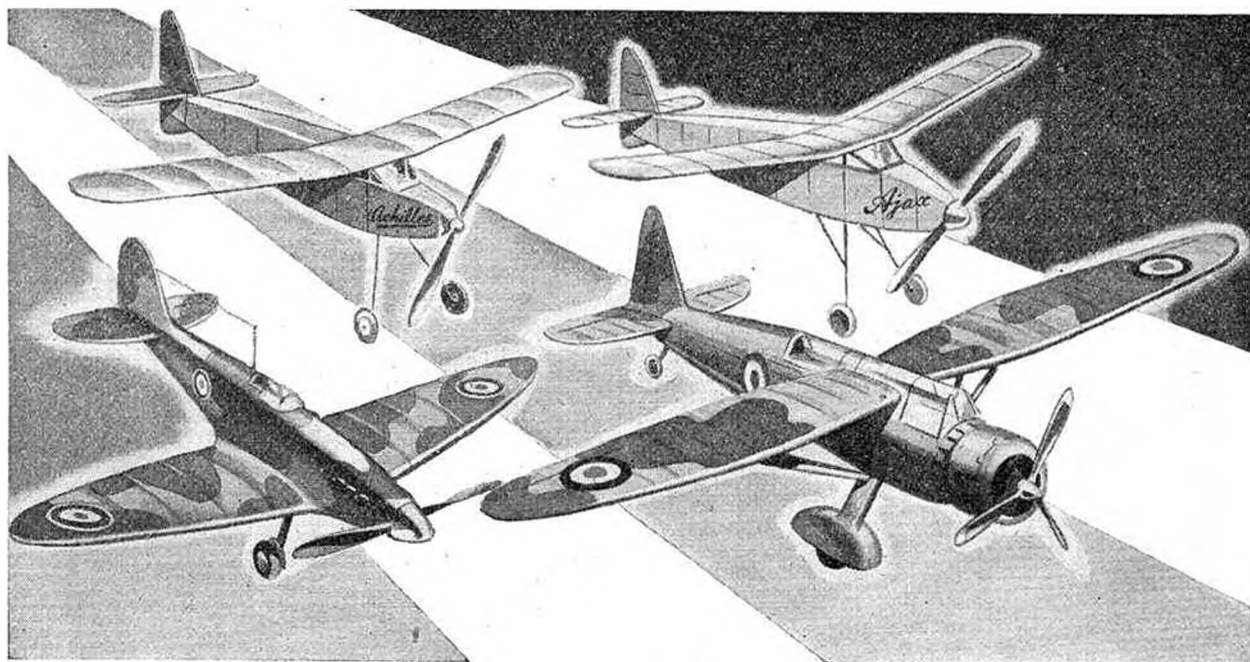
	KITS
"JUNIOR ENDURANCE," 18-inch span High Wing Monoplane	5/-
"BRISTOL PUP," 21-inch span High Wing Monoplane	6/-
"LINNET," 31-inch span Cabin Monoplane	9/10
"SIMPLEX CLUB," 36-inch span High Wing Monoplane	12/-
"SETTER," 36-inch span Low Wing Cabin Monoplane	14/-
"RECORDA," 34-inch span (3 British Records 1937) Biplane	16/-
"BEAU GLIDER" No. 1 - - 31-inch span	7/6
" " " No. 2 - - 40 " "	9/8
" " " No. 3 - - 50 " "	12/11

Postage 7d. extra in each case.

BRISTOL MODEL AERO SUPPLIES
THE MODEL AIRPORT
51 COLSTON STREET, BRISTOL, 1

ENQUIRIES GLADLY ANSWERED, BUT PLEASE SEND STAMPED ADDRESSED ENVELOPE

Kindly mention THE AERO-MODELLER when replying to advertisers.



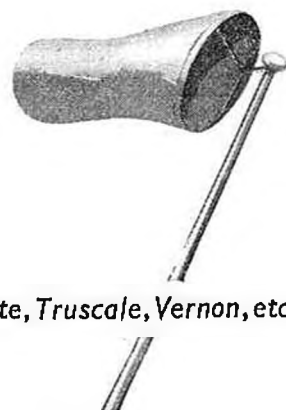
Resting on their laurels

To all interested in aero-modelling, we have to express our regrets that owing to the shortage of materials no more Keil Kraft Kits are available at the moment. When the necessary materials are again avail-

able we will hasten to release as many Kits as possible for sale. Until then, Keil Kraft Kits must rest on the laurels won by the many successful models built from them.

KEIL KRAFT KITS

DURATION AND FLYING SCALE MODELS

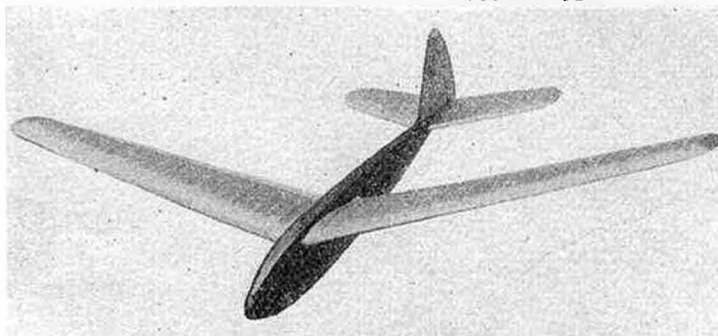


E. KEIL & Co., Ltd., LONDON, E.2. Also distributors for Skyleada, Drome, Studlette, Truscale, Vernon, etc.

Kindly mention THE AERO-MODELLER when replying to advertisers.

"THE 20-minute GLIDER"

A SUPER SAILPLANE Winner of S.M.A.E., 1938 Glider Contest.
Average of 3 flights 495.883 seconds. Designed by E. Chasteneuf, Blackheath M.F.C.
Holder of British Glider Record 20 mins. 7 secs. Member of British Wakefield Team,
and Winner of "Premier Shield" 1937 and 1938.



Contains: Two Full Size Detailed Blue Prints, Selected Wood, Dope, Banana Oil, Covering Tissue, Loading Weights, and all necessary materials and building accessories. Span 52½ ins. Length 28½ ins. **18/6**
A PREMIER "PEDIGREE KIT," 1943 VERSION. Carriage paid U.K.
1942-43 PRICE LIST 4d. POST PAID

PREMIER AEROMODEL SUPPLIES, LTD.
2a HORNSEY RISE, LONDON, N.19 Phone: ARC 2376

NORTHERN MODEL AIRCRAFT COMPANY

25 LOWER MOSLEY STREET, MANCHESTER 2

Telephone: GEN. 1804

MODEL AIRCRAFT SPECIALISTS

MAIN AGENTS FOR

'ROYDON' CAST PARTS

1/72 SCALE

FULL RANGE ALWAYS IN STOCK.

The following Accessories can only be obtained from us.

Stirling, Retracting Undercarriage Sets, 1/8 per set.
Retracting Tail Wheel Units, 6d. Fighter U/C, 1/- per set.
Contra Rotating Props. Four Gun Mountings.

JUST ADDED to our ALREADY LARGE RANGE
FIGHTER UNDERCARRIAGE WHICH RETRACTS
AND TURNS (Swivelling type). Fits Tomahawk,
Kittyhawk, Miles Master, Mohawk, Chesapeake,
Vengeance, etc.

GOING INTO PRODUCTION: Two New Types of Cowl.

Props, Cows, Engines, 9-cyl. and 14-cyl. Radials, Joy
Sticks, Pitot Tubes, Balloon Type Wheels, Etc., Etc.

"WING" SERIES OF BLUE PRINTS
all 1/72 scale.

F.W.190. Mess. 210. Thunderbolt. P.38. Spad.
S.E.5. Fokker D.VI. Camel. B.19, Etc.

A.T.C., R.A.F., R.O.C., ARMY, SPECIAL ATTENTION GIVEN TO ALL ORDERS. SPECIAL TERMS
Kits made up to order, also Fuselage shapes. Models for recognition, send S.A.E. for prices.
Scalecraft Recognition series of plans, 3/8 per set. Choice of 20 out of 24.

1/72 SCALE

"WORCRAFT" STIRLING SOLID KIT
EVERYTHING TO BUILD A SUPER MODEL
KIT PRICE 14/11 POST EXTRA.

PLANS. Over 90 different in stock.

Lancaster, Thunderbolt, Halifax, Etc., Etc.

COCKPIT COVERS. F.W. 190, Lancaster, Maryland,
Baltimore, Liberator, Whirlwind, Stirling, Etc.

"NORTH" SERIES WATERSLIDE TRANSFERS.
British and German.

SQUADRON MARKINGS. See our offer in October
Aeromodeller.

KITS by all leading manufacturers in stock. Truscale,
Silverwings, Skylead, Airyda.

COMPLETE SET OF CUT-OUT PARTS FOR
THUNDERBOLT, F.W. 187 and F.W. 189.

FLYING SCALE AND DURATION
MODELS. Spitfire, Tomahawk, Defiant,
Roc, Blenheim, Etc.

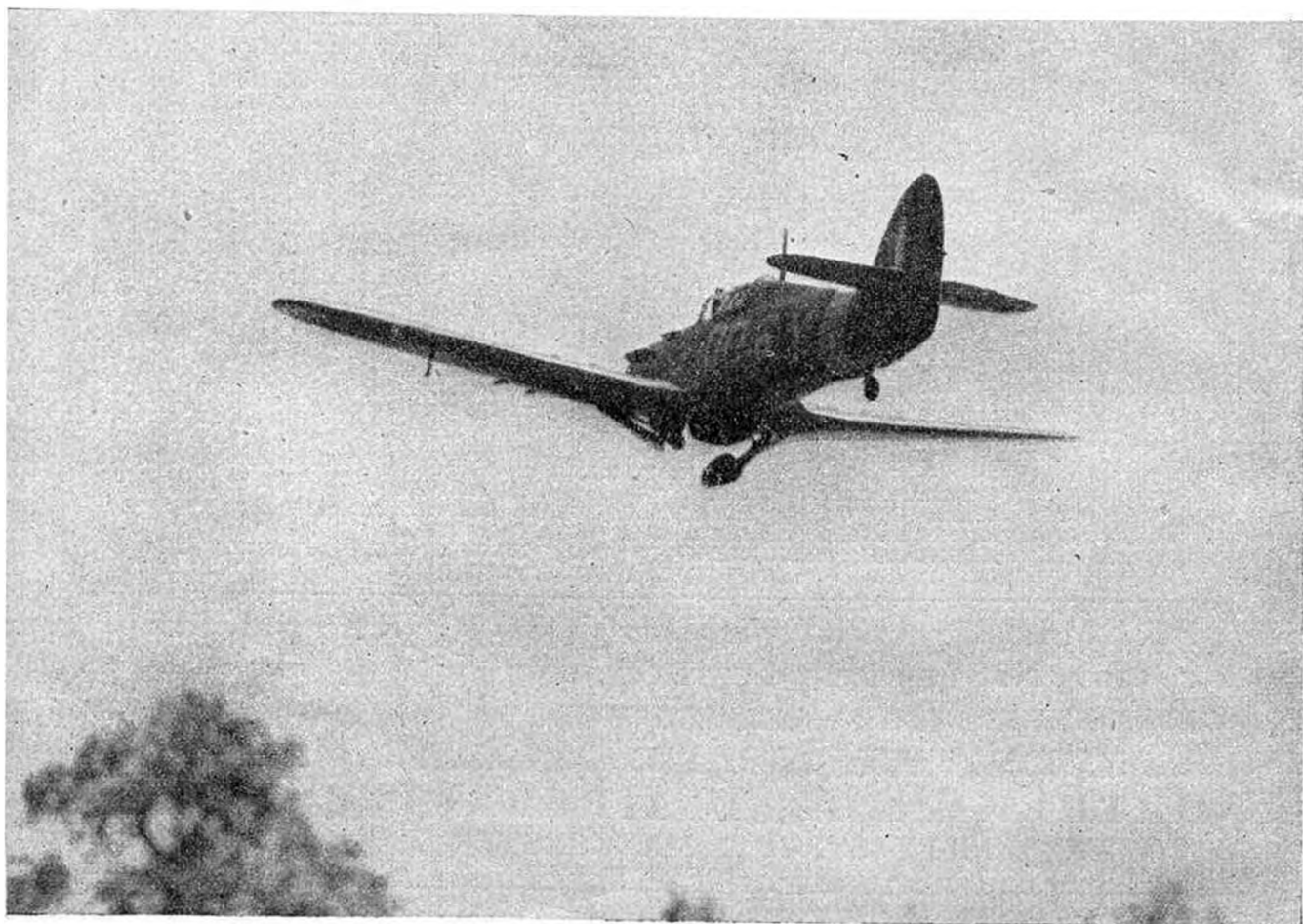
Full range of accessories including Propellers,
Tissue, Dope, Bamboo, Bushes, Paste, Wire,
Etc., Etc. Kits from 1/8 to 21/-.

SEND 4d. FOR NEW CATALOGUE.



Kindly mention THE AERO-MODELLER when replying to advertisers.

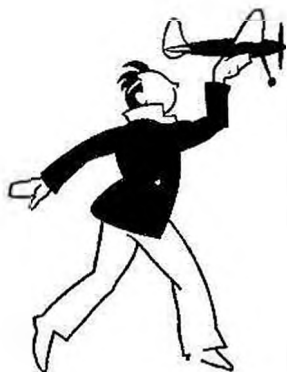
"RAISE UNDERCART!"



The finest posed photograph of a solid scale model which we have yet seen. This remarkably detailed model of a Hurricane IIc is the product of G. R. Woollett of Yalding, near Maidstone, who is also responsible for the photography.

Contents of this issue.

	PAGE		PAGE
Editorial	555	Solid Gliders. By W. A. Dean	590
A Flying Scale Blenheim. By C. Rupert Moore ..	557	Pulley Launch. By R. H. Warring	592
Simple Definitions	562	R.T.P. By E. J. Townsend	598
A Scale Model Race Car. By D. A. Russell ..	565	"Snowwhite." By R. H. Crowe	599
Make your own Transfers. By P. Cooksley ..	569	Petrol Topics. By J. F. P. Forster	600
"Wattie." By Flt./Lt. R. Watson	570	"Stardust"	604
The Return of McGillicuddy. By Robert Jamieson	574	"Lysander." By D. A. Russell	606
Build a Goon	577	Downthrust. By A. F. Houlberg	609
"Lofty VI." By D. Lofts	578	Monthly Memoranda, No. 10. By O. G. Thetford	613
Civilian Aircraft Markings II. By F. J. Riding ..	582	Fighting Aircraft of the Present War—XXIII.	
Technical Topics. By R. H. Warring	584	The Beechcraft 18. By H. J. Cooper.. ..	614
"Wishbone." By E. H. Clark	589	Club News. By "Clubman"	617



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. VII - No. 85

Editor :

C. S. Rushbrooke.

Managing Editor :

D. A. Russell, M.I.Mech.E.

DECEMBER, 194

Technical Editor :

R. H. Warring.

ALLEN HOUSE, NEWARKE ST., LEICESTER

IN the best conventional manner we extend our heartiest good wishes to all readers of THE AERO-MODELLER in this country and abroad. Many copies of this journal now reach members of the Forces serving abroad and to them we send a special greeting, with the sincere hope that soon we shall be welcoming them back to active aero-modelling in the mother country once again. Gala days have lost their glory, and international competitions are a thing of the past; but the spirit of aero-modelling is ever growing, with the result that we look forward to continual development, despite the many handicaps and calls upon spare time imposed by present conditions. There have been of necessity several changes throughout the year. We have welcomed several well-known aero-modellers to our staff, and, in contrast, have been forced to cut down the size of the journal. These two features being in no way related! In its present form THE AERO-MODELLER contains as much, or even more, material than before, with the additional advantage that it is somewhat easier to handle. Our fears of retribution after taking this second step were completely unfounded it would appear, and, as to the former, the capacity of the magazine has been enormously increased.

Our New Year's Resolution!

An immense amount of work goes into the publication of this journal and our aim has ever been to satisfy all the readers demands to the best of our ability. At the beginning of this, our eighth year of publication, we therefore ask the readers co-operation in taking a census of general information and ideas, all with a view to improving the material matter. Such a census will confirm or confound our forecast and study of past opinions, laudatory or defamatory (although, surprisingly enough, the latter are very few and far between considering the wide sphere and influence of THE AERO-MODELLER). We have prepared, therefore, a ballot form which is reproduced overleaf. The details are simple, we merely ask the reader to indicate the type of article which he prefers, the number of plans in each issue, etc., etc. The more completed forms we receive the better, as we shall then be in a position to plan each issue of next year's journal with a view to meeting the popular demand. Further suggestions not covered by the ballot form will be welcomed, but please keep these as brief as possible as we anticipate a return of many hundreds to analyse; and to those readers who do occasionally grumble that their favourite subject does not appear as often as they would wish we would point out that this is *their* golden opportunity to let us know!

EDITORIAL

Christmas Fare.

A feature model of this month's double issue is the one-inch to the foot flying scale model "Blenheim," built by C. Rupert Moore, A.R.C.A., who has depicted this machine on

the front cover. This model is one of the most modern that has yet been attempted in the rubber-powered sphere. The driving of twin airscrews located out-board of the fuselage itself introduces many intricate problems. Several schemes have been suggested or tried, but the originator of this model has had considerable previous knowledge and experimental work with twins, featuring a patent drive which after years of development now appears as a sound and reliable unit. A "Moore" patent drive is thus a feature of this grand model; possibly the main feature contributing to its success.

For "twin" fans we also have further good news of a Wakefield model employing this drive and another scale model, the Scion, also based on the same lines. These will appear during next year.

Duration fans are never satisfied. They always clamour for more and more models, and so this issue presents two tip-top machines, both well proven during the past flying season. Wattie, a semi-streamlined model with many novel features, is one of the most interesting machines which has yet appeared on these pages. In addition to the descriptive matter and plans published on pages 570 to 573, full-size working drawings are also available from THE AERO-MODELLER Plans Service, price 2/-. The second duration model, Lofty VI, is a well tried Wakefield type which has given a consistent high performance at many meetings throughout the year. Glider fans, too, are not neglected, and

D. A. Russell's 1/5th scale Lysander and scale Race Car. Both of these models are described in this issue.



the illustrated article on Pulley Launching, will, we feel sure, prove invaluable to the many modellers who have found that model gliders are every bit as fascinating as power-driven machines. To recall a somewhat hackneyed phrase, the effortless flight of a well trimmed sailplane model soaring in a slight breeze is a sight as equally inspiring as the longest fly-away.

Solid fans, and there are a considerable number of them, have four features for their interest; an article on "Home-Made Transfers"—no more poorly painted letterings and insignias! An illustrated article on civilian markings; latest news of the modern war situation given in Monthly Memoranda; and another modern scale plan by H. J. Cooper.

McGillicuddy has returned in time to enjoy this regal fare and introduces a modicum of seasonal humour. To those staid readers to whom a model is a model, we apologise for the introduction of the "Wishbone" and the "Goon," but we know that many thousands of readers will get much enjoyment in constructing these little craft.

Radio Control.

We have been literally besieged with queries relating to radio control of model aircraft. Well, as an aperitif, Dr. Forster devotes this month's Petrol Topics to this need, and we feel that the announcement that the latest Harborough publication, "Radio Control of Model Aircraft," by Peter Hunt, is now ready, price 2s. or 2s. 2d. post free, is timely.

This book, which is the first of its kind in this country, deals clearly, but extensively, with all aspects of the subject, and bids fair to becoming the Radio Control enthusiasts' "Bible." Copies may be obtained from these offices or through local newsagents.

The Competition Spirit.

Results of the Jackdaw competition are now to hand and a splendid selection of photographs were received. This model has had a special appeal on account of the fact that the air frame is constructed entirely of hardwoods.

First prize for Uncovered model photo :—

L. R. French,

1, Glade Road, Marlow, Bucks. £2. 2s. 0d.

First prize for Covered model photo :—

A. Galeota,

"The Lodge," New House Farm,
Nr. Great Missenden, Bucks. £2. 2s. 0d.

First prize for best photo of model in flight :—

A. Galeota,

Address as above. £2. 2s. 0d.

Engineering Cadetships.

We would earnestly draw the attention of all readers between the ages of 16 and 19 to the announcement appearing on page 564 in connection with the recently introduced cadetship scheme, quoting from the official notice :—

"ENGINEERING CADETSHIPS SCHEME.

The Government announces the foundation of Engineering Cadetships leading to technical commissions in the fighting services. Cadetships will be open to youths aged 16 to 19 inclusive, who have left school with at least the School Certificate, including a credit in Mathematics or Physics or Science, and who are not employed in any branch of engineering.

Successful applicants will be given courses in engineering at technical colleges before being allocated to the Forces as training as technical officers.

Mechanical warfare makes unprecedented demands on our resources of technical personnel, not only for the design and production of weapons but also for their maintenance and repair in the Services.

Engineers of professional grades are needed to ensure the maximum production of armaments, but they are needed also to ensure that the maintenance requirements in the Forces shall keep pace with the supply of equipment from industry. Measures for securing the supply of such men for all war purposes are worked out by the Technical Personnel Committee, which is a committee under the chairmanship of Lord Hankey, with representatives of the Ministry of Labour and of the Service, Supply and Education Departments."

Full details of this scheme may be had on application to the Ministry of Labour and National Service, Sardinia Street, London, W.C.2.

More Plans—and something for nothing!

Last month, the Jay, a particularly attractive little duration model, was described, and reduced scale drawings given. Full-size working drawings are now available from THE AERO-MODELLER Plans Service, price 2s. On page 596 are illustrated the full range of flying model plans now available and on page 597 an additional list of special indoor model plans, in conjunction with the indoor modeller's book "Indoor Model Flying." The usual Christmas feature of introducing vouchers to a total value of 1s. 6d. is again maintained, and an overwhelming response is anticipated. In any case—the staff have been warned! These vouchers are given on page 621 with full details as to their use.

D. A. R.

AEROMODELLER BALLOT No. 2.

I consider that each issue of the Aeromodeller should be made up of the undernoted articles. I have shown the number of each article per issue in the panel and indicated any additional features which I think will be of interest.

(Note: The number of pages of the Aeromodeller are limited!)

FLYING SCALE ★

- ☐ (a) 1 in. to the foot.
☐ (b) Any scale.

WAKEFIELD

GENERAL DURATION MODELS

GLIDER MODELS

- ☐ SCALE PLANS ★
☐ (a) Modern (b) Pre-war
☐ (c) Civil (d) 1914-18

TECHNICAL ARTICLES ★

- ☐ (a) Design (b) Aerodynamics
☐ (c) Structural (d) General
☐ Fiction and Humour

ELEMENTARY ARTICLES ★

- ☐ (a) theoretical (b) practical

PETROL MODEL FEATURE

- ☐ INSTRUCTIVE ARTICLES ★
☐ (a) Duration (b) Glider
☐ (c) Gadgets

SINGLE PAGE PLAN ★

- ☐ (No description)
☐ (a) Rubber (b) Glider

RACE CAR

UNORTHODOX MODELS

FURTHER FEATURES

- ☐
☐
☐

Name

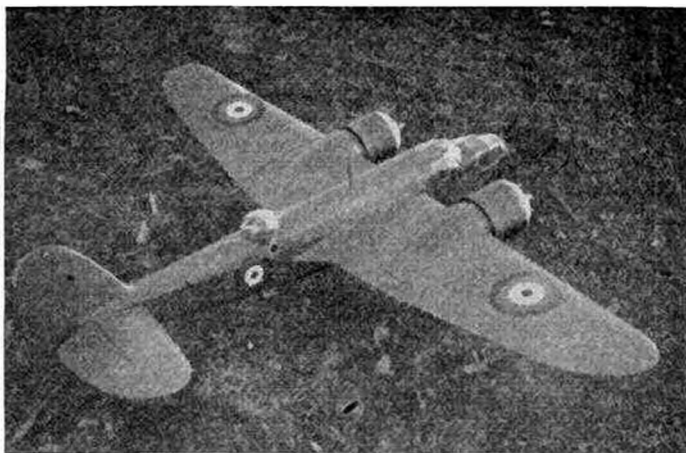
Address

The cover should depict (a) full-size aircraft (b) scale model aircraft (c) duration model aircraft (d) a combination of (a) and (b) ★

★ Cross out items not applicable.

Send in unsealed envelope with 1d. stamp to :—

AEROMODELLER BALLOT No. 2, ALLEN HOUSE, NEWARKE STREET, LEICESTER



A ONE INCH TO THE FOOT Flying Scale Blenheim

By C. RUPERT MOORE A.R.C.A.

THE "Moore Drive" is not a novelty as suggested in last month's Editorial, and I feel a short account of its development is called for.

Nineteen hundred and thirty-six saw the experiments in search of a good flexible drive and by the end of that year, after building 23 different types, I discovered the "Moore Drive." In effect this is a series of shafts set at 45 degrees to each other in rigid bearings. On the end of one shaft is a fork, rather like a hay fork with straight prongs, which engages a stirrup shaped end piece of the next shaft. Thus the rotary motion is passed from shaft to shaft.

The first drive was fitted to a semi-scale "Freighter" named "Castor." The twin 11 in. diam., 11 in. pitch airscrews were geared up 3 to 2 and driven by three skeins of 14 strands $\frac{1}{4}$ in. by $\frac{1}{30}$ in. by 36 in. rubber. The wing area was 298 sq. in. and the weight 26 oz. Every possible adjustment had been allowed for regardless of weight.

With the help of Mr. Jack Smith, I tested this model secretly at Hurlingham during the winter of 1937. No trouble was ever experienced with the drive, it was right from the start, but the plane itself was a bit of a pig at first. Here are two entries from my diary:—

Friday, 8th April, 1938.—Tested "Castor" at Hurlingham. 200 turns, stable at last, drive a success, promises to be alright.

Monday, 11th April, 1938.—"Castor" again tested at Hurlingham. Excellent flight, R.O.G. from grass crashed high up on grandstand, only minor damage. "Castor," in order to compete for the Frog Cup

was turned into a day bomber, and in the eliminations clocked an average of 54 seconds.

Just before the trials I patented the "Moore Drive" in order that it could not be exploited to the detriment of the aero-modellist.

Since "Castor," five other twins have been built, varying from 65 to 469 sq. in., and dozens of simplifications of the drive experimented with until the total weight of the drive for a Short "Scion" of 42 in. span is $1\frac{3}{8}$ oz., including all bearings and freewheels, but not including the gearbox. The gearbox on this model is for four skeins and weighs 1 oz. A sixth model is being built by Mr. Warring, a twin pusher Wakefield and is almost ready for test. The total weight will be $8\frac{3}{8}$ oz.

The Blenheim.

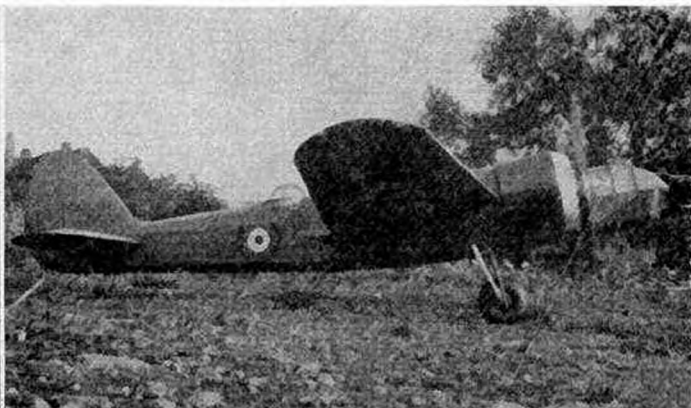
The Blenheim I chose was the Mark IV in Fighting Powers, Vol. I, and below are some specifications:—

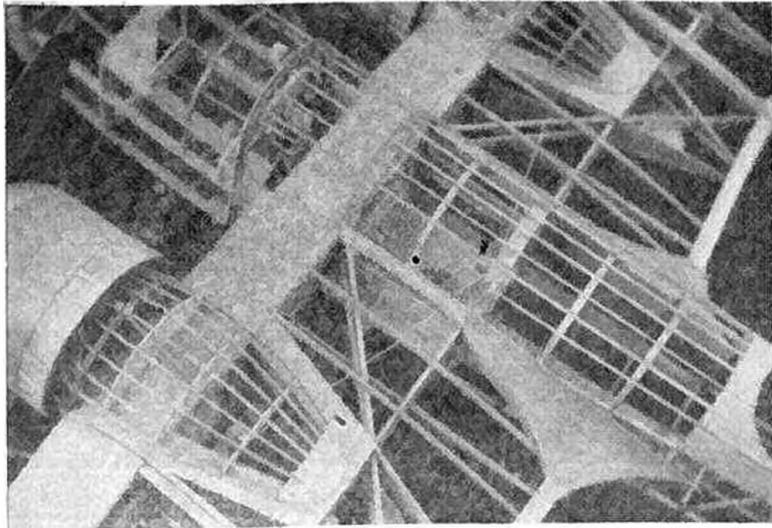
Span, $56\frac{1}{3}$ in. Length, $42\frac{3}{4}$ in. Wing area, 469 sq. in. Weight 29 oz. Wing loading, 8.9 oz. per sq. ft.

The wing loading for such a large model is not unduly high and compares favourably with "Castor's" 11 oz. plus. The Blenheim is powered by four skeins 10 strands $\frac{1}{4}$ in. by $\frac{1}{30}$ in. by 36 in. long rubber, driving two three-bladed $10\frac{1}{2}$ in. diam. 11 in. pitch airscrews through a step up gear of 4 to 3 ratio. It is interesting to note that both blade and wing area of the Blenheim are 50 per cent. greater than "Castor," while the weight has only been increased by 11 per cent. Although the Blenheim has been complete for over a month the weather has been unsuitable for real tests. She has

"Warming up"—prior to the take off.

Scale outline is faithfully preserved.





The detail design of the airframe is well illustrated in this view of the centre section and engine nacelle. Balsa wood is employed throughout.

been rigged for glide which is very flat, and has made a few short flights with 200 turns, but timing has been impossible.

The Structure.

Unlike single screwed aircraft the centre section is the primary structure, not the fuselage. The top half of the centre section was built flat on a board including the drive (which is inside the L.E.), the top half of the nacelles and central portion of the fuselage. When set, this portion was inverted, and the bottom halves of the camber ribs and fuselage were added. The nose of the nacelle is brought to a cone which is covered with jap tissue. The cowlings are lined with jap tissue in the form of a hollow truncated cone. When in place a space is left so that the air flows in at the collector ring and out at the gills.

The rear end of the fuselage was built in the form of a Warren Glider faired by stringers. The rudder and fin are integral with this portion and the tail plane is built in two halves and slotted on to pegs through the fuselage. This unit is cemented to the centre section. The cabin portion is "knockoffable" in case of bad landings and also to facilitate servicing the drive. The wings are plugged in outboard of the nacelles.

The gearbox consists of four $\frac{3}{4}$ in. gears which are arranged to slide in and out of mesh with the gears on the end of the shafts of the

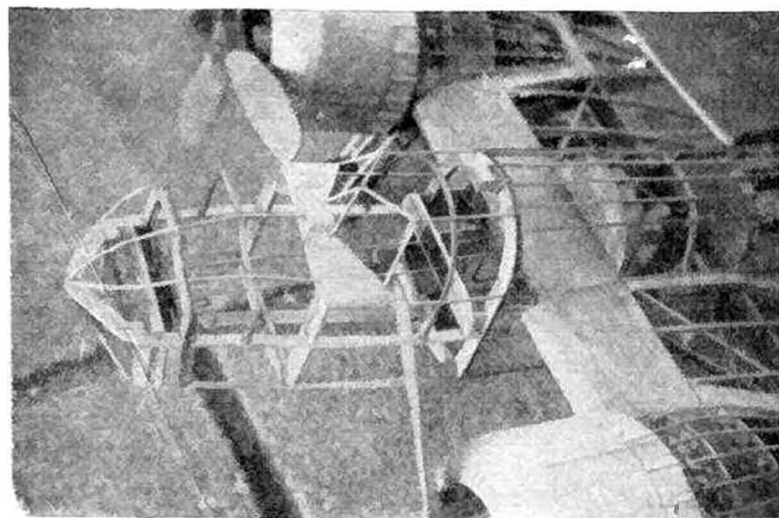
drive when the nose block is removed or replaced. Between the two driving gears is a third which has a hook for an auxiliary motor which controls the timing of the U.C. retraction. These three gears are fixed to the first bulkhead and not to the gearbox.

On the spindle of one of the $\frac{3}{4}$ in. gears is a square on to which slides the starter "Mushroom." The shaft of the "Mushroom" is made from an old clock key and the head is a piece of $2\frac{1}{2}$ in. diam. by $\frac{1}{2}$ in. thick wood. From the centre of this is a string loop swivelled in such a way that the "Mushroom" is free to revolve without twisting the loop. On the diameter of the wood disc are two holes to locate a winder bar for winding.

To wind, the "Mushroom" shaft is pushed through a hole in the nose on to the square and the winder bar



attached to the "Mushroom." In effect a crude airscrew has been added to the nose. When wound the left hand is threaded through the loop and the disc grasped tightly. The winder bar is taken off. The rubber is held by the friction between the hand and "Mushroom" disc.



The rubber motors are located within the fuselage, connected to the airscrews by the Moore patent drive. The shafts of this drive may be seen extending rearwards from the gear-box in the nose and two coupling joints are visible in front of the leading edge of the middle centre section.

The model is held in the conventional manner for launching with the left hand holding the "Mushroom" in place of the usual air-screw. To start the model the pressure of the left hand on the "Mushroom" is relaxed allowing the power to *gently* engage the airscrews and then the hand is thrown forward. The string loop round the wrist pulls the revolving "Mushroom" out of the nose.

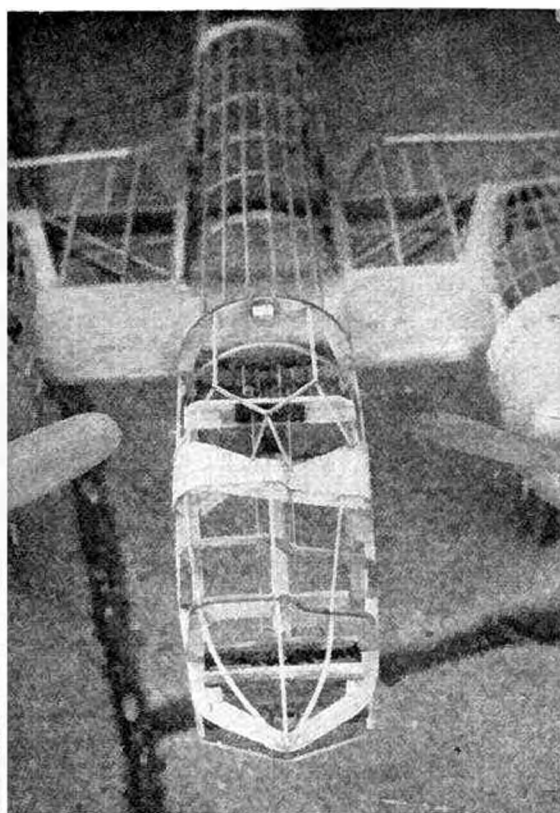
The wheels and collector rings are made of layers of newspaper soaked in flour paste and pressed layer by layer into a plaster mould. This is not only a saving of balsa, but also of weight.

The retracting gear is arranged so as not to interfere with the shock absorbing. The U.C. leg extends about 1 in. above the pivot into the nacelle. This upper portion swings in a sort of hollow quarter cheese and the "cheese" itself is pivoted on the same shaft as the legs by the two apex of the quadrants. Over the outer surface to the top end of the leg the shock absorbing



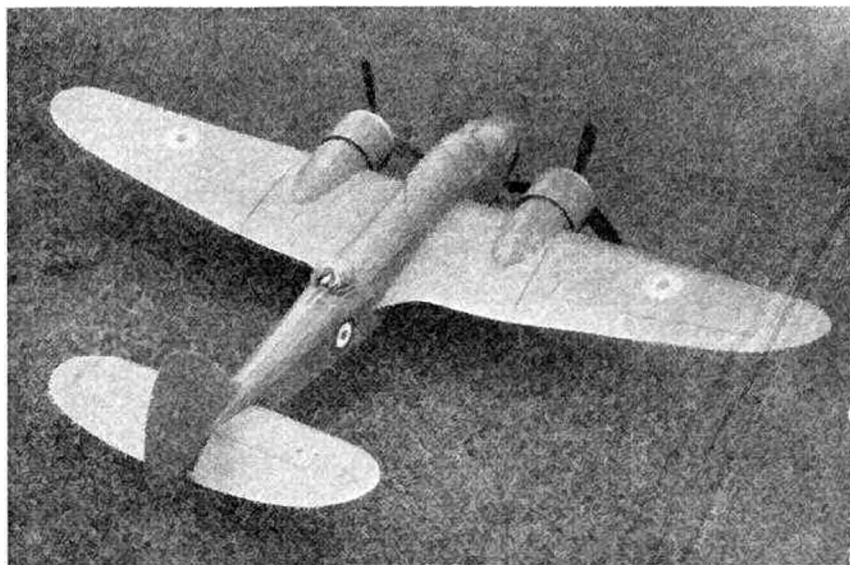
rubber is stretched. When the leg retracts the cheese swings bodily with it.

A catch is arranged to hold the cheese rigid in the down position. A rubber loaded balance arm is arranged in a trough below the fuselage in such a manner that a single cord through each wing connected from it to each leg, not only releases the catch but also retracts the legs. The timing of the swinging of the balance arm is controlled firstly by the auxiliary motor already mentioned on the spare gear on the first bulkhead. The tail hook of this is arranged over the

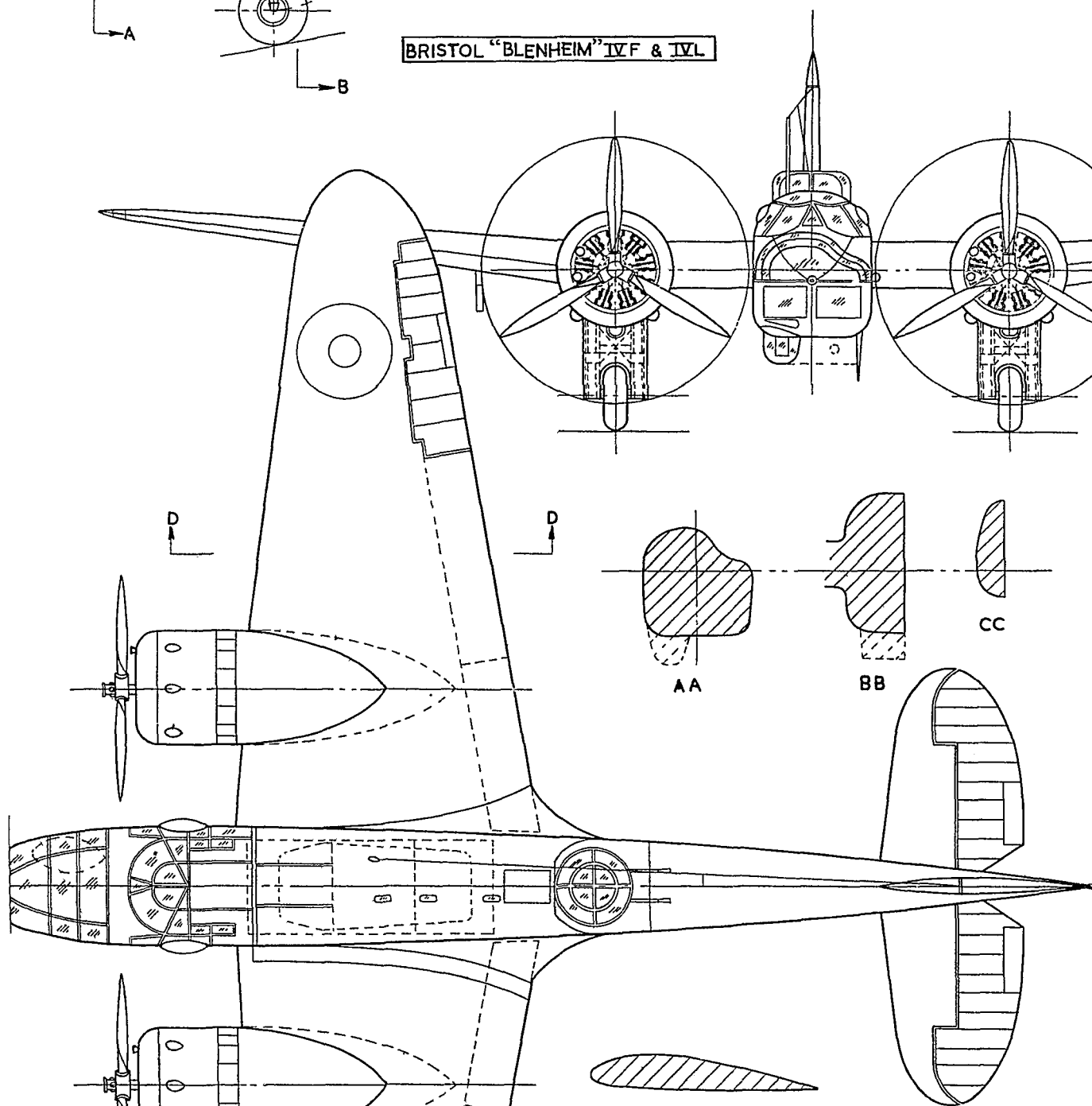
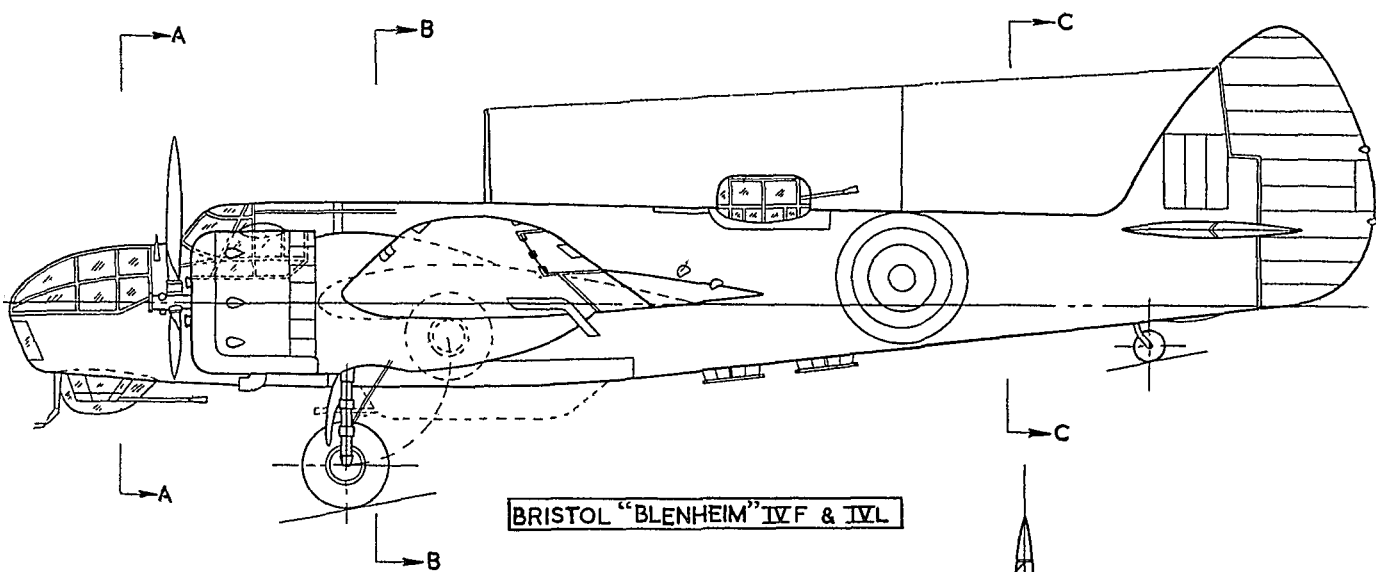


balance arms and is free to free-wheel until a catch is set engaging the balance arm, this locks the tail hook and the auxiliary motor is then wound in conjunction with the main motors. The catch is set about 100 turns before fully wound. The tension of this motor holds the catch. As soon as tension is released from this motor the balance arm is free to travel forward and retract the wheels. When the main motors

run out one of the gears is arranged to travel forward and in so doing release the balance arm for its return journey when the U.C. legs return and lock ready for landing. As the balance arm is quite long the U.C. cannot retract until the machine is sufficiently high to give ground clearance for it. The nacelle bottoms, containing the wheels are removable being held on by rubber both for safety in cross landings and servicing.



Many ingenious forms of construction have been employed on this model and the amount of work involved is indicated in these three photographs.



"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



Westland Lysander
Price 2/5



Avro Anson Price 2/5



Handley Page Hampden
Price 3/1

ADD 3d. Postage on all
Kit Prices.



Tomahawk Price 1/10



Buffalo 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 cowl and wheels, metal propellers, transfer insignia, cement. Also full-size detailed plan.



Whirlwind Price 2/5



Messerschmitt 110 Price 2/5



Blenheim Price 2/5



Heinkel H.E. III K
Price 3/1



Messerschmitt 109
Price 1/10

ADD 2½d. Postage on all
Sundry Prices.

SUNDRIES :

Hardwood cowl, 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. "

MODEL AIRCRAFT STORES (Bournemouth) LTD.

127b HANKINSON ROAD, BOURNEMOUTH

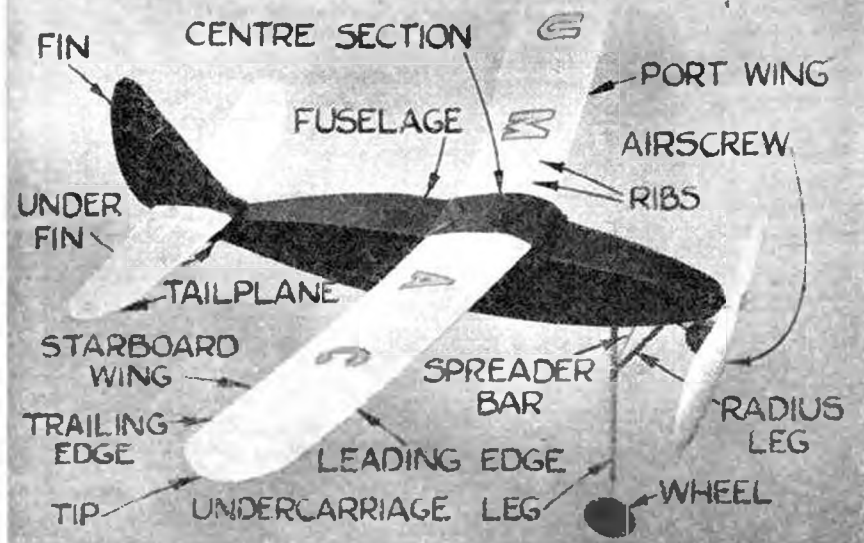
Phone : 1922 WINTON

Kindly mention THE AERO-MODELLER when replying to advertisers.

SIMPLE DEFINITIONS

562

December, 1942



The heading photograph shows a modified Percy III, built by J. S. Gilmore of Belfast from Aeromodeller Plans.

lift distribution over a rectangular wing is as shown in diagram 1b. The lift is considered uniform from the centre of the span to a point one chord length in from the tip. From here it falls off to 80 per cent. of the uniform lift at the tip. Actually the falling off in lift cannot be represented by a straight line but the approximation is reasonably accurate. For tapered wings further modification is necessary where the lift distribution

WITH the increasing number of technical articles that are now appearing in THE AERO-MODELLER, a thorough knowledge of the *basic definitions*, etc., are necessary in order to apply or test such data properly. I am convinced that many people are a little hazy over the difference between angle of incidence and angle of attack, for example, even though they use these terms quite frequently.

This little article sets out to explain some of the simpler terms in common use, together with a few formulæ, but it is by no means exhaustive.

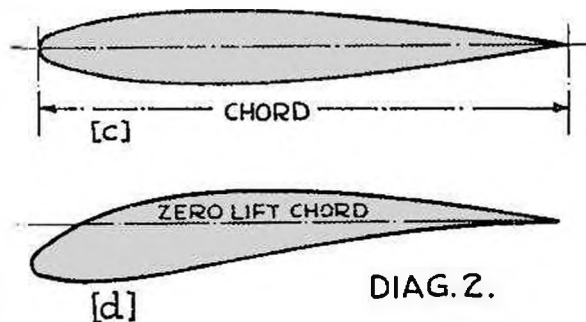
In referring to the *wing* of an aeroplane we mean to imply the whole lifting surface, while the *aerofoil* or *aerofoil section* is taken as a *section* of that wing parallel to some fixed reference line, usually the longitudinal axis or direction of flight.

The *span* is the distance measured parallel to the lateral axis from tip to tip of a wing, inclusive of ailerons if fitted. No deduction is made for any part of the fuselage that may separate the wing halves. The *effective span* is the true span less corrections for tip losses. These losses are computed as follows:

Due to the increase in pressure under the wing and decrease in pressure above the wing, the direction of flow across the bottom surface is slightly outwards and that across the top surface inwards, see diagram 1a. Air is therefore spilling over the tips, destroying some of the lift in that region. A practical measurement of

is more correctly represented by an ellipse with span as major axis.

When an aerofoil has a flat undersurface the *chord** is the length of this surface, or the projection of the aerofoil on this line produced if the nose of the section has an overhang. For an under-cambered aerofoil, the *chord* is defined as the projection of the aerofoil on to the common tangent to the trailing-edge and lowest part of the section, i.e. the projection on a straight-edge laid against undersurface. The bi-convex



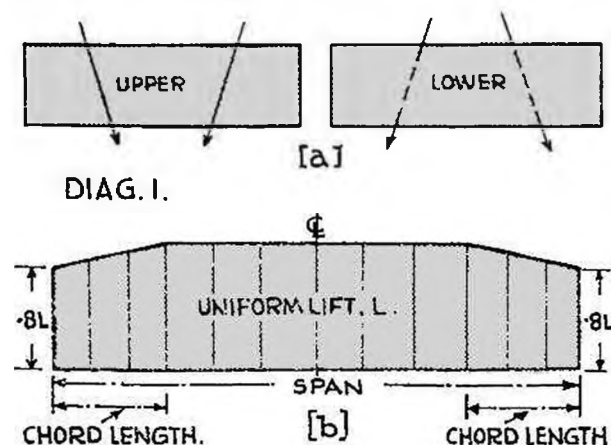
DIAG. 2.

section, diagram 2c, requires another definition. Here the *chord* is the line joining the centres of curvature of leading and trailing-edges of the aerofoil section. This is also the *geometric chord* in this case, but the same principle applies to all other sections in defining geom. chord.

The chord of no lift, or *no lift chord*, is a line drawn from the trailing-edge of the section in such a direction that when this line is parallel to the airflow the section generates no lift. This coincides with the chord and geometric chord of a symmetrical section, but not on any other types.

The *average chord* of a tapered wing is the mean arithmetic chord found by adding the two extreme chords, root and tip, and dividing by two. For curved wings and/or tips it is best expressed as:—

$$\text{average chord} = \text{span} / \text{aspect ratio}.$$



The *mean aerodynamic chord* is the chord of an imaginary aerofoil which would have the same aerodynamic forces acting upon it during flight range.

The *aspect ratio* of a rectangular wing is simply the ratio of the span to the chord. For a tapered wing, aspect ratio = span/average chord.

$$\text{i.e. A.R.} = \frac{b}{\frac{C_1 + C_2}{2}} \quad \text{Where } b = \text{span}$$

$$C_1 = \text{max. chord}$$

$$C_2 = \text{min. chord}$$

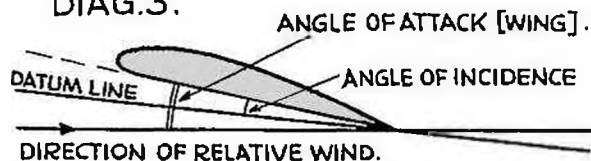
Multiply top and bottom by b .

$$\text{A.R.} = \frac{b^2}{\left(\frac{C_1 + C_2}{2}\right)} \quad \text{but } b \left(\frac{C_1 + C_2}{2}\right) = \text{area of wing.}$$

\therefore Aspect ratio = (span)²/area.

This formula is the simplest to apply to all but purely, "straight-edge" wings.

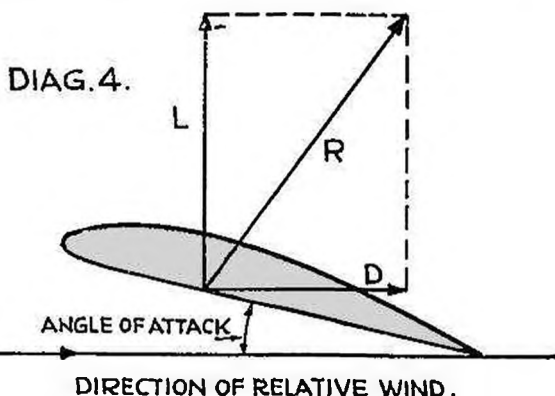
DIAG. 3.



Now to angles, see diagram 3. The *riggers angle of incidence* is the fixed, pre-determined angle at which the chord is set with reference to some datum line, usually the centre line of the fuselage. This angle is *positive* if the leading-edge of the chord or projection thereof is above this line or *negative* if below. This angle does not change whatever the altitude of the 'plane during flight—unless by some mechanical means or if the rubber band fixings are too slack! The angle of incidence when the *geometric chord* is used as one bounding line is sometimes referred to as *theoretical incidence* or *geometric incidence*.

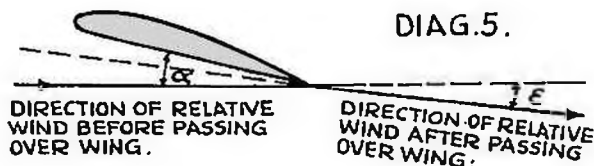
The *angle of attack* of the wing is the angle at which the direction of relative air flow meets the chord line. This obviously depends upon the altitude of the 'plane and is variable during flight. If the fuselage datum line is parallel to the direction of flight (i.e. to the relative air flow), then the angle of incidence is equal to the angle of attack and since it is common practice to arrange this, as then fuselage drag is a minimum, this sometimes causes confusion between these definitions. When the fuselage datum line is inclined upwards the angle of attack only increases, both of wings and fuselage, for in just the same way a fuselage can have an angle of attack. Therefore:—

(Angle of attack) wings = (angle of attack) fuselage + angle of incidence.



The *absolute angle of attack* is the angle of attack measured from the zero lift chord, and wind tunnel results are sometimes given in terms of this so care is needed to avoid mis-reading some reports. The *critical angle of attack* is that angle of attack where the flow over the aerofoil break up, i.e. the stalling angle.

DIAG. 5.



In three-dimensional flow, air in passing over any lifting surface of finite aspect ratio is deflected downwards. This modifies the direction of relative wind and has the effect of decreasing the angle of attack. A wing of infinite aspect ratio is free from this and forms a basis for comparison.

Only part of the actual measured or geometric angle of attack is effective then, the remainder is the "down-flow loss." The *effective angle of attack* then is that part which is useful in producing the lift and, since "down-flow loss" disappears at infinite aspect ratio, is often referred to as the *angle of attack for infinite aspect ratio*.

The "useless" part of the measured value is called the *induced angle of attack*. Thus we have:—

$$\alpha = \alpha_o + \alpha_i$$

Where α = actual or geometric angle of attack

α_o = effective angle of attack

α_i = induced angle of attack

α_i is dependent upon aspect ratio and an approximate equation giving true value of α is:—

$$\alpha = \alpha_o + \frac{18.24 C_L}{AR} \quad (\text{where } \alpha_o = \text{angle att. infinite A.R.})$$

or, to change from one aspect ratio to another

$$\alpha_A - \alpha_B = 18.24 C_L \left(\frac{1}{AR_A} - \frac{1}{AR_B} \right)$$

where the suffixes A and B denote different models both with finite aspect ratios.

Consider now the *resultant aerodynamic force* acting upon the wing. This is usually resolved into two components at right angles, *lift* perpendicular to the direction of the *relative air flow* and *drag* parallel to the relative air flow. The standard lift and drag coefficients were defined by the equations:—

$$L = K_L S \rho V^2 \quad \rho = \text{density of air (slugs./cu. ft.).}$$

$$D = K_D S \rho V^2 \quad S = \text{wing area (sq. ft.). } V = \text{velocity (ft./sec.).}$$

The modern tendency is to use the dynamic pressure $\frac{1}{2} \rho V^2$ in the equations, thus introducing new co-efficients:—

$$L = C_L S \rho / 2 V^2$$

$$D = C_D S \rho / 2 V^2$$

There is still another system employed where *engineering coefficients* are used, viz.:—

$$L = K_y S V^2 \quad S = \text{wing area (sq./ft.) as before}$$

$$D = K_x S V^2 \quad \text{but } V = \text{velocity in m.p.h.}$$

(Continued on page 611.)

*Note.—The term *chord* is used indiscriminately for both chord length and direction. The length is used mainly in connection with plotting sections and consideration of moments, whilst the direction is concerned with rigging angles.



To Young Men....

(AGE 16-19)

A COMMISSION for you! As an engineer-officer in to-morrow's mechanised Army, the Royal Navy, or the R.A.F. Your technical training, with maintenance, free. A foundation for a career in or out of the Services.

Many more technical officers will soon be required for the fighting services. To have charge of the machines of war—guns, tanks, planes, marine machinery. Tomorrow's needs are being met to-day by the training of picked young men. Hence the establishment of

ENGINEERING CADETSHIPS

open to youths aged 16, 17, 18, 19, who

1. Left school before October, 1942;
2. Are not already engaged in any branch of engineering;
3. Have obtained at least their School Certificate, with credit in Mathematics, or General Science, or Physics. (Boys from Scotland must have the equivalent.)

IF YOU are qualified as above, and are keen on mechanics, send for a form of application. If accepted for a cadetship you will receive Free Training, home based, with liberal maintenance allowance. Never before has such an offer been made to lads. In your country's interest, as well as in your own, consider carefully this opportunity.

Write for an explanatory leaflet, marking your envelope "Engineering Cadetships" to:

THE MINISTRY OF LABOUR & NATIONAL SERVICE, SARDINIA STREET, LONDON, W. C. 2

Issued by the Ministry of Labour & National Service

Announcement

We have a few

**PAWLOWINA DURATION PROPS
IN STOCK (No Lists).**

12 in. diameter ...	2/10	Post Free.
13 " " " ...	3/-	"
14 " " " ...	4/10	"
15 " " " ...	5/6	"
16 " " " ...	5/10	"

Only a few left. Send your P.O. now.

LIST OF INSIGNIAS AND
COCKPIT COVERS S.A.E.
(Id. STAMP)

THE MODEL SHOP

2. COLLEGE ROAD, BARRAS BRIDGE
NEWCASTLE-ON-TYNE



THE "FLUXITE QUINS" AT WORK

"You sound quite per-
turbed"—exclaimed OH!
"All you girls are the same—
that I know!"
Don't get so excited,
it'll soon be FLUXITED,
When over the wavelets we
go."

See that FLUXITE is
always by you—in the
house—garage—work-
shop—wherever speedy
soldering is needed.

Used for 30 years in Government works and by leading
Engineers and Manufacturers. OF ALL IRONMONGERS, IN
TINS, 8d., 1/4 & 2/8. Ask to see the FLUXITE SMALL
SPACE SOLDERING SET—compact but substantial, complete
with full instructions—7/6. Write for Book on the Art of
"SOFT" SOLDERING and for leaflet on CASE HARDENING
STEEL and TEMPERING TOOLS with FLUXITE. Price 1d. each.

TO CYCLISTS! Your wheels will not
keep round and true unless the spokes
are tied with fine wire at the crossings
AND SOLDERED. This makes a much
stronger wheel. It's simple with—
FLUXITE—but IMPORTANT.

The "FLUXITE" GUN puts FLUX-
ITE where you want it by a simple
pressure. Price 1/6 or filled 2/6.

FLUXITE LIMITED, Dept. A.M.
Dragon Works, Bermondsey St., S.E.

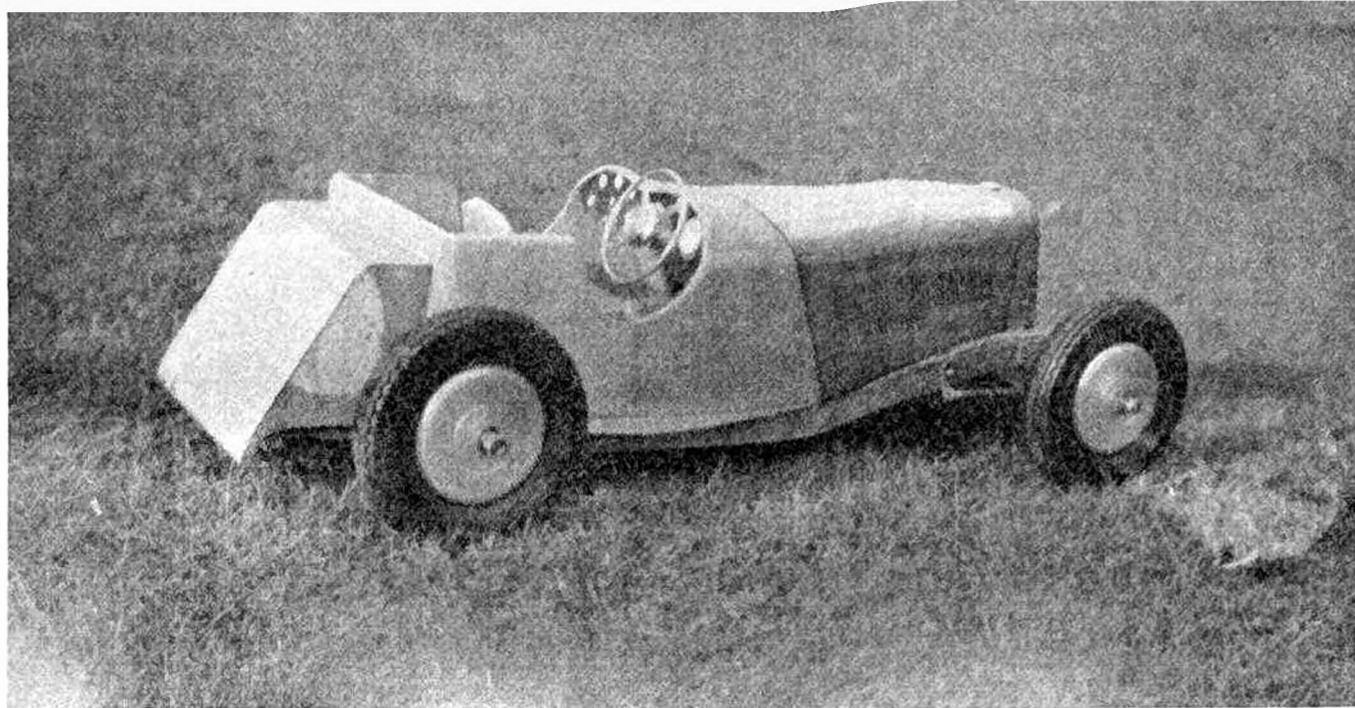
ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING



Kindly mention THE AERO-MODELLER when replying to advertisers.



A 10cc. MODEL RACE CAR—THE "SS 100"

A Scale Model, approximately 1/5 full size.

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

BEING, personally, a "scale" fan, it follows that I would prefer to build a replica of a full-sized car rather than work out a free-lance design of my own.

The model I chose was the well-known "SS 100," a $2\frac{1}{2}$ -litre model of which I own. In its touring form, complete with mudguards, lamps, screens, etc., the car has a maximum speed of just on 100 miles per hour, with a quite phenomenal acceleration. The $3\frac{1}{2}$ -litre model (chassis and body exactly the same, the only difference being the slightly larger engine) has lapped Brooklands at an average speed of 112 miles per hour, with a fastest lap of 118 miles per hour.

The wheel base of the full-sized car is 8 ft. 8 in., track 4 ft. 6 in., and the overall length 12 ft. 9 in. 5.5×18 tyres are fitted to Dunlop racing-type wheels.

To preserve the scale effect it was necessary to have

scale type tyres, and here the India Tyre and Rubber Company favoured me by giving four of their miniature tyres as supplied before the war, embracing glass ash trays, and distributed as part of their advertising campaign. These tyres are 5.4 in. in diameter, and by dividing this figure into the overall diameter of the full-sized tyres, I arrived at a scale ratio of approximately $5\frac{1}{2} : 1$, every part of the model car being worked out so as to match up with the scale of the tyres. The overall length of the car has thus come out at some 26 in.

Following are the calculations which were made in regard to the performance anticipated with an all-up weight of 10 lb., and an estimated output of $1/5$ h.p. from the 10 cc "Dennymite" engine which I decided to fit:—

Assume $F = .1$

Assume frontal area $= 10 \square'$

Then:—

$$F = .1 \times 10$$

$$= 1 \text{ lb. rolling friction.}$$

And:—

$$D = K A V^2$$

$$= .001 \times \frac{10^1}{144} \times 3600$$

$$= .001 \times .07 \times 3600$$

$$= .1 \times .07 \times 36$$

$$= .252 \text{ lb.}$$

H.P. required:—

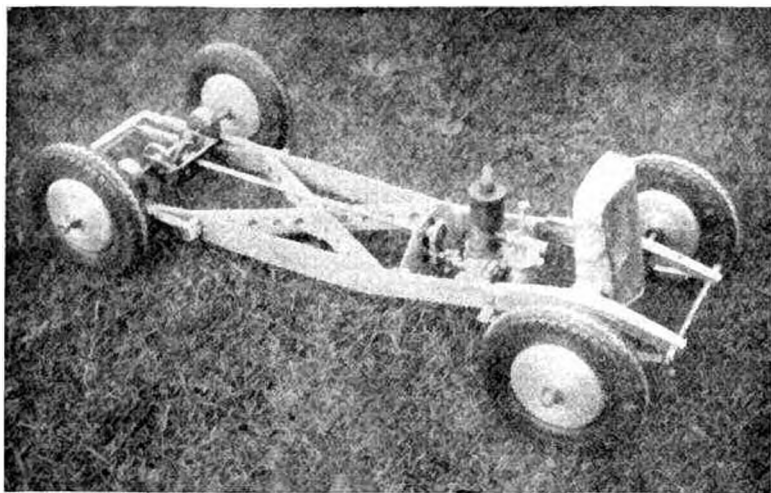
$$= \frac{R V}{375}$$

$$= \frac{(14.25) \times 60}{375}$$

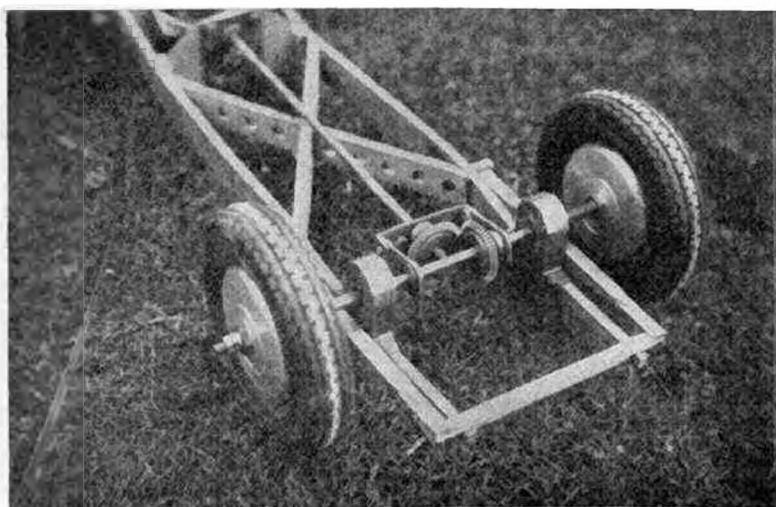
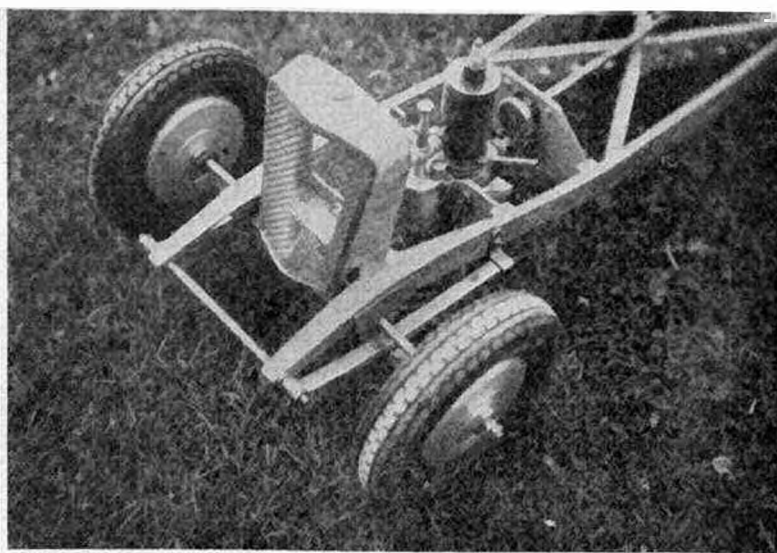
$$= \frac{75}{375}$$

$$= .2$$

$$= 1/5 \text{ h.p.}$$



The right-hand photograph shows how the engine and the transmission shaft are mounted on the chassis. The next photograph is a close-up of the rear wheel-drive and shaft. The latter is completely covered by a hollow casing when the body is in position as shown in the bottom illustration.



in a piece of rubber supported in a steel frame underneath the radiator. The outer ends of the front axles are again carried in ball races which may be moved backwards and forwards underneath the dumb-irons, thus allowing the front wheels to be slightly swivelled for round-the-pole running.

Dummy springs, made of 1/16 in. three-ply, are arranged on all four wheels, and generally I think it may be fairly claimed that the chassis does look pretty real.

The engine is mounted on a bearer of 1/8 in. ply, and the steel plate, carrying the rear end of the engine shaft and the front end of the main driving shaft to the back axle, is mounted on 1/16 in. three-ply. (The fly-wheel was

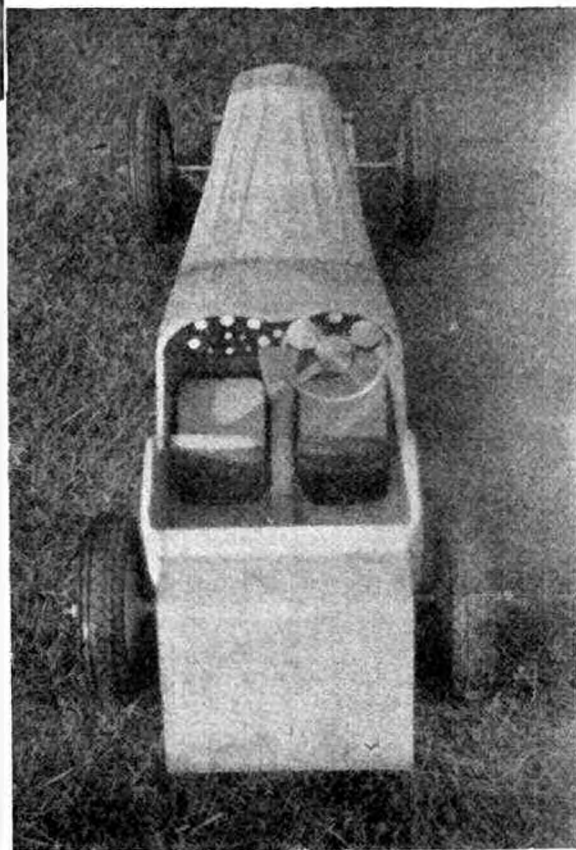
On this basis the model should have a maximum speed (on the straight) of 60 miles per hour, at which speed the road wheels would be turning at 3,720 r.p.m.

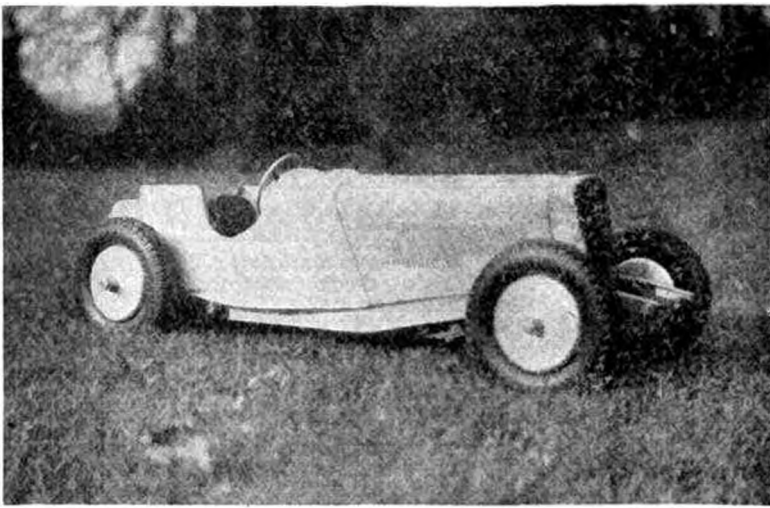
Taking the engine speed at 5,000 r.p.m., a gear ratio of 1.35:1 was arrived at and, as can be seen from the photographs, this is taken care of by straight spur gearing mounted behind the fly-wheel.

Messrs. SS Cars, Limited, were kind enough to provide me with an outline drawing of the chassis, and of course I had my own car from which measurements could be made and scaled down accordingly.

The chassis members were each built from two strips of 1/16 in. three-ply, sandwiched between which were strips of 3/16 in. square birch. Cross-bracings of 1/32 in. three-ply, again embracing 3/16 in. square birch, were built, as may be seen in the photographs, with lightening holes punched in the ply in the approved manner. The ply and birch were glued together and nailed at 1/4-in. intervals, and when assembled, the chassis, supported at either end, would support the weight of a child standing in the centre. The back axle is "solid," of 1/4 in. diameter, and is mounted on twin pairs of ball races. These pairs of ball races are each enclosed in soft india-rubber, enclosed in a sheet metal casing, nailed and secured by cord to the rear end of the chassis.

The front axle is split to allow of the wheels being inclined at the correct camber. Thus, there are two front axles, the inner ends abutting and being supported by ball races, again enclosed





The top photograph shows how the body and bonnet are fitted in place over the chassis. The body is first attached, followed by the bonnet which mates up with the rear of the radiator and the front body former. The middle photo shows the dummy radiator and the front axle springing to advantage. A view of the entire chassis construction and mechanical details is given in the lower photograph.

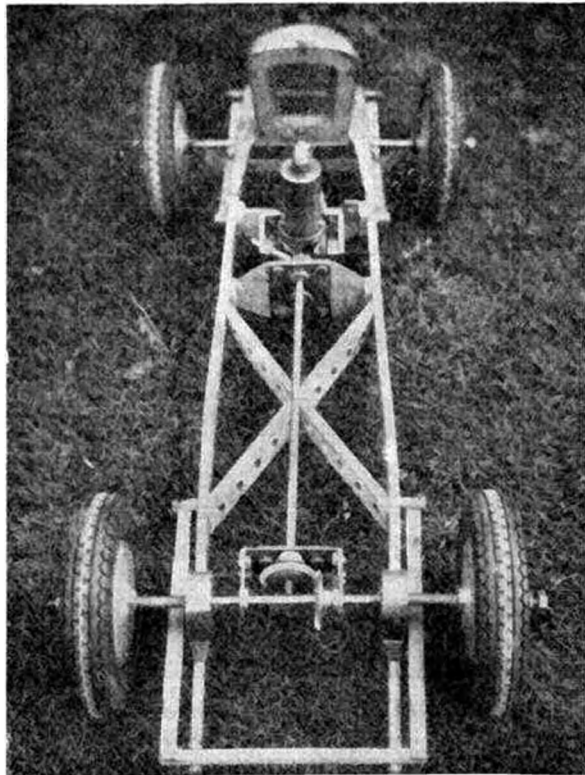
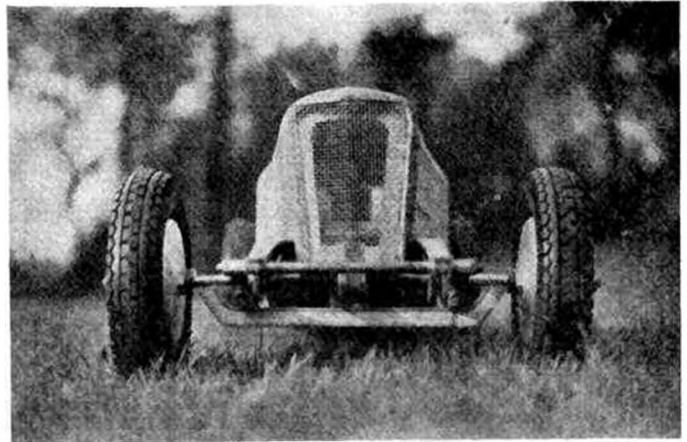
removed for the photographs to be taken so that the arrangement of the gears could more clearly be seen.)

The drive at the back axle consists of a pair of equal bevels, their shafts again being carried in ball races. Altogether there are 13 ball races in the car.

The radiator was built up from ply and hard balsa, the stone guard being of brass, and of exactly the right gauge for thickness of wire and mesh. The seats were built of balsa, padded, and covered with thin red leather.

As will be seen in one of the photographs, only one seat was covered, but since then the other seat has been covered and the interior of the body lined with red leather. The wheels were made from scrap aluminium pulley wheels. They are in halves, there being a ridge on the circumference of each half which grips the inner flanges of the tyres and so makes the half discs solid with them.

The body was built of balsa mounted on $\frac{1}{8}$ in. ply



base and strengthened appropriately with ply and birch strips. The bonnet is of $\frac{1}{16}$ in. ply and is surely a work of art.

There are 246 louvres, each one being individually shaped, glued in position and finally trimmed. The body, bonnet and radiator were built by W. A. Dean, of THE AERO-MODELLER staff, the louvres on the bonnet being made and affixed by B. Alder (age 16 $\frac{1}{2}$), also of the A.M. staff.

The chassis was built by myself, whilst Mr. Rushbrooke constructed the gear box and reduction drive behind the engine.

Altogether the car is the result of a co-operative effort by several persons to turn out a really scale-looking job, and I think the photographs show that this object has been achieved.

As we go to press, preliminary trials are about to take place, and in a later issue a full report of the car's performance will be given together with further photographs of the car when it has been painted and given its racing numbers.

Full size construction is followed as far as possible, even to springing. The axles run in ball races, encased in rubber banding, allowing a certain amount of flexibility and shock absorption.

SKYBIRDS

"ONCE BUILT NEVER FORGOTTEN"

Indispensable for the Services: A.A. Units, Searchlights, Royal Observer Corps, Air Cadets, Roof Spotters and Home Guards.

SKYBIRDS—The FIRST and still the best 1/72nd TRUE TO SCALE Solid Model AIRCRAFT CONSTRUCTION

These are complete sets of parts for assembling various types of aircraft. Owing to restrictions due to the war, the range is at present limited to the most popular types, which include:

SPITFIRE 3/- HURRICANE 3/- TOMAHAWK 3/6
LIGHTNING 6/6 MESSERSCHMITT 109 F 3/-
MESSERSCHMITT 110 6/6 & MIG-3 (Russian) 3/6

This fascinating hobby has captured the imagination of all persons who are interested in aviation and aeronautical modelling—if you make a "SKYBIRD" it will mean more to you than a mere shop-made replica, for it will represent a personal triumph.

Join the 'SKYBIRDS' LEAGUE of model aircraft constructors. There are over 16,000 registered members. For particulars write (enclosing postage 2½d.)

SKYBIRDS — THE MOST POPULAR HOBBY TO-DAY

SKYBIRDS (Desk A.M.)
9, Southampton Place, Holborn,
LONDON, W.C.1

THE MODEL HOUSE FOR PROMPT SERVICE

I regret that owing to restrictions that it is impossible to advertise wood for sale. Particulars can be obtained from my list. Send THREE PENNY STAMPS for same.

THE IDEAL PRESENT FOR THE HOBBYIST

"KEIL-KRAFT." THE ALL BALSA WOOD KIT. Flying Models, 24-in. wing span. Popular Models.

Spitfire, Hurricane, Heinkel, Messerschmitt, Miles-Master, Fairey-Battle, Defiant, Curtiss, Skua.

The Complete Kit, price 5/6 Postage 6d. extra.

All goods carefully packed and dispatched to any address. (No Kits can be sent to any part of Ireland.)

PLEASE ALWAYS GIVE ALTERNATIVE CHOICE.

"CLUB" Kits. The Scale Kit. This is a most acceptable Present.

Spitfire, 4/10 Skua, 6/8 Taylor-Cub, 4/3
Lysander, 4/10 Puss-Moth, 3/7 Monocoupe,
3/7 Gladiator, 7/9 White-Wings, 7/8
Duration, 17/-

Post 4d. extra. Except Duration, post 1/-

I wish all my Customers the Compliments of the Season.

GEORGE D. CAMPBELL
(DEPT. AM.)

46 High Street, Dumfries

WATERSLIDE TRANSFER INSIGNIAS

give that professional finish

PRICES, PER DOZEN :

Diam.	Red and Blue	Red, White and Blue	Red, White Blue, Yellow	Russian	American	Polish	German Crosses	German Swastikas
1/16"	—	4d.	—	—	—	—	—	—
1/8"	—	—	—	4d.	—	—	—	—
3/16"	4d.	4d.	4d.	4d.	4d.	4d.	4d.	4d.
1/4"	6d.	6d.	6d.	6d.	6d.	—	6d.	—
5/16"	9d.	9d.	9d.	9d.	9d.	9d.	—	9d.
1 1/2"	1/-	1/-	1/-	—	1/-	—	1/-	1/-
2"	1/6	—	1/6	—	—	—	1/6	1/6

RUDDER STRIPES, Red, White and Blue, 1/4" and 1/2", in 24" lengths, 4d.

FULL ALPHABETS, A to Z 1/2", 3/8", 1/2", 2 1/2d. 3/4", 3d. per set.

NUMERALS, 0 to 9 .. 1/4", 3/8", 1/2", 2d. 3/4", 3d. per set.

Ample supplies of brass tube, 20, 18 and 16 g. piano wire, clear and coloured dopes, cement, rubber 'lube, banana oil, wax paper, English black and white tissue paper, etc.

Also full range of "Silverwing" solids.

PLANS

Flying Minutes, 48" span duration plane .. 3/6

Halfax "Lancer," 37" span .. 2/6

Halfax "Commando," 21" span duration plane 1/-

BRADFORD AERO MODEL CO., LTD., 75a, Godwin Street, BRADFORD

Telephone :
Bradford 12251

Kindly mention THE AERO-MODELLER when replying to advertisers.

MAKE YOUR OWN TRANSFERS

By P. COOKSLEY

NOW with solid models so much to the fore and the necessity of accurately reproducing the various insignias and markings employed on the full size machines the modeller finds that transfers offer the solution to an otherwise ticklish problem. It is not everyone who is able to paint a small insignia on the rounded surfaces of assembled models and so the following description of how to make transfers at home should be welcome.

First, some drawing paper and a small piece of tissue paper are required and the tissue is stuck to the drawing paper. Waterproof glue must *not* be used for this operation for, as we shall see later, the stiff paper merely forms a temporary backing and is eventually removed.

On to the tissue the insignia or roundel is drawn in pencil and the design carefully painted in, working from the centre outwards and letting one colour dry before the application of the next. Waterproof colours *must* be used and for this purpose coloured red dope is excellent. When completed the paper should be trimmed from around the badge and the backing removed by soaking in hot water for about two minutes. The tissue is then slid off and transferred to another piece of this paper which has been coated with non-waterproof glue. Great care must be taken to ensure that the badge is not strained or crinkled at this stage; it is best *blown* on from above as the fingers tend to stick.

When the gum is dry the paper is again trimmed, but this time square, leaving a margin around the badge. In marking out these badges care should be taken if a compass is used not to make a large hole with the point as paint may go through and stick to the backing.

The transfer is applied to the model in the same manner as those of the commercial variety. Namely, it is first of all soaked in hot water for a minute or two and then carefully slid off into position on the model. Not only has this the advantage of avoiding painting directly on to the model but it enables an insignia of any size or design to be drawn out and attached to the finished product. A further point of interest is that mistakes can readily be scrapped.

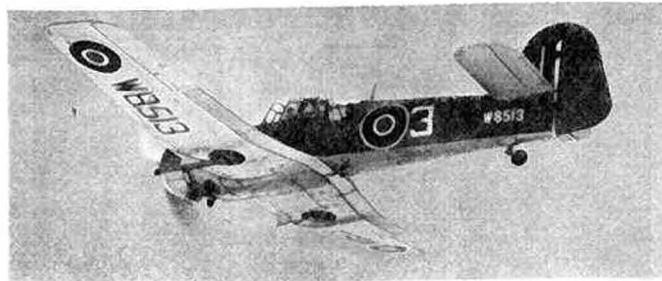


Photo: "The Aeroplane."
MILES MASTER III. (Training Command).

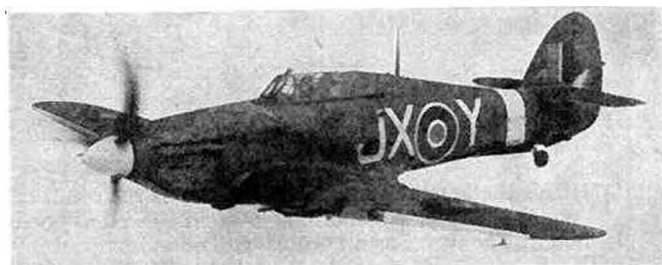


Photo: "The Aeroplane."
HAWKER HURRICANE IIc. (Fighter Command).

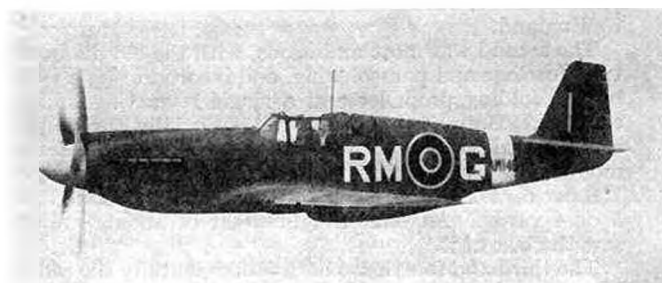


Photo: "The Aeroplane."
NORTH AMERICAN MUSTANG I. (Army Co-operation Command).

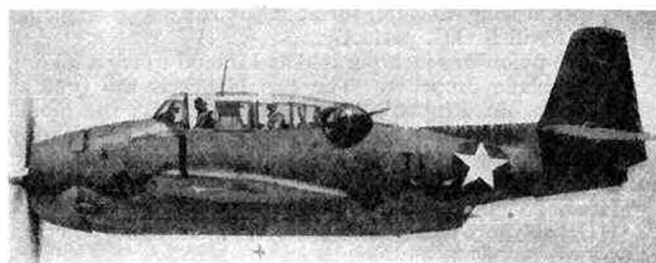


Photo: New York Times Photos
GRUMMAN TBF-1, AVENGER. (U.S. Navy).



Photo: "The Aeroplane."
SPITFIRE Vb, with latest U.S. markings.



Photo: Peter M. Bowers.
LOCKHEED LODESTAR. (Netherland East Indies Air Force).



Photo: Sport and General.
THE NEW JUNKERS JU 87D, used on the Russian Front.

WATTIE

570

December, 1942



By F/LT. R. WATSON

THIS is the fourth model of its kind and is the result of trying to develop something efficient as well as good looking. The first was an ordinary diamond parasol job with a fixed landing gear.

It flew very consistently round about the 1½-2 mins. mark, but never had any thermal flights of note. The best flip was one of 2 mins. in a snowstorm in France in January 1940, but it was left behind when we evacuated to England.

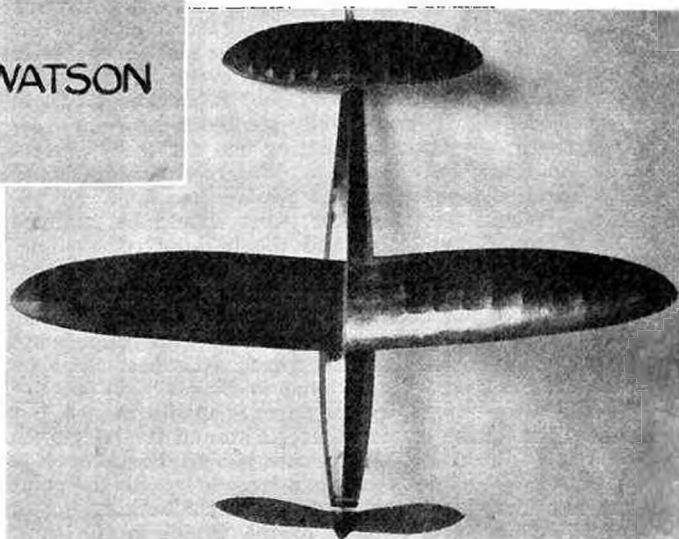
The second was more ambitious, with the old diamond type fuselage and parasol wing, and incorporating a two-bladed folding propeller and a single retracting undercarriage. Both worked very well, especially the undercarriage, which was kept down by the weight of the model, never retracting permanently, and was always 100 per cent. efficient, even though the model taxied for 3 or 4 yards. An out of sight flight of about 8 mins. saw the last of it.

The third and fourth are both fundamentally the same, but No. 4 has had the bad faults of No. 3 eliminated from it. The idea was to produce something with good looks, but which would also fly with the best of them.

A streamlined fuselage, single fixed undercarriage and elliptical wings and tail surfaces. It has only a single fin but it will R.O.G. perfectly.

The pylon was incorporated as I intend to try a folding single-blade propeller. The two blader is the type as used on Mr. Rippon's "George" and suits the model well. The one ounce of rubber will give it quite a snappy flight, but by increasing it will give a real fast climb and it gets almost as much height as a Wakefield, with a lovely flat glide at the end. It was found on the Mark III that the wings were a little too pointed at the tips,

An extremely efficient and modern duration machine which may be flown under Flight Cup rules or, with additional power, in any of the 'Open' contests such as the Gamage Cup, etc. No trouble has been experienced with the mono-wheel undercarriage and the take-off is both rapid and stable. Detailed weights of each component are given at the end of the article and the builder should follow these carefully.

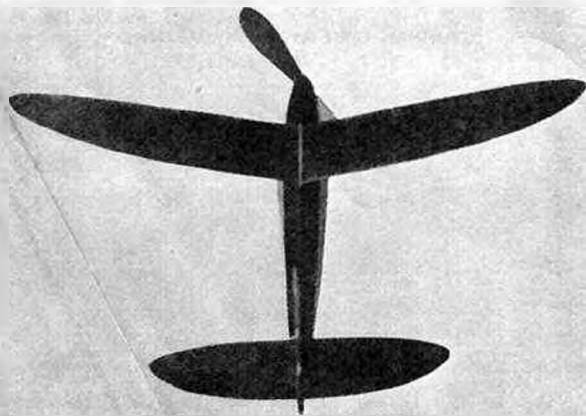


so the Mark IV is a little higher aspect ratio and the tip area increased. This has cleared up the slight viciousness on the turns, if the model was given too much rudder. The Mark IV also has a slightly slimmer nose than the other.

Construction.

Build the fuselage first, using hard $\frac{1}{4}$ for the longerons making it square at first. Cut all the cross braces at the same time and this will make them all the same length, resulting in a true fuselage. Put in the rear rubber anchorage pieces of $\frac{1}{4}$ in. sheet. Lay the square fuselage formed so far on a sheet of $\frac{3}{8}$ in. soft sheet and with a pencil mark off the side contour, and then from the plans measure off the thickness of the side stringers. This will ensure that they fit on the sides, but take care that they are centred when cementing them on. The top one is cut away at the rear where the tail plane rests, and is sheeted in either side for covering. Thin ply is glued on the nose and rounded, and the front filled in with 1/16 sheet for 2 in. Cut the hole for the nose plug to the inside of the four main longerons. Give the whole a good sanding all over and put on the incidence blocks on the tail, also the paper tubes to hold the rudder bamboo plugs. Make the landing gear of 16 gauge wire and bind and cement in place.

The nose block and propeller are carved and assembled, using a ball thrust bearing if possible. The clutch wire is securely soldered on the shaft. Then the brass bearing for the propeller put on and a small piece of brass tube soldered on the end so that the propeller can be pulled for winding. If the hole gets a bit loose put a spot of cement in the hole, wiggle a piece of wire in it and allow to set. Give the propeller three or four coats of banana

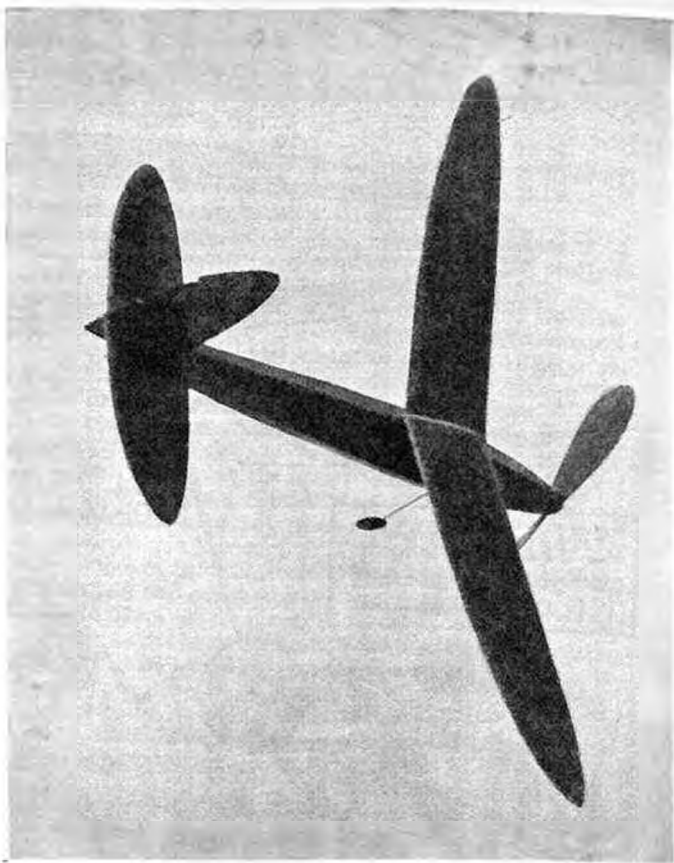


oil and polish. The tail plane and rudder are next built up, using hard $\frac{1}{4}$ in. sheet for the leading edges and medium for trailing edges. The centre section of the tail plane is covered on top with $\frac{1}{32}$ in. sheet. The wire hooks are securely cemented to the rudder. For those who wish it a tail plane with twin rudders can be used, but I find that for competition work that the rudders keep breaking off at the critical moment. However, it is a matter of taste.

The wings are built next. Build the whole flat, using $\frac{1}{4}$ in. medium soft for the trailing edge and hard $\frac{1}{4}$ in. square for the leading edge. The main spar is tapered towards the tips. The $\frac{1}{32}$ in. ribs are cemented in place then the dihedral put in, giving $3\frac{1}{2}$ in. under each tip, ply reinforcement pieces are put in at the centre and well cemented. The sheet $\frac{1}{64}$ in. leading edge covering is put on and is not very difficult if it is cut to approximate shape first, then cemented to the top of the ribs and held on with pins while the front is trimmed to shape; $\frac{1}{64}$ in. cap stripping follows top and bottom, and the centre section covered also. Let the whole dry thoroughly before trimming the $\frac{1}{4}$ sheet trailing edge to conform with the contour of the ribs. Give the whole a careful sanding.

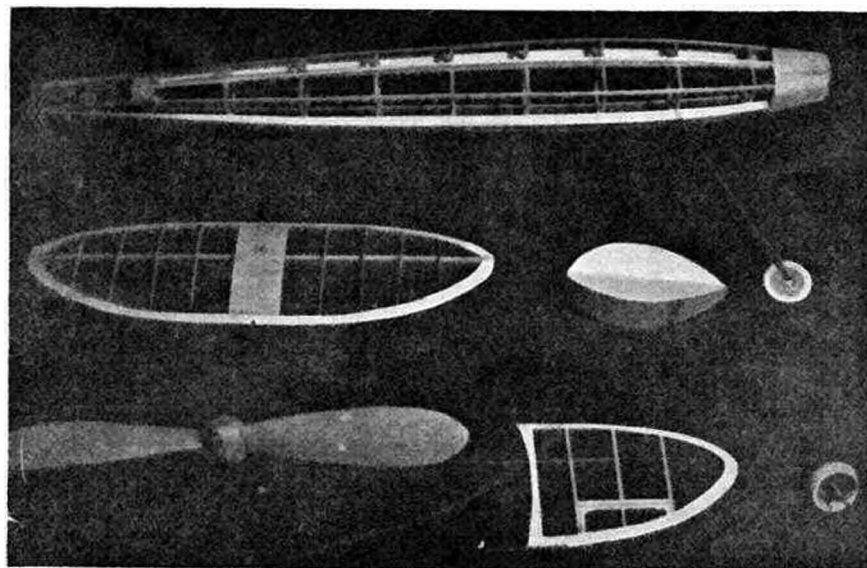
The pylon is made up of $\frac{1}{4}$ soft sheet and covered with $\frac{1}{32}$ sheet sides. Make sure that the wings bed down on one side and the fuselage on the other. Cover the whole with tissue, water spray and give a coat of banana oil. Give a second coat to the fuselage and pylon. The pylon should not be glued to the fuselage yet, but the wing retaining hooks on it should be glued in place. Put a rubber motor in and put the tail unit and propeller on. Balance the whole and mark the C. of G. If the weights of the components have been kept to those specified the C.G. position will be about where shown on the plans.

Cement the pylon on the fuselage with the centre over the C. of G. and leave to set. The whole model was given a coat of red "Nu-Brite." The wing construction is not too difficult, but those who wish something easier should use $\frac{1}{16}$ in. sheet ribs and $\frac{1}{32}$ sheet covered leading edge with no cap stripping, but the wing made as explained before has very clean lines and practically no sag in the tissue.



The model flies to the right and one ounce of rubber will give good flights with a power run of about 45 secs. Make sure the glide is flat before putting on power. On full winds it may need a little right thrust, but practically no down thrust. Increasing the power will give it a terrific climb and will get it up as high as any Wakefield.

Test flights were about 2 mins. on six-seven hundred turns in still evening air and up to $2\frac{1}{2}$ mins. on full winds. The model for R.O.G. flights should be placed with the wind on the port bow and slightly right wing down, when it is released the torque tends to put the left wing down. While the left hand releases the propeller, the right hand supports the left wing and follows through slightly to keep it up. Take care in the construction, use a good cement and the result will be worth while.



Uncovered.

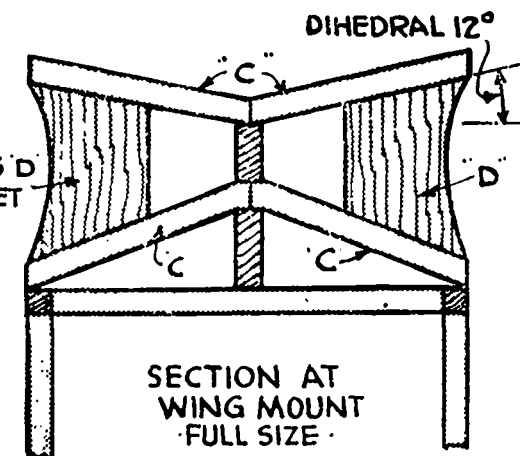
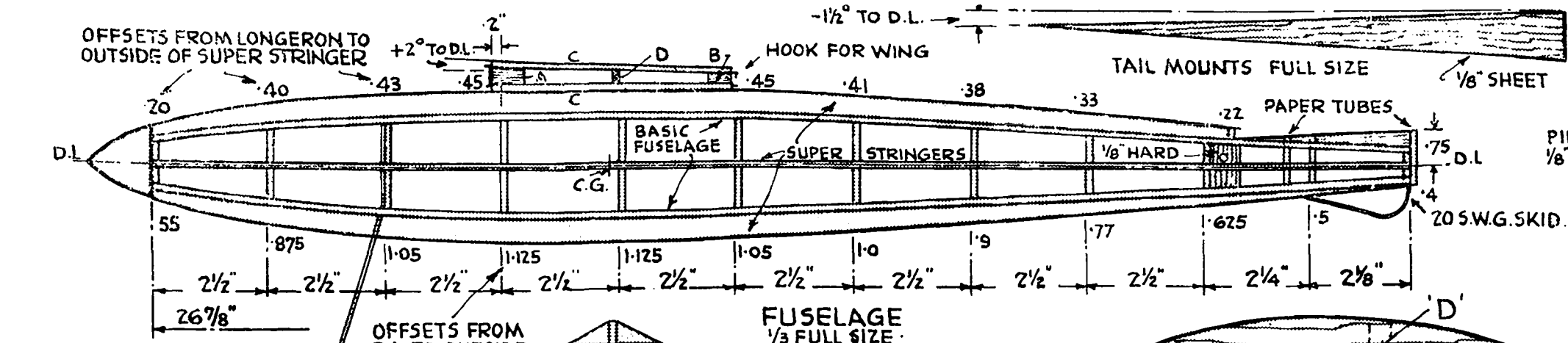
Fuselage and		
U/C. ...	...	.9 oz.
Pylon ...	...	.33 "
Tail and Fin ...	...	.282 "
Wings ...	...	.74 "

Covered + "Nu-Brite"

Fuselage and Py-		
lon and U/C.	...	1.65 oz.
Tail ...	...	.25 "
Rudder ...	...	.15 "
Wings ...	...	.92 "
Airscrew ...	...	.40 "
Bobbins, Nose		
Block, etc. ...	...	.415 "
Rubber ...	...	1.00 "

4.785oz.

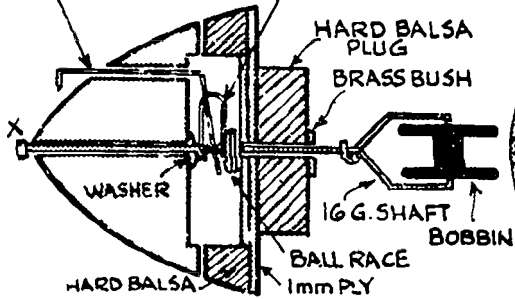
Add a trimming weight if necessary to make weight up to 5 oz.



"WATTIE"
DESIGNED BY
FLT. LT. R. WATSON
DRAWN BY
AHS

20 G. CLUTCH WIRE IN BRASS TUBE.

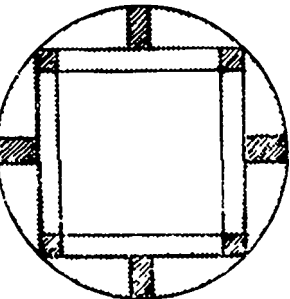
20 G. CLUTCH SOLDER TO SHAFT.



PROP ON 16 G. INSIDE DIA. TUBE WITH LARGE WASHER SOLDERED ON. A SMALL PIECE OF TUBE SOLDERED ON END AT 'X' TO RETAIN TUBE THIS ALLOWS PROP. TO BE PULLED OFF FOR WINDING

OFFSETS FROM D.L. TO OUTSIDE OF LONGERON

BIND & CEMENT TO SPACERS

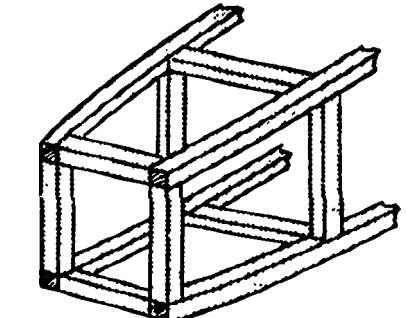
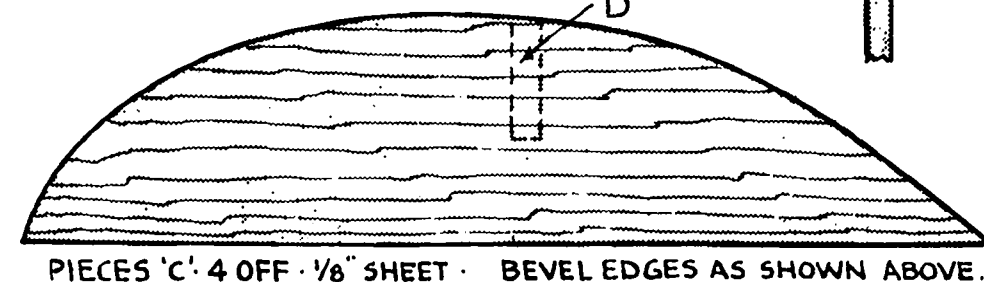
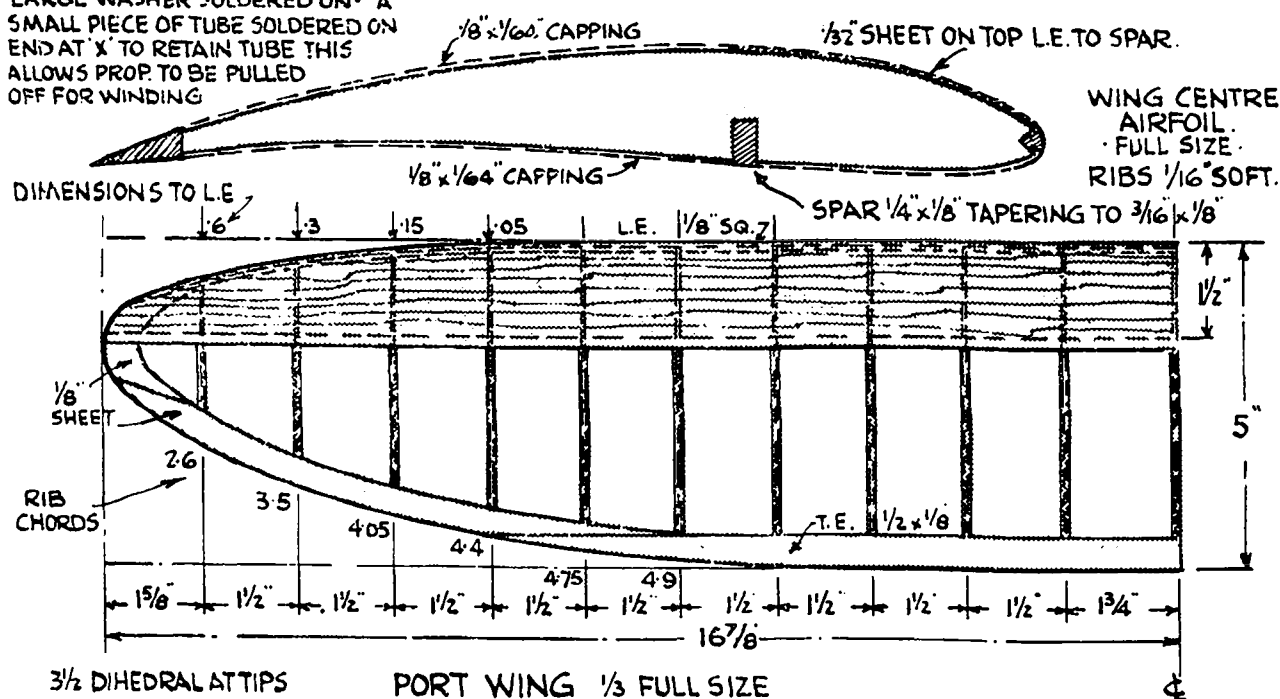


INCIDENCE PIECES 1/8" SHEET FULL SIZE

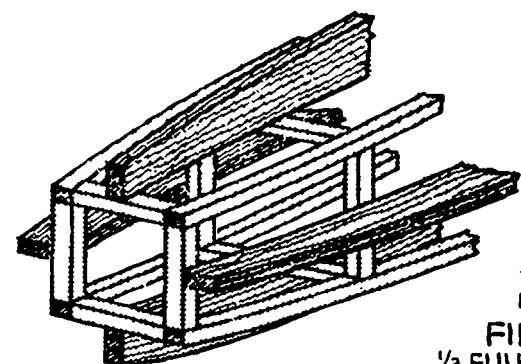
WHEEL 2 PIECES OF 3/32" SHEET - HUB FACED WITH PLY. WHEEL 1 5/8" DIA

PROP. CURVE FROM BLOCK 15" x 1 7/8" x 1 5/8"

FORMER 1 - FULL SIZE FACE WITH 1mm PLY

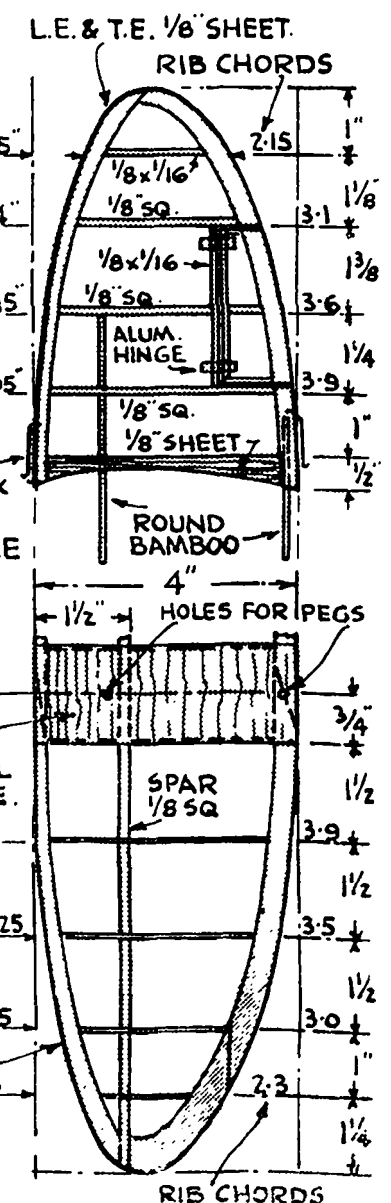
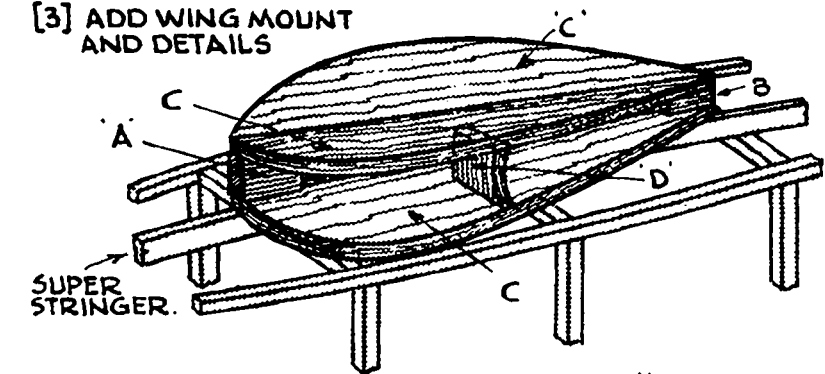


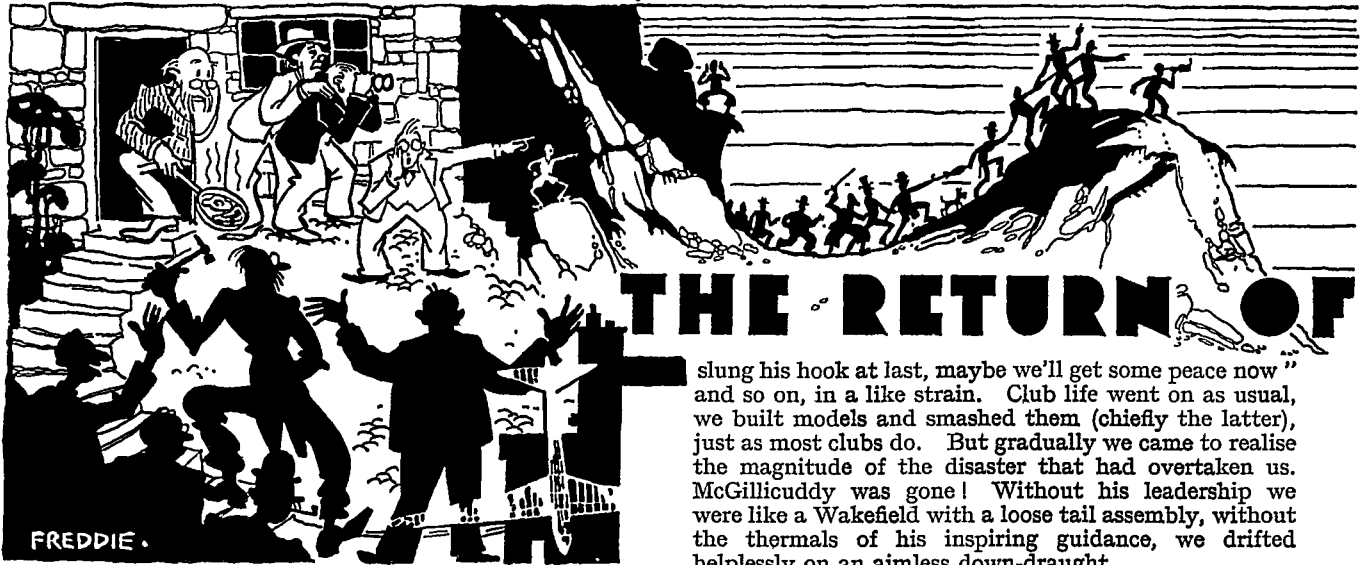
FUSELAGE LONGERONS AND SPACERS 1/8" x 1/8" SUPER STRINGERS 1/8" SOFT SHEET.



FUSELAGE CONSTRUCTION

[3] ADD WING MOUNT AND DETAILS





THE RETURN OF

Hoist the windsock,
Tow the glider,
Let the Wakefield Model soar!
Stretch the motor,
Twirl the winder,
Hail the Maestro, Home once more!

The foregoing is an excerpt from our paen of triumph, and cause indeed had we to twang the lyre and raise our voices in joyful song, for McGillicuddy is returned to Auchengargle! The Maestro is back in our midst, and grand indeed was the welcome we gave our wanderer. As the Club cynic put it "Get all your gear under lock and key, boys, the old buzzard's back again."

History affords countless instances of happy homecomings, but never one such as this. The return of Caesar from Hither Gaul (whither he had gone in search of balsa and other rare woods). The jamboree in the greenwood on the occasion of Robin Hood's return from Nottingham (with the Sheriff's shield for spot landing under his belt), even the wild rejoicings in the Tuilleries when Napoleon returned from Elba (on the off-chance of scrounging a dozen yards of quarter), all these occasions, great as they seem, fade into insignificance, they are paltry and trivial compared to the return of McGillicuddy! Never did a leader return at a more opportune moment, arriving as he did when our need for him was greatest, just in time to turn an ignominious defeat into a glorious triumph.

Perhaps, some day, the Maestro's amazing adventures during his wanderings will be told in full. But the time for that is not yet. All that has happened to him since he set out in pursuit of his model, will, of course, fill several editions of THE AERO-MODELLER (for "AERO-MODELLER," read, "wastepaper basket." Ed.). The African part of his adventure, "With Birch and Balsa in Bechuanaland," or "Props and Thermals up the Nile," has already been bought by Hollywood for a super film. The part of McGillicuddy has not yet been cast, however, the difficulty being to find an actor who is a cross between W. C. Fields, Wallace Beery and Harry Lauder. The part of Jamieson is to be played by Boris Karloff, greatly to the disappointment, it must be admitted, of the writer, who privately considered Clark Gable a much more suitable type.

When the Maestro first disappeared we tried to treat the matter lightly, as though it were a thing of no consequence. Hiding our sense of loss under sayings such as "Well, thank goodness, the old so and so's

slung his hook at last, maybe we'll get some peace now" and so on, in a like strain. Club life went on as usual, we built models and smashed them (chiefly the latter), just as most clubs do. But gradually we came to realise the magnitude of the disaster that had overtaken us. McGillicuddy was gone! Without his leadership we were like a Wakefield with a loose tail assembly, without the thermals of his inspiring guidance, we drifted helplessly on an aimless down-draught.

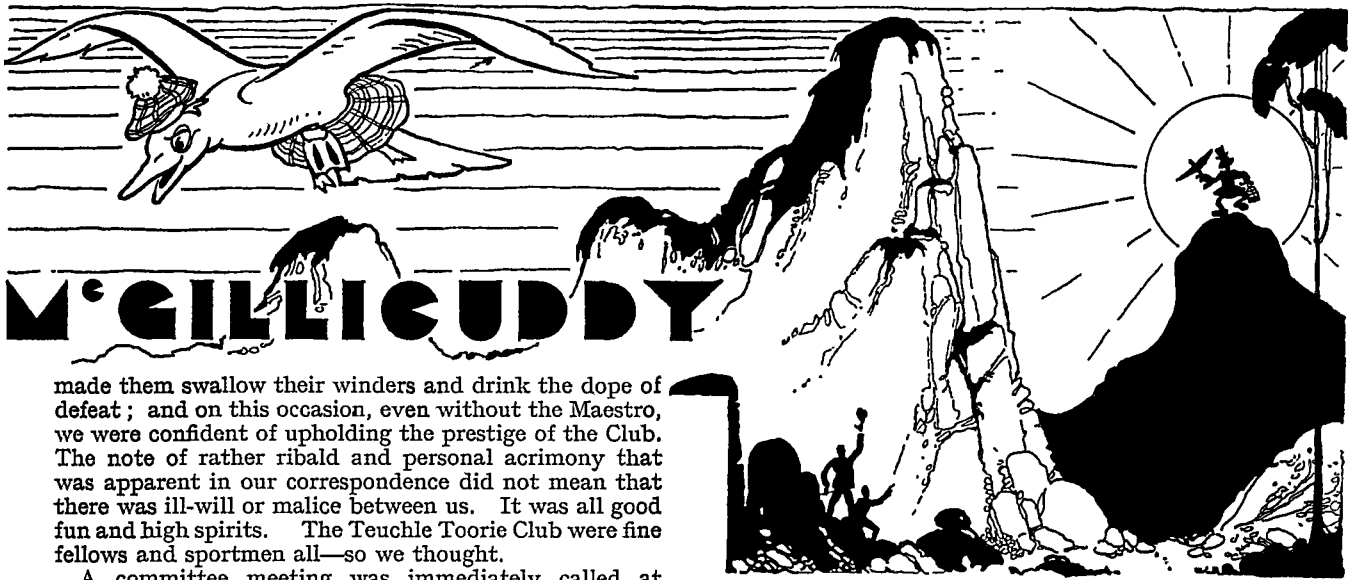
It was that vacant chair in the club-room that upset us. We tried hard not to notice it, but it exerted an uncanny fascination. Just as you all pretend not to notice when a rival's model gets into a thermal on the competition field (and your own time round about 45 seconds). Just as you pretend to be busy, and yet your eyes are constantly drawn back to it, so it was with the Maestro's old chair in the club-room. Should we ever see him again, seated there with Drambuie, his pet seagull, perched on his knee? Should we ever hear his kindly voice handing out gems of wisdom and encouragement to all and sundry, even though no one was listening? It was lucky that we did not realise what trials lay ahead.

There was one small compensation, however. Our hobby cost us less, for the Maestro was apt to be careless when building in the club-room, seldom taking the trouble to find out whether the materials he used belonged to him or not. All really great minds are like this, heedless of mundane trifles and protesting innocence when a rumpus started over missing material, and who would worry over a few scraps of material or balance the saving of them against the loss of the Maestro?

We had nothing left to us, no personal souvenir of McGillicuddy. We had his books and writing, true, but they had that impersonal quality of all scientific truth. And the only picture of him we possessed (apart from the slanderous caricatures made by a certain artist), was a photo of the infant McGillicuddy, taken at the tender age of eight months, seated on a tiger-skin with his fuselage uncovered, except for a pair of button boots, which he had staunchly refused to remove, evidently on the grounds of modesty; it was this peculiar behaviour that prompted his friends and his admirers (to say nothing of his enemies), to call him "Boots" McGillicuddy. We said seated on a tiger-skin rug, but this hardly accurate, for at the crucial moment, he had turned away from the camera and into the wind, and putting his head down and folding up his undercart, elevated his tailend high in the air; a decidedly original pose, one that hardly does justice to his classic features.

The first link in the chain of dramatic and unexpected events that led to the return of McGillicuddy, was a letter from our neighbours and rivals, the Teuchle Toorie Model Aeroplane Club. They challenged us to an inter-club competition for gliders, to be held on the slopes of the nearby mountain—Ben McSplurge.

We were pleased to receive this call to battle. The Teuchle Toorie and ourselves were old rivals. Under the leadership of McGillicuddy, we had, in the past, often



made them swallow their winders and drink the dope of defeat; and on this occasion, even without the Maestro, we were confident of upholding the prestige of the Club. The note of rather ribald and personal acrimony that was apparent in our correspondence did not mean that there was ill-will or malice between us. It was all good fun and high spirits. The Teuchle Toorie Club were fine fellows and sportmen all—so we thought.

A committee meeting was immediately called at Auchengargle to discuss how best the challenge should be met and to make plans for all emergencies. One of our more ambitious members—who imagined that the mantle of the Maestro had fallen upon him (he was wrong, it had fallen at his feet and he had tripped over it), immediately announced the construction of a new super job for the competition; it was to be called the "Song of Auchengargle," and was to be the last word in gliders. But we were not content to leave it at that; in order that we should know what the enemy were doing, we sent for our tame spy and "fourth" columnist (he had not yet qualified for the "fifth").

This was one of our younger adherents and his keenness and daring made him admirably suited for his hazardous work. He lived halfway between the enemy and ourselves, and also, his sister "walked out" with a fellow whose brother's pal was a member of the Teuchle Toorie Club. This practically gave him a foot in either camp, though his loyalty to the Auchengargle Club was beyond question, for we alone knew whose stick glider had broken the police office window.

The spy soon brought in his first report, reassuring in some ways, but containing a sinister note. "They" had a new glider, "Teuchle Toorie Champion II." Test flight O.K. but now in dock with a cracked main-spar, repair work progressing favourably, and (not so good), a certain Mr. R. H. Borring, a London glider expert, a member of the East Hurry Club, was on holiday in their area. He was attending their meetings to advise and coach them.

As a reward for his information, we presented our spy with a half bottle of jellified dope, two old celluloid wheels and a broken propeller; and cutting short his protestations of gratitude, dismissed him with instructions to keep snooping and report anything fresh.

The committee immediately went into a huddle to discuss his report. It was not for us to criticise Mr. Borring's choice of a holiday resort; some people seem to enjoy slumming, and after all he was a free agent. Doubtless the Teuchle Toorie mob thought that with Borring in their corner, and with ourselves deprived of McGillicuddy, it was in the bag for them. Could we prove them wrong?

One of our more aggressive members suggested that a deputation should wait on Mr. Borring one dark night and suggest, quite gently, that he should consider the feeling of his relatives and dependants, and scuttle back to Skittlebampton, or to put in more crudely, did he want anything for himself? But this suggestion was

turned down, reluctantly, as being unworthy of followers of McGillicuddy.

We redoubled our efforts. The "Song of Auchengargle" was completed, its trials promised well. Feverishly we conned the works of the Maestro trying to glean from them anything we might have missed, and seeking to draw from their wisdom, strength and inspiration for the coming struggle. From the chapter "Tactics and strategy for the competition field," one of the gems of wisdom was particularly strengthening; it would almost seem that McGillicuddy had foreseen our present situation when he wrote:—

Fly not in haste, when dour and stern the battle,
Take courage, see that all is trim and true,
The struggle's never lost until it's over,
The other chap can crash as well as you.

What, indeed, was the help of a London glider expert against the wisdom of McGillicuddy? We took heart and, in a mood of sober confidence, awaited the great day, little dreaming of the gripping drama it was to bring.

The morning dawned fine and sunny, with just the slightest whisper of a breeze, and in confident anticipation of a good day's sport, the team repaired to the club-room to receive our spy's final report and collect our machines for the fray. We had several machines ready but we had all bet our shirts on the "Song of Auchengargle"—it was our great white hope. We dismantled it ready for packing and awaited the spy.

Suddenly we heard the sound of running feet and he burst into the club-room, his face as white as tissue. Something was wrong! "That chap Borring," he gasped, "they've made him a member—he's sent for his model—he's flying for them today!"

Has history any record of low, base, mean, disgusting and degrading treachery such as this. Was it possible that people should sink to such depths. And yet, was it altogether surprising? What else could we expect from such a gang of petty thieves and low lifers as the Teuchle Toorie bunch. Why, oh why! could Mr. Borring not have come to Auchengargle for his holidays? And yet no blame could be attached to him, for how was he to know what a gang of thugs and hoodlums he was consorting with.

Worse was yet to come.

One of the team was rather late arriving and, on being told the cause of the uproar, was so overcome with the bad news that he sank into the Maestro's vacant chair where, only a few minutes previously, someone had

placed the "Song of Auchengargle" prior to packing. Our warning shriek was a split second too late. There was a horrid heart-rending scrunch and the "Song of Auchengargle" was no longer a song, it was reduced to a discordant squawk.

If the spy's report had dismayed us, this last disaster struck us down completely, and in a dumb agony of hopeless despair we stared at each other. Flying against an expert, and our best model ready for the junk box! Defeat stared us in the face. We could almost hear the Teuchle Toorie mob crowing their victory.

The silence in the club-room was agonizing, as each of us racked our brains for some way out; what could we do? Then suddenly, the spy (whom we had forgotten to throw out) said, "There's a seagull flying round the hut." We turned on him viciously, "Seagulls indeed!" Our backs were to the wall, we were absolutely up against it and he was yattering about seagulls! Rude hands were laid upon him, but he persisted in his folly. "Look," he said. "It's tapping at the window now!"

A wild thread of hope shot into our hearts, could it be—was it possible—we looked again. Yes! There was no mistaking that wise old bird. It was Drambuie!

We dashed out of the club-room and looked all around. Not a soul in sight! But wait—high up on the moors was that something moving? With shaking hands the field glasses were focussed. Yes! Yes! There was no mistaking the rakish tilt of that top hat or the sweet lines of that model tucked under his arm. It was the Maestro himself! McGillicuddy had returned!

We streamed out to meet him, we convoyed him back to the club-room in triumph, with Drambuie circling overhead. Then in a torrent of words, stammering and stuttering in our haste, we poured into the Maestro's ears the story of our misfortunes.

With sympathetic gravity the Maestro listened, picking his teeth with an old prop. shaft the while, and, when we had finished, he looked round at us all and smiled. "Tuts," he said. "It's no so bad but it might be worse; sit down lads and I'll tell you a wee story." We looked at one another with sinking hearts, telling stories at a time like this! Was it possible that the Maestro's wanderings had deranged his mind even further? Yet we listened, almost in despair—there was nothing more we could do.

McGillicuddy sat down in his old chair, shaking his head sadly over the mangled remains of the "Song of Auchengargle." He crossed his legs and Drambuie perched on his knee. "You all remember the last glider competition we held," the Maestro began, "we had a wee bit bother then, but that's all bye with now." You bet we remembered the last glider competition and the Maestro's shameless bit of skulduggery, trying to pass Drambuie off as a glider, and if it hadn't been for the sardine incident, he would have succeeded.

"In such a desperate situation as this," the Maestro continued, "every expedient must be considered, you'll no be mixing with the Teuchle Toorie Club out on the hill," he suddenly asked, with seeming irrelevance. We certainly wouldn't be mixing, we hastened to assure him, if we got too near the competition would develop into a free for all.

"Aye, just so." He paused, then asked, "You'll have one or two models, just to sort of dress the windowlike. Aye, just so, and Auld McSwindle will be doing the timekeeping and he won't be using field glasses? No! Aweel,"

said McGillicuddy. "I don't think much can go wrong this time.

This was the McGillicuddy we knew and loved, his voice took on a richer cadence as he warmed up to his subject.

"All art," he said, "is only a copy of nature. All creative art draws its inspiration from nature. A model sailplane is a work of art. So is a seagull. And while it is true that a sailplane can never be a seagull, there is nothing, I ken of, to prevent a seagull being a sailplane."

Suddenly we understood and in silent amazement stared at McGillicuddy; in wonder at the workings of this master mind.

Presently, as we marched along together, McGillicuddy broke into a little crooning song. The words suited our thoughts perfectly, it was almost as though the Maestro could read our minds as he sang:—

Let Teuchle Toorie boast and brag,
Don't worry boys, it's in the bag,
A London glider expert—Hooley!
What can he do against Drambuie!

* * * * *

Excerpt from Club News and reports in the current issue of THE AERO-MODELLER:—

"An inter-club glider contest between the Auchengargle and Teuchle Toorie Clubs was held recently. Flown in magnificent surroundings on the slopes of Ben McSplurge, the competition developed into a terrific duel between Mr. R. H. Borring—the Teuchle Toorie's 'guest artist,' and Mr. H. B. McGillicuddy, the Auchengargle President. Mr. Borring, flying his new 'Salamander' model, turned in three splendid flights of 3-15, 2-57, and 2-35. Brilliant and consistent as this was, however, it was not good enough to win. Mr. McGillicuddy had only to make one flight; for his beautifully streamlined glider 'Drambuie' soared right out of sight on his first attempt, vanishing into the clouds at a terrific ceiling, not before, however, circling in full view of the timekeeper for some 37 minutes. Truly a memorable flight! Mr. McGillicuddy has thus broken all records. (As a twister and horns-woggler!—Ed.).

Mr. Borring heartily congratulated the Auchengargle Club on the victory, at the same time expressing deep regret that he had no opportunity of examining Mr. McGillicuddy's model, which, he said, strongly resembled a seagull, so graceful was it in flight and appearance. He commiserated with the Auchengargle President on the loss of so fine a model, and hoped it would be found and returned to him."



THE GOON.

SO you didn't know that Goons could fly, eh? Well, neither did we until a small parcel with a Goonville postmark was delivered at our offices the other day. A steady tapping was proceeding from the inside, so we promptly carried out our usual procedure for parcels from admirers, which tick or make noises

On taking it out of the fire bucket some hours later, we ripped the wrappings off to disclose a gas-mask case in which nestled a very bedraggled—Goon!

After feeding the creature with $\frac{1}{32}$ " square rubber and drying its wings in front of the fire, we soon had it flying round the electric light in nice sweeping $\frac{3}{4}$ ft. circles. After 30 seconds the Goon glided down exhausted and refused to budge until it had been wound up again.

The Editor being out on business—at the "Robin Hood"—we proceeded to vary the Goon's diet until we discovered the combination which it liked best. It seems that three strands of $\frac{1}{32}$ " square, well garnished with lube, possesses all that a Goon can desire in the way of vitamins. The inner Goon thus replenished, the silly little creature was given a thousands turns and then turned loose. It spiralled upwards until it reached its ceiling, or rather OUR ceiling—where it gooned around amongst the cobwebs for a full 45 seconds.

By this time the Editor had arrived back and was watching the proceedings with a somewhat bleary-eyed interest. "That's just what our readers want," he rapped out! (Editors always rap things out). A debatable point, but one DOESN'T argue with the Editor, so by the time the Goon had alighted on our shoulder, the well-oiled mechanism of the "Aeromodeller" had already been thrown into mesh. The member of our staff who has actually built AND flown a model, was consulted. "Yes-men" were called in and work commenced.

The Goon was secured by simply pushing a pin through its fuselage—sorry, we mean body! After a long and arduous struggle, we somehow managed to draw up plans of the struggling creature. It is feared that we have failed to capture the exact likeness, but any aeromodeller should see, at once, that it's a Goon. What! You don't see it? Well, we've done our best—you're either Goon conscious, or you're not.

B. ALDER, a member of our staff, is to be thanked for capturing the Goon in the first place. He admits this much, but refuses to disclose where and when.

W.A.D.

COVER ALL FLYING SURFACES WITH SUPER FINE TISSUE. MAKE SURE THAT THERE ARE NO WRINKLES AS THE MODEL IS TOO SMALL TO WATER DOPE

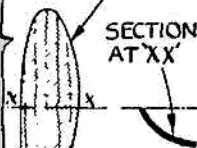
BUILD A GOON!!

$\frac{1}{64}$ " SHT. BALSA



AIRSCREW IS MADE IN TWO PIECES & LAPPED TOGETHER AT THE HUB

STEAM TO OBTAIN PITCH



SECTION AT XX

3" DIAM. AIRSCREW BEAD

CEMENT SKIN

AIRSCREW SHAFT AND BEARING 22 S.W.G.



|| TRIM TO FLY TO THE RIGHT (AGAINST THE TORQUE) ||

WING RIB MAKE 5

$\frac{1}{16}$ " SQ. BALSA

$\frac{3}{32} \times \frac{1}{16}$ HARD BALSA

TAPER STICK FROM THIS POINT

24" OF $\frac{1}{32}$ " SQ. RUBBER ARRANGED IN 3 STRANDS

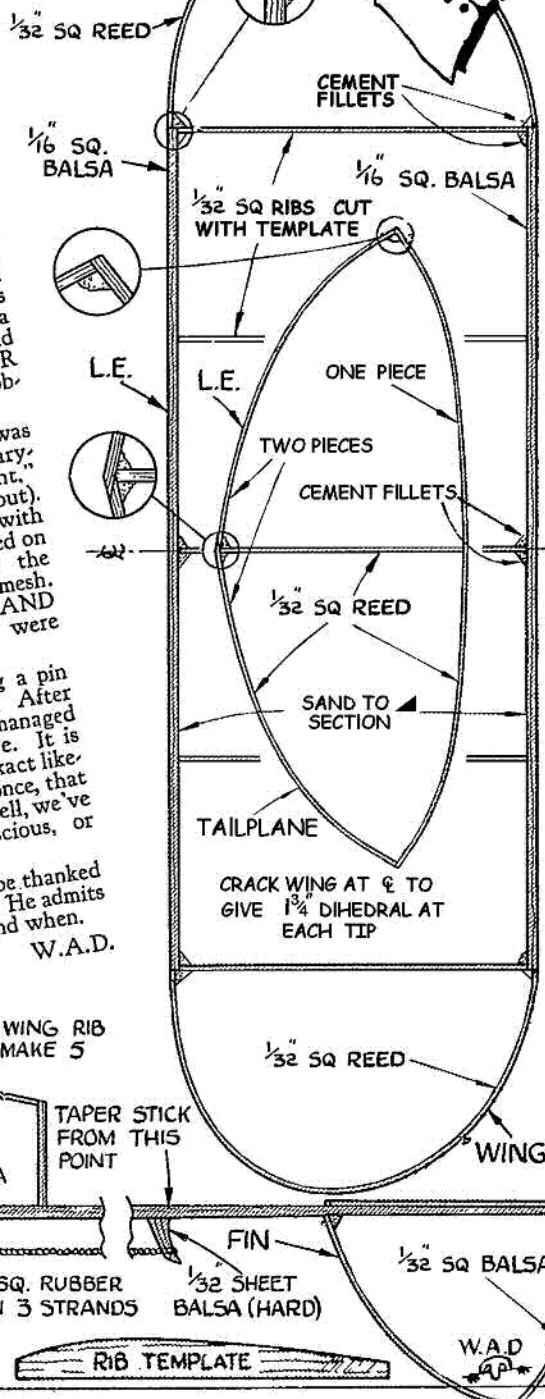
FIN $\frac{1}{32}$ " SHEET BALSA (HARD)

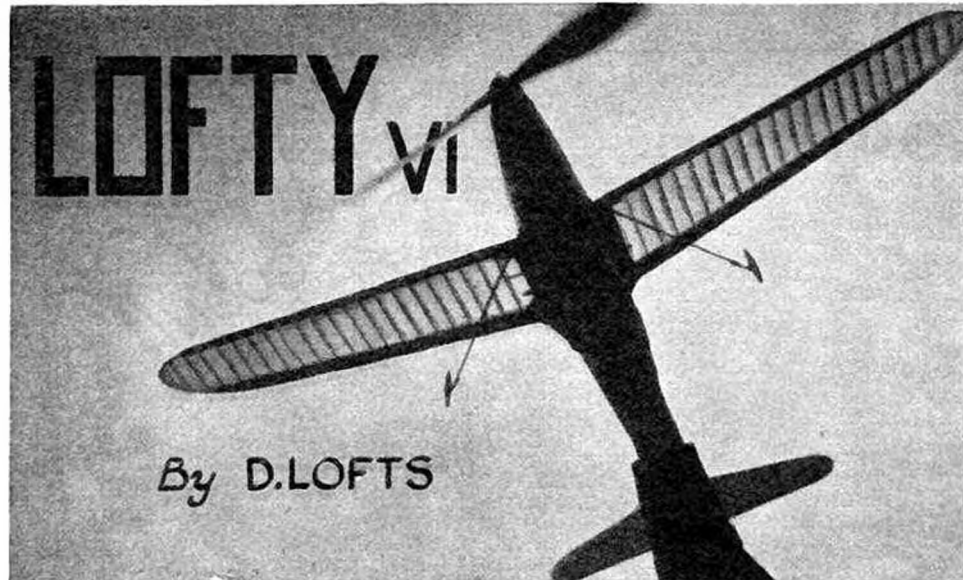
$\frac{1}{32}$ " SQ. BALSA

W.A.D.

RIB TEMPLATE

7"





By D. LOFTS

Introductory remarks by C. A. Rippon.

ONE striking feature of wartime model activities is that while the senior and more experienced aeromodelers are fewer through "call-up" and war work, etc., three fresh generations of young aeromodelers have come to the fore, and the few available experienced hands able to do so have, at least in the case of my own club, concentrated their efforts in training these youngsters to competition quality both in building and flying.

The model to be described is the outcome of such training coupled with a natural enthusiasm shown by the trainee Dennis Lofts. He won his entry into "Northern Heights" by winning a competition for pole flying held at his school and, as his own brief notes show, he has made sound progress in the relatively short time he has been a member. Too many times in the past have I heard it expressed that juniors are a nuisance, and that people couldn't be bothered with them in clubs, but I feel that if a junior shows any aptitude or enthusiasm at all, he should be helped and encouraged to the fullest extent, for the juniors of today are potential Wakefield Challengers when once more peace is with us.

Apart from the sporting side, there is undoubtedly great educational value in model aeronautics, and although mathematics seem a very dry and drab subject when practised in the schoolroom under the eye of one's master, it becomes a very live and virile subject when used in the design of model aircraft.

I can recommend Lofty VI to readers as a sound job that has proved itself a splendid and interesting flyer, not a revolutionary design, perhaps, but one in which the influence of some of the leading British designers of the day can be traced. It averaged 2 minutes 59 seconds in the Weston Cup Contest, 3 minutes 20 seconds in the Model Engineer Cup No. 2 Contest, and 3 minutes 53 seconds in the Northern Heights Wilson Cup Contest, gaining first place.

Building Instructions.

The structural design of the model follows in the main that of other well-known shoulder-wing designs. There are, however, several small points which need careful attention and these will be described later. For the moment we will deal with the basic structure.

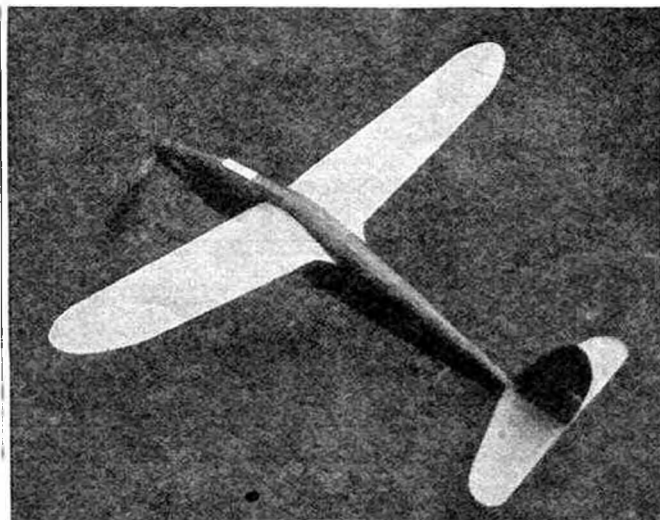
After playing about with the usual beginner's models for a few months, I developed a fancy for folding props. so I designed a parasol light-weight with a single-bladed folder. This, however, only averaged about 80 seconds. I then built a wing for it.

The Wings.

As can be seen from the plan, the wing is tapered and has an aspect ratio of 9.4. The leading and trailing edges form the only spars. The leading edge should be

made from a length of $5/8$ in. soft balsa tapered to $7/16$ in. by $3/8$ in.

Carefully shape this spar to conform with the nose of the section. This is of great importance and will make a definite improvement in the final performance. Make two templates, one of the 6 in. section and one of the section W19, from some hard substance such as $3/32$ in. birch 3-ply. Cut oblong pieces of wood to the rough dimensions of each rib and place them in order between the two templates. The whole is then firmly clamped by means of two rods passed through the whole assembly and bolted at each end. The rough oblong pieces of balsa are then shaped down to the templates with a flat cutting tool such as a wide chisel. Remove the rods and recess the trailing edge of each rib to take $1/16$ in. sheet top and bottom. Cut a piece of soft $1/16$ in. sheet to the shape of the trailing edge shown on plan. The trailing edge of this should be chamfered to a knife edge. Pin leading and trailing edges on the plan taking care to prop up the front of the trailing edge so as to conform to the section. The ribs are now inserted, cutting away the nose of each one at the leading edge. Each rib is firmly glued to the leading and trailing edges. Another piece of $1/16$ in. sheet balsa is cut to the shape of the trailing edge. Chamfer this down at the rear and glue it above the other. Fit a tip of $3/32$ in. square birch, glue in place the odd tip ribs and leave to dry.

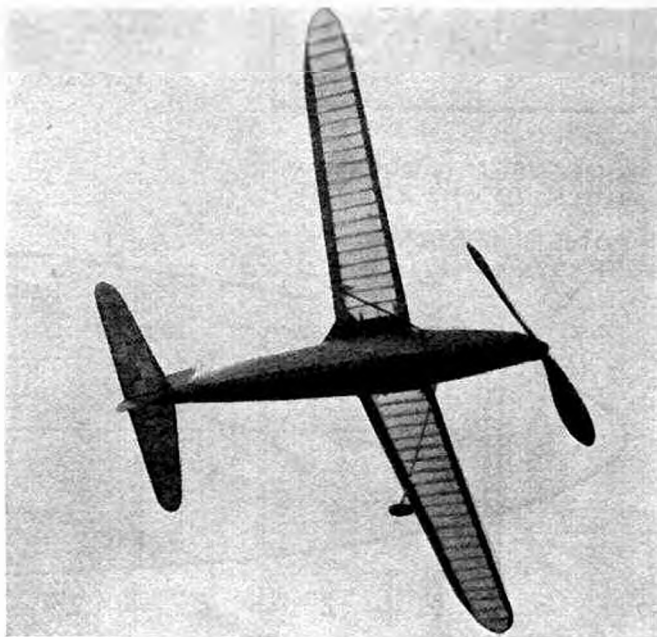


The Fuselage.

This is of rather peculiar design, but the air-flow from the wings follows the shape of it very well. Also it results in a lower position for the c.g. than is usual on this type of model.

Cardboard templates are made for all formers, details of which are shown on the plan. Before assembling the formers on the rod, the wing fixing, dowels and undercart tubes have to be secured onto their formers. The wing fixing dowels are glued onto their respective formers with a slow-drying glue and then sewn onto the balsa. The undercarriage tubes are secured onto former No. 5 in the same way. After each former has been mounted on the rod, the four-master stringers are glued in position. These are made of 1/8 in. by 1/16 in. balsa. The rest of the stringers, all 1/16 in. balsa, are then put in place and glued. The cardboard formers are poked out and the rod removed. From the nose up to the front wing fixing dowel, there is double the number of stringers. This means that lengths of 1/16 in. balsa are inserted between the existing stringers. Also the space between formers No. 1 and 2 is sheeted in with 1/16 in. sheet balsa. Former No. 1 is perfectly circular and is wound in the normal way but it is faced with M.M. ply. After the stringers at the rear have been cut away to accommodate the tailplane fairing and the whole sanded, it is ready for covering.

The construction of the tailplane and fin is orthodox, and need not be commented on. The fin fixing dowels should be made a tight fit in the paper tubes. The main tube is secured to former No. 17 and the front tube glued into the front of the tailplane fairing. The undercarriage legs are shaped to a streamlined section from 1/4 in. by 1/8 in. bamboo tapered to 1/8 in. by 3/32 in. The hard skin of the bamboo should be on the outside to prevent spreading on the take-off board. Brown paper should be used for making the undercarriage tubes, sticking between each layer of paper with some slow-drying glue. Before winding the tubes round the top of the legs, dust the bamboo with French chalk, then it will be found that the tubes when dry will slide off fairly easily. The wing fixing dowels are made from bamboo to the shape shown on the plan. The bend for the dihedral is bent in by dry heat. The bamboo is held some distance above a low flame and allowed to get thoroughly warm, before any attempt is made to bend it. When it is bent, the skin of the bamboo must be on the outside of the curve otherwise the bamboo will crack. Both the undercarriage tubes and the wing fixing dowels must of course be made before the fuselage is



assembled. The detailed wheel construction is shown on the plan and is self-explanatory.

The Nose Assembly.

The airscrew is 18 in. diameter and has a pitch of only 27 in., which ensures a quick take off and a fairly fast climb. The rear of the spinner is hollowed out to accommodate the normal free wheel arrangement. The nose block consists of alternate layers of M.M. ply and balsa, which ensures that the screwed bush does not work loose. The airscrew is covered in white tissue, given several thin coats of banana oil and then french polished so as to give a perfectly smooth finish. The locating pin of the free wheel is now fitted through the spinner.

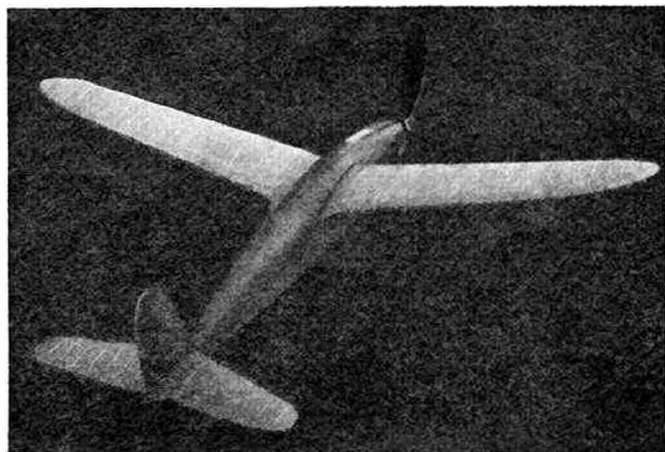
To assemble, first turn a small loop on the end of some 16 s.w.g. wire. Thread a cup washer on and then the airscrew. Slide the free wheel loop up to the rear of the spinner just far enough away to let the propeller free wheel easily. The loop is then soldered in position, the washers and noseblock threaded on and the hook turned at the rear. The tubes for the wing fixing dowels are made in the same way as the undercarriage tubes, and when dry are glued in the wing roots with suitable reinforcing. The spaces between ribs 1 and 2 on both wings are covered top and bottom with 1/32 in. sheet balsa which is continued behind the wing to form the fairing.

Covering.

Carefully sand each part before covering. The fuselage is covered in strips with the grain running down the length of it. Each strip of tissue spans about three stringers. Owing to the scarcity of coloured tissue, the whole model was covered in white, but the fuselage and fin after being treated with one coat of banana oil were finished with one coat of red cellulose dope, which gives a fine glossy finish. The wings and tailplane are doped with one coat of banana oil. The spinner and wheels are treated with alternate coats of red dope and polish until a perfectly smooth finish is obtained.

The motor, 12 strands 1/4 in. by 1/24 in. rubber, will take, when properly run in and lubricated, over a thousand turns.

With full turns, about 1/16 in. downthrust will be needed and when properly trimmed the average duration should be well over three minutes.

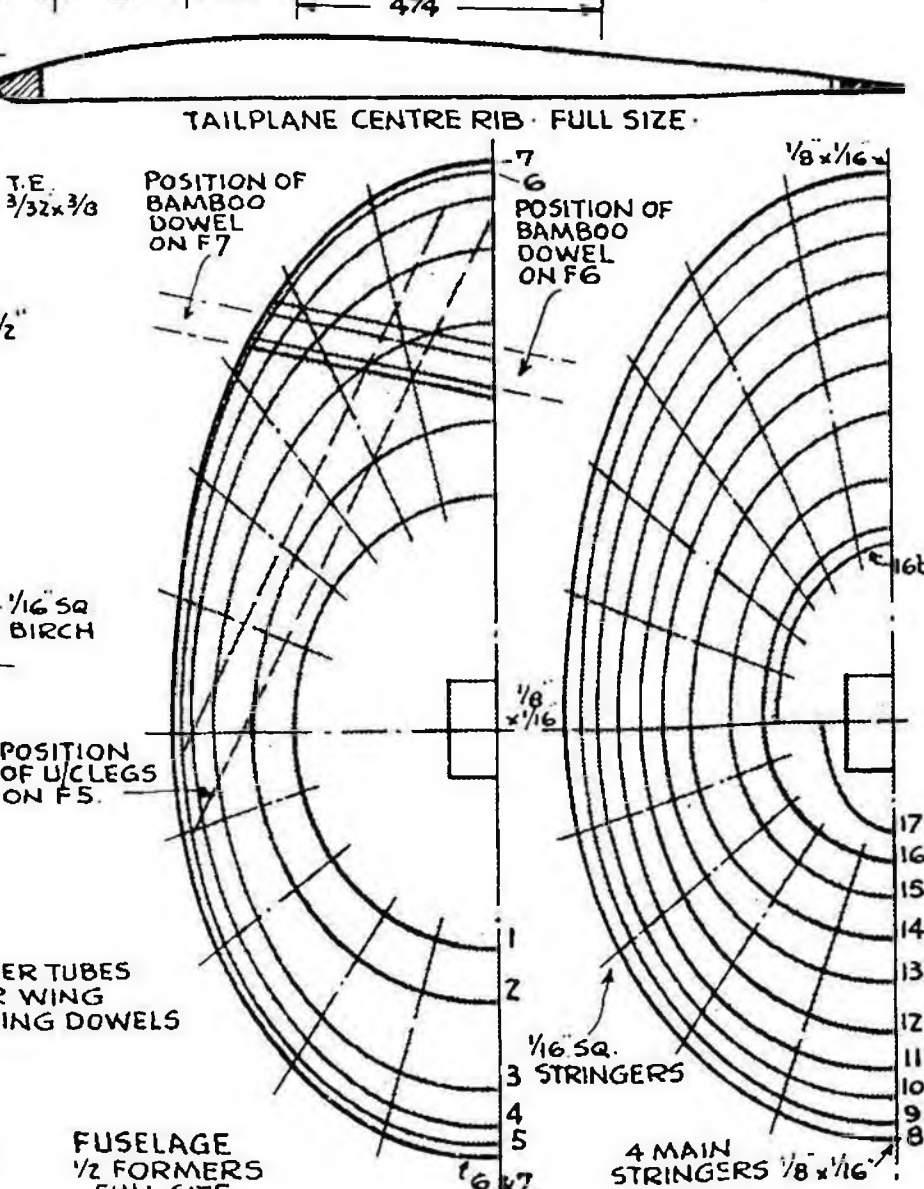
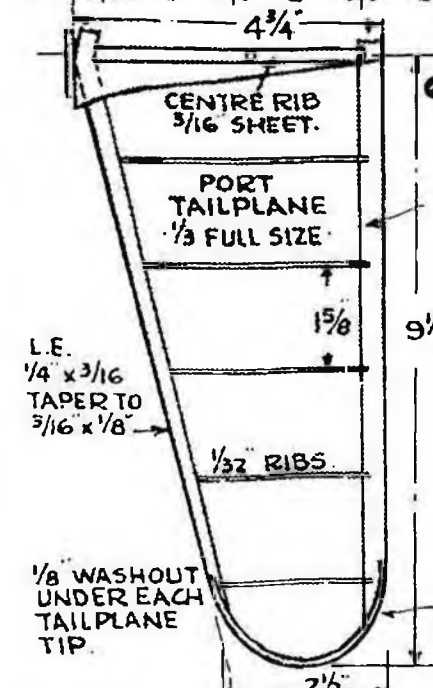
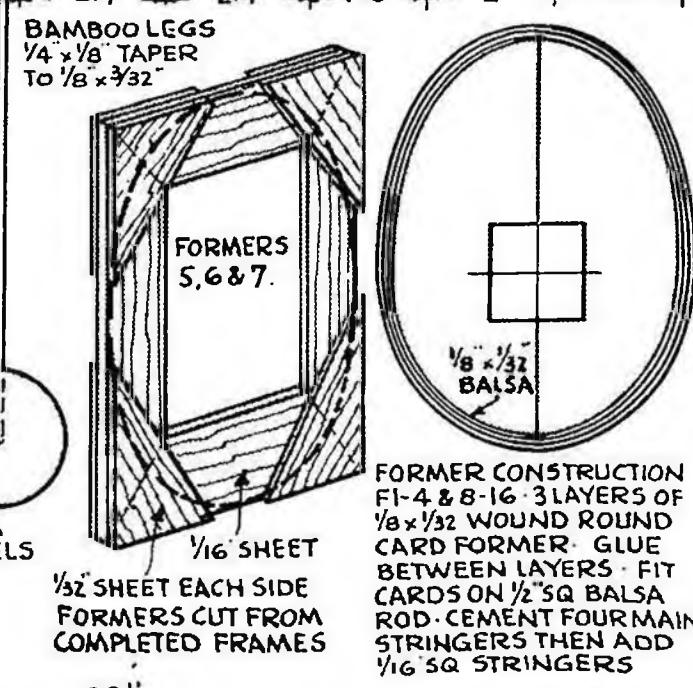
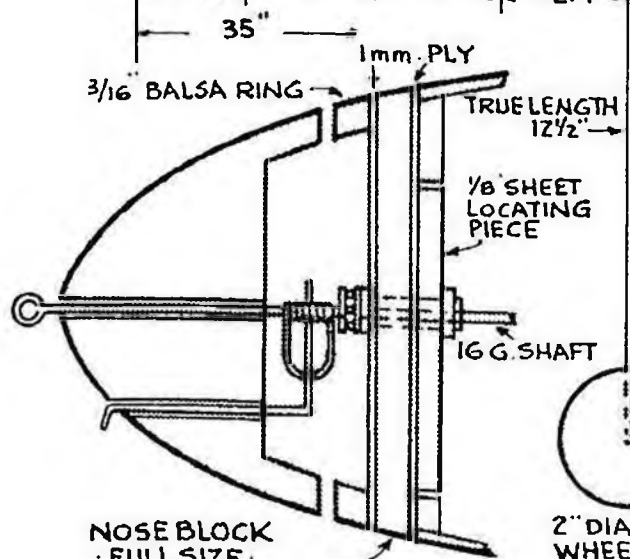
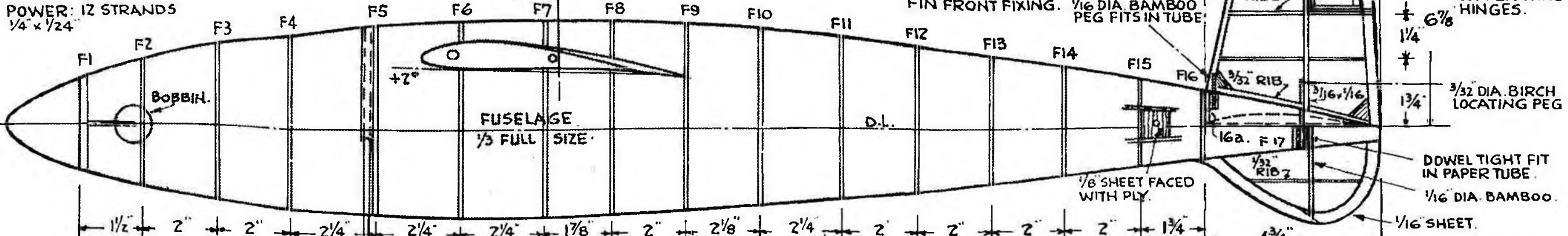
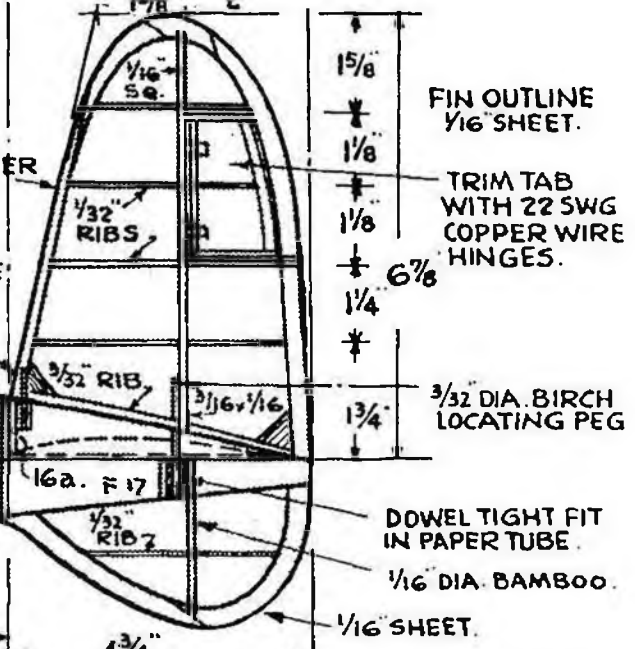
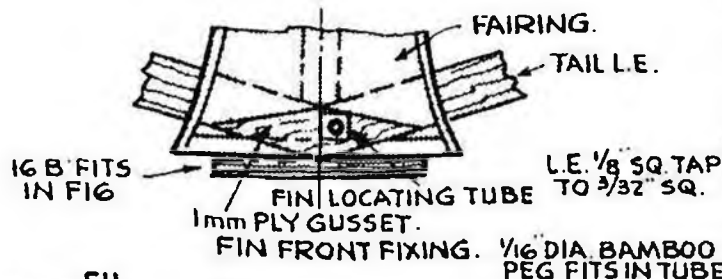
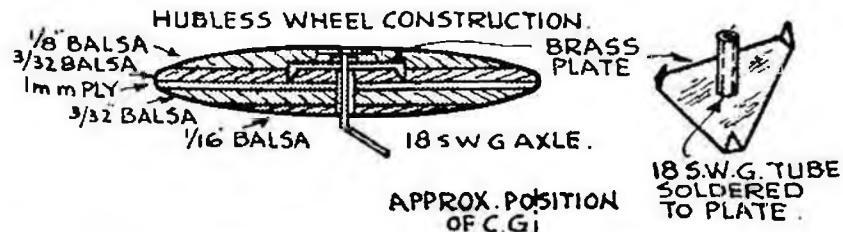


"LOFTY VI"

DESIGNED BY
DRAWN BY A.H.S.

AIRSCREW: CARVE FROM BLOCK 18" x 1 1/2" x 2"

POWER: 12 STRANDS
1/4" x 1/24"



CIVILIAN AIRCRAFT MARKINGS, II

By E. J. RIDING

A further article on the subject of civil aircraft markings, being complementary to that appearing in the July issue. The author is a recognised authority on such matters and has a fully comprehensive book in the course of preparation. Details of this will be announced later.

IN the previous article in this series I discussed the origin and general arrangement of aircraft registration markings as laid down by the Paris Convention in 1919. This month it is intended to deal with variations and other interesting points relating to identification markings on civil aircraft.

I previously mentioned that a registration number once allotted to an aircraft can never be re-issued to another machine after the withdrawal from service of the original aircraft. Several aeroplanes have, however, enjoyed the privilege of possessing two or more different numbers during their lifetime. For example, a Simmonds Spartan, G-AAGV, registered in May, 1929, crashed in September, 1930, was repaired and re-registered in June, 1932, as G-ABXO. Another machine, G-ABEY, a Blackburn Bluebird registered in September, 1930, and changed to G-ABZX in September, 1932, was cancelled in 1935, re-registered as G-ADXX in November, 1935, and finally cancelled in December, 1937.

These two instances are in direct contrast to the two examples given previously of machines retaining their original registrations over periods of fifteen years or so, in which case it is very doubtful whether anything of the original aircraft remained, as there is a limited life to certain components even under the best conditions. It will be obvious that a good deal of "fiddling" would be necessary to preserve the number of an aircraft registered as far back as say 1919, when the scheme was first put into operation, although one can recall several instances of this having been done.

A few years ago, the fuselage and other portions belonging to an aeroplane used for giving pleasure flights were towed out of the hangar, dumped on the scrap heap and burnt. A fortnight later, I saw what was, according to the registration letters, the self-same machine in the air. Another case was that of a similar type of machine, long overdue for overhaul. The craft was in a very bad state; in fact the only serviceable portion seemed to be the "bag" or fabric covering of the fuselage. Now the owner had experienced a bad season through one thing and another and apparently couldn't, or wouldn't, afford the registration fee for a new machine

which he had built up from spares obtained from an R.A.F. depot. Eventually he solved the difficulty by transferring the fabric covering to the new aircraft, making it carry on the old one's number—strictly illegitimate, but lots of things went on in those days that wouldn't be tolerated today, the powers that be being lenient towards the few who were to be the sole supporters of civil flying for many years to come.

Other aeroplanes have been sold abroad, registered under the country of their adoption and then for some reason or other brought back to Great Britain and either reverted to their original number or were allotted a new one, i.e. a D.H.60M, commonly known as a "metal Gipsy-Moth" and registered G-AAXG, was sold abroad in January, 1930, where it became F-AJZB. It was restored in February, 1933, and then sold again, this time to a customer in New Zealand under the letters ZK-ADF. It was restored yet again in August, 1934, and finally sold abroad in 1935.

Occasions also arise when a civil machine is bought by the Air Ministry and adopts a service serial number. Mention of the Beardmore Inflexible—a large cantilever monoplane fitted with three 650 h.p. Rolls-Royce Condor engines and weighing 16½ tons—was made in the aeronautical press recently. This aeroplane was allotted the registration letters G-EBNG before it was built in December, 1925, and was later bought by the Air Ministry and given the number J.7557.

Another example was the De Havilland 91 G-AEVW "Franklin," which became AX.904 in the R.A.F.

Conversely, hosts of obsolete service types have been reconditioned by civil firms and issued with civil registrations. With few exceptions the G-EAAA to G-EAZZ section is composed of last war service aircraft modified for the particular uses to which they were assigned.

Just before the war, a batch of Hawker Tomtits with Armstrong-Siddeley Mongoose engines, formerly trainers in the R.A.F., were placed on the market when the Civil Air Guard boom arrived—at a time when club machines and trainers were very scarce—and were eagerly snapped up by various flying clubs filled to overflowing and with waiting lists a mile long. Then there were, of course, dozens of Avro 504N's and Bristol F.2B Fighters, the former converted to three- or four-seaters or modified to tow banners or gliders.

Service types have also been exported under cover of a civil registration number. A batch of Bristol Blenheim I's registered consecutively from G-AFLA to G-AFLS were sold abroad in August, 1939.

Top—The symbol K was used by A. V. Roe & Co., Ltd., for their experimental machines. Picture shows K.11, an Avro Cadet (experimental version).

Bottom—A Swiss-owned Falchild 24; with nationality marking on rudder and fin (white cross on red background).

All photographs copyright of the author.



Right—A Fokker F.XII of the Royal Dutch Airlines (K.L.M.).

Below—A privately owned Hirtenburg H.S.9a, also with nationality markings on rudder and fin. This particular machine is still in this country and has been given a British registration.



This happened frequently after the last war, when foreign governments were buying up the vast stocks held by the Aircraft Disposal Co. at Croydon. In 1921, for instance, 90 per cent. of the G-EAZA to G-EAZZ section, mainly composed of Avros and D.H.9's, were sold abroad almost immediately after they had been registered.

In transfers such as these, the machine can always be traced by means of its manufacturer's serial number, which remains the same throughout the whole life of the aircraft.

Experimental aircraft were permitted to fly in this country without possessing a registration number on condition that they displayed a pre-arranged recognition symbol. Various manufacturers adopted their own particular symbol—De Havillands took the letter E. E.I was a D.H.87 or Hornet Moth and later became G-ADIR. A. V. Roe & Co., Ltd., adopted the letter K as their symbol, and K.11, an experimental version of the Avro Cadet, is shown elsewhere.

The use of registration letters instead of numerals has now become practically universal. The single prefix letter denoting the country to which the machine belongs has to a certain extent been superseded by a combination of two letters, a few examples being:—

Canada	CF-AAA to CF-ZZZ.
Australia	VH-AAA to VH-ZZZ.
Union of	
South Africa	ZS-AAA to ZS-ZZZ.
Belgium	OO-AAA to OO-ZZZ.
Holland	PH-AAA to PH-ZZZ.
Irish Free State	EI-AAA to EI-ZZZ.
Switzerland	HB-AAA to HB-ZZZ.

Great Britain (G), France (F), Italy (I), Germany (D), and Japan (J), still retain the single letter prefix.

The carrying of registration letters also applies to free balloons and airships. In the case of balloons, the letters are painted round the waist of the balloon at its largest diameter and are duplicated, since the regulations require that the number should be visible from all angles.

Right—A Fokker F.VII 3.M of the Belgian Air Line S.A.B.E.N.A.

British airships have a special series of their own beginning with G-FAAA, and the letters are carried on both sides of the envelope at the position of maximum stress. R.33 was lettered G-FAAG, R.100 and R.101 bore the numbers G-FAAV and G-FAAW respectively, and a small non-rigid airship built by the Airship Development Co., along the lines of a last-war "Blimp," carried the letters G-FAAX.

One more compulsory means of identification carried by all civil aeroplanes is in the form of a small metal plate on which are engraved particulars regarding the number, type, owner and owner's address so that in the event of total destruction by fire the machine can be traced.

There are still a number of civil aircraft flying in various parts of the country. They are owned chiefly by the aircraft manufacturers and are used for communication and liaison work in connection with the trade.

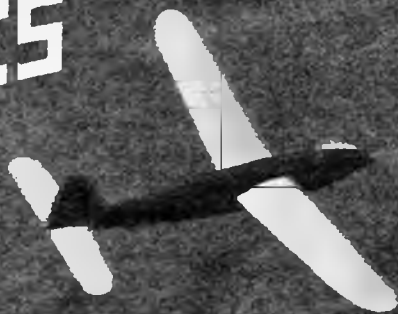
Examples of machines of this nature seen recently are: G-AGDN, a Monospar ST.25; G-AFVT, a Stinson Reliant SR.10C; and G-ADMT, a D.H.87b Hornet Moth. In addition to the "trade" machines, there are, of course, those owned by British Overseas Airways and various internal airlines operating in this country. The big Short S.26 and S.30 flying boats of B.O.A. are a common sight in certain localities, G-AFCI (S.26) and G-AFCZ (S.30) having been seen quite recently. The company has now taken delivery of twelve Armstrong-Whitworth XXXVIII's for use as freighters. One of these machines bears the registration letters G-AGDZ.

Quite a number of civil light aircraft have been acquired by local A.T.C. units for ground instructional purposes, and apparently they still bear their civil identification letters. This seems to be a really sound idea as there are plenty of these machines lying idle when they could be serving a useful purpose.

The study and collection of civil registration numbers has ceased for the time being, but who knows that after the war it may become as widespread as the collection of locomotive numbers was amongst the railway fans?



TECHNICAL TOPICS



By R. H. WARRING

Photo shows the author's 1940 Wakefield model airborne.

MORE controversy has raged over the subject of model design than of any other feature of model aeronautics. Many people still maintain that theory is just so much waste of time—and point to the excellent results obtained by the purely practical builder. Now without wishing to detract one iota from the achievements of these people I am prompted to reply that the pure theorist is of invaluable assistance to design; in the full size sphere may I just quote the names of Lanchester, Joukowski, Prandtl, Munk, Glauert, Bairstow—to name but a few? Again, whilst appreciating the mentality of the person frightened by the mere suspicion of a formula it is quite possible to put in one simple formula what would otherwise take several pages of text to explain.

Aeroplane design is a complicated business. Up to the present time we have been severely handicapped by the lack of sufficient low speed data so that a large amount must, of necessity, be guesswork. For several years I have been engaged in collecting and collaborating such data as might usefully be employed in model design. By this I do not mean that finally the solution has been reached. It is still impossible, even in full size work, to accurately predict every particular feature which may be met—in the model world, we have really but started. But we are in the position of having *some* figures to work with which are known to be reasonably accurate. As most readers are aware much data is abstracted from wind tunnel tests—but how many appreciate that identical tests on the same test piece in different tunnels lead to different results? Thus in all cases corrections must be made, these corrections being predetermined for the particular tunnel involved and their peculiarities appreciated.

This, however, is tending to an impression which will defeat my object. I will endeavour, with the Editor's permission, to set out each month basic design data for the aero modeller which, in its collected form, should establish *model design* as apart from model "guesstimations."

First and foremost one must establish a clear design procedure. Full size procedure entails far more than mere aerodynamics; in fact, this is, I think, the main reason why model work has attracted me more than

full size design. The latter eventually resolves itself into severe problems of structural design, a feature not commonly elaborated in model work. Model design, therefore, gives more scope for purely aerodynamic research and the possibility of far-reaching results.

The design is essentially a compromise from the very first moment it is conceived; a striving to obtain a compromise between the desirable characteristics and the necessary limitations. The cleverness of the design in solving these problems is reflected in the success or otherwise of the final result.

Firstly, one must study the specifications to which the model is to be built, i.e., if it is to conform to certain rules such as those laid down by the F.A.I. or the Wakefield International Competitions. These are far less exacting than the detailed specifications the full size designer has to face at the birth of his brain child! The latter *must* conform to his rules if only for the purpose of making the job a paying proposition. The exception is sometimes found in the "Private venture" machine which may or may not be finally accepted or put into production. Few firms can afford such monetary risks.

Returning to our subject. The designer is well advised to study in detail as many other machines of a similar type as possible, not with the idea of producing a flagrant copy but to form a clear view of the general layout, weights of each component, power/weight ratio, etc. The ideal is to evolve one's own design through a number of similar models tested and flown over a number of years. Unless the new machine is completely unorthodox the data obtained from existing designs is the best guide to proportioning a new machine.

The designer will by now have a general idea of the layout of his new model, having decided the *type*. This is governed mainly by the specifications, although these in themselves often lead to an infinite number of combinations. If a monoplane, the wing position—parasol, high wing, shoulder wing, etc.—construction (general)—cantilever, semi-cantilever, etc., must be decided. If a biplane, the relative areas and disposition of the two wings, i.e., the stagger, gap, decalage, etc., are decided in conjunction with this, the other variables, such as fuselage shape and cross section, tail unit layout, under-carriage design, etc., etc., must be generally fixed, in outline shape at least.

Then follows a preliminary weight estimate; gross weight and unit structural weight. The designer is then in a position to choose the wing section and its setting and compute preliminary performance figures. Similarly a preliminary balance diagram should be prepared and the aerodynamic form checked.

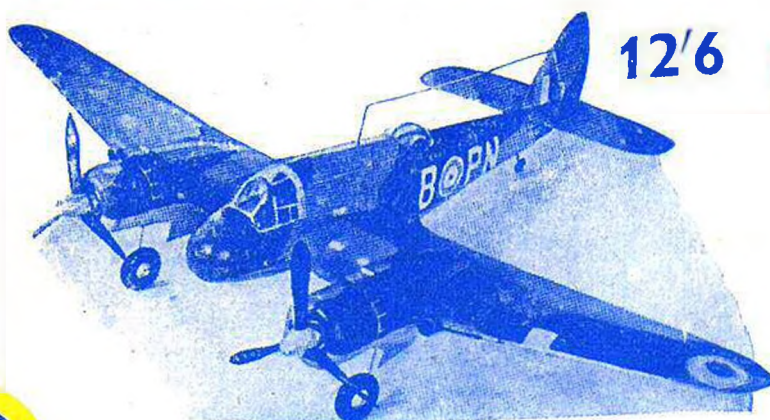
This is where the average model builder who attempts design stops. Actually the whole machine should now be gone over completely again; this time with a view to structural and detail design. This covers every part of the structure which must be stressed to carry its design load with an adequate factor of safety. Full size and model work must, of course, vary in this respect—the model being generally far more robust and stressed for,

(Continued on page 603)



Aero
Model ©

BRITAIN'S GLORIOUS NIGHT FIGHTER
"Beaufighter"



Designed by H. J. TOWNER

NOW IN PRODUCTION

A Super Series of
BOMBER FLYING KITS 28 in. Span **12/6**

A Magnificent Series of
"ACE" FLYING FIGHTERS 28 in. Span **8/6**

A **"CADET" SERIES**
A most varied and exceptional range. 16 in. Span **1/9**

ASTRAL FLYING KITS ARE UNDOUBTEDLY THE
MOST POPULAR MODELS ON THE MARKET TO-DAY

TRADE ENQUIRIES TO
ASTRAL MILLS, Dixon Lane Road, LEEDS 12

Phone : 37021 (3 lines)
ASTRAL KITS ARE THE CEILING

Kindly mention THE AERO-MODELLER when replying to advertisers.

BOOKS - PHOTOGRAPHS - SCALE PLANS - FLYING MODEL PLANS

A COMPLETE COURSE ON MODEL AERONAUTICS

Model Aeronautics is recognised as one of the best media for training future pilots, designers and aircraft engineers. It is an inexpensive, fascinating study and one which is capable of reaping rich reward. The service offered by the four associated companies

named below is unique. It is absolutely authentic—right up to date—and covers every phase of the hobby. There is at least one book for every phase of aeromodelling, hundreds of accurate scale plans for recognition enthusiasts, and plans of flying models of all descriptions. The greatest service of its kind in the world.

BOOKS —

Every one of the Harboro' range of Books is written by an acknowledged expert on the subject, and presents it in a comprehensive, yet easy-to-follow manner.

OTHER TITLES NOT ILLUSTRATED

The Design and Construction of Flying Model Aircraft by D. A. Russell, M.I.Mech.E. Price 7/6
Model Aircraft Petrol Engines by Dr. J. F. P. Forster Price 3/-
Indoor Flying Models by R. H. Warring Price 3/6

PHOTOGRAPHS —

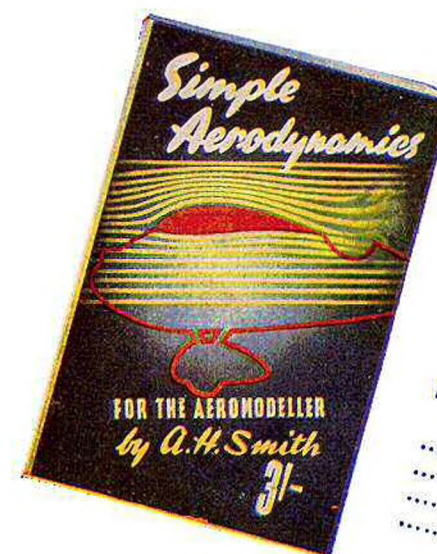
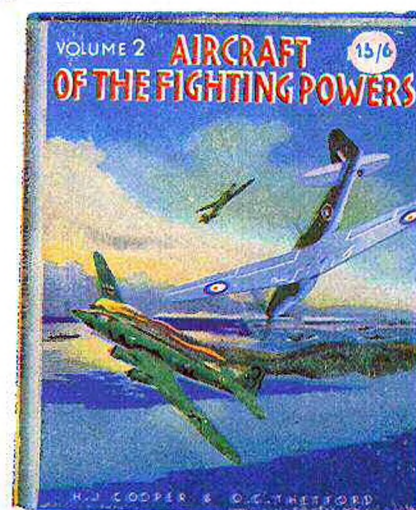
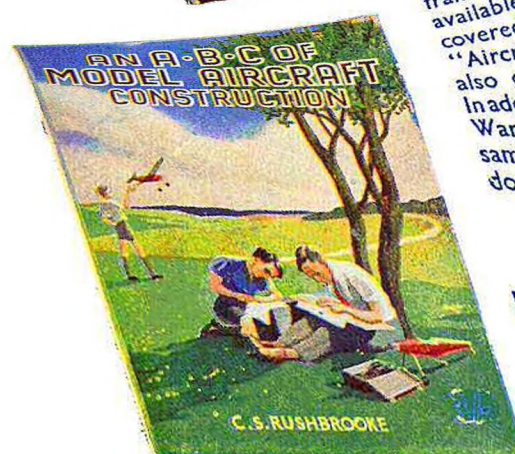
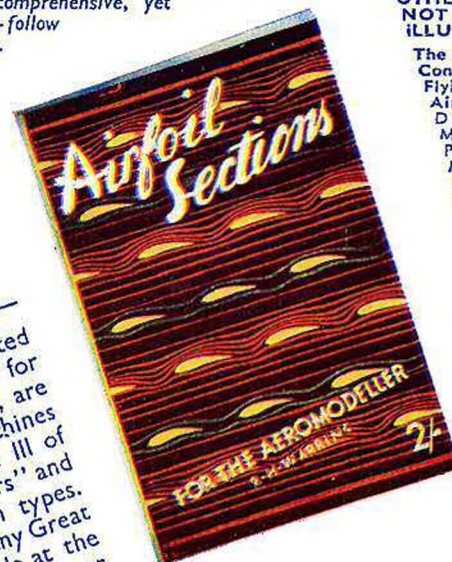
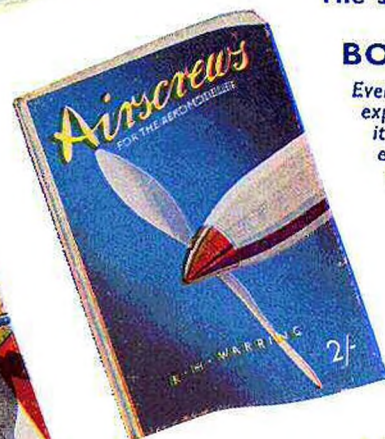
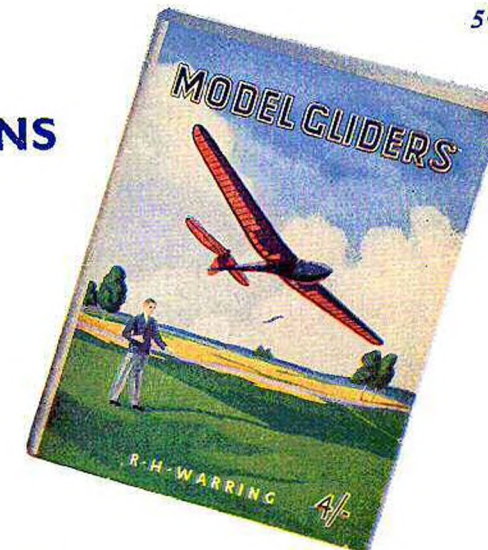
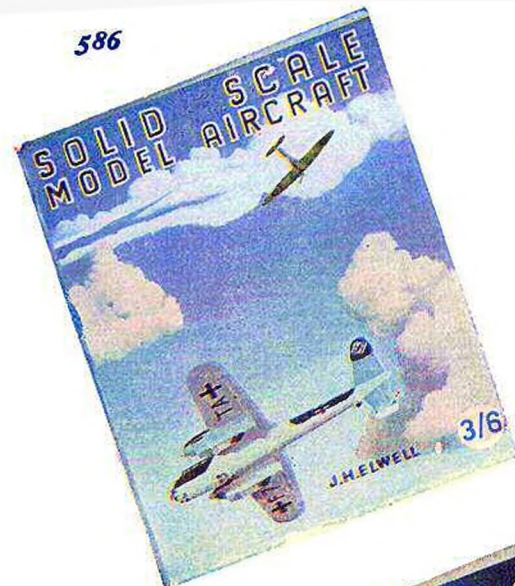
Large photographs, printed on art paper and ideal for framing or forming a collection, are available of all the modern machines covered in Volumes I, II, and III of "Aircraft of the Fighting Powers" and also of many other modern types. In addition photographs of many Great War 'planes are now available at the same price. Price 3d. each: 1/6 per dozen. A full list sent on request.

N.G.A. —

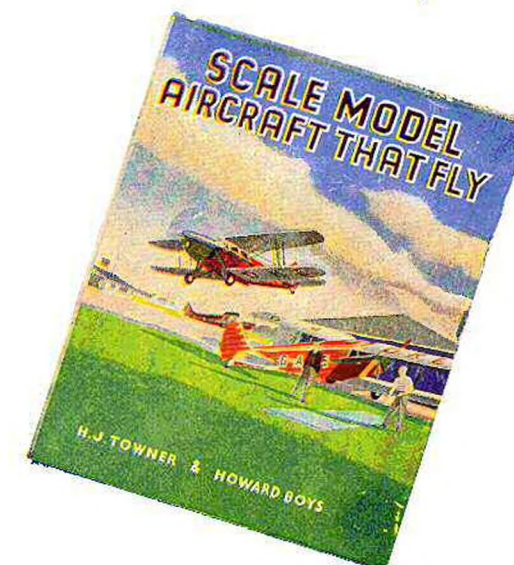
A fully comprehensive third party insurance scheme is in operation covering the flying of all types of model aircraft.

SCALE PLANS —

A unique range produced especially to meet the needs of Air Cadets, aircraft recognition tests, model builders and all interested in aviation. Each plan is complete and contains all the detail necessary for the finest exhibition model. A modeller building from these plans starts with the knowledge that they are the finest of their type in the world, being the result of months of painstaking and thorough research. The full range of scale drawings includes some three hundred modern machines - all those described in the three volumes of "Aircraft of the Fighting Powers" and many others besides. Complementary to these, there are some fifty drawings of machines used in the Great War. All these plans are drawn to the same scale, i.e. 1/72 full size, and are the most accurate of their kind available. Price 6d. each; 3/- per dozen. A full list will be sent on application.



FLYING MODEL PLANS —
Wakefield Class Rubber Driven Model
Rubber Driven Duration
.....Flying Scale Models
.....Petrol Driven Models
.....Gliders and Sailplanes
.....Indoor Models, etc. etc.



The products of the Associated Companies :—
Harborough Publishing Co. Ltd.
Model Aeronautical Press Ltd.
Aeromodeller Plans Service Ltd.

ALLEN HOUSE - NEWARKE STREET - LEICESTER



Aero
Model ©

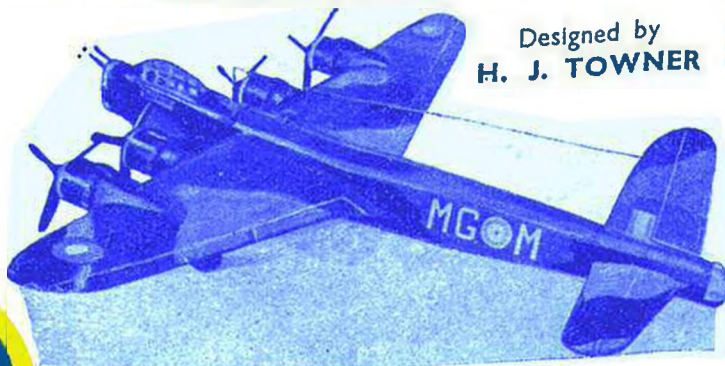
THE MOST MARVELLOUS FLYING MODEL OF THE AGE

ASTRAL

GIANT BOMBER 38-in. SPAN



Designed by
H. J. TOWNER



NOW IN PRODUCTION **21/-**
PRICE
Plans only 3/6



TRADE ENQUIRIES TO:
ASTRAL MILLS, Dixon Lane Road, LEEDS 12

'Phone : 37021 (3 lines)

ASTRAL KITS ARE QUALITY KITS

Kindly mention *THE AERO-MODELLER* when replying to advertisers.

TAIL BOOMS $5\frac{1}{2}$ " LONG
CUT FROM $\frac{1}{32}$ " HARD SHEET

FINISH PUSHER
PROP FROM
SEMI-CUT BLANK
OR MAKE FROM
SHEET AS
ABOVE

SECTION OF
STICK

1/8 SHEET
BALSA STICK

CEMENT

3 STRANDS OF
1/16" FLAT RUBBER

LE:

FIN
CUT ONE FROM
1/32" SHEET

THE FLYING WISHBONE

-DESIGNED BY E.H.CLARK-

FRONT ELEVATOR (PORT)
TWO FROM 1/2 SHEET
TRIANGULAR AT TIP

LE.

THE TAIL BOOMS CAN
BE CEMENTED ON TO
OR NOTCHED INTO
WING

PROPELLER BLADE
CUT TWO FROM
1/16" SHEET

PORT WING PANEL
CUT TWO FROM $\frac{1}{16}$ SHEET
2" DIHEDRAL AT TIP

FRONT
ELEVATOR MOUNT
CUT TWO FROM $\frac{1}{32}$ "
SHEET & LAMINATED
CROSS GRAIN

WING
MOUNT
CUT TWO FROM
1/8" SHEET

POSITION OF
TAIL BOOMS

REAR ELEVATOR
CUT ONE FROM
1/32" SHEET

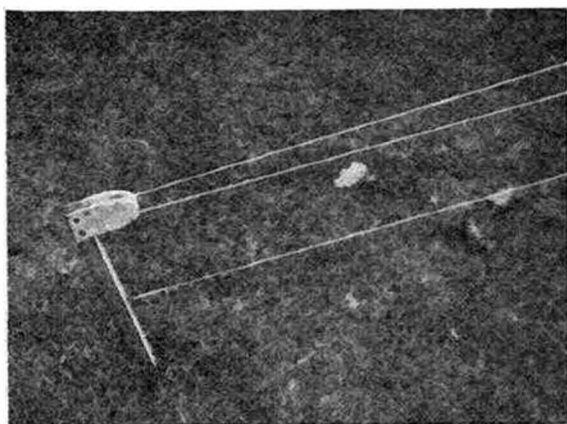
ALL WOOD SPECIFIED
IS BALSA

W.A.D.

PULLEY LAUNCH

By R. H. WARRING

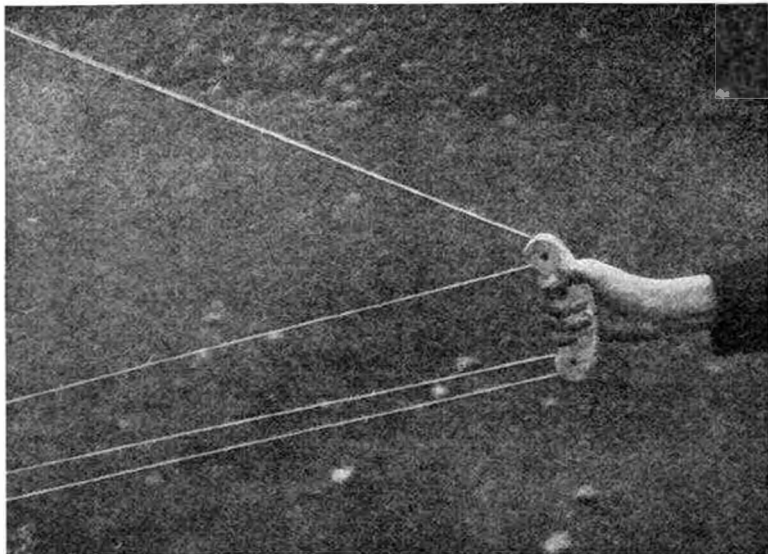
An authoritative article on some of the lesser known methods of glider launch, illustrating the extreme simplicity of the apparatus required.



WITH the subject of glider launching receiving prominent attention in recent issues of this magazine, this article has been written to cover as fully as possible the various methods of pulley launch which are possibly amongst the best of their kind and do allow a considerable amount of control to be exercised over the model itself.

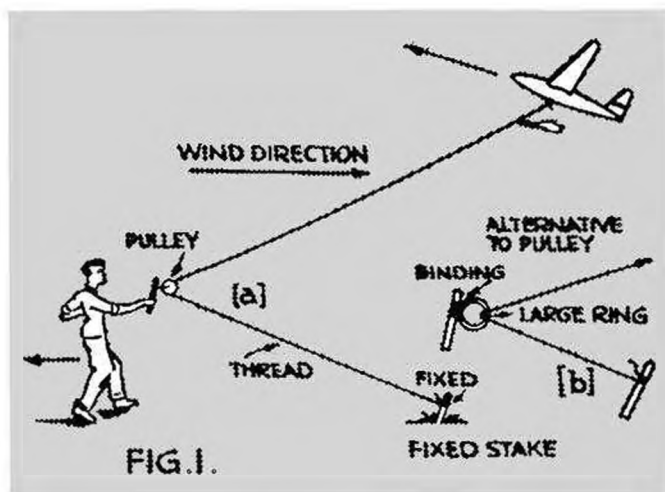
Extremely gratifying results have been obtained with system No. 5 (a) by S. Collins and C. A. Rippon, amongst others, and this augurs well for its reliability and usefulness. Its application is not merely confined to this one system, however, and the object of this article is to detail the various modes of approach. It is even possible with certain arrangements to carry out a launch entirely single handed.

The first system, illustrated in Fig. 1, is simple in the extreme. The line is tied to a stake, driven firmly into the ground. It passes over a pulley attached to a handle in such a manner that the pulley is free to revolve. The launcher then walks backwards into the wind thus pulling the glider forward at twice the speed



he is moving. There is relatively little that can go wrong and the actual towing speed may be adjusted to fine limits. An assistant is essential and it is his duty to hold the glider in a position ready for release, walking forwards with it when the operator pulls on the line and releasing when well under way.

The obvious disadvantage to this method is that the operator must walk backwards, this often placing him in awkward situations. System No. 2 is so arranged



that the operator walks *towards* the machine during the launch and also the speed of the model is now three times that of the operator. The diagram is self explanatory, but slightly stronger line must be used than in the first example.

This second method lends itself readily to solo-launching which will no doubt appeal to lone-fliers. The actual positioning of the launcher is now slightly different and unless a terrific length of line is employed it will be impossible to get any great altitude. The lines from stake to hand pulley must be equal to the length of the final towline and if this is very long there is a danger of fouling the ground or other obstacles.

Warring using the pulley system illustrated in Fig. 5. This will probably prove the most popular arrangement.

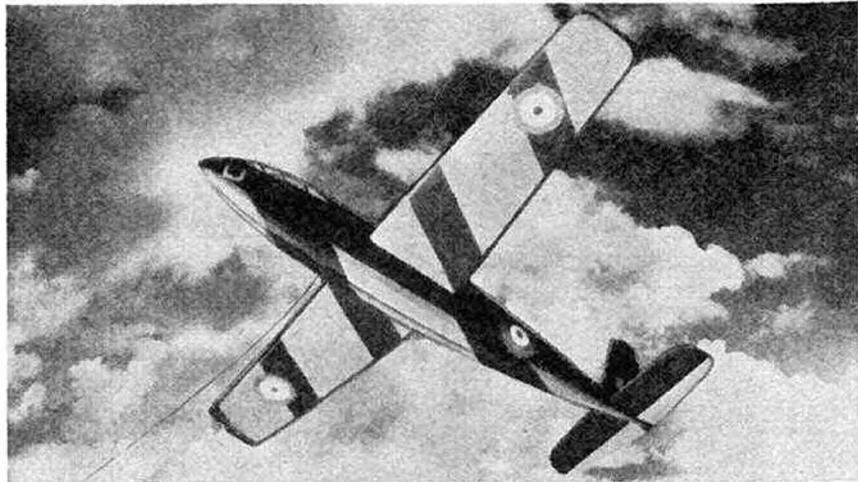
The *Hotspur II* going up on the tow line. The pulley launch is excellent for handling relatively large models such as this. The model was fully described in the October *Aeromodeller* and full-size plans are available.

Price 4/-

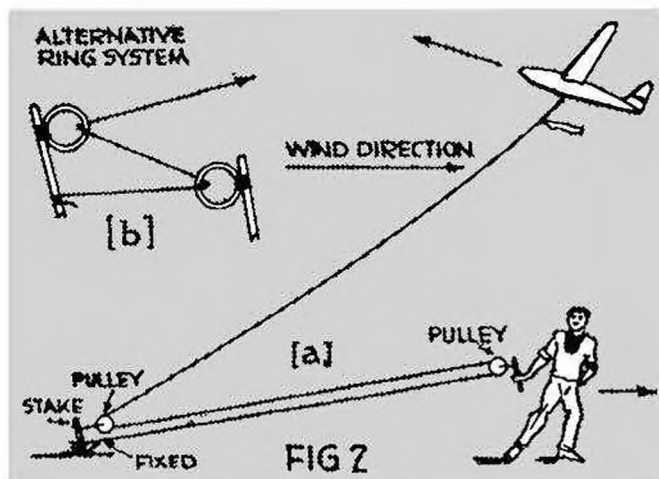
(see page 596)

This method is illustrated in Fig. 3, and it will be apparent that approximately three times the length of the final "leg" of the line itself is required.

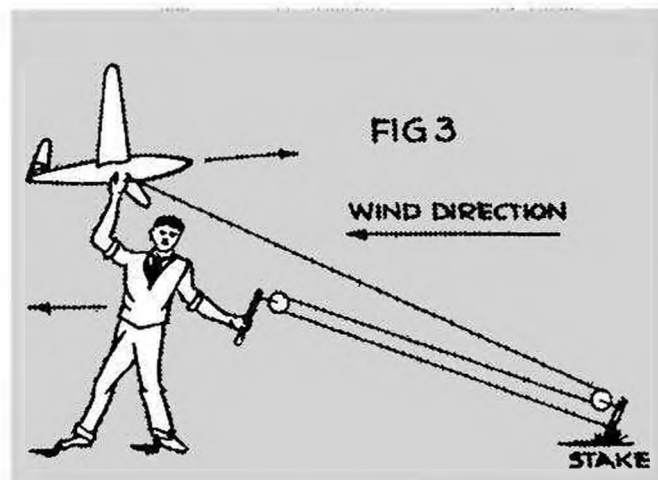
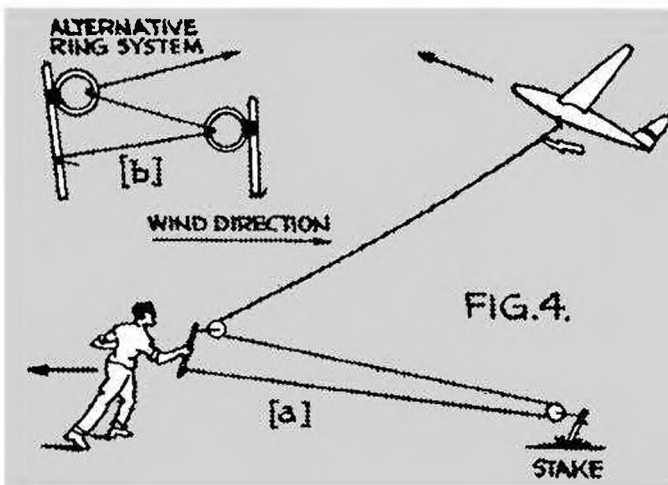
It may be employed, however, where the occasion demands it, but in all cases it is far better to make launching a "two-man" job and obtain the help of a competent assistant.



Method No. 5 is the one which, as previously mentioned, has found great favour amongst many prominent aero-modellers. The actual speed of launch is four times that of the operator, which means that he may move comparatively slowly. Against this is the fact that a really hard pull is necessary to pull the line

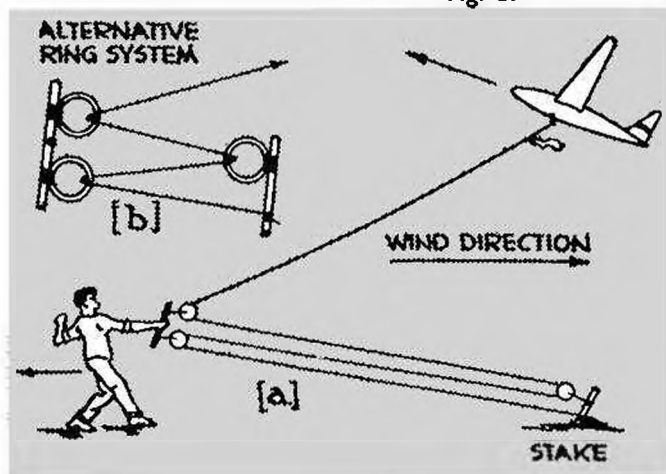


Method No. 4 is essentially the same as No. 2 with the attachments reversed. In this case again the operator has to walk backwards if he is to keep his eye on the model. One strong argument which tends to nullify the advantage of walking forwards during the launch is that whichever direction the operator has to take his eye is fixed on the model and progress over the ground tends to be in a straight line regardless of what is in his path!



through the pulley system. For heavily loaded models, however, it is probably the best method. The arrangement at the operator's end and the fixed end may be reversed, if desired, so that the operator walks towards the model during launch as in 2, but this system is not recommended for the solo launch.

Fig. 5.





This photograph shows C. Dennison holding the author's model, Aeolus, prior to launching. It will be noticed that Warring is using twin tow lines. This scheme, which shows great promise, will be described in detail in a future issue.

The actual constructional details of each type may be left to the ingenuity of the builder and the following notes are intended to be taken as a guide and not a rigid set of building instructions.

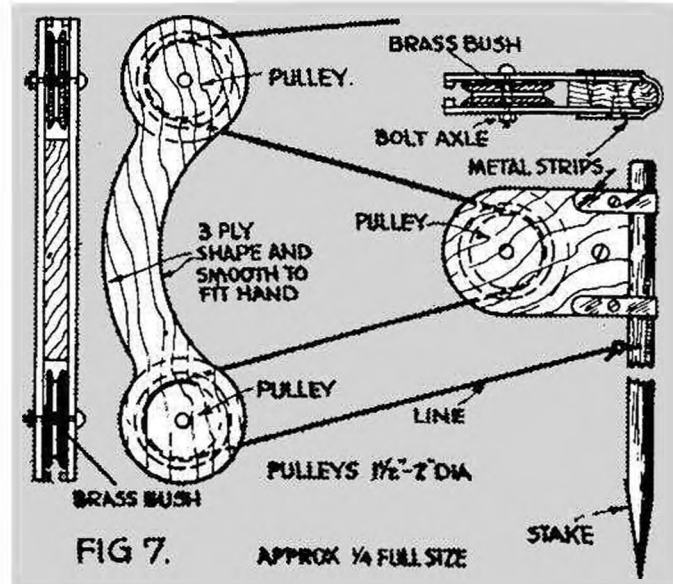
The pulleys themselves need only be small, about 1-1½ in. diameter will be ideal. These should preferably be of hardwood and must have a deep groove to carry the line. Brass bushes assist trouble-free running.

Several suggested methods of attaching these pulleys to the stake and the operator's set are illustrated in Fig. 6. There is no need to arrange the pulleys in the operator's set to swivel, but it would be an advantage to incorporate such a feature at the stake end.

Where the operator's set consists of more than one attachment it must be grasped between these two and figure 7 shows a good layout for a twin pulley system. The handle is so shaped to comfortably fit the hand and can be made of any suitable hardwood or plywood. Nothing extremely elaborate is required, in fact the emphasis should be on simplicity when there is less chance of failure.

For those individuals accustomed to the normal type of winch launch, the friction of the line over the pulleys and that of the pulleys themselves may appear excessive at first, but practice will bring familiarity with the "feel." Obviously a smooth running set of pulleys is vastly better than one which "jams" or is "spasmodic," and so a little care paid to the fashioning and assembly of these items will yield good returns.

A far simpler, although slightly less efficient, system is to employ rings in place of pulleys. These are bound direct to the operator's handle and the stake and, once

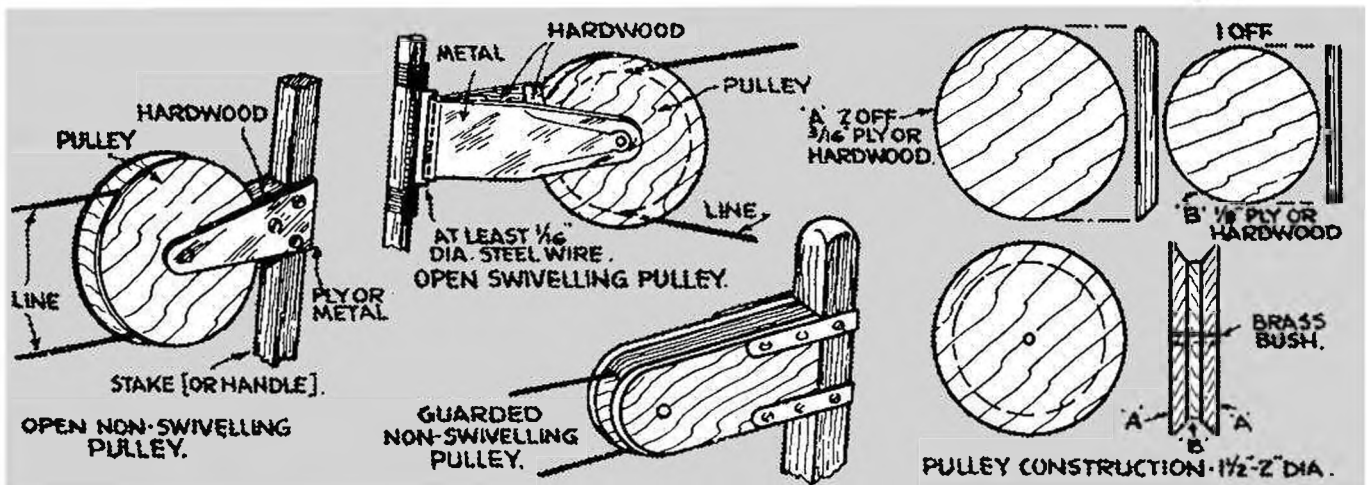


set up, there is absolutely no danger of the line jumping out of place or fouling the apparatus. The rings themselves should preferably be of bone or some plastic material. If these are unobtainable then metal ones may be employed, but with these the wear on the line is very much greater and it must be inspected at frequent intervals for signs of fraying.

The rings are bound securely to the handle and the stake. If desired, they may be pivoted by strut wire attachments, but this refinement is rarely necessary. Obviously there will be more friction on the line during operation but the fact that it works quite well even on system No. 5. should encourage the reader who may fight shy of making the pulley attachments.

And now, having offered this final encouragement to laziness, the author leaves the reader with the hope that the article has fulfilled its purpose, namely, publicized a progressive step in the development of model sailplane launching methods.

Fig. 6.





FROG

SCALE
MODEL
AIRCRAFT



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



DURATION • SEMI-SCALE • GLIDERS • SCALE PETROL • MICROFILM & R.T.P. • 1/72 SCALE

Following our usual practice, we once again have pleasure in announcing a Special Rebate on all plans purchased, accompanied by the Voucher Coupons printed on page 621. This offer is open until the 31st January 1943, and the use of these coupons entitles you to Cash Rebates totalling 1/6. Make your choice from the comprehensive list on this page.

Duration Types

(MONOPLANES)

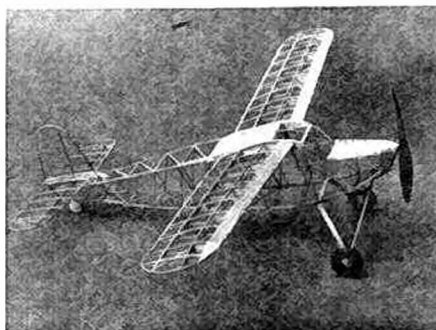
AIR CADET ...	38-in. span	1/3
A.M. CABIN MONOPLANE	23-in. span	1/6
BIG STUFF ...	68-in. span	7/6
COPLAND'S WAKEFIELD	44-in. span	1/3
FIREFLY ...	34-in. span	2/6
GUTTERIDGE TROPHY WINNER	42-in. span	3/6
GEORGE ...	24-in. span	2/6
ISIS ...	44-in. span	3/6
JACKDAW ...	35-in. span	2/-
JAY ...	28-in. span	2/-
J.B.3 ...	36-in. span	2/-
JEEP ...	28-in. span	2/-
KAMLET ...	31-in. span	1/6
MACCLESFIELD MARVEL	37-in. span	2/6
PERCY III. ...	38½-in. span	3/-
PTERODACTYL ...	60-in. span	2/-
R.A.H. 37 ...	37-in. span	3/6
STABILITY BABY...	26½-in. span	2/-
SPARROWHAWK	30-in. span	1/3
SUNSTAR ...	28-in. span	2/-
TRIKE ...	28½-in. span	1/6
TOOTS II. ...	26-in. span	2/-
WARRING'S WAKEFIELD	45-in. span	3/6
W.A.D. 20 ...	43-in. span	3/-
WATTIE... ..	35-in. span	2/-
X.F.S. I (Co-axial)	36-in. span	3/-

(BIPLANES)

BEGINNER'S BIPLANE	25½-in. span	1/6
BIPLANE SPORTS	29-in. span	2/6
CABIN BIPLANE ...	20-in. span	1/6
MINERVA ...	36-in. span	2/6

Gliders

AEGEUS ...	42-in. span	2/6
AEOLUS ...	48-in. span	3/-
ATALANTA ...	52-in. span	3/6
A.P.6 ...	72-in. span	5/-
CURLEW ...	46-in. span	3/-
HOTSPUR II. (scale)	46-in. span	4/-
KING FALCON ...	76-in. span	5/6
KIRBY KITE (scale)	72-in. span	3/6
LEANDER ...	49-in. span	3/6
R.F.L.G.53 (tail-less)	48-in. span	2/-
STOTHER'S GLIDER	60-in. span	1/3
TEMPLE TRIBUTE XPS-841	84-in. span	6/-
ZEUS ...	82-in. span	5/-



Flying Scale

AIRSPEED ENVOY	52-in. span	3/6
FAIREY ALBACORE	50-in. span	7/6
FOKKER D.VIII	35-in. span	2/-
GLOSTER GLADIATOR	28-in. span	2/6
HENSCHEL 126 (¾-in.-1-ft.)	35-in. span	3/6
HENSCHEL 126 (1-in.-1-ft.)	47½-in. span	5/-
HEINKEL 112 ...	18½-in. span	1/3
MILES KESTREL ...	39-in. span	3/6
MEW GULL ...	16-in. span	1/3
MESSERSCHMITT 109	19½-in. span	1/3
MOTH MINOR ...	35-in. span	2/-
SPENCER LARSEN	68-in. span	6/-
SOPWITH CAMEL	14-in. span	1/6
SUPERMARINE SPITFIRE II	15-in. span	1/3
WESTLAND LYSANDER	50-in. span	5/-

Flying Semi-Scale

CYGNET (Solid type)	17½-in. span	2/-
FOKKER D.23 ...	42-in. span	3/6
SKYRANGER...	20-in. span	1/6
VIPER II. ...	48-in. span	6/-

Seaplanes & Flying Boats

DIASPHERE ...	36-in. span	2/6
G.B.2 FLYING BOAT	48-in. span	6/-
PERCY IIS ...	38½-in. span	3/-

Petrol Driven

MERMAID (Flying Boat)	72-in. span	7/6
WESTLAND LYSANDER	60-in. span	7/6
VULCAN ...	96-in. span	10/6

Microfilm and

R.T.P. Types

(See list on opposite page).

In past years many readers have failed to understand the conditions to be followed when forwarding the Voucher Coupons with their orders. Coupon "A" is for use when ordering any plan up to 2/6 in value (e.g. should you order the 'Jackdaw,' fill in Coupon "A" correctly, and forward together with a postal order for 1/6). Coupon "B" is used when ordering a plan over 2/6 (e.g. if requiring the 'Hotspur,' send Coupon "B" with a remittance of 3/-). Both coupons (value 1/6) may be used when ordering a plan over 5/- in price.

Coupons may be used when ordering from our extensive range of 1/72 scale plans and photographs (see lists in the October and November Issues). With these types, however, Coupon "A" may be used only for orders of six plans or twelve photographs, and Coupon "B" with orders for twelve or more plans, or twenty-four or more photographs.

In all cases, please make certain that your name and address is fully stated in block letters:

(Please note that our service is for the sale of fully detailed working drawings only, and building materials must be obtained from your usual supplier, or any of the advertisers in the "Aeromodeller").

All plans are POST FREE and obtainable through the
AEROMODELLER PLANS SERVICE, LTD., ALLEN HOUSE, NEWARKE STREET, LEICESTER

TWO Special Announcements for INDOOR MODEL FANS

© © ©

FIRSTLY — TWO BOOKS IN ONE!
"INDOOR MODEL FLYING"

3/6 By R. H. WARRING 3/10½

Post Free

A grand new book covering every aspect of the design, construction and flying of all types of INDOOR MODELS.

One half of the book is devoted to R.T.P. flying with numerous model plans and instructions for building and flying contest models. The author starts from first principles and explains in non-technical language everything the average modeller will require to know about R.T.P. flying.

The other half deals exhaustively with the subject of microfilm, the construction of microfilm models, the advances in design, and hints and tips on trimming for best performances.

Each section is complete in itself. The two together make this one of the greatest books yet introduced to aeromodellers.

Ninety four pages, filled with useful and absorbing reading. Nearly two hundred illustrations and photographs of all types of indoor models. Model plans galore, both R.T.P. and microfilm. Everything the indoor model flyer wants to know.

The price of this book is only 3/6—so order your copy today, otherwise you will be disappointed. Nearly a thousand copies were on order after the first announcements appeared in the September Aeromodeller—now, IT IS HERE AT LAST.

© © © © ©



Photo shows CARL GOLDBERG and his Championship model. Time—more than 23 minutes.

SECONDLY—A WHOLE RANGE OF INDOOR PLANS!

Lazybones, a 25 in. span microfilm model by Joel Senber, Canadian champion.

Baby microfilm model by Joel Senber.	Price 1/6
Baby microfilm model by J. H. Maxwell.	Price 1/6
Baby Microfilm model (easy construction)	Price 1/3
Simple 16 in. span R.T.P. stick model.	Price 1/3
Simple 16 in. span R.T.P. fuselage model.	Price 1/-
3 min. 43 sec. R.T.P. model by R. H. Warring.	Price 1/3

24 in. span streamlined R.T.P. model.

18 in. span tandem monoplane, by F. W. Gates.	Price 1/6
28 in. span R.T.P. Pterodactyl.	Price 1/3
R.T.P. Canard model, Class A or B.	Price 1/3
20 in. span R.T.P. Pusher, Class A or B.	Price 1/3
Class A R.T.P. autogiro.	Price 1/3
18 in. span Experimental R.T.P. Ornithopter.	Price 1/3
Experimental R.T.P. Helicopter.	Price 1/3

© © © © ©

Copies of the book and any of the plans may be obtained direct from the Aeromodeller offices:

ALLEN HOUSE, NEWARKE STREET, LEICESTER

R.T.P. BAHT 'AT

By E. J. S. TOWNSEND

or a short history of the adventures of the Ilkley M.A.C. round the pole

THE model goes up and around, ta-ra-ra, and it comes down crash. Yes, the floor came off best

We first started experiencing fits of dizziness late in 1938, with a very light 24 in. span model tethered in a drawing-room. The line was 5 ft. long and was attached to a 3 ft. 6 in. pole. Several hazards in the disguise of chair arms appeared at an altitude of 2 ft. 6 in., and we proved once and for all that heat produces rising air. You should have seen that model rise as it shaved the mantelpiece just over the fire. This model turned in several flights of 45 sec. to 48 sec. until the lamp-shade got lower and caught the line, with disastrous results for the model. Without much deliberation the conclusion was reached that more space was required, and a search then commenced for a more suitable site.

Emigration to a bedroom produced a less hazardous circuit with the same line and pole, the only obstacle being the bed. A new model was constructed with a high aspect ratio 30 in. span wing, weighing $1\frac{1}{2}$ oz. all up, $\frac{1}{2}$ oz. of this being rubber. It used to make two or three circuits and then stall or dive into the ground after one circuit. The propeller was fine pitch and made from sheet balsa, giving good revolutions, but no power run, its best flight being about 16 sec.

We then obtained permission to fly in a hotel ballroom (no, not bathroom) which boasted a floor 50 ft. square, with about 15 ft. of headroom. Whoever saw so much solid emptiness! We ran round in joyous circles for an hour or two to make sure that there wasn't anything in the way (we had *not* been to the refreshment bar, George) and started free flying with light stick models. The best time was 42 sec., but there was no height available, so we returned to the pole. This was now 4 ft. high and had a 12 ft. line attached. An outdoor lightweight managed to do 23 sec. at colossal speed. The next meeting was cancelled owing to an epidemic of the unpatriotic variety of measles and put an end to further activities in the winter of 1939. The war-time black-out restrictions stopped flying during the 1939-40 winter.

Late in 1940 we organised an r.t.p. rally in the same ballroom and had several practice meetings beforehand, at which the best time was 45 sec. h.l. We used a 4 ft. 6 in. pole and 9 ft. line on the great day, but all our models put up a pretty miserable performance. Our best flight was made by a revamped outdoor job, 42 sec. The only visiting flyers came from Halifax, who won most of the contests. Some better flights would have been made if the Christmas decorations had been less obtrusive, as several models got too high and then crashed to the floor, tail first, winding the line round the rudder. This meeting was the first one at which a variable pitch propeller was used.

After watching these efforts we decided that more rubber was needed to give a longer motor run and less climb.

Then came the decentralised S.M.A.E. r.t.p. contests,

with Classes A and B, limiting line length and weight, etc. We concentrated on Class A models, those used in the February contest being parasol, H.W. models, weighing $\frac{1}{2}$ oz., with $\frac{3}{4}$ oz. of rubber (in four to six strands of $\frac{1}{8}$ in. wide strip). Single leg undercarriages and twin rudders were universal. At first we were rather anxious about the r.o.g. flights, but everything went well, the run required being about 3 ft. After a few test flights more turns were wound on, and times gradually rose, the best time of the month being 114.8 sec., which was the club record. 2,200 turns were used on this flight.

It was noticeable that after about 40 sec. the models remained 12 in. to 18 in. off the floor. This led to the phrase "angin' on th' line." Variable pitch propellers were much in evidence, and were very successful, experiments proving that fewer strands and *finer* pitch were the most efficient.

For the March contest we decided to build slightly larger models with more wing area to give a slower flying speed, and therefore requiring less power. The model was a failure, as the structure was too heavy for the rubber. Best time about 35 sec. For the actual contest two high- and one low-wing models appeared. The idea of the low-wing job was to lower the point of line attachment on the model and get it to 'ang on th' line better. This model weighed $\frac{1}{2}$ oz. and flew on $\frac{3}{4}$ oz. of rubber. It made the best flight of the month, breaking the club record with a flight of 116.0 sec. The high-wing models were not on form and suffered minor casualties.

For the April contest we built models as light as possible, two being high wing and one low. All weighed under $\frac{1}{2}$ oz., with $\frac{1}{2}$ oz. to $\frac{3}{4}$ oz. of rubber.

The low-wing model was mediocre, its best time being 96.0 sec. It was destroyed by a breaking motor after three flights. The two H.W. parasol models did extremely well. They both had $\frac{1}{2}$ oz. of rubber and variable pitch propellers. Times began to creep up as more turns went on, and two minutes was soon passed. Finally, the club record was put up to 152.5 sec. with a fine flight of 'angin on th' line. We don't know to this day how the rubber stood the 2,502 turns.

So we see a rise from 16 sec. to 152.5 sec. over a period of three years experimenting. Here are the conclusions reached:—

1. Build as light as possible ($\frac{1}{2}$ oz. for Class A models). Use four to six strands of $\frac{1}{8}$ in. rubber, weighing $\frac{1}{2}$ oz.
2. Low aspect ratio wing, 20 in. span, 4 in. to 5 in. chord.
3. Single leg undercart and single rudder act perfectly for r.o.g.
4. Steam and banana oil the fuselage only.
5. Variable pitch propeller, diameter = $\frac{1}{2}$ span.
6. Trim by h.l. flights on half turns until the model hangs on the line to the last few turns.

We hope this tale of woe (?) will encourage those who have had some difficulty in the past.

THE MODEL SHOWN ON THE OPPOSITE PAGE IS A TYPICAL R.T.P. MACHINE.
PLANS AND BUILDING INSTRUCTIONS FOR A SMALL FREE FLYING MODEL
ARE GIVEN ON PAGE 577.

"SNOWWHITE"
DESIGNED BY R.H. CROWE DRAWN BY AHS

WEIGHT - $\frac{3}{8}$ oz.
RUBBER $\frac{5}{8}$ oz.
6 STRANDS $\frac{1}{8}$ "

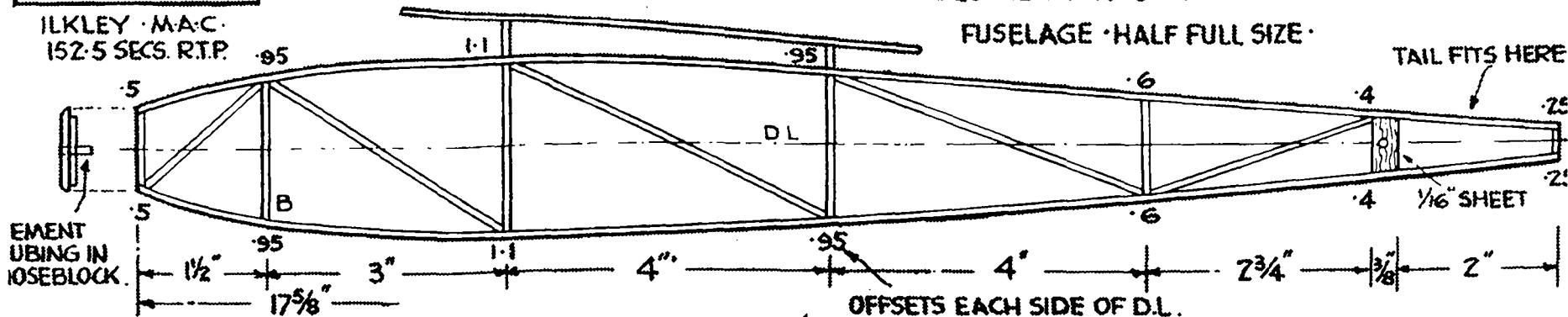
ALL LONGERONS AND
CROSS PIECES $\frac{1}{16}$ " SQ.

FOUR FUSELAGE SIDES ARE
IDENTICAL AS FUSELAGE HAS
SQUARE CROSS-SECTION.

ILKLEY · M.A.C.
152.5 SECS. RTP.

FUSELAGE · HALF FULL SIZE ·

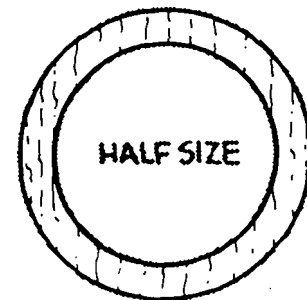
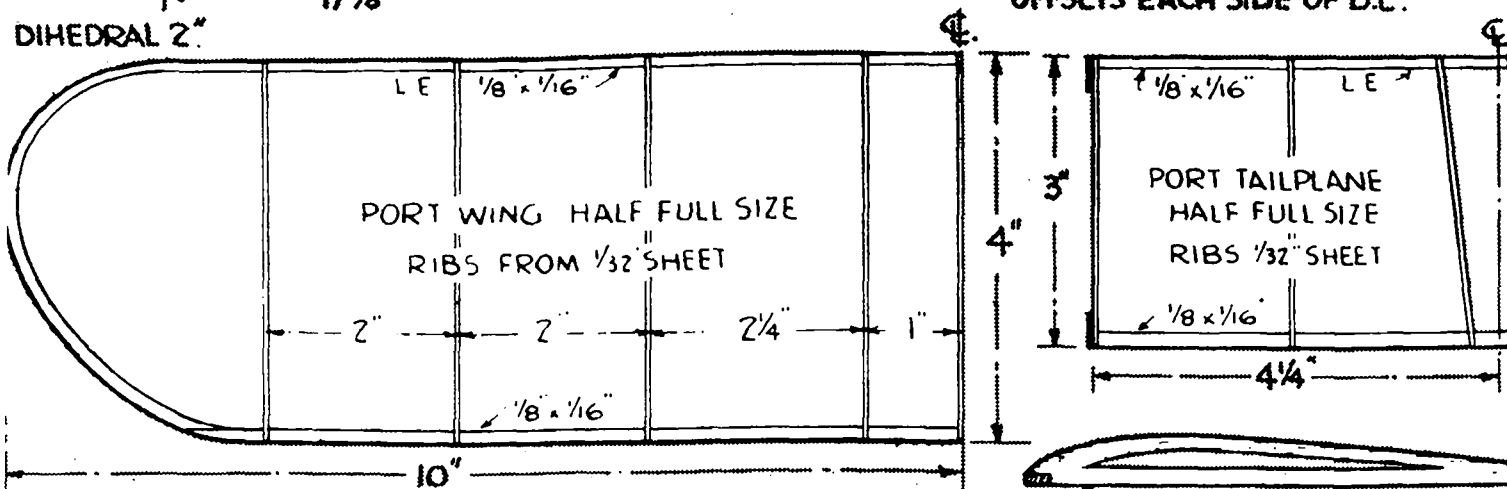
TAIL FITS HERE



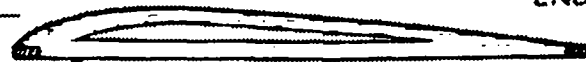
EMENT
UBING IN
JOSEBLOCK.

OFFSETS EACH SIDE OF D.L.

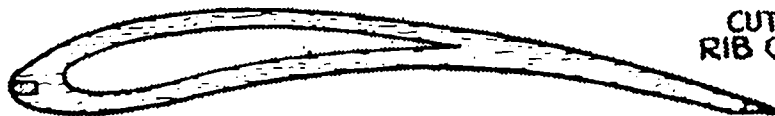
DIHEDRAL 2"



CUT 2 RUDDERS FROM
1/32" SHEET & GLUE TO
ENDS OF TAIL PLANE.

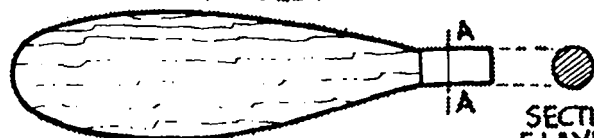


· TAIL SECTION · FULL SIZE ·



· WING SECTION · FULL SIZE ·

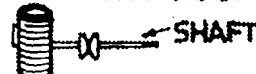
2 BLADES.



SECTION A-A
5 LAYERS 1/16 SHEET.

CUT OUT
RIB CENTRES.

PROP HUB.



WIND 1/32" SHEET ROUND
A PENCIL · BIND WITH
COTTON TO STRENGTHEN

BEND UNDERCART
FROM 26 S.W.G
PIANO WIRE.

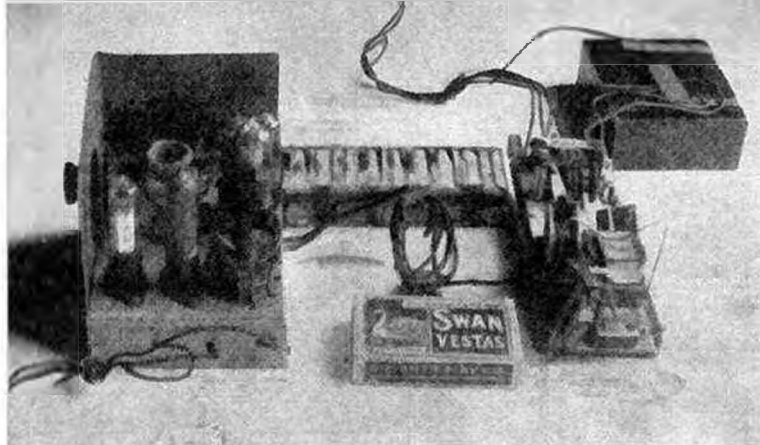
WHEELS
1/16" SHEET
1/2" DIA.

BIND TO LOWER
CROSS MEMBER "B".



PETROL TOPICS

by J. F. P. FORSTER



This photograph shows the Radio Control set employed by Peter Hunt, author of "Radio Control" for Model Aircraft, price 2/2.

A special Christmas edition of *Petrol Topics* which, in response to popular request, deals with radio control for petrol models and discusses at length a system designed by A. J. Cope, a lesser known, but nevertheless authoritative, worker in this sphere. We would further remind readers that a book on Radio Control by Peter Hunt is now available from these offices, price 2/2 post free.

FROM time to time there have been curt references in this feature, and one or two special articles in the *AERO MODELLER* bearing on Radio Control. Apart from whetting our appetites, giving us food for thought, and even the incentive for a few optimistic souls to do a little elementary practical experiment—I, for one, have twice rigged up very roughly constructed escapement mechanisms for rudder control!—the authors will, I think, be the first to agree that no one has so far bothered to publish (in this journal at all events) a comprehensive description of the "works" of a model in sufficient detail to enable any reader to equip a suitable model with all necessary gear for serious practical experiment, even if he were fortunate enough to obtain the necessary official permits for experiment with the Radio side of the problem.

The complete banning of all experimental radio transmission at the present time, quite apart from the very stringent regulations governing this sort of thing even in the days of peace, have been well "aired" in Editorial and other places in the *AERO MODELLER*. Naturally the majority of men qualified to carry out such experiments are at present in H.M. Service, but this does not suppress all *thought* on the matter, and the growing number of letters asking for information on, and discussion of Radio Control matters in "Petrol Topics" (apart from similar requests to you, Mr. Editor, I believe?) only goes to show that there are a number of people toying with half formed ideas and a few even going ahead, in spare moments, with full grown ideas, while many more, less fortunate (because of their being in the Services) are thirsting for, at least, reading matter on the subject.

Mr. A. J. Cope, the undercart and outline drawings of whose model was given in August "Topics," has now "come clean" with the Selector and Control Mechanisms of his model, which he generously presents for inclusion in "Petrol Topics."

This system seemed to me so definitely practical and weight saving, and such an improvement on anything hitherto published in this country—indeed, I was so intrigued that I resolved at once to construct a very "Heath Robinson" working model of this ingenious Selector myself just to watch it work (Silence, Mr. Cope, please!)—that I made further enquiries *re* its origin. The actual inventor is unknown in this country, but is probably one C. E. Bohnenblust (note the *initials*, which seem to hold some magical passport to fame in the Petrol Modelling world!), who published details of it in the August 1940 edition of the American radio periodical "Q.S.T." to which journal due acknowledgment is hereby given.

While my own knowledge of radio was never more than rudimentary (and certainly out of date to-day) there are certain aspects of the problem which can be discussed without any detailed working knowledge of radio, and I invite readers to agree or disagree with the two following contentions, which seem to me just plain common sense:—

(1) Since part of the equipment is not going to be "airborne", efforts should be made to keep the receiver as simple and light as possible, a large and sensitive receiver being much more likely to respond to unwanted radio interference, as well as being heavy and less crash-proof.

(2) The much talked of "reed selector" would appear to any Petroleer with experience of engine and model vibration, to be difficult (if not impossible?) to instal in a Petrol Model with any guarantee that not *one* of the many possible vibration periods, or harmonics thereof, could accidentally set one or several of the reeds vibrating, with disastrous results. Furthermore the variable frequencies necessary, involve more complex and heavier radio gear in both receiver and transmitter.

Much may depend in the future on the maximum permissible power of the transmitter, of course, but apart from interference with other licensed users of the Ether, the ideal for our purpose would naturally be to use a relatively powerful transmitter and a very simple and light receiver. Many people seem to overlook the unfortunate fact that interference may not be all one-sided. In spite of international conventions and allotment of limited wavelengths for specific purposes, I have never yet twiddled the dials of a receiver over any waveband without coming across some "pirate" or unintentional harmonic (not to mention heterodynes on the broadcast bands!). If R-C model receivers are to be sufficiently sensitive to respond to very weak transmitter signals, the chances of their responding unintentionally to extraneous interference would, to say the least, seem "rosy."

To return to the less "ethereal" and more solid and mechanical aspects of the problem (i.e., Selector and Control Mechanisms), these can, with only the most superficial consideration "on paper" of the radio equipment, be tackled *during the war*, and constructed by any reader so inclined, in the certain knowledge that, whatever system of radio transmission (if any!) is, some day, allowed by the authorities, his apparatus only requires the actuation of a single relay on-off contact in the output circuit of the receiver, for its infallible operation and, as will be seen, the selection and operation of any of 10 separate control movements in any sequence desired.

Apart from the Radio Relay (of which I cannot speak with certainty) the rest of the apparatus is sufficiently robust and "positive" to be proof against engine vibration interfering with its proper action. The other outstanding advantage over some previously published control mechanisms, is the reduction of the number (and considerable weight) of electric motors operating the controls to *one*, in the ingenious R.E.M. unit.

Before sorting out the real "low-down" on the working of the Selector and Control units, derived from several letters and sketches from A. J. Cope over some months (and culminating in a flying visit to his "hide-out" to see for myself!) it might be well to explain at the outset that only 4 controls (Throttle, Elevators, Undercart and Rudder) are provided in the following description, though it is quite possible (but probably unwise?) to add still more such as flaps, ailerons, bomb release, etc.

The Selector. (See Fig. 1.)

This consists basically of a driving shaft A (driven by a suitable rubber motor) geared to a lay shaft B in the ratio of 1 : 6, the rotation of which is checked by the Escapement Lever L.

Attached to A is a cam, W, which *closes* the 6 main switches R, 1, 2, 3, 4 and 5) placed at equal intervals of $1/6$ th of a circumference around A) as it passes over them, but *opens* the automatic return switch, E₁ (placed half way between switches 5 and R).

Shaft B thus does one complete revolution for every separate movement of Cam W from one switch to the

next, with the exception of E_1 , which, being midway between 5 and R, results in only half a rev. of B between 5 and E_1 , and again between E_1 and R.

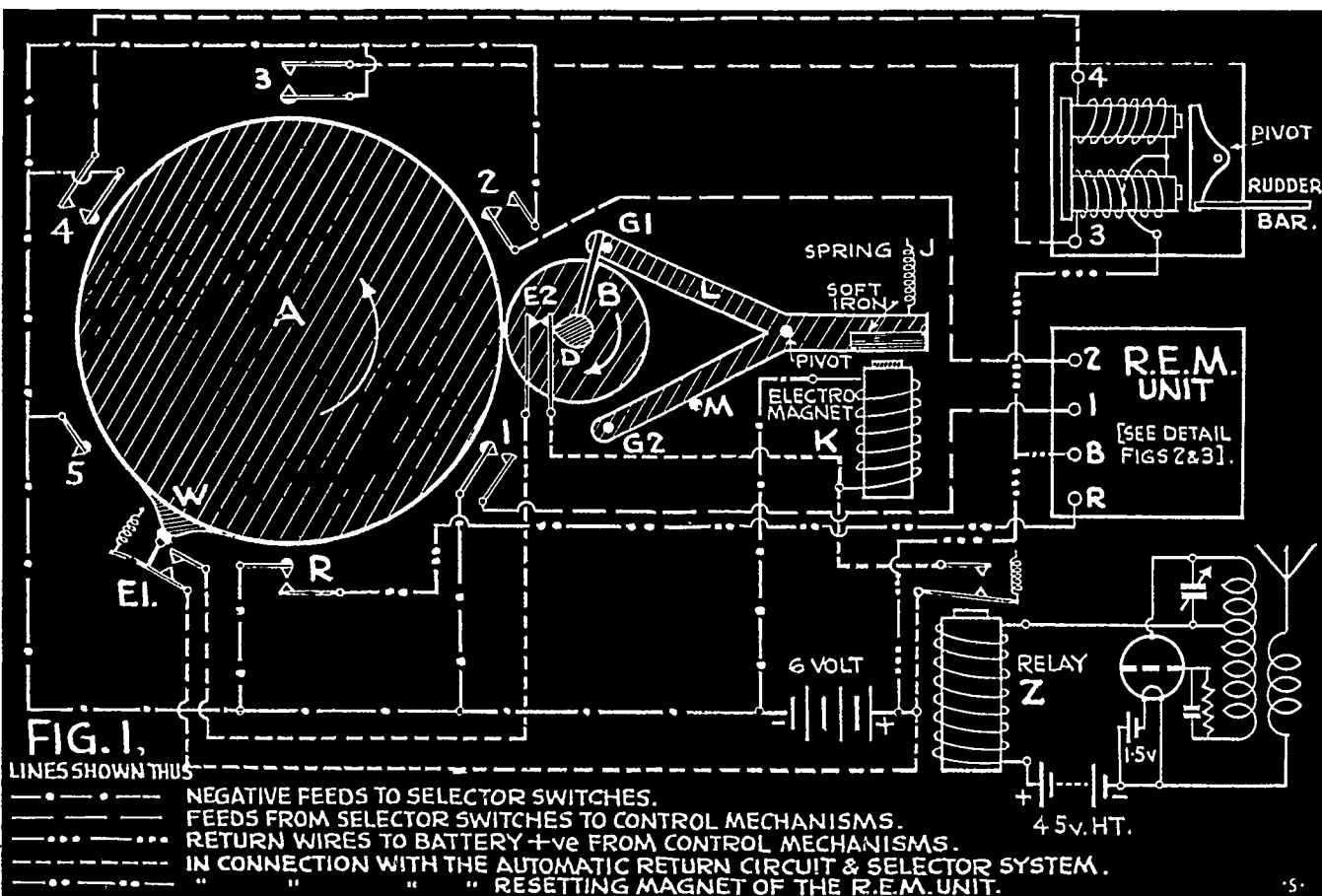
Shaft B carries an arm P and a cam, D, which is so placed as to close switch E₂ when arm P is in the position drawn (Fig. 1).

Now for the description of it working : The Receiver is of the "super-regenerative" type, in which there is a *drop* in plate current on receipt of a signal. Therefore, when the receiver is on but receiving no signal, the contacts of Relay Z (8,000 Ohms) are held open.

As soon as the transmitter is on, the drop in plate current of the receiver allows the contacts of Relay Z to close, thus energising the Electro-magnet K. (The 6-volt accumulator powers everything.) The soft iron insert of escapement lever L is thus attracted to K, releasing arm P from pin G_1 , so that P rotates to pin G_2 , while cam W moves from E_1 to R. (The result of this closing of switch R will come later.)

The system is now ready for the selection of any desired control switch from 1-5. At the transmitter, this is effected by means of a telephone dial giving, on its return run, the equivalent number of breaks in transmission to the number dialled. (It should be understood that this occurs at a fixed speed as the dial *returns* after release by the finger and not while it is being turned by hand.)

Supposing for example, we dial 2 : As the dial returns and the first momentary break in transmission occurs, the receiver current jumps up, breaking contacts of relay Z. Electro-magnet K becomes "dead" allowing spring



J to pull L back against stop M, and P returns to pin G_1 . As soon as the break in transmission ceases (it is only momentary) K is again energised through closing of contacts Z, so that if P has already got to G_1 , it is immediately released again till it reaches G_2 . The second break in transmission, as a result of dialling 2, again releases P from G_2 (through the "usual channels"!) and it reaches G_1 , only to be returned to G_2 again by the resumption of the transmission signal.

Arm P has thus performed two complete revolutions, starting and finishing at G_2 , so that meanwhile cam W has moved from R, across switch 1, and come to rest at switch 2, which was what we wanted. Here it remains as long as the operator desires—i.e., as long as transmission continues.

It should be noted that the dial pulses at about 9 breaks per second, so that no sooner does P complete its first revolution (W moving to switch 1) than it is again released from G_2 by the next break (one-ninth of a second after the first break), and it will be appreciated that the fraction of a second during which W closes switch 1 in passing, is insufficient to affect the control operated by that switch, as will be seen when the operation of the R.E.M. unit is explained.

Readers who have followed the working thus far will probably have noticed that it is essential for the speed of B to be at least fast enough to bring P back to G_2 before the second or subsequent breaks in transmission occur, otherwise some of these might occur too soon and fail to register on P. With a dial pulsing at 9 breaks per second P must revolve at somewhere between 10 and 20 revs. per second. The duration of the "break" should be as short as possible—just sufficient, in fact, to release P from G_2 .

Now for the ingenious part of the device: After the desired control has been applied for the length of time desired, the operator ceases transmission by an on-off switch in series with the dial. With the breaking of the relay contacts Z, by the rise in plate current of the receiver, Magnet K is immediately de-energised, thus allowing spring J to move escapement lever L and release P from G_2 .

Now watch the automatic return circuit drawn in the diagram (Fig. 1). Switch E_1 has been closed ever since W left it at the outset. When P reaches G_1 , cam D closes E_2 (in series with E_1) and completes the circuit from battery positive through switches E_1 and E_2 and electro magnet K back to battery negative (an alternative route to the voluntarily controlled contacts of

Relay Z). Magnet K thus releases P from G_1 , and by the time it has reached G_2 , K is no longer energised, thus releasing P from G_2 —indeed, in practice I find G_2 has already been drawn clear by spring J, and P does a complete revolution to G_1 , where it is again immediately released, as before—and this rapid process continues until cam W, flying round over the rest of the switches 3, 4 and 5, comes back to E_1 which suddenly breaks the circuit, leaving P where it originally started at G_1 , and all is now set for the resumption of transmission and selection of any other control (or the reversing of the previous control movement if desired). "Cute, isn't it?"

Control Mechanisms.

As will be seen in Fig. 1 the rudder controls consist of Solenoids energised through switches 3 and 4, giving left and right positions respectively. When neither is energised, the rudder lies in a neutral position being lightly spring-loaded.

The other controls, Elevator, Throttle and Undercarriage, are all motivated through a system of cams and levers, by a single Reversible Electric Motor, in a fixed sequence, which however, can be reversed or stopped at any point in the cycle. The sketches (Figs. 2 and 3) will, it is hoped, reveal the working of this cunning control unit.

The motor-shaft Y drives the camshaft (spindle X) through a 60-1 worm reduction gear. Switch 1 results in an anti-clockwise, and switch 2 in a clockwise rotation of spindle X. This shaft carries the Cut-out Disc (Fig. 2) as well as the three cams (Fig. 3) which move the torque tubes operating the Throttle, Elevator and Undercart-retraction gear respectively. These cams are shaped, and so arranged on the shaft that during one complete anti-clockwise rotation of the shaft—

the 1st quarter turn lowers elevator (after previous 3-point landing!) to a neutral position for take-off and climb;

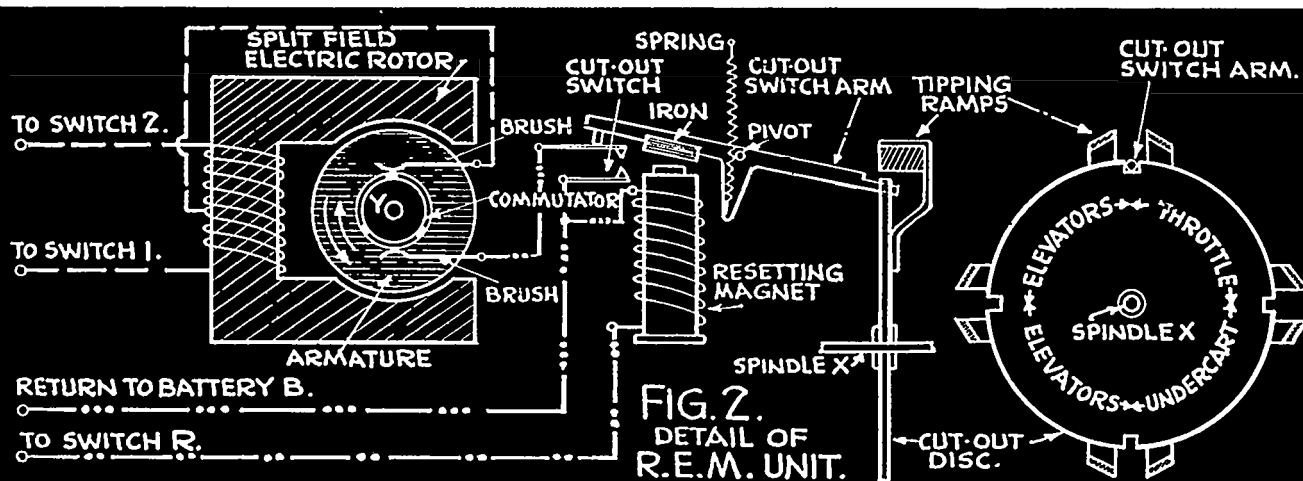
the 2nd quarter turn opens the throttle;

the 3rd quarter turn retracts the undercart; and

the 4th quarter turn depresses the elevator, preventing excessive climb.

The reverse cycle will be seen to be what is *theoretically* required in making a 3-point landing!

Fortunately, this sequence, once set in motion by dialling 2 preparatory to landing, does not proceed without a break, for as soon as a quarter turn in either direction has been completed, the cut-out switch arm



(Fig. 2) drops into a slot in the cut-out disc and breaks the circuit to the Electric Motor, thus stopping rotation of the camshaft. As soon as transmission starts again, cam W (Fig. 1) moves first to R thus energising the Resetting magnet (Fig. 2). This tips the cut-out switch arm out of the slot in the cut-out disc, leaving the cam-shaft free to rotate again in whichever direction is dialled. (The spring of the cut-out switch arm is so arranged as to hold the arm lightly in whichever position the switch is tipped).

If 3, 4 or some greater number is dialled, the momentary flick imparted to the motor as W passes over switches 1 and 2 is insufficient to move the camshaft appreciably, but if either 1 or 2 is dialled, as soon as the cut-out disc begins to rotate, the tipping ramps tip the cut-out arm just beyond its critical point so that it lies against the circular edge of the cut-out disc, but the motor circuit is not broken until a quarter turn is completed, when the arm again drops into a slot.

Conclusions.

Reviewing the working of the R.E.M. Unit, the camshaft can be rotated back and forth as many times as desired, and it is not necessary to complete the whole cycle—it can be reversed at any point in the cycle, even half-way through a quarter turn. It is quite possible, for example, to open the throttle a little by dialling 1, and then, ceasing transmission (for long enough for the automatic return of W to E₁), to resume, and dial 2, closing the throttle again.

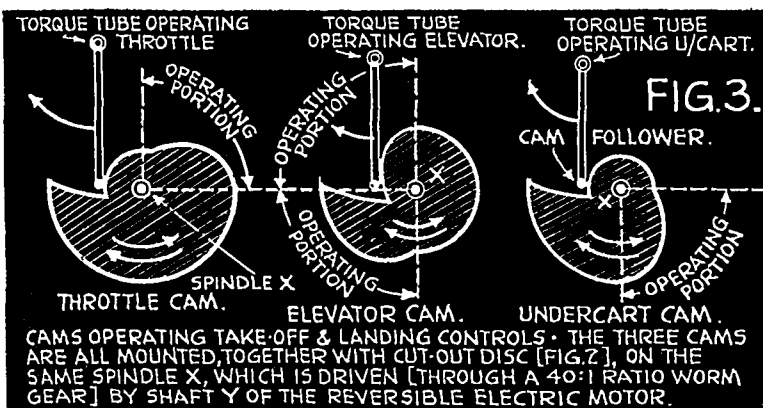
The following points, which hardly amount to snags, will doubtless occur to imaginative readers: once the undercart is retracted, it is not possible to reduce throttle without previously lowering the undercart. Nor is it possible to raise the elevator (say, for a loop!) with full throttle and undercart retracted.

There is, however, an easy answer to both of these: lowering the undercart during level flight or climb should have much the same effect as reducing throttle. Switch 5 (unused in the diagram) could quite easily be connected to a separate Solenoid (or motor) raising the elevator independently of the cam control.

With my own pessimistic crash-complex, I also visualised the possible (probable?) disaster that might occur in the event of engine failure with the cams in the last quarter turn (i.e., Elevator depressed). In order to level out, this would appear to involve dialling 2 three times in fairly rapid succession, and unless one had sufficient altitude in hand, things might be "just too bad"!!

However, I tackled Mr. Cope on this point, suggesting that instead of dialling 2, the operator should dial "1" yet again (a 5th time)—this would result in the cam-followers falling over the ends of their cams, returning to their starting points, i.e. elevator up, undercart down (the engine be it remembered is dead in any case).

With any luck, this might be expected to convert the vertical dive into a terrifying zoom (if not an "engine-off loop" assuming the wings are not already torn off!) unless with still more courage and presence of mind, the operator (probably clammy, if not unconscious with apprehension—he *should* have blacked-out by now in sympathy with the "pilot"!) boldly dialled "1" yet again (for the 6th time of asking) thus returning the elevator to neutral position. A few pretty approach



turns, dialling 3 or 4 as required, might (by some!) be expected to bring the model into position for a nice forced landing. It is to be hoped that by this time the operator, having recovered his composure, will not have to look up in the "directory" how to "ease that stick back" by dialling 2, thus at last allowing the mass of spectators to breath again as his machine comes in to a perfect 3-point landing in front of the grand-stand!!

For the benefit of sceptics, here is Mr. Cope's latest speed record, using a dial with 10 positions instead of 6 as described herein (connected direct, of course, and not by radio): *Any Ten controls in any order desired, selected in 20 seconds!* This involves flicking a dial with one hand and a transmission on-off switch with the other. Time includes "Switch on"; flicking dial; return of dial to zero; "Switch off"; automatic return of cam W. Ten such operations in 20 seconds.

Well, chaps, go to it! Your attempts to beat this should fulfil my wish to all Petroleers of "A Merry Christmas"! Alternatively, sorting out the foregoing description may prove a pleasant substitute for the usual alcoholic headache over the "festive season" in better times. My thanks, too, for your continued support and encouragement to keep this feature alive, not forgetting that growing pile of letters to which it has not been possible to refer in detail.

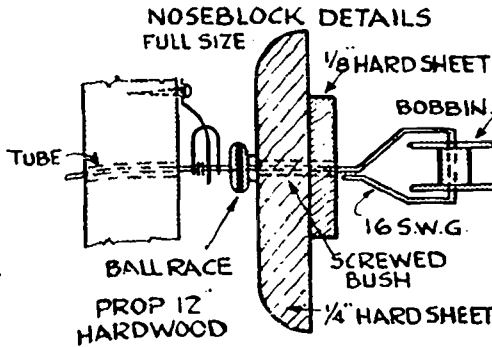
TECHNICAL TOPICS (continued from page 584).

say, a wing tip landing at speed or a nose dive under full power with a safety factor of five to ten.

With this stage completed the final three-view layout may be drawn in detail, complete in every form. Stability calculations should now be checked and limiting values found. Airscrew design, the power unit, etc., is also checked. Detailed performance figures can then be drawn up.

The important factor is then to *build the model as it is designed*, checking your final flight performances against calculated performances and eliminating any discrepancies by necessary adjustment. The existence of such divergences does not necessarily mean that theory is not reliable. It may be that serrating figures have false values, or certain influences, e.g., downwash, have been over or under estimated.

It is, of course, impossible to even outline every stage of the design in one page—and even methods differ with the individual. But suffice it to say that the latter part, i.e., the actual *building* of the machine is every bit as important as the other aspects. Unless careful attention is paid to weights the C.G. position will be found most elusive; in fact an allowance of $\frac{1}{4}$ oz. dead weight for trimming is often a wise precaution. Where there is the possibility of power units of slightly different weights being employed it is, in fact, necessary.



OUR CHRISTMAS MESSAGE is one of HOPE—

We hope the final phases of this war are approaching—

We hope the Victory of the Allied Nations will secure for all time peace on earth and a fuller understanding between the peoples of the world—

We hope that finance will be men's succour, not his master—

We hope the good fellowship existing in our Forces to-day will be reflected in our factories and businesses after the War—

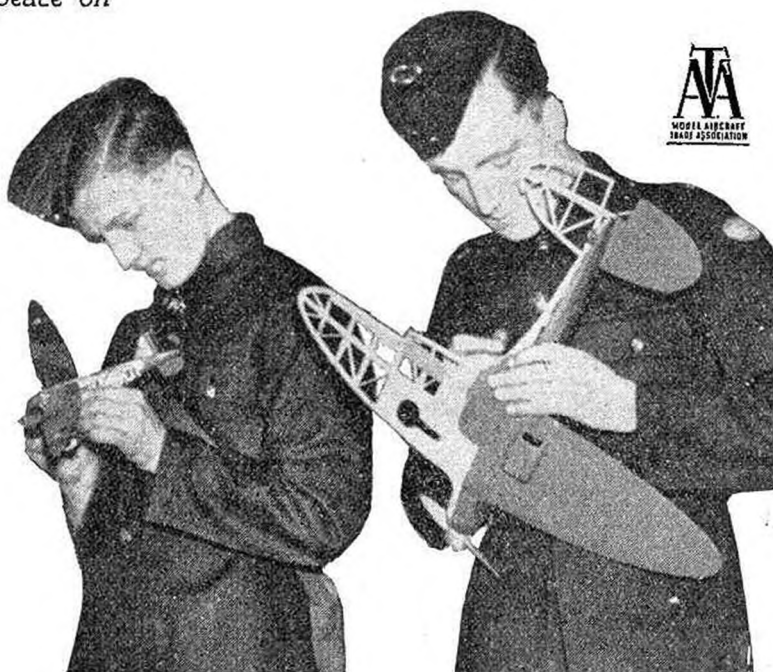
We hope the Powers to be will remember they are our advisers, not our oppressors—

We hope you all will be home again this time next year, and that we shall all of us be together there—at the end of the Road.

JOY-PLANE PRODUCTS

In the Royal Air Force, Anti-Aircraft Batteries, Royal Observer Corps, Air Cadet Training Corps and Schools, the men of today are becoming more and more Air-minded and Models are being constructed for recognition purposes, etc., with Joy-plane Products

TRULY an ESSENTIAL PART of WAR TRAINING



OFFICIAL SELLING PRICES AND SIZES AT PRESENT AVAILABLE

BALSA CEMENT 4d.
LUMINOUS PAINT—Bottles 7½d.
Outfits containing Base Coat
and Top Coat .. 1/8, 2/10
RUBBER LUBRICANT .. 6d.
WING DOPE (clear) .. 7½d., 1/2
FIELD CEMENT 7½d.
SILVER & GOLD DOPE 9d., 1/3
BANANA OIL (1) Thick 7½d., 1/2
BANANA OIL (2) Thin 7½d., 1/2

COLOURED MODEL DOPES
(Opaque colours).
MATT COLOURS: Brown,
Green, White, Black, Grey,
Heinkel Blue, Duck Egg Blue.
4½d., 8½d.
GLOSSY COLOURS: Cam-
bridge Green and Brown, also
Yellow, Red, Light Blue, Dark
Blue, Light Green, Grey, Black,
White, Brown .. 4½d. 8½d.
TISSUE PASTE .. Bottles 4d.
PLASTIC BALSA WOOD Tins 1/3

THE FIRM FAVOURITE OF EVERY MODEL BUILDER.

THE TURNBRIDGE MANUFACTURING & SUPPLY Co., Ltd., 52a/62a, LONGLEY ROAD, LONDON, S.W.17

Kindly mention THE AERO-MODELLER when replying to advertisers.

A FURTHER ON THE

The author, dwarfed by his one-fifth scale Lysander! With a wing span of 10 feet, the estimated flying weight of the model is 25 lbs. A radio control unit is to be fitted, operating elevators, throttle, rudder, slots and flaps; quite the most ambitious model attempted in this country to date.

PERHAPS it will be as well if I commence this second "interim report" (which on account of the duration of the war bids fair to become an annual feature of THE AERO-MODELLER!) by reminding readers that construction of the model was first commenced in 1938, when the aircraft was still on the Air Ministry's secret list, and very little information was available other than the main dimensions and that which could be scaled up from photographs.

The fuselage, landing gear, fin and elevators had been constructed by the outbreak of war in September, 1939, and from then until the autumn of last year no further work was possible.

Just before Christmas, 1941, I was able to get the engine mounted and a first section of the radio control apparatus had been constructed by Sqdn. Ldr. Peter

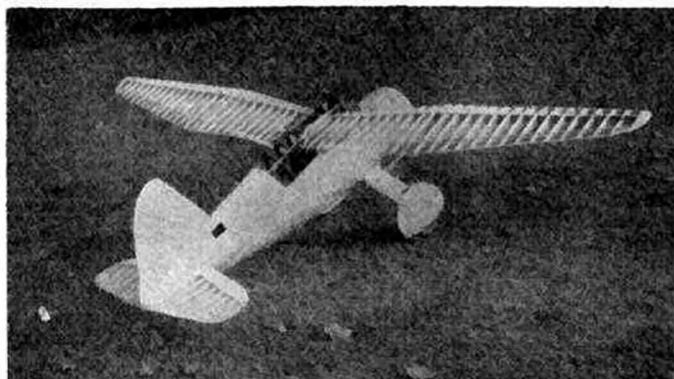
Hunt, author of "Radio Control for Petrol 'Planes," shortly to be published.

Recently, and let it be frankly admitted, to enable some progress being reported this year! several of THE AERO-MODELLER staff have furiously worked with me on constructing the main wings. Whilst the main structure of them has only been built and the slats and flaps have yet to be fitted and the wings covered, some idea of the size of the model can now be ascertained from the photographs accompanying this short report. When it is borne in mind that the wing area is a bare 10 square feet, and that the anticipated all-up load will be some 25 lb., it will be realised that the intention of getting this model into the air is certainly a very ambitious one!

With flaps and slats fully open it is hoped that a



A close-up of the cockpit enclosure, showing the "pilot," who, like the wings, is still in a naked state! The joy-stick may be seen in the "pilot's" hands and the instrument panel, although not visible in this view, has a full "set" of dials and switches.



slow-flying speed of not much in excess of 20 miles an hour will be possible, whilst, with them closed, the 'plane will have to fly at some 45 miles per hour to be air-borne. Such a performance would take most aero-modellers, and certainly myself, into an unknown field, and therefore the 'plane as a whole can but be regarded as an ambitious experiment which may be fraught with failure . . . but most useful knowledge is learnt from failures . . . and so I feel that the whole job is well worth while.

The following semi-technical information may be of interest:—

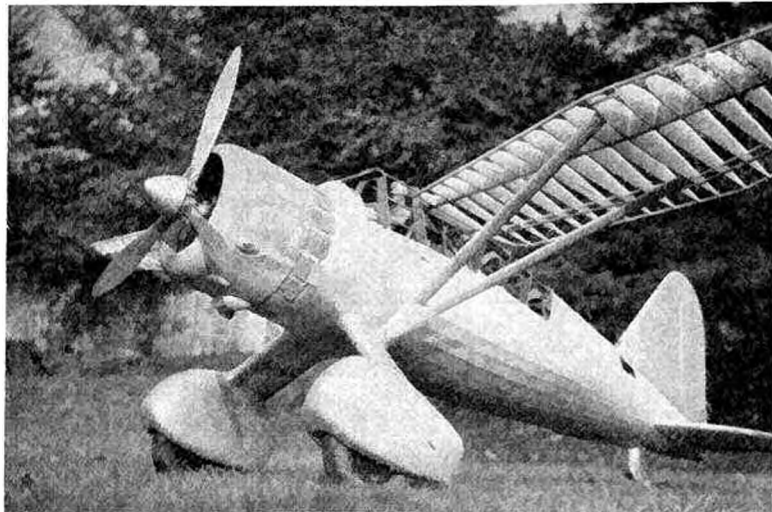
The airfoil section is approximately R.A.F. 34 with

"INTERIM REPORT"

"LYSANDER"

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

Power for this large model is provided by a "flat four" engine driving a three-bladed airscrew of 26 in. diameter. The blades are of wood, locked into a metal hub, and may be adjusted for pitch. The airframe is of mixed construction—balsa and hard woods.



the standard thickness chord at the wing tip, thickened to some 15 per cent. at the maximum width, and reduced to approximately 7 per cent. at the juncture with the cabin super-structure.

KL Max. is .51 at 15°
 .43 at 10°
 .22 at 5°.

The slat opening is about 10° and the flap depression something over 40°. When the slats and flaps are in full operation CL is about 2.3 at 20°.

Messrs. The De Havilland Airscrews Co. were kind enough to offer some information in regard to the airscrew blades, which are of Clark Y Section, and calculations

indicate that the thrust would be about 9 lb. with the blades set at an angle of 6.7°, corresponding with a speed of 40 miles per hour and 4,000 r.p.m.

At a speed of 20 miles per hour and a blade angle of 4.8° the thrust would be some 15 lb. Both these figures should well take care of the drag of this model.

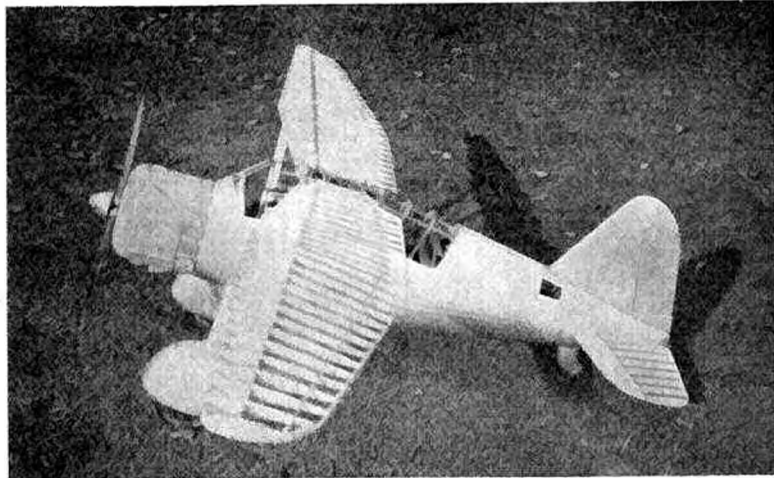
Originally it was intended that some form of pendular control for the elevators should be incorporated in the model but, as already stated, it is hoped, with the aid of Sqdn. Ldr. Hunt, to have an efficient radio control apparatus available as soon as the cessation of hostilities permits of testing out this model aircraft.

Latest information appears to indicate that there is a large change of trim between the high and low speed conditions on the full-sized "Lysander," which necessitates a large negative tail incidence for the landing condition, although this (the tail incidence) is practically neutral in the high speed conditions.

Opening of the slats and flaps tends to depress the nose somewhat further, so that it appears that a powerful and positive control of the whole tailplane, or at least the movable (elevator) portions, will be necessary.

However, that is all part of the fun of trying out a big scale model like this, and no doubt we shall have plenty of snags and trouble to overcome before getting the 'plane into proper flying trim.

Not the least of these snags will be associated with the radio control unit—but, of course, this must wait until after the war. Altogether the machine has presented a pretty problem and a lot of work still remains to be done.



Constructional details are similar to the full size machine. The slots and flaps, and the control unit, are yet to be added.

Liberal use has been made of sheet covering, particularly around the nose, with a final covering of silk. The spats are of solid balsa, with the wheels fully sprung to absorb landing shocks.



Buy Your Xmas & New Year's Gifts Early

Avoid Delay and Disappointment.

Mr. Wood of Elite Models wishes all customers, old and new,

**A MERRY XMAS & A
HAPPY NEW YEAR**

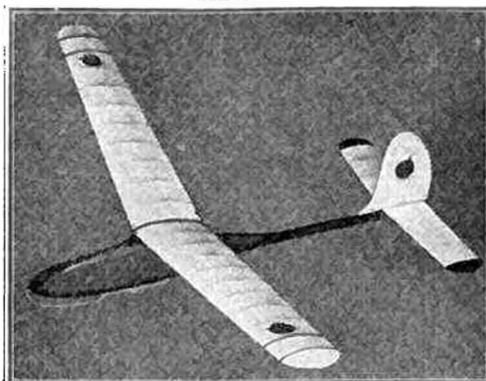
"ELITE"



MODELS

The "AIRBORNE" GLIDER

WING SPAN
42 inches.



Contents of kit:

**Dopes, Cement, Tissue,
Strip, Wire, Sheet,
CUT-OUT RIBS &
FULL-SIZE PLAN**

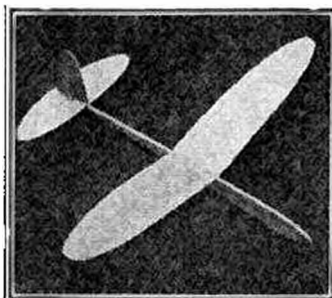
Price

11/1 Post Free.

"MAYBIRD"

Wing Span 27 inches.
With Finished Prop.

8/7 Post Free.



"GNAT" Solid Glider
Wing Span 16" 2/6 Post Free.

"NIPPY"

Wing Span 30 inches.
With Finished Prop.

10/7 Post Free.

Metal Castings for Solids

FLAT PROPS.	3d. each
PILOTS	5d. "
COWLS	3d. "
GUNS	3d. "
WHEELS 1/2" 3d. 1/2" 4d. 1/2" 4d.	
1/2" 5d. 1/2" 5d. 1/2" 6d. per pair.	

"Drome" Scale Kits

SPITFIRE	5/4 Post Free
H. HURRICANE	5/4 "
LYSANDER	5/4 "
PLANER GLIDER	5/4 "
SKUA	7/3 "
GLADIATOR	8/3 "

Cockpit Covers

SPITFIRE	6d.
H. HURRICANE	6d.
WHIRLWIND	7d.
WELLINGTON	1/10
SKUA	8d.
LYSANDER	1/6

Send 3d. For Catalogue. Fully Illustrated:

ALL ACCESSORIES STOCKED, INCLUDING BALSA SUBSTITUTE, CEMENT, DOPES, FINISHED PROPS, ETC., ETC.

ELITE MODEL AIRPLANE SUPPLIES
14, Bury New Road, Manchester 8

Kindly mention *THE AERO-MODELLER* when replying to advertisers.

DAYLIGHT ON DOWNTHRUST

By A. F. HOULBERG

THE opinions expressed in recent issues of THE AERO-MODELLER by various correspondents, and the article on the subject in the last issue, have now brought "Downthrust" into the prominence of a mystery of the first order. It is surprising how, in the process of argument, the most straightforward subject can become distorted to the point of confusion by the use of incorrect and irrelevant statements.

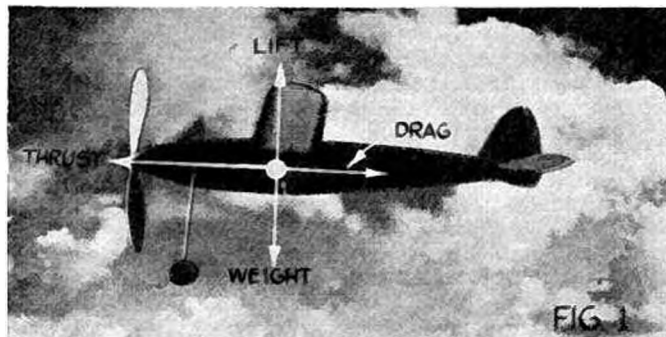
As the subject of downthrust appears to be approaching a controversial stage which is likely to develop further if something is not done to clarify matters, an attempt will be made to explain the why and wherefore of this simple expedient which is used by almost every aero-modeller.

The flight path.

First of all it should be pointed out that most of the confusion which has arisen is due to misconceptions on what defines the flight path of a machine in flight. This is evidenced by such remarks as "the machine will fly along the thrustline" or "the machine will fly along the datum line" which one hears so often.

Now there are no "roads" or "tramlines" in the atmosphere along which the machine is restrained to go, and the first thing to realise is that the flight path of the machine is defined entirely by the various forces which are acting upon it.

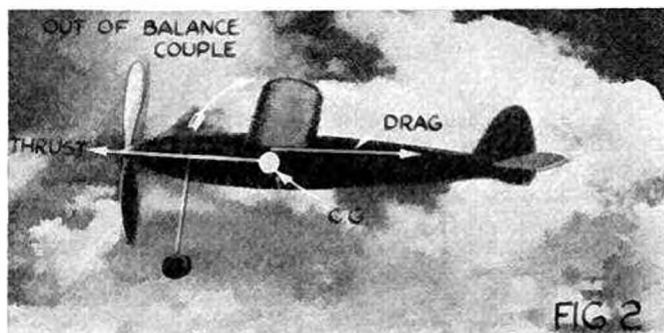
Let us therefore consider these forces in their simplest terms:—



- (1) There is the weight of the machine acting downwards through the centre of gravity of the machine.
- (2) There is the lift of the supporting surfaces acting vertically through the centre of pressure.
- (3) There is the drag of the components of the aircraft due to its passage through the atmosphere which acts through the centre of resistance of the complete machine.
- (4) There is the thrust from the airscrew—sorry Airforce, "propeller"—acting along the propeller axis.

These are the four primary forces, and the first three can, of course, be sub-divided into the individual forces produced by the separate components of the machine, and this, in fact, is the process used in designing a machine to arrive at the resultant forces outlined above, but for the time being it is undesirable to confuse the issue by introducing them into the picture.

The ideal layout would have all these forces intersecting at one point, that point being the centre of gravity of the machine. Under such conditions the attitude of the machine would not change even though the magnitude of the forces might change since the forces are in balance.



For instance, if the thrust was increased the machine would continue to move in equilibrium and in the same attitude to the horizontal although at an increased speed. Similarly the increased speed would produce an increased lift and the machine would gain height but there would be no out of balance force tending to make the machine stall, dive, or lose its trim.

Unfortunately in practice this desirable state of affairs is extremely difficult to attain, and in many cases quite impossible of achievement. This is particularly true of models due to the scarcity of authentic or reliable design data, and in addition to such things as structural considerations, the need for the provision of a landing gear, variations in the position of the centre of pressure of the wings with different angles of incidence, the disposition of the components to obtain stability, etc.

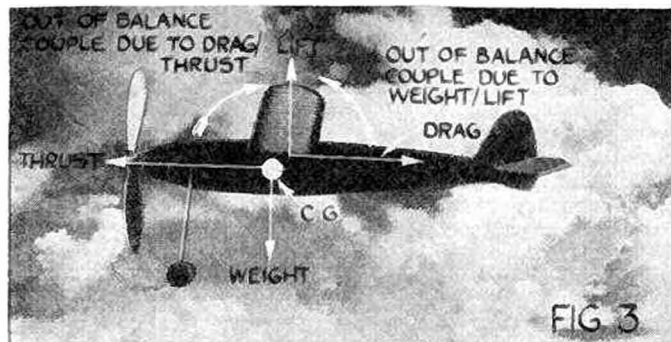
When the Primary forces do not coincide.

In the average model which one sees the four primary forces are certainly not all acting through one point as shown in Fig. 1, but are more usually disposed in the manner illustrated in Fig. 2.

It will be seen that the resultant total drag is acting on the machine at a somewhat higher point than the centre of gravity and the application of the thrust, so that the thrust and drag forces are out of equilibrium and there is therefore an out of balance couple continually tending to force the nose of the machine upwards.

Now if the thrust was *constant* we could easily counteract the out of balance couple produced by the thrust and drag by moving the wing rearwards to produce a similar and equal out of balance couple between the lift and weight forces, acting in the opposite direction as indicated in Fig. 3.

Unfortunately for the model enthusiast, however, the thrust of our models is *not constant*, in fact it varies within extremely wide limits especially in rubber-driven models, with the result that we should have to devise a

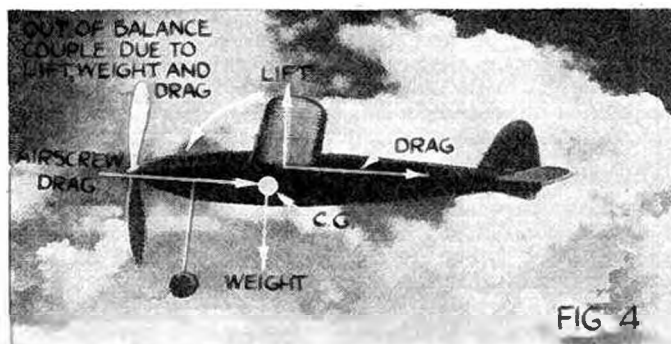


movable wing which shifted its position in step with the change in thrust, or movable elevators which did likewise, both pretty mechanical problems which might be tackled by those model makers who desire fresh fields to conquer.

The magnitude of the out of balance forces due to the thrust and drag forces not coinciding is more easily understood when we take into consideration the fact that when the power has died out completely, instead of there being a thrust at the propeller axis there is in fact an additional drag or resistance from the propeller which now acts in the *opposite* direction to the thrust produced while the propeller is revolving under power.

When we consider the effect of this on a machine whose out of balance couple has been corrected in the manner shown in Fig. 3, we find the very unsatisfactory state of affairs indicated in Fig. 4.

Clearly the reversal of the out of balance couple is undesirable, tending as it does to force the machine into a steep dive from which there is no recovery.



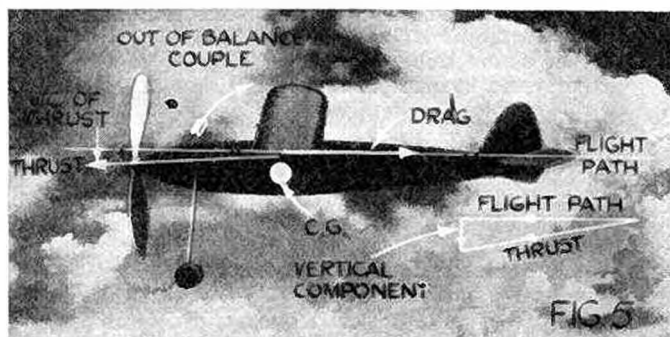
Why Downthrust ?

Since it is the *thrust* which is the varying factor in our models and the cause of the disturbance of balance and we have no pilot at the helm to correct its effects with the elevators, it is surely logical to make use of the *thrust itself* to correct the out of balance couple and so maintain the trim of the machine throughout the flight.

In the case illustrated in Fig. 2 this is easily done by tilting the thrustline downwards to produce a downward component to the thrust which will just balance the drag/thrust out of balance couple as shown in Fig. 5.

It is to be noted at the same time that inclination of the thrustline as practised by acro-modellists, by

packing out the nose block, also has the effect of making the thrustline more closely coincide with the line of the resultant drag in the neighbourhood of the centre of gravity and thus tends to reduce the out of balance couple itself. In fact, it can be arranged to eliminate it altogether. Thus by a judicious adjustment of the degree of downthrust employed it is possible—as has been proved over and over again in practice—to so adjust the model that it maintains perfect longitudinal trim throughout the flight and furthermore enters smoothly into the glide without change of trim.



The low-wing machine.

So far we have considered the question in relation to the popular high-wing machine but similar considerations apply to the low wing layout, although in the majority of instances the reverse effects take place, that is to say, the thrust is acting in a plane above the line of total drag with the result that *upthrust* may have to be resorted to.

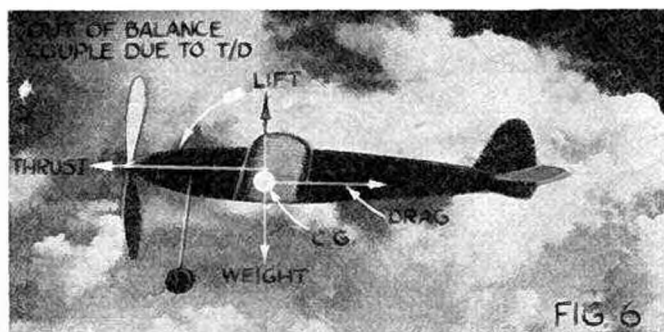
Fig. 6 illustrates such a condition and here we shall clearly need upthrust to keep the nose of the machine up under power if it is trimmed for the glide.

How to set the Downthrust.

The first essential is carefully to note the flight path of your model.

If it shows signs of stalling with the first burst of power and gradually flattens out coming into a more or less satisfactory glide, you are not using sufficient downthrust to cope with the initial burst of power, so give it more.

If on the other hand the machine tends to fly nose down at the start of the flight, gradually picking up and finally becoming over elevated, you are giving the model too much downthrust, so take some off and move the wing back slightly.



Since the ideal we aim at is a good flat glide at the end of the flight the best method of trimming the model is to find the best position of the wings for the glide and then adjust the downthrust to prevent the model from stalling under the effects of the first burst of power.

Another use for Downthrust.

There is another use for downthrust which is seldom realised which is bound up with the popularity of the high-wing model.

The equations for sustained flight is $L = \frac{K_L \rho A V^2}{32 \cdot 2}$ and is well known.

Where L = Lift of wings or weight of machine.

K_L = Lift coefficient of wing (now often written C_L).

ρ = Air density.

A = Area of lifting surfaces.

V = Velocity.

Now in our model the weight remains constant during flight and the lift required of the wings therefore also remains constant.

As both wings and tailplanes are fixed during flight the angle of incidence is therefore fixed and the wing is working at a fixed value of K_L .

The area of the wings is also fixed in the orthodox model, therefore this component of the equation does not vary.

To all intents and purposes ρ the density of the air does not vary during the average model flight so that here again the value remains constant.

Gravity = $32 \cdot 2$ is again constant.

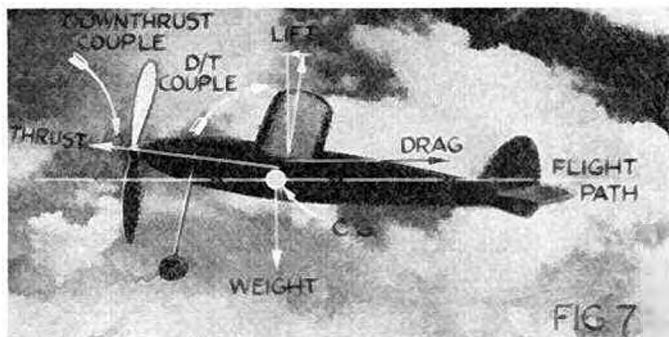
Since therefore all the factors in the equation other than V remain constant, it follows that V must also remain constant unless some disturbing force is brought to bear on the model to make the wing fly at a greater angle of incidence. In short, our model aeroplane is a constant speed machine by natural instincts and it only changes speed when the effective angle of incidence of the wing is changed.

Since we have no movable elevators, movable tailplanes or movable wings during flight we have been forced to use (often unconsciously) some other method of varying the effective angle of attack of the wings in

order to obtain maximum lift, while we have maximum power available from the motor.

This is where the out of balance force due to the thrust-drag couple in the high-wing machine comes in.

By using this out of balance couple to force the nose of the machine upwards and correcting it just sufficiently



to prevent an actual stall, we can make the wing fly at, or near, the angle of maximum lift while we have the power available to do so and thus obtain maximum climb, while gradually decreasing the angle of incidence as the flight progresses until finally, at the end of the flight, the model flies at an angle of incidence which provides the minimum sinking speed in the glide.

This, of course, calls for patient work and nice trimming, but it can be done and is being done, although in many cases the aero-modellers concerned are not aware that this is what they are actually doing; all they know is that they are getting good results.

It is to be noted that there is a forward component of the lift force tending to help the downthrust but this is counteracted by the inclination of the thrustline to the flight path and the travel of the centre of pressure of the wings.

We have, however, now destroyed the constant speed characteristics of our machine and this brings inertia forces into play to further complicate matters, but I am not going to confuse the question of downthrust by discussing this aspect of the problem in this article.

SIMPLE DEFINITIONS (continued from page 563).

K_y is the lift of a wing 1 sq. ft. in area moving at 1 m.p.h. through standard air and K_x is the drag of that wing. Note that standard air is assumed so that the equations require modification for calculations appertaining to different air densities:

The relationship between all these coefficients is as follows:—

$$C_L = 2K_L = 390 \cdot 7 K_y; C_D = 2K_D = 390 \cdot 7 K_x$$

$$K_L = 5C_L = 00128 K_y; K_D = 5C_D = 00128 K_x$$

From the triangle of forces, diagram 4, we have $R = \sqrt{L^2 + D^2}$ and the line of action of R is at an angle of $\tan^{-1} D/L$ with the direction of L , the lift.

In keeping with the other equations R can be expressed as:—

$$R = C_R \rho / 2 SV^2 \text{ where } C_R = \sqrt{C_L^2 + C_D^2}$$

We have mentioned *downwash* in connection with induced angle of attack and noted that the flow over any lifting surface of finite aspect ratio is deflected. It is this angle of deflection (in radians), that is known as the *downwash* of an aerofoil and is usually denoted by ϵ , see diagram 5. This downward deflection is apparent for some considerable distance behind the wings and is still quite appreciable at the tailplane. Accurate investigation of the flow involves the use of higher mathematics and for all practical purposes the downwash, i.e. the angle of relative wind at the tailplane, is taken as $\epsilon/2$ (i.e. the angle of attack of the wing divided by two. This angle of attack should be measured from the zero lift chord). An empirical formula is available for calculating the *exact* downwash at the tail but the above assumption is generally accurate enough.

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—"NORTH" 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.



Model Supply Stores

17 BRAZENNOSE STREET MANCHESTER 2

MODEL SUPPLY STORES

MARKET SUPREMACY 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-ENGINE 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 every-
thing for flying and solid
enthusiasts.

Always obtainable at M.S.S.



M.S.S. "PANDA"

SKYLEADA

SLICK

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

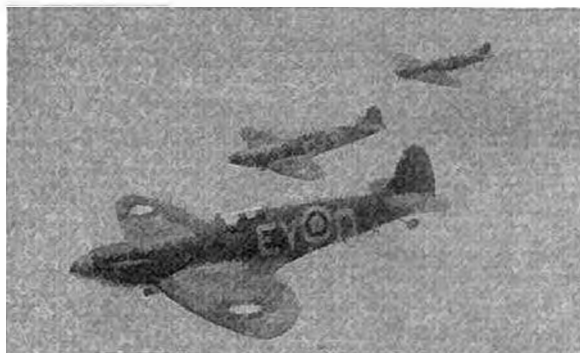
CAMOUFLAGE DOPE,
brown and green, in 8d. size
tins

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

THOROUGHLY
TESTED

HIGHLY
RECOMMENDED

Manufactured
by:—



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 dry-
ing) 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

SLICK BRANDS LTD., Waddon, Croydon, SURREY

Kindly mention THE AERO-MODELLER when replying to advertisers.

Presentation Hurricanes.

A flight of Hurricane II fighters, complete with tropical equipment, has been presented to the Middle East Forces by Lady McRobert of Scotland. The Hurricanes carry long-range tanks beneath the wings, Vokes air filters beneath the nose, four shell-guns, tropical type exhaust ejectors and a new type of casing to the gun barrels. They all carry the inscription "The McRobert Fighter" on the nose and an individual name beneath. Hurricane "Sir Alasdair" is serially numbered HL 844.

Spitfires become "Peashooters."

On September 29th, 1942, the three American Eagle Squadrons of the Royal Air Force Fighter Command, Nos. 71 (F), 121 (F) and 133 (F), equipped with Spitfire Vs, were officially transferred to the command of the U.S. Army Air Forces-in-Europe. The squadron will form part of the 4th Pursuit Group of the 8th U.S.A.A.F.

The markings of the transferred Spitfires are interesting in that they show yet another variation in the United States international marking. On the fuselage sides of the Spitfires the white star is surrounded by a yellow ring similar to that familiar on British machines. The star insignia on the wings remains unchanged. The "sky" band round the rear fuselage and on the spinner—characteristics of all British day fighters—are retained. British type code lettering is still seen on the machines and the Spitfires of one of the squadrons carry the letters "XR" ahead of the star. This squadron was originally equipped with Hurricane IIs but changed earlier in 1942. The British pattern of camouflage colouring is also retained.

The Oxford IV and V.

Two new versions of the well-known Airspeed Oxford twin-motor crew-trainer which has been a standard type in the Royal Air Force since 1937 have appeared recently. The Mk. IV is experimental only and differs in having two De Havilland Gipsy-Queen IV six-cylinder inverted in-line air-cooled motors in place of the Cheetah radials. It has no dorsal gun turret. The prototype Oxford IV carries trainer markings.

The Oxford V is in full production and is almost indistinguishable from the original Cheetah-powered versions. It is fitted with American Pratt and Whitney Wasp Junior nine-cylinder radials and has Rotol airscrews. The top speed is increased from 190 m.p.h. to 202 m.p.h. as a result. One of the first Oxford Vs was serially-numbered AS 592 and was actually a converted Oxford II. The serial number was carried in yellow on the fuselage and in black beneath the wings. On AS 592 the camouflage paint was carried the whole way round the motor cowlings—a peculiarity noticeable on a large proportion of Oxfords.

Venturas with Coastal Command.

Several squadrons of Coastal Command are now equipped with the Lockheed Vega-Ventura reconnaissance bomber which has been arriving in this country since the early summer of 1942. One of the Coastal squadrons flying the new Ventura carry the code letters "YH." An early batch of Venturas to go into service was numbered from AE 658 to AE 748.

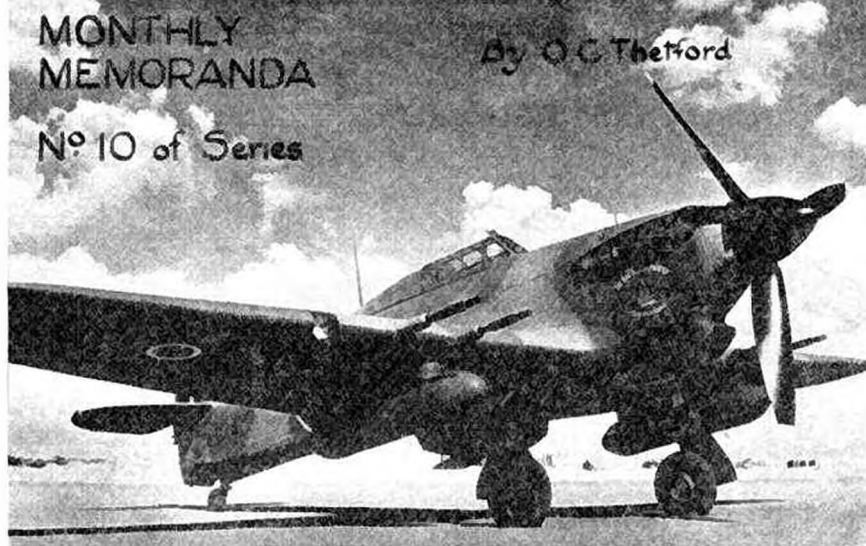


Photo: Air Ministry.

Hercules-Wellingtons.

Since the summer of 1942 large numbers of Wellingtons with Bristol Hercules XI motors have been in service with the Bomber Command of the R.A.F. This version is known as the Wellington III and the performance is improved considerably so that the type is likely to have an extended lease of life on operations alongside the four-motor bombers. The Wellington III has a four-gun Nash and Thompson turret in the tail similar to that carried initially on the Whitleys. Externally the Mk. III may be distinguished from the Mk. IC with Pegasus motors by the location of the exhaust pipes and intakes on the cowlings. On the Hercules there is an intake above the nacelle aft of the cooling gills which is absent on the Pegasus. The exhaust pipes of the Hercules are fitted on the inner sides of each nacelle which is exactly opposite to the arrangement on the Mk. IC. One batch of Wellington IIIs is numbered from X 3662 to X 3763. Wellington III X 3763 is machine "E" of "KW" Squadron. The serial number is painted above the tailplane root attachment as is the case with all Wellingtons since January, 1942.

A New Target-Tower.

A special version of the Phillips and Powis Miles Master advanced trainer has been produced for target-towing and glider-tug duties and is known as the Martinet. Like the Master II, the Martinet I has the Bristol Mercury XX motor installed, but the large container beneath the fuselage of the Martinet makes it readily distinguishable from the standard trainers. The container is similar to that fitted beneath certain Trainer Battles and is the stowage for the flag targets. Martinets have the usual target-towing markings, i.e. green and brown camouflage on the upper surfaces and a yellow belly and undersurfaces crossed with diagonal bands of black. One Martinet in service is numbered HN 862. The number is painted on the fuselage only. Aeroplanes which may now be seen painted as target-towers include the Martinet, Henley, Lysander, Hector and various older types such as the Wallace and Seal biplanes.

Photo: Keystone.





Beech AT-7

Photo: Fox Photos, Ltd.



Beech F-2

Photo: W. T. Larkins.

FIGHTING AIRCRAFT OF THE PRESENT WAR——XXIII

The Beechcraft 18

By H. J. Cooper

THE Beechcraft 18 two-motor low-wing monoplane has proved itself remarkably efficient in many spheres of military, naval and civil aviation, and at present is known by at least twelve different designations.

First produced in 1939 as a six-eight passenger commercial monoplane, three civil versions of it became known as the 18A, the 18D and the 18S, and were fitted respectively with 350 h.p. Whirlwind R-760-E2, 330 h.p. Jacobs L-6 and 450 h.p. Wasp Junior motors.

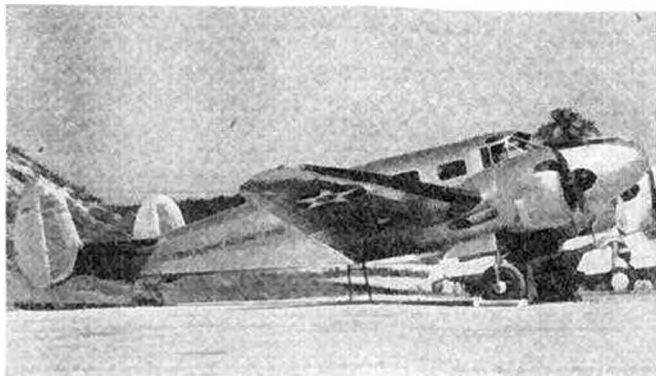
Two versions of the 18S, the C-45 and C-45a, fitted with Wasp Juniors are in service with the U.S. Army for the transport of personnel, and are equipped as six-seaters.

The AT-7 is a five-seat variation issued to the U.S.A.A.F. as a navigational trainer, and is in fact the first type to be used solely in that category by that service. This version also has Wasp Junior motors and differs externally from the 18S in having an astro-dome just to the rear of the pilot's cockpit. As a twin-float seaplane with the same service this type is known as the AT-7a. It is fitted with an extra fin below the tail.

A three-seat photographic version, the F-2 (Wasp Juniors), is used by the U.S. Army for photographic duties and can be fitted with various combinations of cameras and mapping apparatus.

Another version is the AT-11, which is generally the same as the AT-7 but has a modified fuselage with a transparent nose and smaller cabin windows. It is intended for the training of air-gunners and bomb-aimers and many variations of armament can be installed. The AT-11 generally corresponds with our Airspeed Oxford, but has the higher power of 450 h.p. Wasp Juniors.

Beech JRB-2



Two "Utility" versions, the JRB-1 and JRB-2, both with Wasp Junior R-985-191s, are used by the U.S. Navy for general transport work. The JRB-2 is externally similar to the other models in this series, but the JRB-1 has a raised transparent fairing above the pilot's cockpit for wider observation.

In 1940, a special version of the 18D equipped with two 450 h.p. Wright Whirlwind R-975-E3 motors was fitted as an ambulance and supplied to the Swedish Government. The undercarriage was interchangeable with wheels, skis or floats.

Yet another version is the wooden AT-10 transitional trainer but this differs among other points in having a single fin and rudder. It somewhat resembles the Cessna Crane, though its development from the Model 18 is apparent.

Types in the 18 Series are of all-metal construction except for the fabric covering of the control surfaces.

Figures for the 18S (Wasp Juniors) are as follow: They may be taken as generally representative of the whole series, though naturally the installation of alternative motors and military equipment results in slightly varying figures: cruising speed, 220 m.p.h.; landing speed, 61 m.p.h.; climb, 1,850 ft./min.; service ceiling, 27,000 ft.; the range of the military versions is usually about 1,000 miles.

The following dimensions are applicable to all versions: Span, 47 ft. 8 in.; length, 34 ft. 3 in.; height, 9 ft. 5 in.; root chord, 10 ft. 4 in.; tip chord, 4 ft.; tailplane span, 15 ft. 8 in.; track, 13 ft.; airscrew diameter, 8 ft. 3 in.; wing area, 347 sq. ft.

The tare weight of the 18S is 5,031 lbs. and the loaded weight 7,500 lbs. The pay-load is 1,534 lbs.

The power loading is 8.33 lbs./h.p. and the wing loading 21.5 lbs./sq. ft.

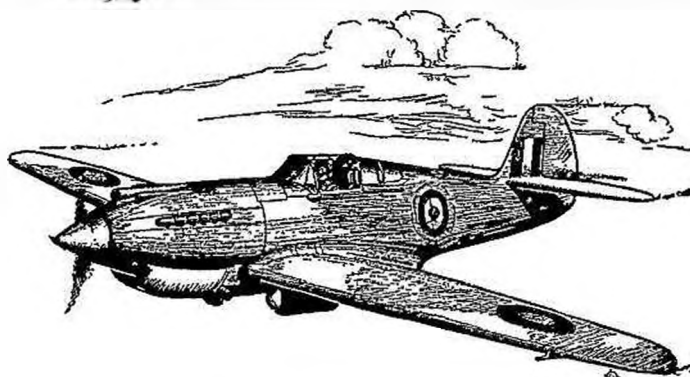
The cargo versions with the U.S.A.A.F. are camouflaged olive green on the sides and upper surfaces and are usually light grey underneath; the AT-7, AT-11 and the Naval JRB-1 and JRB-2 are at present left in the original aluminium colour.

Beech JRB-1

Photos: Rudy Arnold.



SPITFIRE
MESSerschMITT 109
BOULTON PAUL DEFIANT
CURTISS TOMAHAWK (XP-40)
BELL AIRACOBRA
HURRICANE



CURTISS "TOMAHAWK."

For sheer realism and accuracy of detail these $\frac{1}{4}$ -in. to 1 ft. Scale Solids are "TOPS." Absolutely complete with 3 bottles coloured dope, transfer insignias, turned spinner and wheels, celluloid, cement, and sand paper. All parts cut to shape. Price 4/6 Postage 5d.

MODEL AERO SUPPLIES,
146, SPRING HALL LANE,
HALIFAX, YORKS.

Tel.: Hx. 61201 and Hx. 2729.

Ample stocks of cement, clear and coloured dope, banana oil, wire, brass tube, English tissue, rubber lubricant, transfer insignias, etc.



"SILVERWING" SOLIDS

These $\frac{1}{72}$ " Scale Solids are undoubtedly the finest value-for-money Kits it is possible to buy. Fuselage and wings ready shaped. Turned wheels and cowls, transfer insignias, metal propellers, cement, full scale detailed plan and instructions
—AND A REAL PHOTOGRAPH OF THE MACHINE.



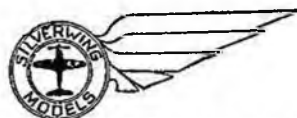
DOUGLAS "BOSTON."

Me 109F	1/6	Whirlwind	2/6
Kittyhawk... ..	1/9	Me 110	2/9
Buffalo	1/9	Beaufighter	3/3
Spitfire V	1/9	Junkers Ju 88	3/9
Hurricane	1/9	Douglas Havoc... ..	3/9
Lysander	2/-	Douglas Boston	3/9

Postage 4d. extra.

YORKSHIRE MODEL SUPPLY CO., LTD.
NEW BOND STREET, HALIFAX, YORKS.

Telephone: Hx. 2729.



Kindly mention *THE AERO-MODELLER* when replying to advertisers.



Whilst mod'lers watched their balsa stocks
and tried to eke it round,
a benefactor spread the news
—he knew where 't could be found ! !
" Oh, follow me, my friends," he cried,
" there's stacks and stacks galore,
and when you've used the bit that's there,
I'll show you where there's more."
" Lead on, lead on," the thousands yelled,
a-tripping in their haste.
But oh—the cries of sad dismay
when all they found was waste !
For nowadays the full-size craft
use balsa by the mile,
so now you see why mod'lers get
some scrap once in a while.

AND

The blinking stuff gets dearer and dearer and dearer and
dearer and dearer, and now you will see, Bob Copland and
me, planking " fuses " with sheet that's inferior.

And having got that off my chest, suppose I start off
with wishing you all the usual wishes for this time of
the year. Unhappily we are still in that turmoil known
as war, but, being us, I suppose we just carry on carrying
on, and make the best of poor conditions, and even
scarcer supplies. However, we can always cheer our-
selves up with the thought that " it could be worse "
. . . and, anyway, we'd have no time to use it even if
we could buy wood and materials without stint !

I am pleased to include in this month's columns the
final results of the National Championships, both indi-
vidual and club. Bushy Park are to be congratulated on
winning the Plugge Cup, also in providing the Individual
Champion in A. H. Taylor. Consistency counts, and
never more so than in these accumulative events, and
it says much for the man and his club that they have
competed with regularity (and unusual success) and
come out winners by a substantial margin.

One disappointing thing is the relatively small number
of clubs who bothered to enter for the contests—only
38 out of well over 100 groups. What's the matter
with the rest . . . cold feet, inferiority complex, or just
plain lack of opportunity or disinterest ? I do feel that
this is a poor state of affairs when only some 25 per cent.
bother to compete in important National events. The

Club News

By CLUBMAN

thing is, what can be done to im-
prove matters ? If anyone—or group—
has ideas on this vital subject, I shall
be pleased to hear them, and pass
them on eventually to such quarters
as would appreciate them.

258 competitors wrestled for the Individual Champion-
ship, though pressure on space prevents the complete
list being printed here. This will appear in the "S.M.A.E.
Journal," so the contestants will be informed of their
final positions. Bushy did well to take the first two
places, while Birmingham come in for a special pat on
the back for taking so many high places. A word of
congratulation also to our old friend, R. T. Howse, of
Bristol, still going strong after more years at the game
than I like to confess to.

And so, that's another season over, at least as far as
National events are concerned. Let us look forward to
the day when we are once again able to stage really big
affairs, and meet at centralised competitions and Rallies
as before. Ah me . . . happy days !

I see that the S.M.A.E. is to hold an Extraordinary
General Meeting on the 15th November, two special
items on the agenda being Competition matters, and
" Wings for Victory " exhibitions. Information, gleaned
from the report of a Council Meeting held in October,
indicates that the Air Ministry and Savings Committee
are interested in conducting a series of exhibitions, and
the Society has naturally agreed to co-operate to the
best of its ability. Unfortunately, this issue will have
gone to press prior to details being available from the
Extraordinary General Meeting, but I'll give you all the
dope in the January number.

Congratulations to Mick Farthing, of the Croydon
club, on being awarded the British Speed Record with a
speed of 50 m.p.h. The model (plans and details of
which we hope to present shortly in this magazine) was
timed over a course 88 feet long at Epsom Downs, and
covered the course each way in 1.2 secs. Following
this matter, it is now being discussed in Council that some
revision is required in the timing, etc., of such records,
and a proposition is tabled to make the course a length
of 50 yards in future. This and other matters will be
discussed at the meeting mentioned above.

As a record of achievement in one season, the following

Top : Members of the Harrogate and Leeds clubs at the former's open meeting.

report, quoted in full, from the BUSHY PARK M.F.C. makes good reading:—

"After placing 2nd in the Plugge Cup last year we have succeeded, for the first time in our short history, in lifting the trophy this year. The Club has won both the team contests and the Weston and Pilcher Cups. High places have been gained in all other contests. Flying was particularly consistent in National Cup, the lowest aggregate being well over 400 secs.

THURSTON INDIVIDUAL CUP.		Points
1. Taylor, A. H. (Bushy Park) ..	..	719.5
2. Wright, M. (Bushy Park) ..	..	699.5
3. Doughty, P. C. (Birmingham) ..	..	647.5
4. Bushell, W. H. (Birmingham) ..	..	609.5
5. Blair, D. (Birmingham) ..	..	536.0
6. Tyler, J. (Birmingham) ..	..	503.5
7. Boxall, R. J. (Brighton) ..	..	494.0
8. Boxall, F. H. (Brighton) ..	..	463.0
9. Jones, W. (Golden Wings) ..	..	461.0
10. { Howse, R. T. (Bristol) ..	..	448.0
{ Marsh, A. (Northern Heights)	..	
11. Hassell, H. A. C. (Birmingham) ..	..	440.0
12. Jeffs, H. C. (Streatham) ..	..	414.0
(258 competitors)		

PLUGGE CUP, 1942		Points
1. Bushy Park .. .. .	..	2323.6
2. Birmingham .. .. .	..	2195.6
3. Northern Heights .. .. .	..	1769.1
4. Brighton .. .. .	..	1681.0
5. Bristol .. .. .	..	1651.0
6. Blackheath .. .. .	..	1531.0
7. Streatham .. .. .	..	1429.1
8. Luton .. .. .	..	1154.6
9. Oxford .. .. .	..	1131.1
10. Golden Wings .. .. .	..	1045.5
11. Leicester .. .. .	..	1027.0
12. Harrow .. .. .	..	1003.0
13. Halifax .. .. .	..	937.0
14. Walton .. .. .	..	892.5
15. Beverley .. .. .	..	853.1
16. Croydon .. .. .	..	825.5
17. Sale .. .. .	..	777.5
18. Ashton .. .. .	..	669.5
19. Pharos .. .. .	..	669.0
20. Merseyside .. .. .	..	563.0
21. Cardiff .. .. .	..	527.0
22. Thames Valley .. .. .	..	464.0
23. Bath .. .. .	..	446.0
24. Stratford-on-Avon .. .. .	..	392.5
25. Ilkley, Halstead .. .. .	..	343.0
26. Leeds .. .. .	..	307.0
27. Woking .. .. .	..	289.0
28. Cheam .. .. .	..	288.5
29. Chester .. .. .	..	282.0
30. Sudbury Heights .. .. .	..	274.0
31. Stewarton .. .. .	..	225.0
32. E. Birmingham .. .. .	..	215.5
33. Fife .. .. .	..	134.0
34. Hawker .. .. .	..	119.5
35. Bradford .. .. .	..	106.0
36. British Airways .. .. .	..	91.0
37. St. Helens .. .. .	..	89.5
38. De-Havillands .. .. .	..	82.0

"Mr. A. H. Taylor's model did 13 : 37 in the Weston, placing third, while Mr. M. A. Wright won the contest with his first flight of 29 : 37 o.o.s., thus just missing the British record by 2 mins. J. Lewis, a junior, placed fifteenth in this event.

"With the same model Mr. Wright placed third in the Gamage and second in the Model Engineer No. 2, losing the model after 5 : 33 and 8 : 49, Mr. A. H. Taylor placing third in the latter contest. In the Flight Cup, Mr. D. M. Searle placed third, Mr. A. H. Taylor fourth, and Mr. Sylvester seventh. Mr. Searle also placed fifth in the Gutteridge, while Mr. Wright was third in the K. & M.A.A. Cup. Mr. Sylvester broke the club gliding record (150 ft. line winch launch) with a fine flight of 5 : 44 in the Model Engineer No. 1. In a 50-m.p.h. gale the club placed second, third, sixth and seventh in the Thurston Glider Cup, Mr. A. H. Taylor making the best flight with 2 : 03 o.o.s."

Now then, the rest of you, doesn't that make you want to do better next time?

H. Poulton, of the LUTON & D.M.A.S., again won the club's President's Trophy, other awards going to L. Capper (Lutoman Cup), E. C. W. Clark (Holton Cup), J. Hillyard (Novices' Trophy and Poulton Brown Trophy), R. Brown (Clarke Scale Trophy), and E. Barrett (Fauch Glider Cup). The latter fellow holds the hillside glider record at 1 : 46.5, while Clark holds the lightweight figure of 1 : 12.5.

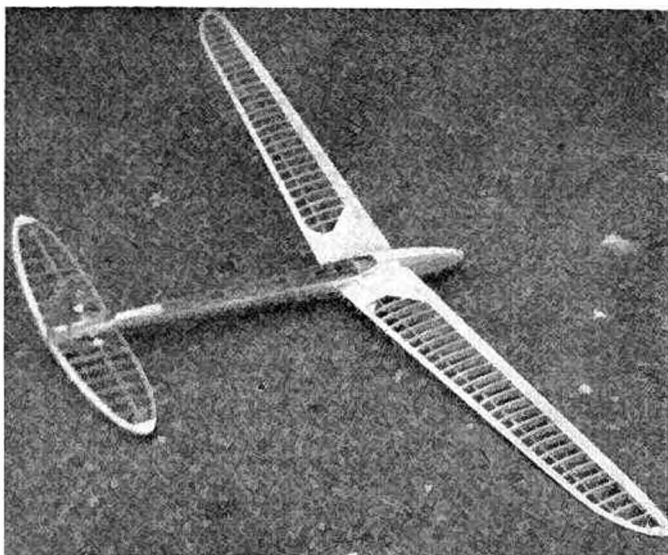
The LEEDS M.F.C. have been busy lately, and records have been broken with regularity. The present holders are H. Tubbs (2 : 34 H.L.) and P. Holt (1 : 32 R.O.G.). These chaps do well in competitions, as evidenced by the recent results of two events:—

Duration :	H. Tubbs	5 : 51 aggregate.
	H. Vauvelle	5 : 37.5 aggregate.
	P. Holt	2 : 58.8 aggregate.
Nomination :	H. Vauvelle	.1 second error.
	E. Jackson	.2 second error.
	H. Tubbs	2.8 second error.

The Leeds chaps went to a meeting organised by chaps at Harrogate, when C. Furse put up the best time of the day with 2 : 18, full results being:—

Open Duration :	C. Furse (Leeds)	2 : 18.
	E. Carroll (Harrogate)	1.47.
	H. Vauvelle (Leeds)	1 : 07.2.

A neat-looking sailplane designed and built by I. S. Cameron of the Merseyside M.A.C.



30-in. Duration	G. B. Summersgill	
	(Harrogate),	1: 14.3.
	E. Jackson (Leeds)	1: 13.
	E. Goldspink (Harrogate)	57.8.

Tow Launch Glider : Summersgill (Harrogate) 1 : 13.

Competitors wishing to take part in the Open Contest for the "Wilkinson Challenge Shield" are asked to get in touch with the secretary of the SHEFFIELD AIR LEAGUE SOCIETY, Mr. Cudworth, 18, Derbyshire Lane, Sheffield, when dates, etc., can be arranged for the event to take place at the first opportunity.

Pole flying has been continued with the WALTHAM-STOW M.A.S., and a competition held on October 2nd proved very successful. W. Taylor was the winner with an aggregate for two flights of 2 : 09, S. Sutherland placing second with 1 : 59.8. The R.T.P. record so far is 1 : 12, but this should soon go by the board.

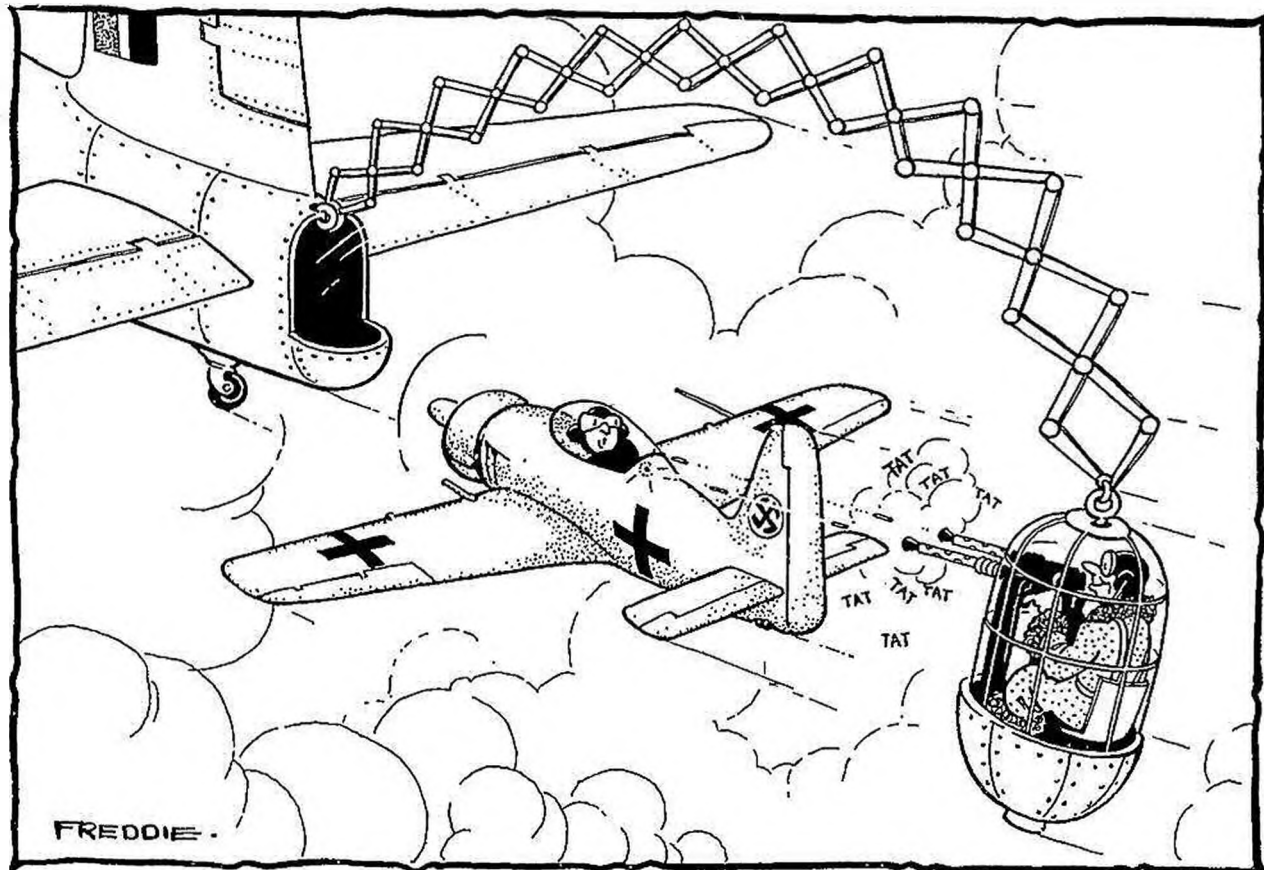
Membership of the BLACKPOOL & FYLDE M.A.S. is now 48, and steady progress is being made. In spite of poor weather, the glider record has been boosted up to 1:34 by P. Baldan, while indoor meetings and flying are held every Thursday at the clubroom.

The SEAFORD M.F.C. seem to be experiencing a spot of wet weather, as I am promised (or is it threatened?) that next month's report will have to be sent by boat if things don't improve!! Membership is up to 33, and great stunts are in progress for boosting funds, etc. The local Girl Guides are holding a jumble sale for them, and they've even got a canteen on the go! Nice work, boys—how do you do it?

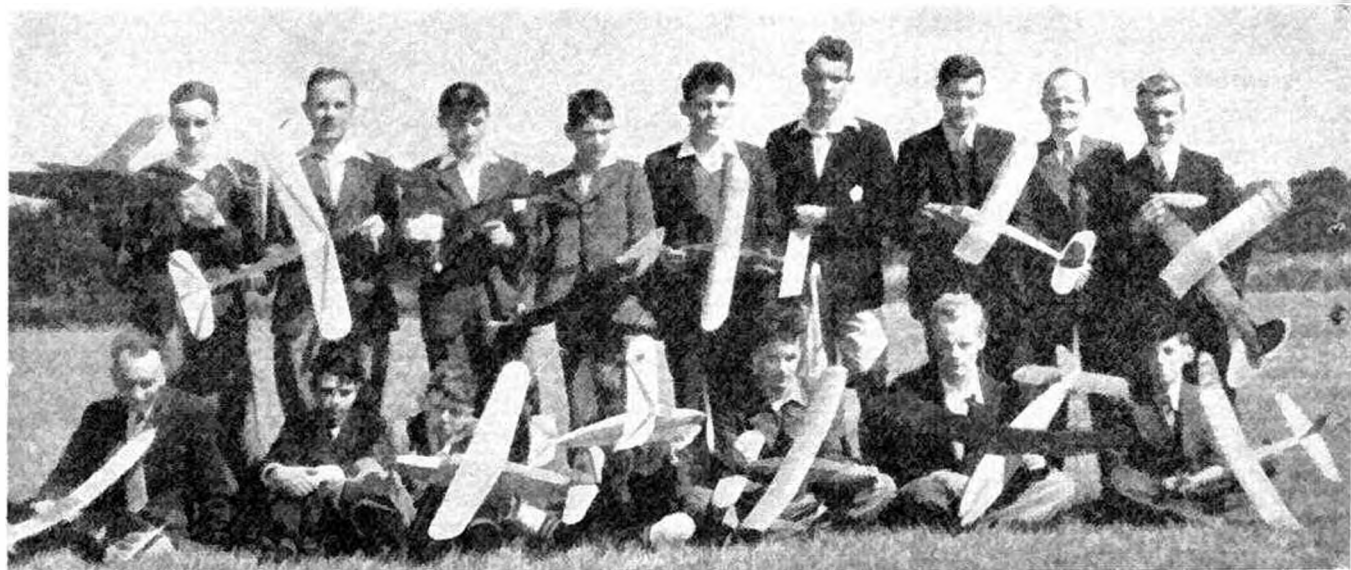


Mrs. Foyster holds her husband's towline glider. Span of model is 36 ins., with an A/R of 6-1, and total weight of 7½ oz.

The MOTHERWELL & D.M.A.C. are going ahead well, and have run two competitions recently. The first, for "Ajax" models (to stimulate the beginners) was won by J. Wilson with an aggregate for 3 flights of 1:22.8, second 1:22.4 and third W. Donald, 1:15.6. The second event for best time was a win for R. Jones with 56.4, Donald was second with 45.3 and T. McDonald third with a flight of 4.14. Light and weather are now playing havoc up that way, so indoor activity is all the rage now.



THE NEW "FREDDIE" TURRET. (Patent not likely to be applied for.)



Line up of the Taunton M.A.C. How many machines can you name?

Solid models seem to have become more popular than flying types with the BURY & D.M.A.C., results for the club trophy being:—

Single-engined types: G. Ashworth (Mustang).
E. Simpson (Hs. 126).
J. Greenhalgh (Hurricane II).
Twin-engined types: Greenhalgh (Ju 88).
Ashworth (Botha).
Greenhalgh (Boston III).

A very stormy flying season has come to a close with the GLASGOW M.A.C., and G. Leask emerges club champion. J. Howie holds the club record of 7:45. A very good winter programme has been drawn up, including the finishing of a wind tunnel, a points event for r.t.p. flying, and several lectures.

A girl member nearly put it across the lads at the ILKLEY M.A.C., Miss J. Hartley placing second with 2:26.8 to J. Townsends 5:10.2 for three flights. Miss Hartley's model was lost before completing the competi-

tion. Instructional classes are now being held for junior members.

The only news to report from the HALSTEAD & DISTRICT M.F.C. this month is of a dance organised by the ladies' section of the Club in aid of the Royal Air Force Benevolent Fund.

The Club's own dance band played for this event and a sum of £3 has been forwarded to the fund.

The BLACKHEATH M.F.C. competition for the "Club Shield" was won by R. Galbreath with an average of 2:08. Miss Phillips (their first lady member) made one flight well up to "champion" standards. Mr. Temple has offered a special prize for the development of the heavy type model glider. Size has been fixed at 54 in. span maximum, with a 7 oz. loading, launching will be by hand, and the model covering the greatest distance will be accounted the winner. This event, to be flown on November 1st, should prove interesting.

The BRIGHTON DISTRICT M.A.C. had a good time entertaining the Eastbourne boys to a competition in the middle of a fog! However, difficulties are made to be overcome, and a good time was had by all. Mr. Towner had one of the best gliders in the shape of his "Spencer Larsen"—real scale effect! Results were:—

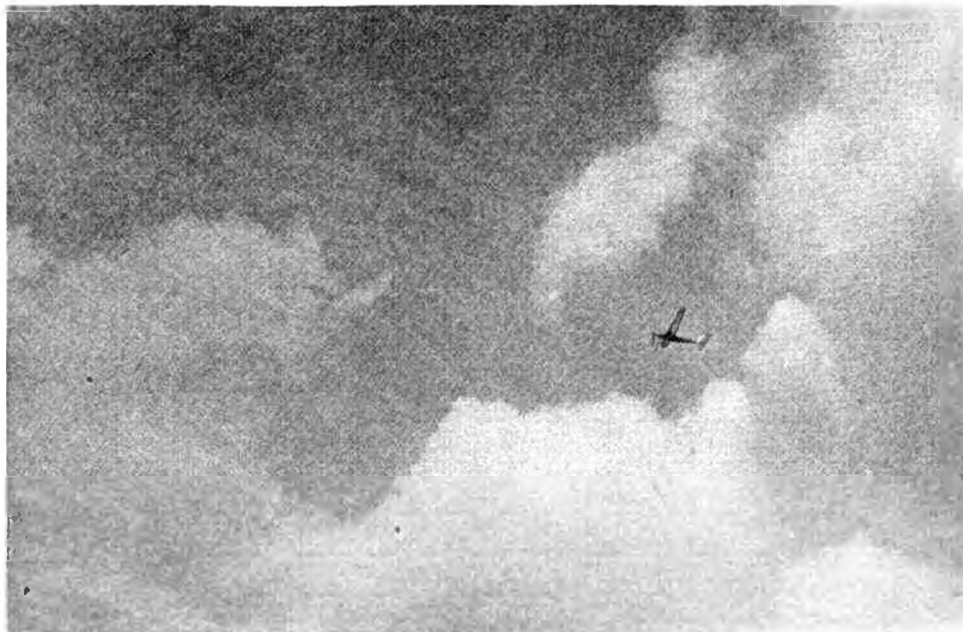
Nearest 45 secs.

1. H. A. King,
Brighton 47.1.
2. L. Downer,
Eastbourne 42.0.
3. F. H. Boxall,
Brighton 48.2.



How's this for a cute bike trailer. Quite a number of these runabouts are being used in model clubs all over the country, and this one is often seen around Birmingham.

Memories of happy days are conjured up by this grand shot of N. A. C. Hassall's (Birmingham) Wakefield model away for a good steady flight.



Gliders H.L.

1. A. Burleton, Eastbourne 71.0.
2. F. H. Boxall, Brighton 54.7.
3. P. G. Browne, Brighton 41.8.

Glider spot landing.

1. P. G. Browne, Brighton 25 yds. error.
2. L. Downer, Eastbourne 28 yds. error.
3. J. Finch, Eastbourne 36 yds. error.

Glider golf.

1. A. Burleton, Eastbourne, 3 shots.
2. P. G. Browne, Brighton, 5 shots.
3. L. Downer, Eastbourne, 10 shots.

The spot landing was thuswise: all competitors lined up with any type of model they could lay hands on, and at the signal launched them in an attempt to hit the wretched timekeeper at the bottom of a slight slope.

As for the golf: the same timekeeper (now 2/3 invisible) stood a good way off, and competitors tried to reach him in as few shots or chucks as possible. Good fun. Mr. Towner was last seen haring after a Spencer Larsen flying west, rubber jobs were wobbling all over the hill, with owners wobbling in pursuit.

The CARDIFF M.A.C. held the "War Time Cup

Contest" on Sunday, the 4th October, after a fortnight's postponement due to bad weather. The day in question was the weirdest flying day experienced. Warm but clammy, due to the fog that prevailed all day. There was not a breath of wind about!!

Entrants took their planes off in any direction, to their own choice. Average flights all day were 60 secs. It was a common occurrence for a model to go out of sight in 60 secs. The day was noteworthy, as not one rubber motor was heard to break!

The Silver Cup was won by E. J. Cleverly, of the Newport High School for Boys. His total was 223.5 secs., followed closely by B. Morgan, of Cardiff, with 194.9 total secs. Mrs. Morgan, of Cardiff, came third with 185.8 secs. total.

IMPORTANT.—Readers are asked to please fill in their coupons *correctly*, making certain that their full name and address are clearly stated in *block letters*. Coupon A may be used when ordering six 1/72 scale plans, or Coupon B when ordering twelve or more. Please note that these Voucher Coupons are for use as a *rebate*, and do not constitute a full payment in themselves.

COUPON A. Value 6d. For use with Plans up to 2/6 only.

Please send me the Plan for the

and allow the Special Cash Rebate of 6d. as offered.

I enclose the balance of.....s.....d. herewith.

Name.....

Address.....
(BLOCK LETTERS)

(Only one Coupon may be used for any one Plan.)

VALID UP TO 31st JAN., 1943.

COUPON B. Value 1/- For use with Plans over 2/6 only.

Please send me the Plan for the

and allow the Special Cash Rebate of 1/- as offered.

I enclose the balance of.....s.....d. herewith.

Name.....

Address.....
(BLOCK LETTERS)

(Only one Coupon may be used for any one Plan.)

VALID UP TO 31st JAN., 1943.

For a Plan over 5/- in value, both Coupons will be accepted, obtaining a total rebate of 1/6.

Mrs. G. Clarke of the Luton & D.M.A.C. winds up for the Women's Challenge Cup event.



Interest is strong on seaplanes in the STRATFORD-ON-AVON M.A.C., and after many attempts with varying success, R. Double has at last managed to set up a time of 24 seconds.

Although this figure may seem low, things look a bit better when one considers that the flight took place off a pond in a disused gravel pit and ended when the model just didn't clear the rim of the pit. The record is not expected to stay intact for long.

Shortage of supplies and of time are hindering building, but a few hardy souls are carrying on. Did you hear the priceless one about the modeller (I mean modeller) who built a "Kirby Kite" out of a tea chest and an old blackboard?!!! I assure you it's quite true!

The BIRMINGHAM M.A.C. boys have it over the Mountain Ash chaps—they cycled 48 miles to compete in the Midland Rally at Leicester!! A return match was held, though again the weather was at its worst. However, this did not cancel events, and the results were:—

Open Duration: C. Doughty (Birmingham), 218 points.
H. Hassall (Birmingham), 175 "
F. Lewis, Jr. (Birmingham), 164-25 "
Nomination: G. Dunmore (Leicester), 5-5 error.
J. Tiler (Birmingham), 11 "
G. Bradwell (Birmingham), 11-6 "

DEWFLY MODEL PLANS

The "DE-H-HORNET MOTH." A nicely designed scale biplane, easily constructed with detachable wings, stabiliser and fin. Average duration 40-50 sec. Scale 1 in. to 1 ft. Price 2/9 Post 3d.

"THE DEWFLY." A 32 in. span cabin type high wing monoplane of smart appearance. Winner of many contests. Average duration 95-100 sec. Best official time to date 11 min. 4 sec. Price 2/- Post 3d.

"THE FALCON." A 48 in. span cabin type high wing Wakefield model of pleasing appearance. This model has proved very successful in competition and has made many flights of over 10 min. Price 3/6 Post 8d.

Manufactured by:

DEWFLY (MODEL) AIRCRAFT

(C. P. DYNE LTD.)

72 Falcon Road, CLAPHAM JUNCTION, S.W.11
213 London Road, MITCHAM

Gliders:

D. Blair
(Birmingham) 136-4.
G. Bradwell
(Birmingham) 121-55.
W. Bushell
(Birmingham) 48-6.

And so, just before finishing up, a few requests, sales, etc. A number of R.A.F. chaps stationed at Cosford would be pleased to receive any unwanted modelling magazines. Please send to 1604126 AC/2 Grafton, Hut E4, 110 Entry, A. Squadron, 3 Wing, Cosford, R.A.F., near Wolverhampton.

R. J. Thompson, of 59, Northbrook Road, Ilford, Essex, wishes to purchase a copy of the June, 1942, AERO-MODELLER; H. Beeton, "Culham," Exning Road, Newmarket, has a model "Wren" and a pound of rubber for disposal.

And so, far though it seems from the Festive Board, I once again wish all my readers—yes all two of 'em—a very merry Christmas, and a speedy return to better times. Aeromodelling is on a good firm basis now, so try and visualise what it can be when peace is once again with us.

The CLUBMAN.

NEW CLUBS.

STRETTON M.A.C.
D. A. Lacey, 28, Bitham Lane, Stretton, Burton-on-Trent.
AYLESTONE M.F.C.
P. Williams, 305, Aylestone Road, Leicester.
WILLINGTON YOUTH M.A.C.
T. Martin, 24, Stephenson Crescent, Willington, Co. Durham.

Secretarial Changes.

STRATFORD-ON-AVON M.A.C.
R. Double, 146, Alcester Road, Stratford-on-Avon.
PECKHAM & D.M.A.C.
J. Milson, 40, Cronin Road, Peckham, S.E.15.
HALSTEAD (ESSEX) M.F.C.
P. F. Mitson, 15, Colne Road, Halstead, Essex.
EXETER M.A.C.
B. F. D. Pollard, 6, Mount Pleasant Road, Exeter.
WALTHAMSTOW M.A.C.
R. L. Sharp, 8, The Risings, Whipps Cross, E.17.
DARLINGTON M.A.C.
E. Chanam, 24, Orchard Road, Darlington.
BROMLEY SOLID M.A.C.
E. A. Walker, 43, Holbrooke Way, Southborough, Bickley, Kent.

A. E. WALES - - - - - 8, BELL LANE, BURY
Model Aircraft, Hobbies, etc. supplies and accessories.
KEILCRAFT, SKYLEADA, TOWER, HALFAX, ASTRAL, etc. KITS.
JOYPLANE Dopes, Cement. AEROMODELLER Books and Plans always
in stock. All Aeromodelers Welcome.

LANCASHIRE CALLING!
Aero-modellers, A.T.C., get your Kits, Plans, Aero Books, Accessories
from PRATT'S (The Well Stocked Model Shop)
37, YORKSHIRE STREET, MORECAMBE
For Skylead, Skyrova, C.M.A., Club, Halfax, Astral, Airyda, Keilcraft.
Orders by Post receive Special Attention.

SCOTLAND CALLING!
FRANK ROYLE, 54, SOUTH CLERK STREET, EDINBURGH
WISHES ALL PAST AND PRESENT CLIENTS A MERRY XMAS AND
A PROSPEROUS AND PEACEFUL NEW YEAR.

H. CHINN & SON
Kits, Plans, Accessories, Books on Model Aircraft Building and
for those joining R.A.F. Foreign Stamps.
"DUNMORE," HIGH STREET - BANSTEAD, SURREY
Phone: Burgh Heath 596.

NOTE THE ADDRESS!
R. G. KING - - - - 5, CHATHAM STREET, RAMSGATE
Wide range of 1/72" Solids for A.T.C. and all Services, who are specially
catered for.
The largest stock of Kits and Model Aircraft Parts in Thanet.

WAKEFIELD MODEL AERODROME
All Aeromodeler Books in stock. Solid and Flying Kits and Plans.
Skylead, Skyrova, Halfax, Airyda, Keilcraft, Drome and Accessories.
200, KIRKGATE, WAKEFIELD

H. & C. WILLIMENT
All popular Kits and Accessories. Kits prepared against your own plans.
Veri-Tru Kits and Plans.
NO LISTS. SEND YOUR REQUIREMENTS (PLEASE ADD POSTAGE).
39 and 41 ST. BENEDICTS, NORWICH

WOODS SPORTS, LTD.
STILL HAVE AMPLE STOCKS OF AEROMODELLERS' SUPPLIES.
NO CATALOGUES.
98, CHAMBERLAYNE RD., KENSAL RISE, LONDON, N.W.10
Phone: Ladbroke 1414.

ALLSPORTS, 43, HOLYHEAD ROAD, BIRMINGHAM, 21
Offer you a "Solid" foundation for a "Model" Xmas and hope to
receive your enquiries for the "Duration."
Astral, Keilcraft, C.M.A., Skylead, Silverwings, Halfax, Truscale
Kits always in stock.

HITCHIN, HERTS.
THE RECOGNISED AEROMODELLERS' SHOP FOR THE DISTRICT IS
WILMANS,
THE ARCADE - - - - - HITCHIN, HERTS.

THE "SKYLANDER"
A 50-in. span Glider, specially designed for construction in substitute
woods.
Ideal for A.T.C. Cadets. Super performance. Simple construction.
Kit 15/- POST FREE. Plan 1/6
ULSTER MODEL SUPPLIES, 36, Wellington Place, BELFAST

FOR BETTER SERVICE
T. GARNER & SON, LTD.
Skylead, Keilcraft, Truscale, Drome, Astral, Silverwings, Halfax Kits.
Joy-Plane and Slick Products. All the Harborough Publications.
5, SHEFFIELD ROAD, BARNSELY, YORKS.

DERBY AEROMODELLER' RENDEZVOUS!
MERRIMAN'S WOODCRAFT SHOP
Solid and Flying Kits galore. All AEROMODELLER publications and
Plans. Balsa Substitute. Dopes. Cement. Accessories, etc.
220, NORMANTON ROAD - - - - - DERBY

AIRCRAFT MODELS - - SOUTH WALLS, STAFFORD
Have a good selection of Kits and Materials.
Give us a call, it will be worth your while to be served by Model Enthusi-
asts giving personal attention and advice. Est. 1936. Member M.A.T.A.

Berkhamsted and District Aero-Modellers!
GET YOUR SUPPLIES FROM
PHILIP FANCOURT - 47, FROGMORE STREET, TRING
Astral, Keilcraft, Skylead, Skyrova, Silverwing, Veron Kits.
Dopes, Tissues, Cements, etc. Small stock Strip Balsa and Substitute.

SOUTHAMPTON'S MODEL SHOP
THE BITTNER ELECT. INST. CO. - - SPRING ROAD
Large stocks of Kits and Accessories for Aero and Ship Modelling
enthusiasts. Astral, Airyda, Aero-Models, Halfax, Keilcraft, Skybird,
Skylead, etc. Publications: Aero-Modeller; also Identifications and
Recognitions. Stockists for Hobbies.

BEDFORDSHIRE AERO-MODELLERS!
LUTON MODEL AIRCRAFT STORES
All the well-known Solid or Flying Kits in stock: Skylead, Silverwing,
Halfax, etc. Transfers. Props. Coloured Dopes.
1a, WALDECK ROAD - - - - - LUTON

BROMLEY
Large stocks of Kits of all makes. Large Props., Dopes, Cements, Tissue
and all Aeromodel Publications.
Enquiries must have stamped addressed envelope.
481, BROMLEY ROAD, DOWNHAM, KENT

DUGGLEBY'S
ALL KITS AND ACCESSORIES STOCKED
REGAL BUILDINGS, HULL

ROCHDALE ENTHUSIASTS!
THE SPORTS HOUSE
Your model shop for Aeroplane Kits: Airyda, Skylead, Tower, Astral,
etc. Props., Cabins, Guns, Bombs, Pilots, etc. Ship models, Galleons.
120, DRAKE STREET (opposite Rialto Cinema), ROCHDALE

WHITEWOODS - - 103, BRIGHTON RD., SURBITON
Flying Kits: Keilcraft, Veron, Astral, Aeromodels, Skylead, Airyda.
Solid Kits: 1/48 C.M.A., Halfax; 1/72 Truscale, Skylead, Grace, Airyda,
Silverwing; 1/144 Skyrova. Sundries, Dopes, Transfers, etc.
Harborough Publications.
Regret no Catalogues. Postage must accompany Orders and Enquiries.

BUY NOW FOR XMAS!
Aero Kits, Toys, Watches, Cycles, Radios, Leather Waistcoats, Capes
and Leggings, Electric Fires and Toasters.
JAMES ADAMS - - - 14, HIGH STREET, BARNET

J. G. HILL
Model Aeroplanes, Gliders and Ship Kits Stocked. Best makes. Flying
Scale and Solid. Also Bronze Aeroplane-Rough Castings, Files, Props.,
Stands, Transfers, Roundels, etc. Paints, Dopes, Cements, Inks, Glues,
Enamels, Lacquers, Brushes, Thinners, Rubber Lubricant, Pastes.
54, EIGN STREET, HEREFORD

MODEL AERO SUPPLIES
Flying and Solid Kits. All leading makes. Plans, Dopes, Insignia,
Cements, Stripwood, etc.
AT:
MOORE'S HANDICRAFTS - 41, CLIFTON RD., RUGBY

YOUR LOCAL MODEL AERO STORES
LOVEARD'S
A good selection of Kits in stock. Flyers and Solids. Suppliers to
A.T.C., Youth and Scout Movements.
4, NORTH STREET - - - - - HORNCHURCH

BOOTH'S SPORTS DEPOT
Flying scale and Duration Kits. Solid Scale Kits. Joy-Plane products.
Lepages Cement. C.M.A. Dope and Transfers.
Keilcraft, Silverwing, Skylead, Skyrova, Veronite, Astral.
15, HARDSHAW STREET, ST. HELENS, LANCs.

GEO. HINTON & SONS, LTD.
Agents for Keilcraft, Skylead, Astral, Truscale Kits, etc. Full range of
Slick Dopes and Cements.
Accessories of all kinds including AEROMODELLER PUBLICATIONS.
5, FORE STREET, TAUNTON

NEW AGE BOOKSHOP
Stock all makes of Kits, including Keilcraft, Astral, Airyda, Skylead,
Truscale, Silverwing, etc., together with all Accessories.
BOOKS: All Books by the Harborough Publishing Co. in stock.
9, OLYMPIA ARCADE, KIRKCALDY

OLDEST BOOKSELLING FIRM IN GREAT BRITAIN!**BOAK & SONS**

Where all Aeronautical Books are stocked or can be obtained on the shortest notice. H.M. Stationery Booklets stocked as issued. Also War and other MAPS.

PICKERING

LINCOLNSHIRE AEROMODELLERS!

All your requirements, including Kellcraft, Skylead, Skyrova, Truscale and Alryda Kits and Materials, and all Model Maker's Tools, ARE AT
MUSGRAVE & CO. (Tools), LTD., CLASKETGATE, LINCOLN

WHITEHEAD'S MODEL AIRPORT

Solid and Flying Kits, Dopes, Insignias, $\frac{1}{2}$ in. Rubber Strip and Real Balsa Strip. Special "E.P." Balsa Substitute, 1/32 in. to $\frac{1}{2}$ in. by 2 in. by 36 in., 1 in. by 1 in., 1 in. by 1 $\frac{1}{2}$ in., 1 in. by 2 in. Blocks.
All Aeromodeller Books and Plans stocked. Enquiries S.A.E.
718, EASTERN AVENUE, ILFORD

SPENCER'S

Airyda, C.M.A., Silverwing, Skylead Solids, Duration Flying scale Kits. All Accessories, Micromodels, Plans, Books, Balsa, Strips, Sheet. Stamp for Lists.

45, SIPSON WAY - - - WEST DRAYTON, MIDDX.

H. COVE CLARK

Stockist of all well known Solid, Flying Scale and Duration Kits, also Airplane Accessories, Plans, Dope, Waterslide Transfers, Wire, etc.

HYDE ROAD, PAIGNTON

All accessories for the model aeroplane maker: Balsa Cement, Dope, Camouflage Colours, Plastic Wood, Grain-filler, Lustrous Finish, etc. Flying Kits and Gliders from 5/6 to 18/4 Solid Kits: Truscale and Skylead. Propellers, Wheels, Bombs, Undercarriages, etc.

2, VICTORIA COLONNADE, SOUTHAMPTON ROW, LONDON, W.C.1

THE MECCA FOR ALL AERO-MODELLERS!

We are agents for Truscale, Airyda, Astral, Skyrova, etc., Kits and all Accessories, Dope, Tissue, Props., etc. Aero-modeller and other Books. PAY US A VISIT

POPE & SMITH, 21, TINDAL ST., CHELMSFORD. 'Phone 2331

Large selection of Kits, Dopes and Accessories; also wide range of Cockpit Covers.

47, RICHARDS STREET - - - CATHAYS, CARDIFF

WONDERFUL SELECTION SOLID AND FLYING KITS!**JANES & ADAMS**

Palmers Green, E.N. & C.E., Finchley, Burnt Oak and Barnet
'Phone: Palmers Green

DIBBS

All known Kits, and Aeroplane Library. Joy-Plane Products. Juneeero and Spares. Foreign Stamps. Hobbies' Outfits and Accessories.

THE ARCADE, NELSON, LANCs.

ABINGDON STREET MARKET, BLACKPOOL

"RABSONS," ASHFORD'S (KENT) OLDEST SHOP

Always have in stock a large range of Flying and Solid Kits. Also Accessories, Dopes, Cements, Tissue, etc.

RABSONS

55, HIGH STREET - - - ASHFORD, KENT

BATEMAN'S

Solid Kits: Stirling, Halifax, Seafox, Whirlwind, 1.18 Russian, Lightning, Mustang—1/72 scale.

Stamped addressed envelope for List.

151, HIGH STREET - - - WALTHAMSTOW, E.17

Stockists of "Astral," "Halifax," "Airline" and authentic Kits. "Joy-Plane" Dopes and Cements. "Caton's" Rubber. "Aero-modeller" Books, Plans. Morse Keys and Buzzers. "Micromodels" for building Model Ships, Galleons. Trade supplied.

GEO. HOLLINS & SONS LTD., NEWCASTLE, STAFFS.

LAKELAND AIRCRAFT. MODEL DEPT.

Model Aircraft Makers and Agents. Large stock of popular models. Duration, Flying Scales, Solids, Accessories and "Aero-modeller" Publications. Enquiries welcomed.

WILLIAM BROWN & SON, 12, STRAMONGATE, KENDAL
Telephone: 276.

THE SCOTIA MODEL CO.

We still have supplies of Kellcraft, Drome, Skylead, Silverwing, Elite, Astral and Halifax Kits, and can make up any 1/72 scale kit required from your own plans. This offer is open to Services only.

40, CHAMBERS STREET - - - EDINBURGH

BIRMINGHAM MODEL SUPPLIES

Wish to extend Xmas Greetings to those who pursue the craft of modelling. The stocks available are 1/72 solid models, cast fittings for same. Galleons and "Seacraft" Ship kits. Send for appropriate list.

96, DALE END, BIRMINGHAM

TO LOCAL AEROMODELLERS!

We are your largest Local Agent for Kits and Accessories, and "Aero-modeller."

DEVANNEYS - - - 53, KING ST., SOUTHALL
Right by the 'Bus Stop.

CRASKE AND SMITH

All the best Kits in stock, also Dope, Props., Cows, Radial Engines, Cockpit Covers, Plans, etc.

191, CLEETHORPE ROAD - - - GRIMSBY

LIVERPOOL MODEL AIRCRAFT SHOP

Stocks of all "Aero-modeller" publications and Plans for 1/72 Solids, Gliders and Duration.

All well known makes of Kits including: Skylead, Silverwing, Airyda, C.M.A., Astral, Kellcraft, Aeromodels, Veron, Elite. Also Accessories.
402, PARK ROAD - - - DINGLE, LIVERPOOL, 8

AGENTS

for all makes of Kits and Accessories. Large selection of Aeromodelling literature.

The best display of models in Yorkshire.

49, CLEVELAND STREET - - - DONCASTER

E. WORFOLK & CO.

5, ROBINSON ST., DEWSBURY, YORKS.

Model Aero Kits of all kinds supplied.

Actual manufacturers of the Worcester Stirling Solid Kit and others.

J. CHAPPELL

Stockists of the leading makes of Kits. Specialists in Wood for the modeller. 1/72 Solid Accessories, Cockpits, etc. Dope, Cement, Tissue, Gear Wheels, Bushes, etc. "Aero-modeller" range of Plans, Photos and Publications. Warship and Galleon Kits. Hobbies Agents.

339, ECCLES NEW ROAD, SALFORD

MODEL CRAFT

For Solid and Flying Kits, Propellers, Solid Model Accessories, W.S. Transfers, Harborough Publications.

GIVE US A CALL

22, SINCIL STREET, LINCOLN, NEAR L.N.E.R. STATION

C. E. PASK

For all Popular Kits, Astral, Skylead, Skyrova, Truscale, Kellcraft, Silverwing, Halifax, etc. All Accessories Stocked.

12, VINE STREET, SPALDING

BEESLEY'S, 89, SPON END, COVENTRY

Send their Best Wishes to all Aeromodellers from this District, especially those in H.M. Forces. We're still in the front line with all that matters in Aeromodelling.

Full Stocks of everything—as always.

SELLY OAK MODEL SUPPLIERS (N. H. TIMMINS)

Duration, Flying Scale, Glider Kits, Drome, Kellcraft, Skylead, Astral, etc. Solids: Grace, Halifax, Skylead, Skyrova, Silverwing, Truscale, Dopes, Cement, Tissue, etc.

Aeromodeller and all Harborough Publications in Stock.

764, BRISTOL ROAD - - - BIRMINGHAM, 29

STOCKPORT'S AERO MODEL SHOP

Kits and Accessories. 1/72nd Hampden Casting 10/6; Stand 4/6 1/72nd Scale Solid Stirling Kit, 14/11 Other Kits in Astral, Tower, Silverwing and other Series. Write or Call:

54, WELLINGTON RD. STH., STOCKPORT 'Phone STO 4744

Kindly mention **THE AERO-MODELLER** when replying to advertisers.

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, Skylead, Truscale, Halifax, 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

1/72nd Scale Solid STIRLING! JUST OUT! Price 14/11
METAL CASTINGS OF HURRICANE, DEFIANT, WELLINGTON,
HAMPTON and STANDS - Other types to follow
Plenty of Kits in the Silverwing, Astral, Airyda, Skyrova and Tower Series
All the Harborough Publications, and a wide range of
Model Aero Accessories - WRITE OR CALL

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, Skylead, Studiette, Elite, Club, Astral, Airyda, Britannia, C.M.A., Halifax, Tower and many others.

GIVE US A CALL OR DROP A LINE TO:

WATER LANE WILMSLOW, CHESHIRE

NOTTINGHAM CALLING!

Over 2,000 kits of all makes
Wood and Accessories stocked

See the latest releases.

RADET ELECTRIC, 21, ARKWRIGHT STREET
Just below Midland Station.

LIVERPOOL MODEL AIRCRAFT SHOP

MODEL AIRCRAFT SPECIALISTS EXPERT ADVICE GIVEN
Duration and Glider Kits—Halifax, Vernon, Northern, etc. Flying Scale
Kits—Aeromodels, Astral, Keilcraft, etc. Solid Kits—Skylead, Skyrova,
Halifax, C.M.A., Airyda, etc.

All Accessories for Flying and Solid Models.

AEROMODELLER PUBLICATIONS AND BOOKS FOR A.T.C., ETC.
Postal Enquiries must have Stamped Addressed Envelope enclosed
402, PARK ROAD - DINGLE, LIVERPOOL 8
Trams Nos. 1, 3 and 20 pass the door.

**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.

Yorkshire Aeromodellers!

A visit to our retail shop is well worth while. Hundreds of kits in stock: solids, flying scale, duration, gliders, and every accessory.

Full range of "SILVERWING" Solid Scale Kits in Stock.



THE MODEL SHOP,
21, WESTGATE, HALIFAX

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

SUPERFINE, 20x24 ins. Red, Yellow, Orange, Green.

6 sheets 1/6; 12 sheets, 2/10

"SUPERLITE" Light-weight Bamboo Paper, 20x30 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 OVERHEAD HEIGHT CHECK

(Patent applied for)

● A simple yet effective training device carried readily in the waistcoat pocket.

● Gives the height of IDENTIFIED Brit'sh, American and German aeroplanes flying overhead or almost overhead.
Obtainable from: **FRANK HARPER** Price 3/- post free.

SOUTHCLIFFE, SELBY ROAD, FULFORD, YORK

WADE & CO.

For Astral, Keilcraft, Halifax, Skylead 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, Skylead, Cloud, Vernon, Aeromodels, Truscale, Halifax 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, Vernon, Halifax, etc.)
Solid Kits (Skylead, Skyrova, Halifax, Grace Airplanes, Airlines, Airyda, Truscale, Skycraft).
Waterline and Leyden Ship Kits.

Accessories and all Aeromodel publications stocked.

Balsa Substitute, Spruce, and Obachi for callers only.

Postage must accompany orders and enquiries.

57, SYDENHAM ROAD, LONDON, S.E.26
SYD 8320

SCOTLAND CALLING!

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

Largest selection of flying and solid kits in Scotland.

Agents for **VERNON, 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

British and Foreign Transfer Insignias, Cockpit Covers,
Turrets, Wheels and other accessories.

Stockists of all leading makes. Super-detailed "Wing" Series solid
Blue Prints, including Whirlwind, Thunderbolt, Focke Wulf 190,
ME 109.C5, etc. 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.

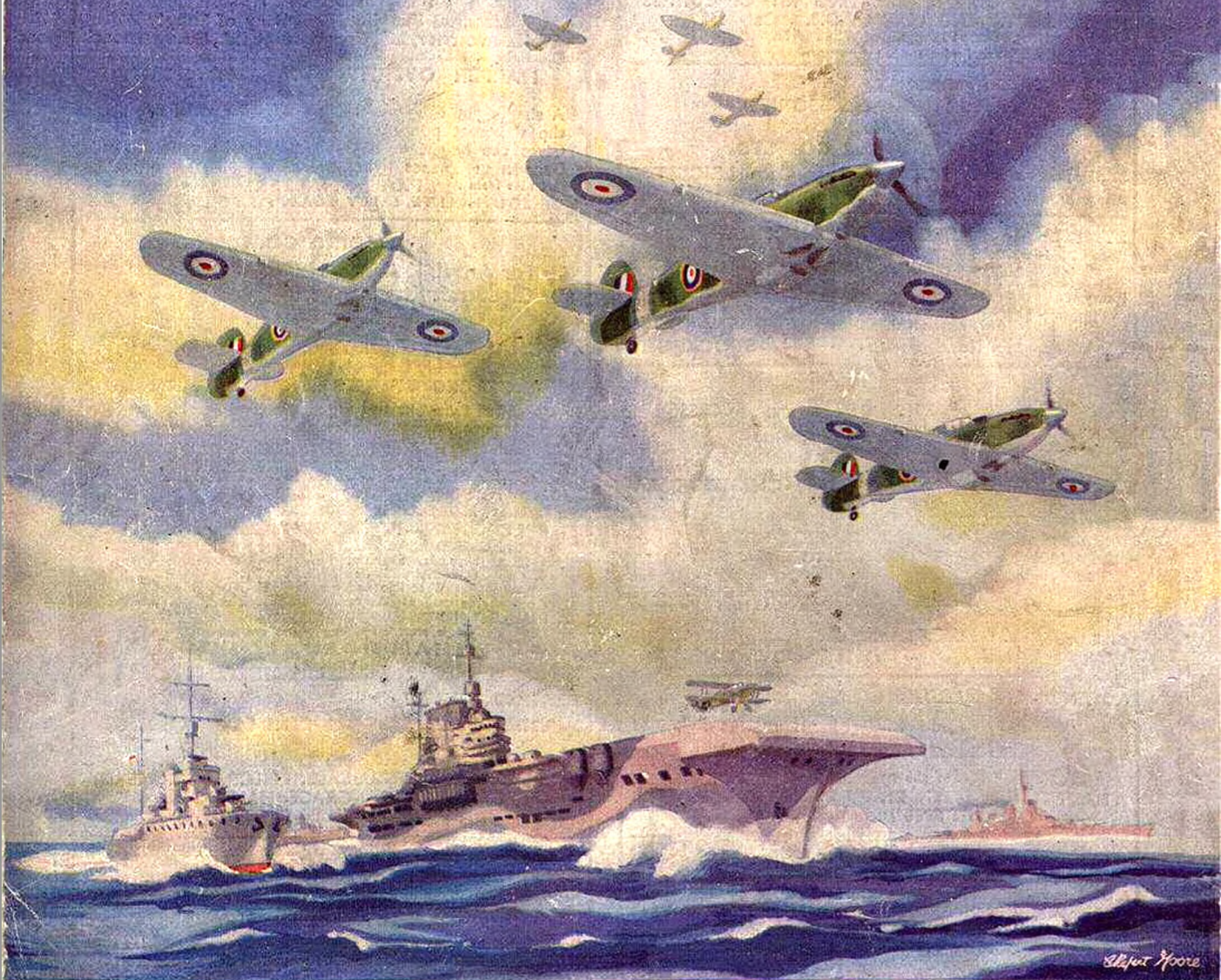
TO MANUFACTURERS, ETC. — URGENTLY WANTED
ACCESSORIES OF ALL DESCRIPTIONS FOR 1/72nd.

Kindly mention **THE AERO-MODELLER** when replying to advertisers.

Studiette

R E G I S T E R E D

NOW ON ACTIVE SERVICE



For the duration of the war our works are mainly engaged on work of National importance.

We should like you, and all our many friends, to bear this in mind. We know that you will appreciate that we are unable to give the service that has always been associated with "Studiette" products.

Please therefore reserve us your goodwill until the time when we are again able to offer a full and up to date range of "Studiette" construction outfits for all types of aircraft, ship and galleon models.

STUDIETTE HANDCRAFTS, KENT STREET, BIRMINGHAM 5, ENGLAND