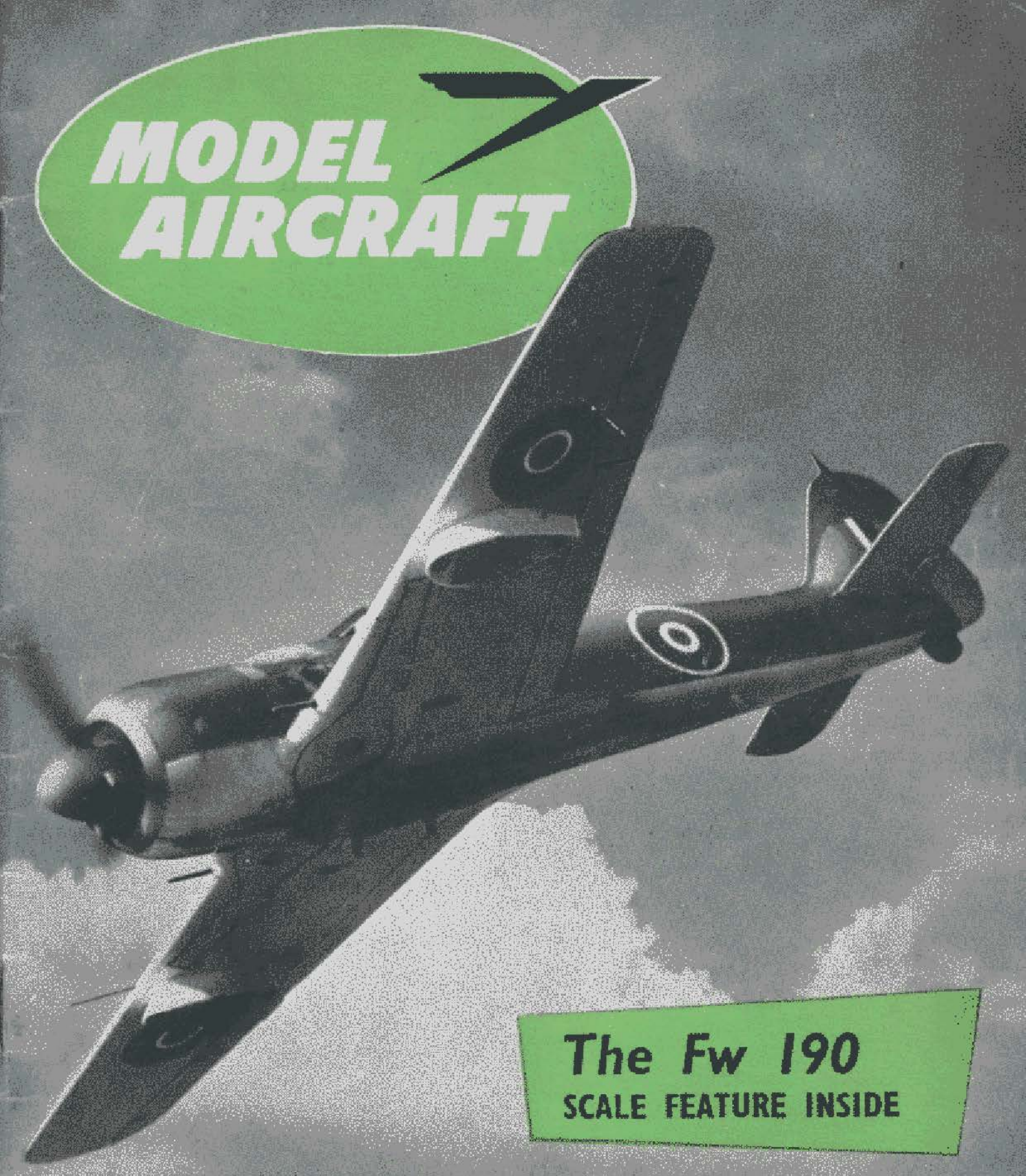
MODEL AIRCRAFT

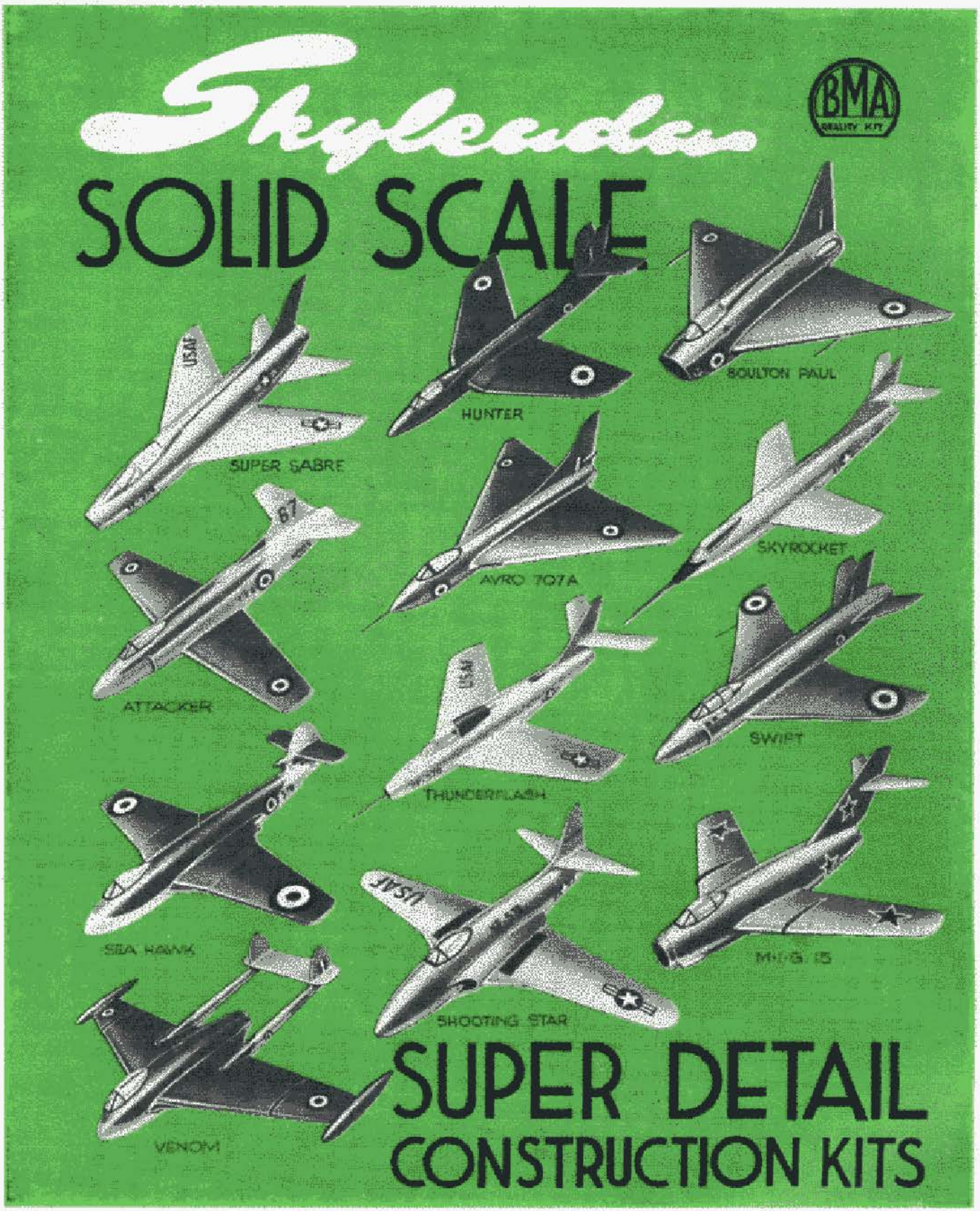


The Fw 190
SCALE FEATURE INSIDE

IN THIS ISSUE

FEBRUARY 1955

1'6



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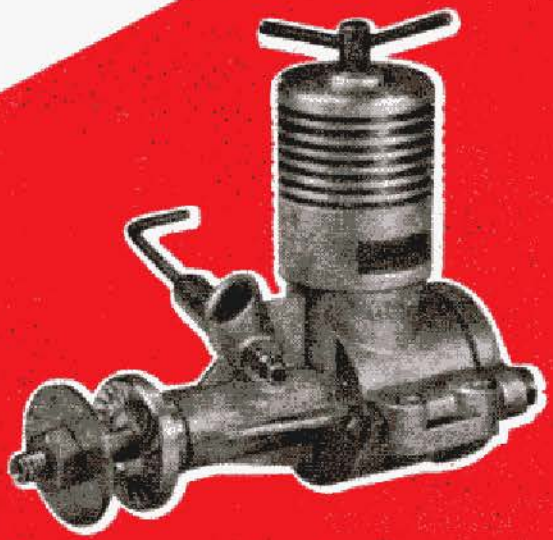

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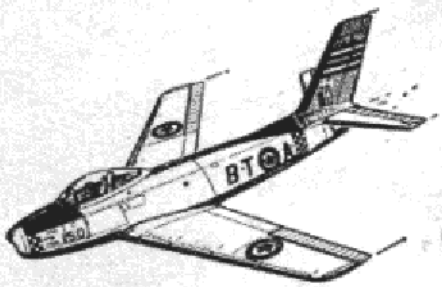

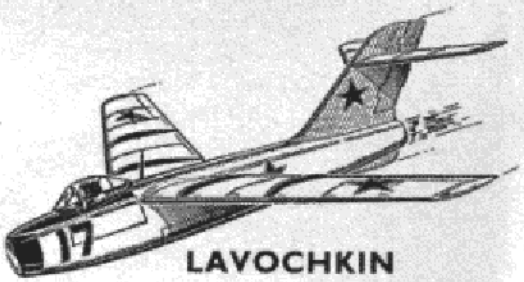

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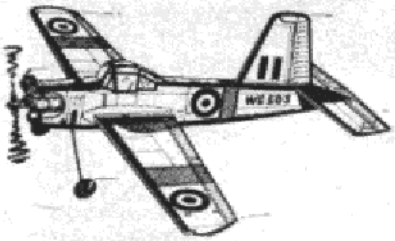

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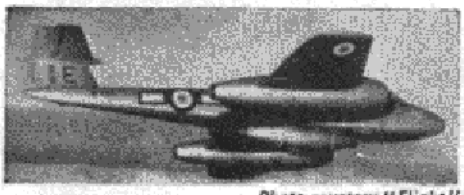

Photo courtesy "Flight"

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METEOR 8 (illustrated above) 4/1 (incl. P.T.)

Every aircraft enthusiast has his own particular favourites—why not pick yours from our wonderful range of solids at prices varying from 2/5 to 7/2 incl. P.T.

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Ideal for motors up to .9 c.c. such as the Allbon "Dart" .5 c.c. and Frog 50. No undercarts are supplied as the models are hand launched. BOTH KITS **29/2** EACH (incl. P.T.)

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LONDON RIVER POLICE LAUNCH

Here is the Ideal Companion for the Marlin. A 26" replica of the famous prototype used by London's River Police. Suitable for up to 1 c.c. Diesel or 6-volt Electric Motors. Unsinkable construction. No shaft or propeller is provided, thus you can fit the propulsion of your choice.

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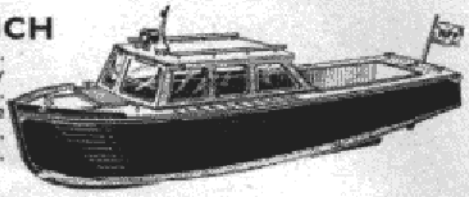

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"ELECTROTOR" MOTOR 9/11 incl. P.T.

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MODEL SPACE SHIP

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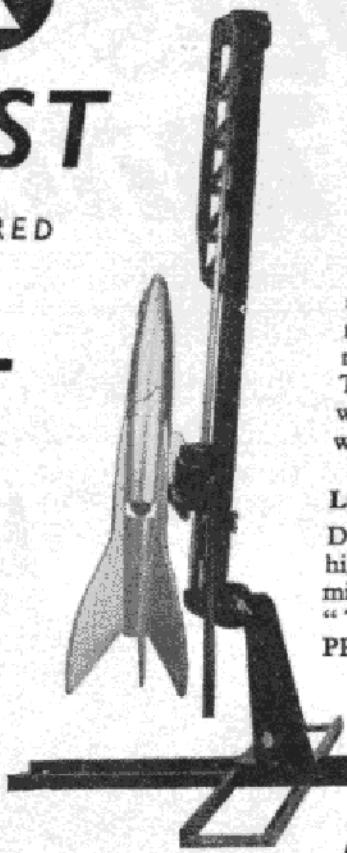

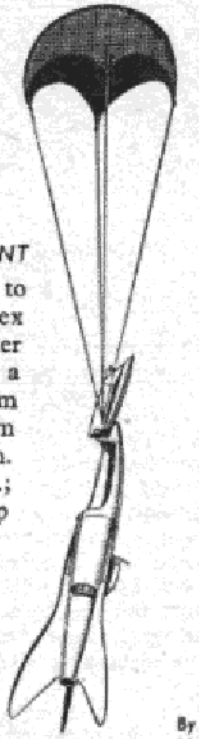

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Makes ramp-assisted ascent to over 150 ft., powered by Jetex Rocket motor with Augmenter Tube. At zenith of climb a specially designed mechanism releases nylon parachute from nose for safe return to earth. Technical data : Length 13¼ in.; width across fins 3¼ in. ; all up weight 1¼ oz.

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Designed also for launching high speed model aircraft and miniature guided missiles. In "Tailored" kit form.
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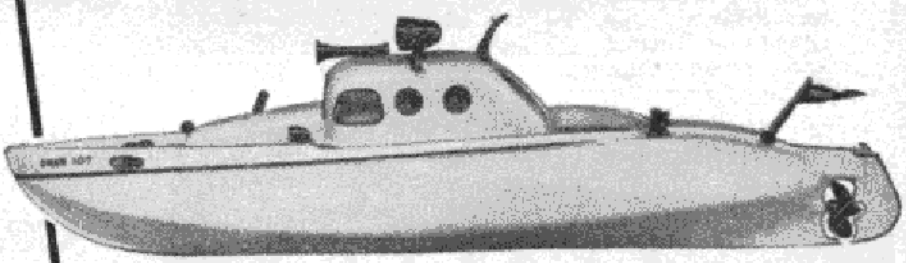

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4,400 MILES with the Mills!

The Model Road Racing Track at Blackpool, built and run by Model Road Racing Cars Ltd., is probably the most realistic and impressive venture of its kind in this country.

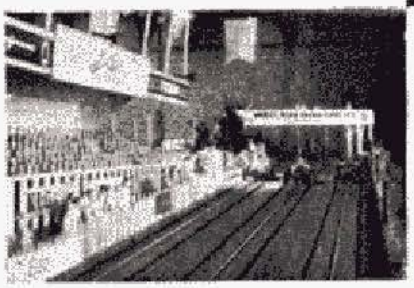
In a show like this, engines must be quick to respond and be reliable performers . . . and this not just for the occasional weekend, but every day of the week during their long service.

This is what M.R.R.C. Ltd. have to say of the Mills—

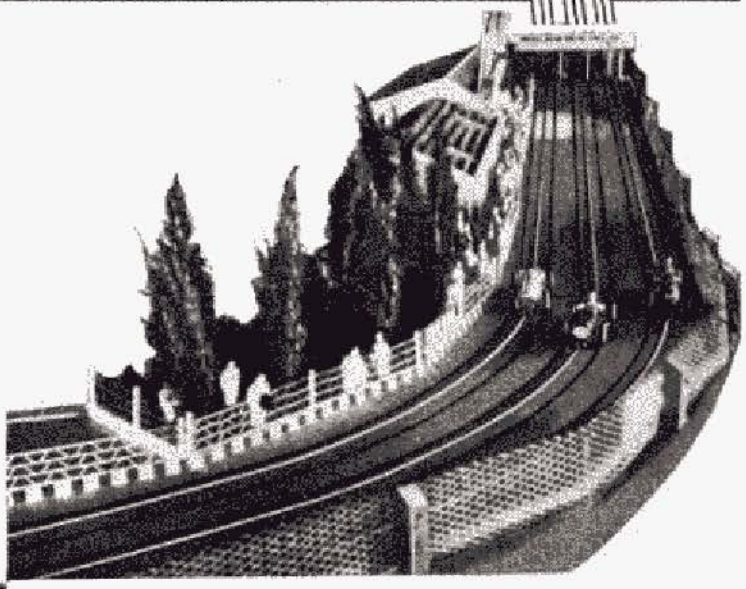
"As you know we have used the Mills .75 in most of our 1/16 scale cars, and I thought you would like to know that I recently made a careful check of the mileage these engines do in the course of a season in our cars.

"The average distance covered by each car per week is 200 miles and they have been run for 22 weeks continuously which is a total of 4,400 miles.

"Generally speaking, all we have to do is an occasional de-coke. Added to this is the fact that our cars at Blackpool have now completed two seasons' running.



"I thought you would like to know these figures because it was not until this check was made that we realised the amount of running and strain these Mills .75 c.c. engines had stood up to."



Section of the track of Model Road Racing Cars Ltd., a feature at Blackpool

Professional men of wide experience choose the Mills for quick response and reliable performance. You, too, want to spend your time flying, not flicking props, and you want an engine that lasts.

Here is the answer, the

MILLS 1.3 cc. 87/-
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MILLS P. 75 cc. . . . 58/-
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FEBRUARY 1955 No. 164 VOL. 14

Contents

Cover Story

Our cover subject this month is most certainly a "wolf in sheep's clothing" being, of course, a Fokke-Wulf Fw 190A4 with R.A.F. markings. The A4 differed from previous versions in having a slightly altered fin, different radio equipment, and inner wheel covers removed, among other details. It was this version which was used extensively for tip and run raids over southern England. *Crown copyright photograph.*

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

Published on the 20th of each month prior to the date of issue by PERCIVAL MARSHALL & CO. LTD., 19-20 NOEL ST., LONDON, W.1.
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Letters TO THE EDITOR

More on Colour Schemes

DEAR SIR,—I would like to point out one or two corrections to "Colour Schemes" Part 2.

1. No mention of change from roundels which overlapped control surfaces to ones which did not (1935).
2. No. 25 Squadron's *Grebes* did not have painted black lines aft of roundels.
3. In between the X's of No. 29 it was silver instead of white.
4. No. 41 Squadron's markings were plain red bands.
5. No. 54 Squadron's were alternate red and white bands tapering to point on fuselage.
6. 65 Squadron's markings were painted on fuselage.
7. 66 Squadron's markings were painted on fuselage with silver in between.
8. The markings shown for 600 are upside down.

It was wrong to have 2½ pages for 1914-18 and only half a page for the 1939-45 war.

Yours faithfully,
London, S.W.18. T. D. REES.

DEAR SIR,—Like my friend, Peter Gray, I have welcomed your articles on colour schemes, but, also in agreement with him, feel it a pity that details should either be sketchy or not quite correct. Therefore I wondered if you would accept these comments on the second article.

It is not strictly accurate to say U.S. Army aircraft were either olive drab, or olive drab and yellow, or blue and yellow. The all-olive drab scheme was dropped in the late twenties, being replaced by chrome yellow flying surfaces and olive drab fuselage and undercarriage. This would cover Boeings up to P12 H (only one built, I think) and Curtiss up to P6-H, likewise "one-off" and P-26a. The blue fuselage was introduced about 1934, and would cover 0-46, 0-47, A-17, P26B, etc. The 0-46 may have been seen with olive drab fuselage, the 0-47 and 1-17—never. The Curtiss P-36 and Seversky P35 were left all aluminium, and a system of identification by lettering began.

Yours faithfully,
Cambridge, A. P. C. JORDAN.

DEAR SIR,— I would like to make a few comments on the letter from Mr. P. L. Gray appearing in the December issue of your magazine.

The *Fokker D7s* bearing the cross

(Continued on page 78)

MEMBERSHIP INCREASES

New S.M.A.E. scheme a success

THAT the new membership scheme, which was introduce dlast year by the S.M.A.E., has met with considerable success is shown from the latest figures available. Without doubt the provisions for Associate Members—a new departure as far as the Society is concerned—has proved extremely popular and is largely responsible for the increase in membership.

As the only benefit Associate Members receive is insurance cover, it would seem that these non-competitive fliers, who now outnumber those interested in contest flying, deserve to have more offered to them.

Council members recognising this fact drew attention to the need for organising other activities, both to retain the interest of the existing Associate Members and to encourage new ones, at the recently held Annual General Meeting. After discussion, a special sub-committee was set up.

The all-round increases in the Society's membership figures are as follows, with 1953's figures in brackets:

Full Affiliated Clubs, 265 (207).
Full Club Members, 2,720 (3,122).
Associate Members, 3,578 (—).
Country Members, 138 (120).

From these figures it can be seen that total membership has increased by 3,176 during the past year, largely as a result of the big influx of Associate Members.

Israeli Nationals

SURE of fine weather when they held their third Nationals recently, Israeli modellers put up a good show at their annual get-together. Entrants totalled well over a hundred, with over 150 models, and they came from 18 different branches of the Aero Club of Israel.

Seven events were held, including one for the *De'onith*—the beginner's glider. The A2 contest conformed to F.A.I. rules as did the general glider event, the latter having only three rounds instead of five. There were no limitations for engine runs in the F/F power event, but flights were measured only up to 4 min. duration.

Standard of flying in the "A" and general glider events was good, with the F/F power showing much improvement. For C/L speed it was planned to have two rounds, but nobody succeeded in becoming airborne more than once.

Drop in Contest Entries —1000 down

CONTEST entries for 1954 showed a drop of a thousand from the previous year's total of 4,000. Bad weather and lack of support for the Northern Gala were two of the factors which Major S. D. Taylor, S.M.A.E. Competition Secretary, quoted at the A.G.M., and he said the decrease was spread over all types of contests.

Glider entries still headed the list, followed by Power and Rubber. Team Race and PAA-Load were on the increase, but there was a decline in the C/L Speed and Stunt sections. Entries in R/C events showed an increase although the number who actually flew in these contests was down.

The Indoor Flying was given a big fillip by the S.M.A.E. meetings at Cardington Aerodrome, at which all the existing British records were broken.

NO MEANS OF SUPPORT !

Latest idea to come from America is the plastic pylon—that shown in our photograph being Tenite, which has proved ideal for the job. This model was built by Leo Garringer of Portland, Indiana, and he powers it with a K. & B. 29. It is held by Evaline Campbell of Hamilton, Ohio. Colour scheme for the *Natural*, as it is called, is red fuselage with blue upper decking, yellow tail unit, and blue wings with red leading edge.

This picture, originally a colour transparency, was sent by Bill Dean.

Model Flying at the Palace?

FOLLOWING the recent discussions about the future of the site of the Crystal Palace in S.E. London and the proposals to make a sports centre there, the Federation of Model Aeronautical Manufacturers and Wholesalers have made a written approach to the London County Council requesting them to examine the possibility of allowing model flying.

Owing to the nature of the site—wooded land on the side of a hill—it is unlikely that there is sufficient space for free flight events, but it is hoped that facilities might be made available for control line fliers.

SENIOR CHAMPION

John O'Donnell, the well-known and versatile modeller from Salford Lancs., and member of the Whitefield M.A.C., is Senior Champion for 1954. Junior Champion is—and no prizes for guessing—Hughie O'Donnell, John's brother. In a year or so, when Hughie becomes a senior, the family battle for champion modeller of the year will become intense.

THE PLUGGE CUP

Croydon and District M.A.C. have once again won the Plugge Cup, narrowly beating Birmingham M.A.C.

ENGINE QUIZ RESULTS

There was a lively response to our Engine Quiz which we published in the Christmas issue and there seem to be a surprising number of enginewise readers in need of a year's free subscription.

The correct solution is as follows: 1, Allbon Merlin; 2, Wilo 2.45 c.c. (East German); 3, McCoy "Sportsman" (Junior 36 or Senior 55); 4, OSAM "Supre-tigre" G.14; 5, Allen Mercury 25; 6, Elfin 1.49; 7, B.W.M. 250D; 8, Kalper .32; 9, Atwood "Glo-Devil" (Atwood Type DR, or Glo-Devil DR, or Champion DR, but not type JH); 10, E.D. Mk. II; 11, Frog 250; 12, K. & B. Torpedo 19.

It seems, however, that the quiz was a little on the difficult side as we had to open all the letters in an endeavour to find two correct solutions. Only one all correct answer was found and the enginewise winner is P. Bearne, of Ormskirk, Lancs. To award the second free subscription we marked the letters, extracted those with only one answer wrong (there were about two dozen) and put the names into a hat and drew one. The lucky man is A. G. Young, of Streatham, London.

The engine picture which caused the most confusion was No. 3, the McCoy Sportsman. It is not possible to differentiate between Junior 36 or the Senior 55 from the illustration so both of these answers were valid, but the engine is *not* the Sportsman 29.

The two winning readers will receive a free subscription to "M.A." for twelve months starting with this issue.

British Records Increase

Thirty-two British records were ratified during 1954 and they represented the following classes: Indoor, 12; C/L speed, 6; Gliders, 5; Power, 4; Rubber, 3; R/C, 2. See page 82 for current list.

Scottish Rally

Since our note on the Scottish Rally in the December issue we have received a few additional details. The date is now definitely fixed for Saturday and Sunday, September 10th and 11th, and at the moment the organisers are negotiating for the use of Heathfield Aerodrome in Ayrshire.

We mentioned previously that no R/C event had been included in the proposed programme, but this omission has now been rectified and in addition there will be a Jetex event. To make the programme as complete as possible the organisers are open to suggestions from modellers, who should contact the Contest Secretary, Mr. W. Meecham, 116 Banner Road, Glasgow, W.3. Sassenachs having queries on travel, accommodation, etc., should write to Mrs. Freda Shirt, 13, Patmore Road, Sheffield, 5.

We Visit Frogs

As makers of the famous Frog model aircraft kits and engines, Lines Bros. will need no introduction to "M.A." readers. Recently we were able to visit the group's factory at Merton, London, S.W.19, and see their wide range of products and the ingenuity of their design and production methods.

The factory covers an area of 700,000 sq. ft., including over three miles of roadways between the buildings, and its output accounts for nearly one-third of total exports of toys from this country.

Design and production are as carefully planned as for the most elaborate industrial products, and equipment is on the most up-to-date lines.

It is to the credit of British manufacturers that they have not only kept development fully up-to-date, but have in many cases even anticipated demands. A design and experimental department, with a staff of about 100 skilled men and women is maintained at Merton, and is responsible for the development and testing of all products.

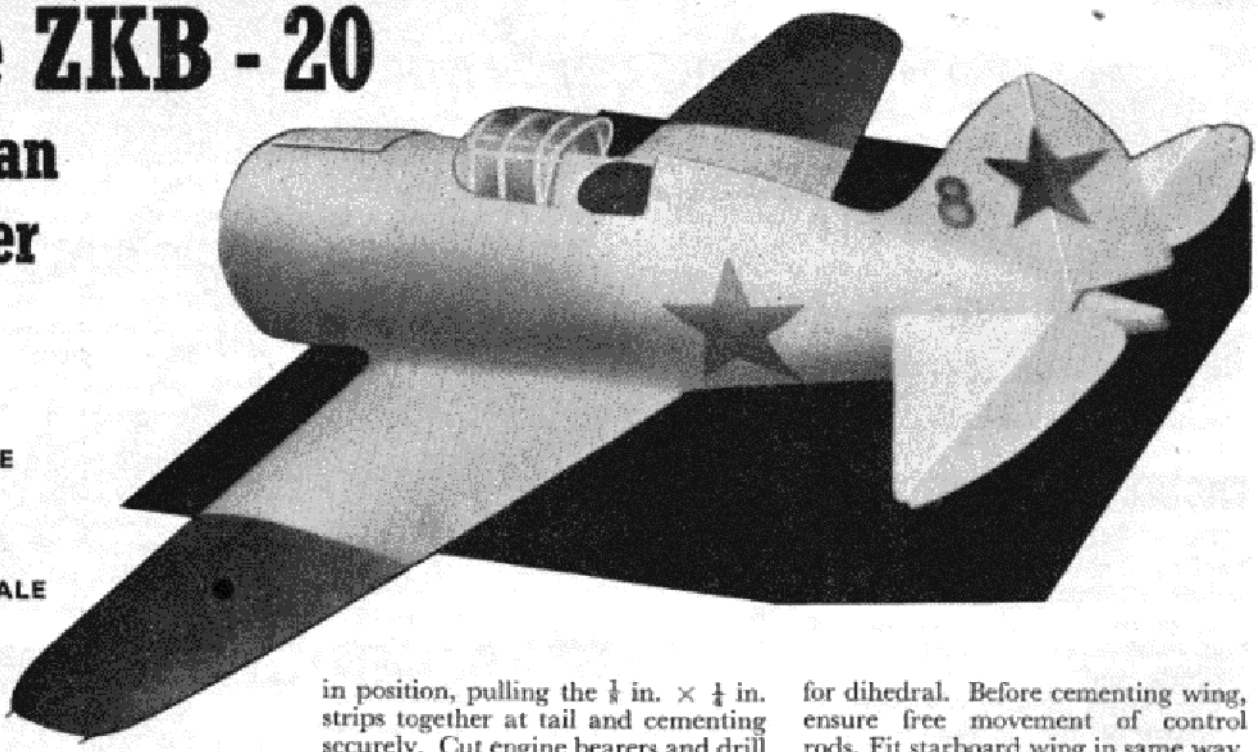
Lost Property

Will the owner of a Mercury Magna with the "code" R.V.-I,86 Q13, please collect his lost property from Hackney Police Station, 2, Lower Clapton Road, E.5.

Unlike the pigeon, a model aircraft has no "homing device," and yet it seems there are still a few blithe spirits who believe "it can't happen to me." We repeat this advice yet again: Attach your name and address on any model you value.

Mrs. R. L. Preston, presents Silvio Lanfranchi, well-known power man, and popular after dinner speaker at the S.M.A.E. Dinner and Prize-giving, with a trophy.

The ZKB - 20 Russian Fighter



AN UNUSUAL PROTOTYPE FOR A FINE FLYING SCALE CONTROL-LINE MODEL

by G. Brittain

THE Russian ZKB-20 I-18 fighter operated with the Spanish Government Air Force during the civil war. It was powered by a Russian built Wright Cyclone 1,200 h.p. radial engine, operating a two bladed metal prop, top speed being 300 m.p.h. Construction was all metal stressed skin with fabric covered movable control surfaces. The undercarriage retracted inwards. Armament consisted of two .30 Browning machine guns fixed outside the airscrew disc. ZKBs operating in Spain were identified by the Government markings of red, yellow and blue concentric circles on wings and fuselage, and similar coloured horizontal bars on rudder. Those used by the Russians in World War II were, in summer, all green or mist grey with a red five-pointed star outlined in white on wings, fuselage and rudder. In winter, they were all white except for the top outer wing panel, which was a vivid red for easy identification on forced landings.

Construction

All balsa unless otherwise stated. Cut out formers FA to FC; FB is $\frac{1}{8}$ in. ply. Cut holes for engine bearers in FB, C and D to suit engine to be used. Take two $\frac{1}{8}$ in. × $\frac{1}{4}$ in. strips, cut to length and cut away at rear for horizontal tail unit. From plan, mark on these strips the former positions.

Starting from FB, cement formers in position, pulling the $\frac{1}{8}$ in. × $\frac{1}{4}$ in. strips together at tail and cementing securely. Cut engine bearers and drill to suit engine, and also hole for control plate. Fit bottom bearer in place and bolt for control plate.

Fuel tank is now placed in position followed by top bearer. Now cement both bearers in position and secure fuel tank in place. Fit $\frac{1}{8}$ in. × $\frac{1}{4}$ in. strip between FB and FD, similarly underneath between FB and tail. Cut stationary portion of horizontal tail surface and fix in place, followed by fin, but not offset rudder. Now fit the two pieces FH.

Plank in top half of fuselage with $\frac{1}{2}$ × $\frac{1}{16}$ in. strip starting either side of the $\frac{1}{8}$ in. × $\frac{1}{4}$ in. longeron and working upwards. Cut out cockpit and sand to shape. Fasten three control wires to control plate and bolt control plate in position using two nuts between bearer and plate to drop plate to approximate centre of wing.

Wings

Wings are each made separately over plan. First cut required number of ribs, the two shaped $\frac{1}{2}$ in. strips for leading edge and the two $\frac{3}{4}$ in. shaped for trailing edge. Pin leading edge in position, also trailing edge, packed at rear with $\frac{1}{8}$ in. scrap. Cement ribs in place.

Now fit wing tips, starboard tip being $\frac{1}{2}$ in. sheet, whereas port tip is made up of three $\frac{1}{8}$ in. pieces with tube for control wires passing through centre. Slide port wing into position with control rods passing through ribs.

Place fuselage upright on building board and pack up wing tip $\frac{3}{4}$ in. for dihedral. Before cementing wing, ensure free movement of control rods. Fit starboard wing in same way. Pack between leading edge and FB with scrap. Ensure wings are firmly cemented in place.

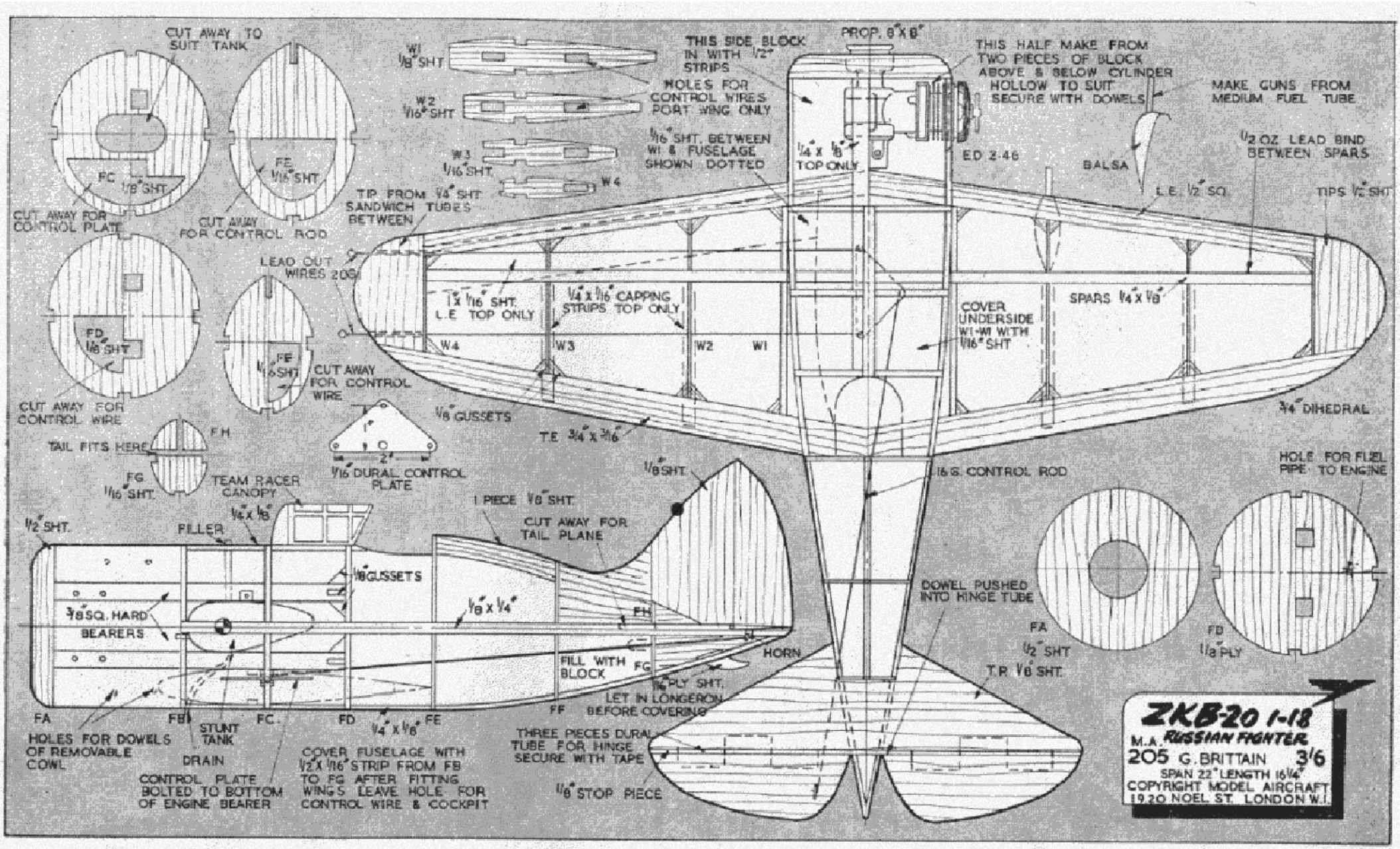
Plank in top leading edge and capping strips from $\frac{1}{16}$ in. sheet as shown, also between W1 and fuselage. Plank in underside of fuselage with elevator control rod passing through hole in port side. Cut out movable elevators, sand and join the two portions with dowel. Bind metal tube with linen in place, also to fixed tail surface as shown on plan. Fit ply control horn.

Tail Unit

Join the two portions of tail by passing pieces of wire through tubing and then cement pieces of scrap balsa on outside to prevent wires coming out. Join control rod to control horn. Next fit rudder with 10 deg. offset. Fit ply tailskid. Fill in both sides above and below horizontal tail surface with scrap and sand to shape.

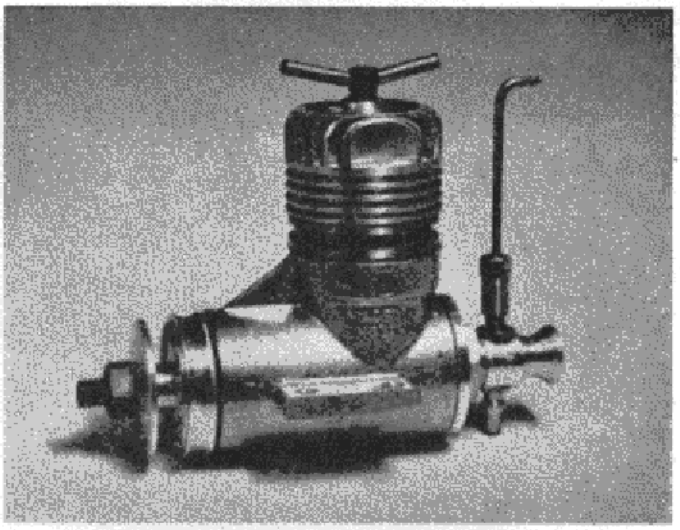
Now cement FA to bearers and fit engine bolts. Fill port side with $\frac{1}{2}$ in. strip fitting flush with engine bearers, forming fixed cowl. Starboard movable cowl is shaped from block balsa, which is held in place by dowels which fit into holes in fixed cowl.

Sand whole aircraft to smooth finish then cover wings with heavyweight tissue and remainder with lightweight. Give two or three coats of clear dope and sand smooth. Fit cockpit cover, then colour dope to taste. Guns and drop off undercarriage may be added if desired but original model was hand launched.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT
19-20, NOEL STREET, LONDON, W.1, 3s. 6d., POST FREE

Engine Tests



No. 70. The Elfin B.R. 1.49 c.c.

JUDGING by the performance of our test examples, the new B.R. model Elfin, with reed-valve induction and ball-bearing crankshaft, is markedly superior to its predecessor, the shaft valve plain bearing model introduced in 1950.

Early in 1950, at the request of the manufacturers, who supplied an engine for the purpose, we dynamometer tested a 1.49 in connection with the makers' overseas advertising programme. This test was later published (August 1950 issue) in MODEL AIRCRAFT and showed the quite exceptional output of .15 b.h.p. at 13,500 r.p.m. Actually, subsequent tests on other, production, Elfin 1.49s indicated (not surprisingly) that the average "off-the-shelf" model produced about 10 per cent. less than this figure. Nevertheless, a reasonably good Elfin has been a favourite choice for the 1.5 c.c. competition classes. J. A. Gorham, for instance, has used an Elfin 1.49 almost exclusively, and with numerous successes, for the past four seasons, culminating in his World Championship fourth place in which the model was proxy flown against many top class 2.5 c.c. models.

Our experience has been that (a) 1.49s vary more than some other makes, but that, (b) when one gets a "good one," it can be very good indeed and unequalled by any other mass-produced 1.5 c.c. engine. In the case of the new B.R. 1.49, the tradition appears to be continued in respect of (b). Whether (a) still applies or not, it is yet too early to say, but, if our test engines can be taken as representative examples, then the B.R. 1.49 will not disappoint Elfin enthusiasts, who can look forward to even better all round performance.

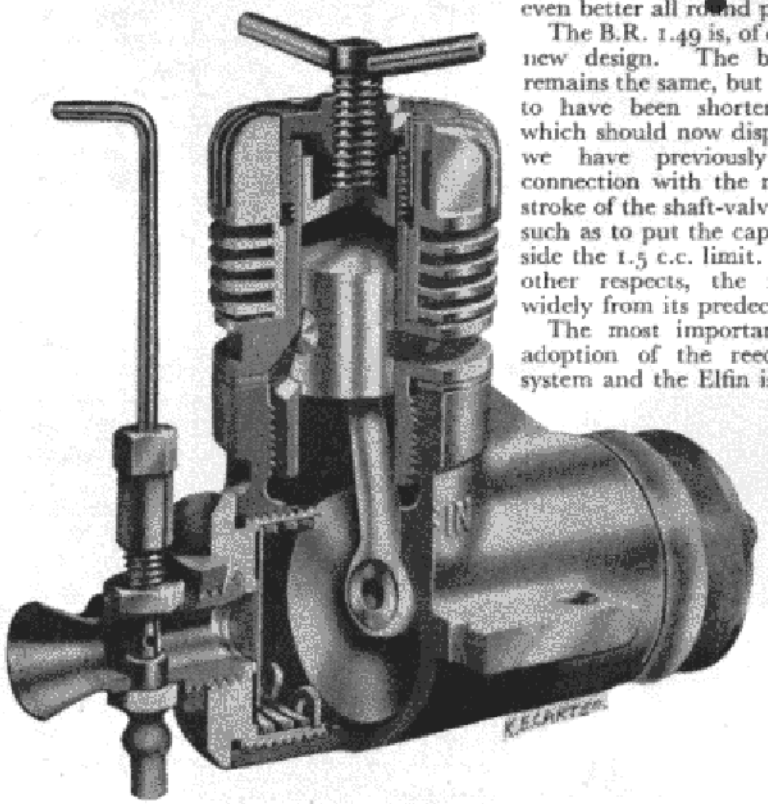
The B.R. 1.49 is, of course, an entirely new design. The bore measurement remains the same, but the stroke appears to have been shortened by .006 in., which should now dispose of the doubts we have previously entertained in connection with the nominal bore and stroke of the shaft-valve 1.49 which were such as to put the capacity slightly outside the 1.5 c.c. limit. In practically all other respects, the new 1.49 differs widely from its predecessor.

The most important change is the adoption of the reed-valve induction system and the Elfin is, at the moment, the only quantity produced diesel having this feature. Secondly, a new and unusual crankcase design has been adopted, housing two ball journal bearings to support the crankshaft and having a unique central lug mounting. Thirdly, a new cylinder liner, with revised porting, is used. In this, the previously employed "Arden" type transfer system, in which four "grooves" were cut in the lower cylinder wall, leaving the piston to run on the lands thus produced, is discarded and three grooves are instead cut in the threaded outer wall of the liner, where it screws into the crankcase. Leading direct from these are three 5/32 in. dia. ports, inclined at 53 deg. to the cylinder axis. The total area of the transfer passages, incidentally, is by no means large for a high performance engine.

Finally, the finned aluminium cylinder barrel and head marks a departure from standard diesel designs in that vertical head finning is used and in that a recessed screwed cap is employed to lock the component on to the liner.

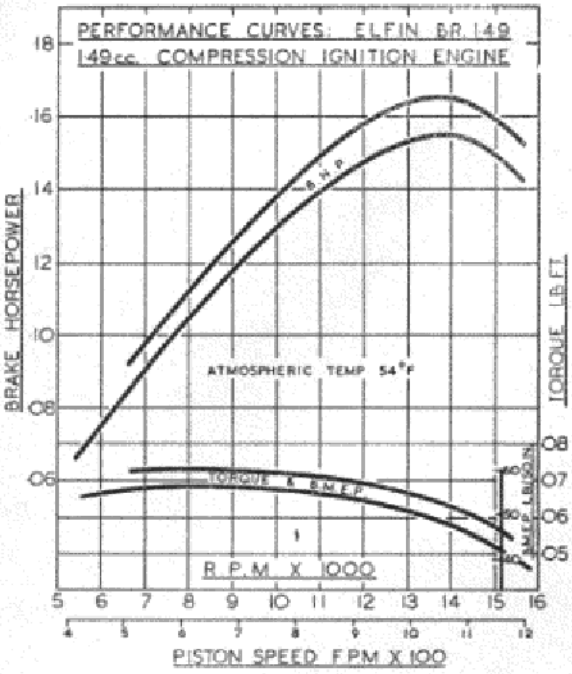
Certain of the B.R. 1.49 features are, of course, aimed at achieving higher output: others at obtaining stronger construction or at facilitating ease of installation and operation. The centrally mounted carburettor assembly, for example, can be rotated through a full 360 deg. about the engine centre-line to bring the needle valve control to any convenient position and, of course, its location at the rear of the crankcase keeps one's fingers well away from the rotating prop.

This new Elfin is considerably heavier than the earlier model. However, apart from the fact that it is also exceedingly robust, the swing away from the ultra-lightweight trend to one of greater concentration on obtaining maximum specific output, is in accordance with current competition requirements in which the emphasis is on power output rather than on power/weight ratio.



Specification

Type: Single cylinder, air-cooled, two-stroke cycle, compression ignition. Reed-valve induction with sub-piston



supplementary air induction. Radial exhaust and transfer porting with conical crown piston.

Swept Volume : 1.498 c.c. (.0914 cu. in.).

Bore : 0.503 in. Stroke : 0.460 in.

Compression Ratio : Variable.

Stroke/Bore Ratio : 0.915 : 1.

Weight : 4 oz.

General Structural Data : Aluminium alloy, pressure-diecast crankcase and main bearing housing with detachable rear cover. Nickel-chrome steel disc-web crankshaft running in one inner and one outer ball journal bearing. Nickel-chrome steel cylinder liner, flanged above transfer ports and screwing into main casting with fibre washer under flange. Cast-iron piston with pressed in solid gudgeon-pin. Machined duralumin connecting rod. Cylinder finned barrel and head, carburettor and locknut and backplate machined from duralumin. Large diameter propeller driver machined from duralumin and fitted on crankshaft taper. Beam type mounting lugs. Brass spraybar type needle valve.

Test Data

Running time prior to final tests : 5 hours each unit.

Fuel used : 30 per cent. Shell " Royal Standard " kerosene, 40 per cent. Ether BSS. 579, s.g. .720, 25 per cent. castor-oil B.P., plus 2½ per cent. amyl-nitrate.

Performance

Our usual practice, whenever possible, with new engines of a popular type is, of course, to obtain more than one example for test and, in the case of the B.R. 1.49, two engines were used. This is not always possible, especially with foreign engines, but it is desirable in the interests of a representative report on the particular type being featured.

One of the B.R. 1.49's handled prior to our test was a rather poor starter. Two other examples, however, were outstandingly quick starters. On average, it appears that good starting is one of the 1.49's attributes—an opinion which seems to be generally borne out by the findings of other B.R. 1.49 owners thus far consulted. The makers' leaflet calls for priming through the ports with two drops of fuel. However, we found that a start could be obtained extremely rapidly by the simple finger-choking method. The best of our two engines would start within three flicks by this method.

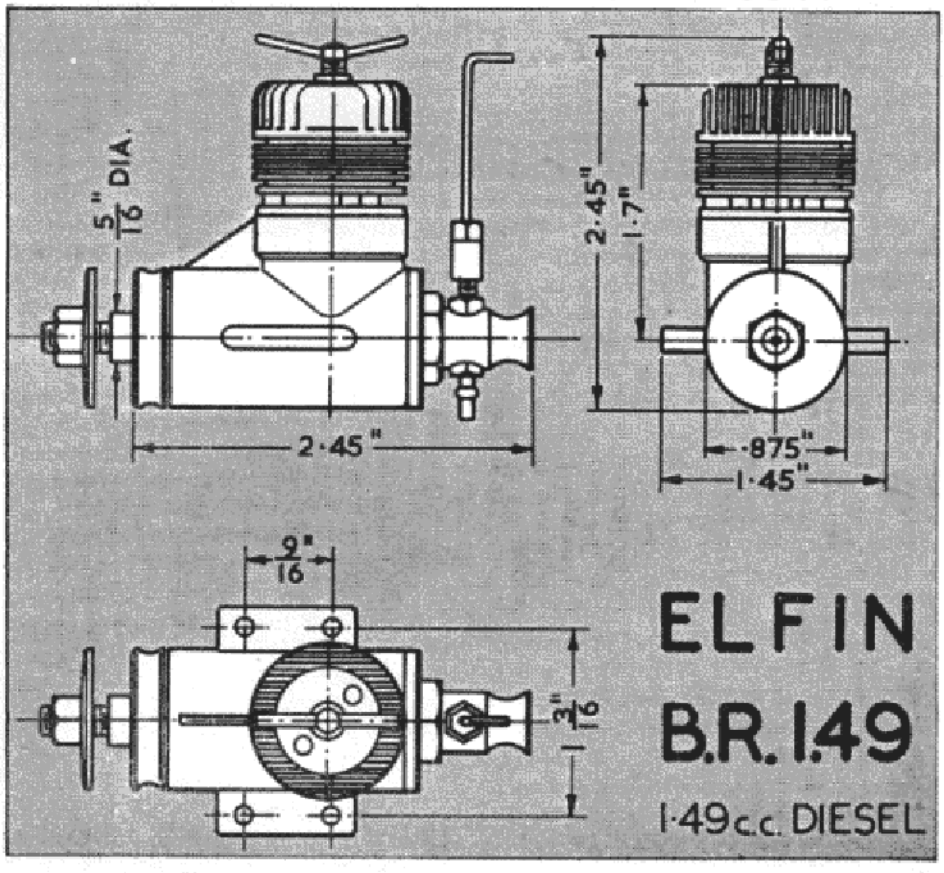
The B.R. 1.49 runs with noticeably more power at low speeds than the older model. It is, of course, a theoretical characteristic of the reed valve system that the variable timing obtained should give more even charging over a wide range of speeds. It will be noted that the B.R. 1.49 was tested over an exceptional range of speeds, extending through some 11,000 r.p.m. The engine was tested for hand starting at all speeds up to 16,000 r.p.m. It remained remarkably free from undue viciousness and " biting," even on the lightest loads. Due to the fact that induction timing is governed by crankcase depression and not by degrees of crank-angle, the Elfin will run, with equal efficiency, clockwise or anti-clockwise. This can be useful for pusher or twin-engine installations. On the other hand, it does mean that the Elfin will sometimes start " backwards." This is noticeable with the limited flywheel effect of a small prop. The tendency can be reduced by avoiding an excessively rich mixture or high compression for starting.

Controls are responsive, although a rather tight contra-piston was experienced with one engine, so that, when the unit had warmed up, the contra piston would not return to a lower setting when the compression screw was slackened.

The engine runs evenly and without excessive vibration at practically all speeds. When loaded below five figure r.p.m. on the bench, there is the usual power loss as the engine warms up at the lowest speeds, but at the speeds more likely to be used with this engine, this tendency disappears. When adequately run in, the engine will hold even revolutions at high speeds for long periods and without readjustment of controls, a point of particular interest to team racing and radio-control enthusiasts. Checked at a steady 11,000 r.p.m. on 15 c.c. of fuel, incidentally, the best engine ran for 4 min. 25 sec.

Figures obtained under dynamometer test were exceptionally good and showed a performance well above that of any other quantity produced engine in the 1.5 c.c. class. Maximum outputs of .155 b.h.p. and .165 b.h.p. were obtained at peak speeds of 13,500 to 14,000 r.p.m. The best torque recorded was at the exceptionally good figures of .073 lb. ft.; approximately 14 in. oz. and equivalent

(*Continued on page 70*)



SHOW BUSINESS . . .

. . . or how to put a club on its feet the hard way

by Eric Fearnley

Ted Cartwright's compressed air demonstration model, with Frank Bailey's Kiel Kraft "Venom" flying round at about 25 m.p.h. at the N.L.M.A.S. exhibition at Cleethorpes.

THE nearest Bill Brown and I got to packing up making model aeroplanes altogether was the Saturday night our club's first exhibition was assembled—or I should say Sunday, very early a.m. Also, "thrown together" would be a more accurate description than assembled. However, let us start at the beginning.

It's difficult to pin down how it all started. We had been discussing ways and means of improving the size of the club on one of those summer nights when we would all have preferred to have gone flying. It may be that this frame of mind breeds trouble : anyway, before I had the good sense to close the official meeting we had it all planned. Being only four miles from the seaside, we had decided that visitors will pay admission to see *anything* when they are on holiday ; we would hire a hall, plaster the town with clever posters, bung all our models in, and sit back and take the money. Yes . . . I should have closed the meeting sharp ! But the club was only eight months old, and, as the first chairman, I didn't want to be too officious. Anyway, I think I was the one who actually first mentioned it, and I really believed it myself !

When a meeting gets going on an idea, a sort of fanaticism breeds, and as it spreads, we all get our heads in the clouds. It was all too clear what the exhibition would look like ! But we overlooked the small detail of getting it together.

It was agreed to pass the matter to the committee at once, as time was pressing, and there, quite frankly, I thought it would end. But on committee night everyone seemed quite determined, so it was put in motion.

Fools may rush in where angels fear to tread, but very often a fool gets a sort of protection. We must have had a full fighter escort that night, for we did one thing at least that put us on our feet. We had a good man with us who had the drive to get things done, and we gave him the lot—threw the whole job at him and said in effect, "get on with it." And get on with it Bill Brown did. We all know now that but for his drive, personal sacrifice, and hours of time devoted to the job we would still be planning the thing.

First job was finance. That was easy. Pete said he thought the room we wanted, belonging to the council, was £12 for the week—we had £3 in the kitty. Everyone said that we were bound to meet our expenses, anyway, so we agreed to back the venture out of our own pockets in the almost impossible event of its failing. Which just goes to show how little we knew about the job ! So we gave Bill the O.K. to book the room for the first available week in August, at "about" this figure.

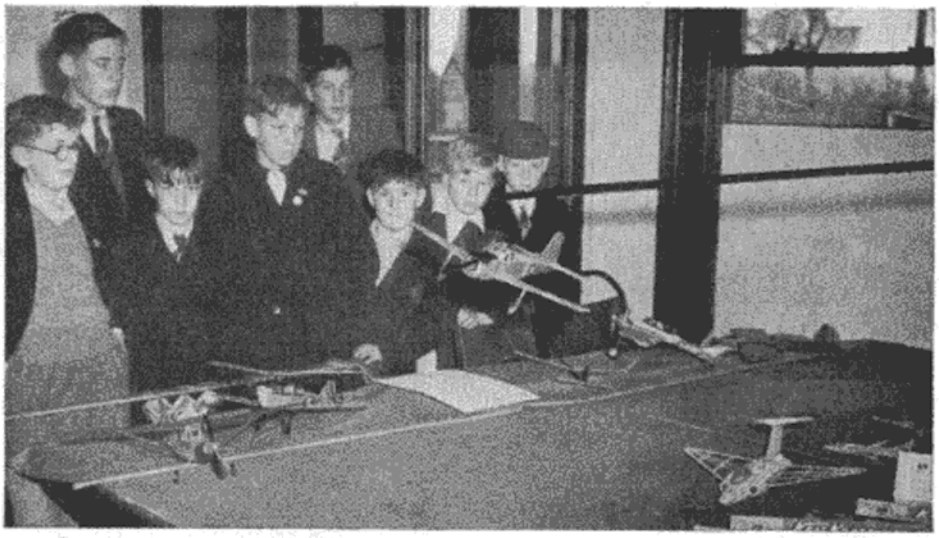
Had we enough models ? A quick tot-up revealed that we could muster about fifty, provided we all went easy on flying, and patched them up a bit. In actual fact, fifty models would not have filled a quarter of the two rooms we had in mind, but we blithely went on our way, wallowing in our sweet ignorance !

Next day, I had the first real idea of what we had started. Bill, on the phone, said that the room was £30 for a three session, but we could do a wangle if we opened late on a two session basis, and it would cost £20. It had to go before the council, and it was now or never, yes or no. Quickly totting up my savings certificates and doing a "mental" on how much six engines would fetch on a quick market, I said I would see him in gaol, and so the die was cast.

The deeper we got into the water, however, the more canny we got. The rent had rather shaken us into activity, and we had to put the show on in six weeks ; we made up our minds it was going to be good. Committee meetings were once a week, and a regular lashing-up-of-enthusiasm among club members began. It was here that we first realised that we had the finest set of youngsters anyone could wish for. They took it all in their stride, and, what's more important, kept their word. If attendance was promised, they arrived ; if models were promised, they turned up. Those clubs that don't want juniors are losing some of the best membership, I can tell you.

It was decided in committee that working models were wanted most, and engines, or Jetex stuff was out. That left us with electric, and compressed air. The latter was right up Ted Cartwright's street, as he had a compressor (or thought he had) ; so he started on this project. I said, in a moment of weakness, that I would try an electric r.t.p. job.

A fortnight hence, Ted had taken his compressor to bits and remade it, and, driven by his motor drill, got about 30 lb. per sq. in. on the clock. I assured him on the phone (he lives 12 miles out of town, just to add



A Kiel Kraft "Provost" trainer engined by a Frog Tornado electric motor stooges round to amuse visitors to the N.L.M.A.S. Exhibition. Built by E. Fearnley.

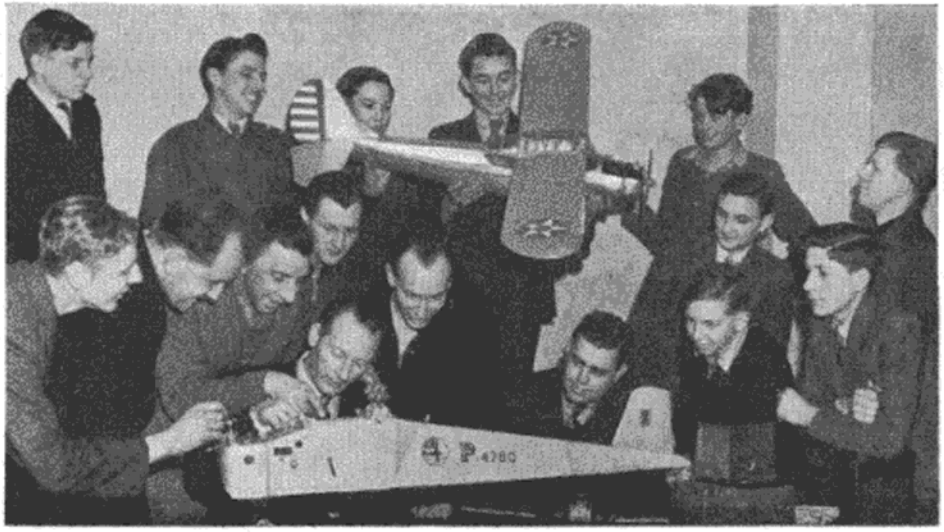
complications!) that that would fly a Jetex 50 kit round all right. I think I was trying to convince myself as well. I, at this time, had a 3s. 6d. *Provost* kit framework made, and also bought a midget electric motor. After it was installed in the model, I tried various props and studied the taxying speed. It was plain, after I had exceeded the maker's current through the motor by 100 per cent., that it had as much chance of flying as a *Radio Queen* with a .5 in it. There was only one thing to do, and that was to counter-balance the model on an arm, and as soon as some forward speed was reached it would rise. This proved better than F/F, as it was now a flight "simulator," rolling round at scale speed, and taking off in a lazy sort of way. Having mocked this up in the garden, and played with it, I set about finishing the job. We agreed that the demonstration space should be 8 ft. sq., which meant that I wanted hardboard this size. Quartered to 4 ft. sq., I thought I could manage it. Only thing is: it is sold 8 ft. × 4 ft., so I had to carve it up in the builder's yard. Fortunately, my car is a convertible and by removing the hood I just got the four sheets in. Getting home without anything worse than a hard look from a policeman, I was just about done in with the exertion in the heat, so I wished the project—all success!

Ted, meanwhile, had made one of his famous "Fuffle valves," which he assured us would administer the thrust in a frictionless manner up the centre pole and into the captive neoprene tube to the model. A mock up in his garden revealed that the spring top lifted completely under full pressure, and if the tension was increased it seized up at slow speed. Starting again, a plain bearing was made to cylinder precision this time, and it worked. The compressor, however, would lose badly all the time the model flew, so we had to build up about 80 lb., and let it fall as the model flew round. It was extremely effective, however, and we were beginning to feel a bit better.

Bill's register of models was taking shape and he had about 80 on the books, much to our delight. In these odd moments of bliss, fate usually lands out. Bill went to take a good look at the room and came back shot down in flames. The walls were very bad, the rooms were much bigger than we anticipated, and there were no tables much to hand. That meant wall covering, more display material, extra tables, and not much time. Letters to the trade brought forth a super set of plans for the walls from Veron, a giant balsa log from Solarbo, masses of leaflets from Kiel's and the local shop loaned us a truckload of kits, engines, etc. But this brought up another problem: who was going to look after the place during the day? While juniors were off school, and could do a little floor walking to watch small visitors, they cannot be employed, of course, nor could they be expected to be able to handle the money, even if it was legal. Here, we were lucky again in having two wives, Mrs. Cartwright and Mrs. Sam Dowie, who between them kept the door the whole week. Lucky us! Time was running out and plenty to do. Insurance had to be fixed up. Tables were loaned from a friendly livestock society, and also some covers. Newsprint was "borrowed" for covering the tables; wood obtained to build stanchions to keep the lads off the working models. Tools, nails, wire, plugs, lamps, and a primus stove for tea were mustered. Posters were ordered and a small card was typed for each model with a description to add interest. Everyone read them—they were well worth it.

Suddenly it was zero hour—6.0 p.m., Saturday. All the weeks of planning, and, now, into battle. The transport available was three cars, and a dozen bicycles. It had been agreed that we must fetch all we could to be sure of its safe arrival. By the time I had done five trips up and down that four miles, I was wishing it was in town. We removed the back seat and filled up to overflowing. My last trip had fifteen models, four

(*Continued on page* 54)

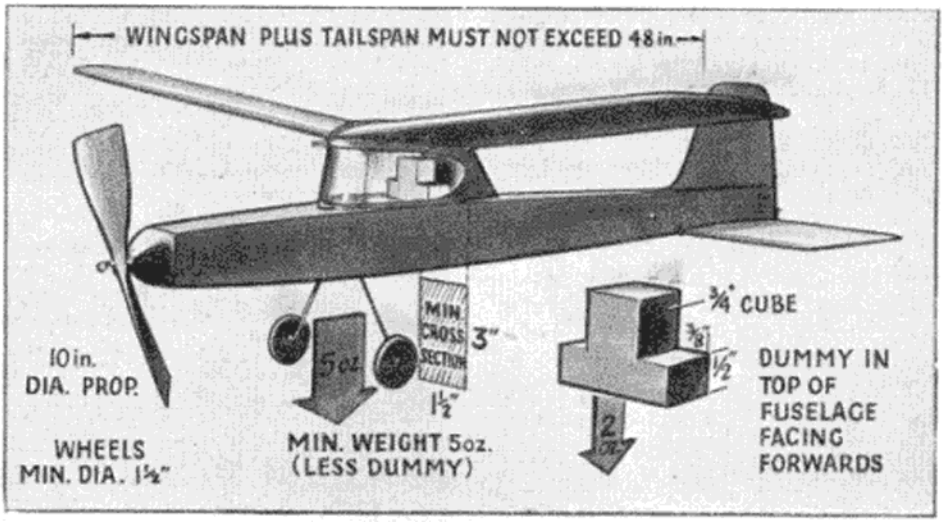


Some of the members of the North Lincolnshire M.A.S. at a club meeting.

DESIGN FEATURE

Rubber Powered Paa-load

by R. H. Warring



LONG before Pan American Airways took any interest in model payload events there were suggestions that the performance of Wakefields could be limited, and design standards enhanced, by making them carry a dead weight. Two oz. was the figure suggested, which, with the specification otherwise unaltered, gave in effect a 10 oz. model.

A model built to this specification by Norman Lees proved good enough to compete on level terms with conventional Wakefields of the time. Even allowing for the fact that Norman rates in the expert class, it was pretty obvious that a simple "payload addition" need not markedly reduce performance. The old "Flight" cup specification called for a 1 oz. payload, with restricted rubber, and again produced models which were readily capable of thermal flights. More often than not they were simply "standard" duration models with added ballast and shorter motors.

Similar "conversions" produced "new rule" Wakefields out of "old rule" Wakefields and although the Wakefield is not a payload specification, many models flown under the new rules have, in fact, carried quite a substantial amount of dead weight, which is the essence of a payload model.

When Pan American Airways interested themselves in model aircraft events and developed the Paa-load specification. They introduced the novel touch of the payload being in the form of a passenger and/or pilot of specified sizes and weights. This idea was extended to rubber models in an experimental specification first issued in 1952 (flown at the '52 American Nationals). It is quite definitely a restricted performance specification which calls for an original design—not a modification of an existing contest model. As such, therefore, it avoids the unpopularity generally attendant on any specification which can be met by taking a standard duration design and rehashing it to suit. But whether the rubber Paa-load specification will become popular on its own merits remains to be seen. The first event of this kind to be run in this country is scheduled for the Scottish Rally next September.

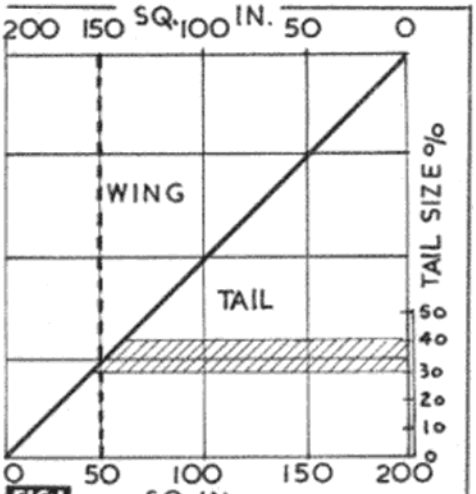


FIG 1

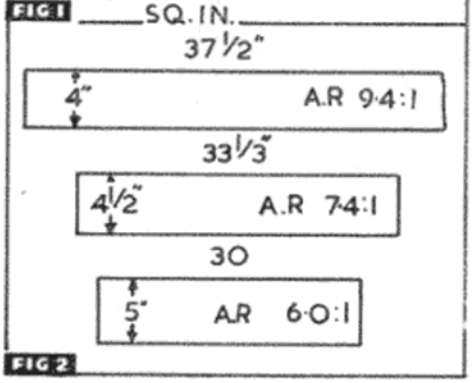


FIG 2

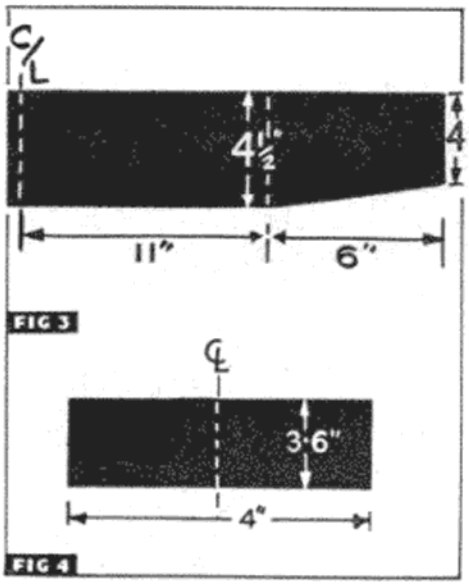


FIG 3

FIG 4

Some of the main points in the specification are summarised in the heading drawing. The resulting model is of medium size, and therefore quite inexpensive and simple to build. Performance is unlikely to be outstanding with propeller diameter restricted to 10 in. (single-blade and folding propellers are banned, incidentally), so it is a type of model suitable for small space flying, such as the local park. Weighing 5 oz. without dummy, the airframe should be quite sturdy.

Wing and tailplane area must not exceed 200 sq. in. Normal rubber model design practice is to use a tailplane area of anything between 30 and 40 per cent. of the wing area. A 33 per cent. tail gives nicely rounded figures—150 sq. in. wing and 50 sq. in. tailplane (Fig. 1).

Having decided on this figure, some sample calculations for typical wings of this area produce figures as shown in Fig. 2. Since the model is on the small size it would be an advantage to have a reasonably large span. However, bearing in mind that the sum of the wing and tail spans must not exceed 48 in., the 9.1 aspect ratio wing would have to be employed with a very "square" tail. The

second wing would appear the better choice. In actual fact the performance of all wings of this size within the range of aspect ratios of 6 : 1 to 9 : 1 would probably not differ much, and so taking a mean value is good practice.

The wing planform selected can be refined somewhat by introducing a taper over the tip portion. This will enable squared off tips to be used without incurring excessive tip losses. Tip chord need only be reduced by $\frac{1}{2}$ in., when the revised span measurements are as given in Fig. 3. This planform is intended for use with straight dihedral, ten degrees being an adequate figure on each wing. The aspect ratio of this particular wing now works out at 7.7 : 1.

A simple rectangular planform is then adequate for the tailplane, to the dimensions shown in Fig. 4. Total rectangular area (wings and tailplane) then work out just slightly in excess of 200 sq. in. The surplus would normally be lost in rounding off the tips. A flat plate aerofoil section would be adequate for the tailplane. Under the rules, however, all covered frames must be covered on both surfaces. Hence a cambered section tailplane would probably be easier to handle from the covering point of view.

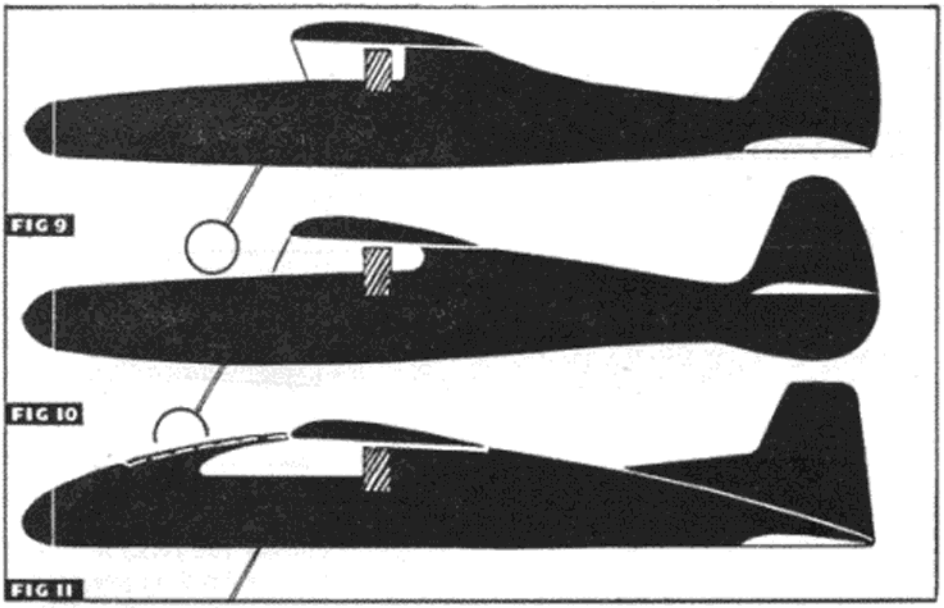


FIG 9

FIG 10

FIG 11

Main rule affecting the fuselage proportions is that the distance between the rubber hooks must not exceed 18 in. (Fig. 5). The motor must be a single unit (no return gears or nose gears), but since it does not specify that the motor must be *taut* between hooks, actual motor length can be assumed to be unlimited.

There are, however, practical limits to the motor length, otherwise bunching will be an ever-present trouble. Because of this it will not be possible to use a motor having an unstretched length greater than twice the hook distance, which gives the following limits to rubber *weight*, based on using $\frac{1}{4}$ in. x 24 in. strip.

Six strand motor, $1\frac{1}{4}$ oz. max.; 8 strand motor, 1 2/3 max.; 10 strand motor, 2 oz. max.; 12 strand motor, $2\frac{1}{2}$ oz. max.

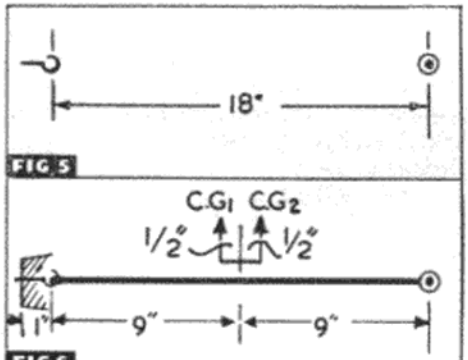


FIG 5

FIG 6

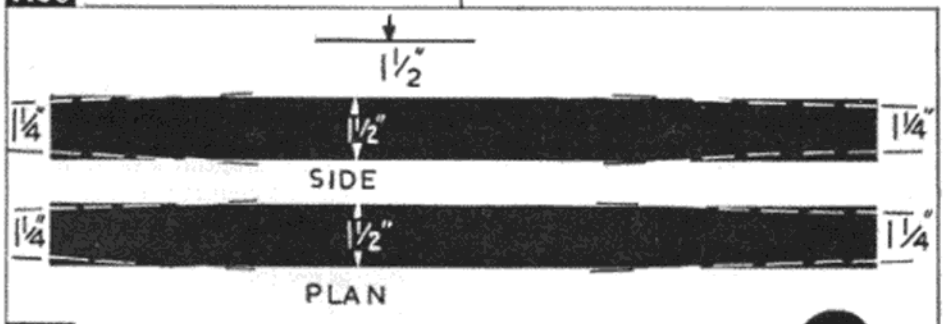


FIG 7

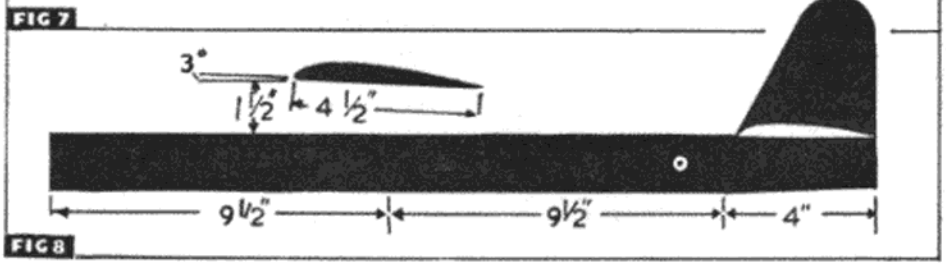


FIG 8

Quite likely it will be impossible to achieve even these motor weights without running into trouble. Also it is a matter of conjecture as to the maximum number of strands we can use on a 10 in. dia. propeller before we end up with a too short, and thus too inefficient, power run. It would be as well to aim at a 2 oz. motor weight for an initial design survey.

The centre of gravity of the finished model will then lie close to the centre of the motor—say $\frac{1}{2}$ in. forward for a conventional or short fuselage, or $\frac{1}{2}$ in. aft if the rear fuselage is extended—see Fig. 6. Also the extreme front of the fuselage will come approximately 1 in. in front of the front rubber hook.

Skeleton outlines of the side and plan views of the main fuselage can now be sketched in (Fig. 7). The fuselage can be considered as a $1\frac{1}{2}$ in. square tube, on which is to be superimposed a wing mount, itself $1\frac{1}{2}$ in. high. Fore and aft the fuselage can be tapered off a bit, if preferred, but minimum dimension should not be less than $1\frac{1}{4}$ in. square to preserve adequate rubber clearance.

Completing the fuselage outline around the forward c.g. position (c.g.1), the wing can be disposed equally about the c.g. at a 3 deg. incidence—Fig. 8. The rear of the fuselage is sufficiently extended beyond the rear rubber anchorage to incorporate the tailplane, thus giving a total fuselage length of 23 in. Any number of final outlines can then be filled in around this basic pattern, preserving the tube and pylon effect, as in Fig. 9, or blending the shape into a hump-backed cabin layout, Fig. 10, etc.

A further possibility is shown in

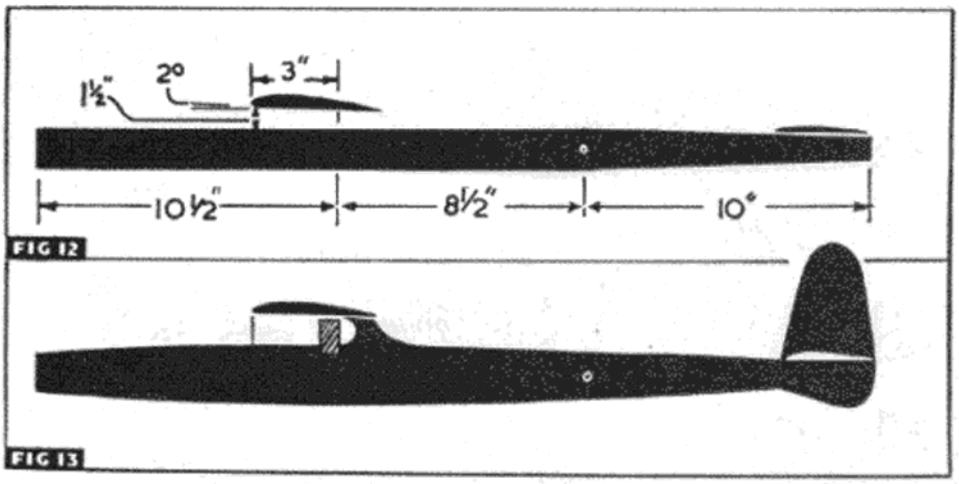


FIG 12

FIG 13

Fig. 11 in which an aerofoil profile is used. Forward visibility to a "depth" of ¾ in. in front of the Paa-load figure is given by celluloid covering on the top of the fuselage. The Paa-load figure, in all cases, is mounted in the top of the fuselage section and located at about the c.g. position. It can then be removed without affecting the trim of the model. The dummy must also be easy to remove for checking—e.g. through a hatch in the fuselage side.

The longer fuselage layout is used with the model balanced at 66 per cent. of the chord (instead of mid-chord) and therefore employs slightly less wing incidence. It should be a somewhat more efficient layout, although the reserve of longitudinal stability will be less. The design c.g. position is now estimated as 10½ in. from the extreme nose of the fuselage. Pylon height remains the same, but incidence setting is reduced to 2 deg. The length of the rear fuselage, which is now virtually a tail boom, is extended to 10 in. (Fig. 12.) The resulting model loses in semi-scale appearance as a result and so it is probably not worth while considering other than a purely functional layout as a final design—Fig. 13.

The fin area can safely be made two-fifths of the tailplane area on all the designs. It should not be particularly critical unless extremely high power is used (i.e. a short power burst), when a reduction in area might be advisable. In any case the fin is probably best made from light quarter-grain sheet and so can readily be trimmed to adjust the area, if necessary. It is better to start with a fin which is too big rather than too small.

The undercarriage can be of the simple cantilever wire type, bent from 16 s.w.g. wire. It needs only to be short in view of the small propeller diameter, but must be reasonably stiff in view of the relatively high total weight of the model (e.g. 7 oz.). The A.M.A. Paa-load rules specify, incidentally, that the landing gear must include at least two wheels ; wheel diameter must be at least 1½ in.; and all wheels must rotate and function as wheels. Single wheel type or retractable undercarriages are banned.

The propeller represents a problem which cannot be solved on theoretical grounds. The secret of maximum performance from almost every rubber powered model is the best possible propeller-rubber motor combination. The Paa-load specification calls for a propeller size directly opposite to duration trends—i.e. a reduction in diameter rather than in increase. A freelance duration model of similar proportions would have a propeller diameter of about 16 in.

Lacking any data on the performance of 10 in. dia. propellers, this is one problem which will have to be worked out on the field. Two ways in which the propeller can be "slowed up" (i.e. used with a more powerful motor without over speeding) are increasing the pitch and increasing the blade area. However, if the resulting high-pitch propeller is still rotated at high speed it will, in effect, be stalled, and therefore working inefficiently. Thus there is a limit to the pitch which can be used.

Interesting possibilities which suggest themselves are the use of a slotted propeller ; the use of drag plates on a high pitch propeller to slow it up ; using a four-bladed propeller, etc. Of these, the best arrangement would appear to be a four-bladed propeller with a pitch-diameter ratio of about 1.75 : 1 and normal blade proportions. This should give a reasonable power run with a 2 oz. motor and plenty of thrust for a good climb. If for any reason it is decided to use a more powerful motor in a short burst, then a polyhedral wing may be an advantage to simplify trimming.

SHOW BUSINESS

(*Continued from page 51*)

sheets of hardboard, a working model, transformer, one passenger and a box on top—and a log of balsa on top of that ! Ted arrived in an Austin Seven loaded with everything but the kitchen sink. Ropes had to be untied before our treasurer-driver could get out.

The sight when we went in I will never forget as long as I live. Models ! Big ones, small ones, good ones, bad ones, rubber ones, power ones, gliders, new ones, pranged ones, museum pieces—all over the floor. The space allocated for my working model was snowed up with the wretched things ! I have never seen such a mess, and it was getting worse. Clearing a way for the tables, I found that there were none left. Ted found out the same ! We just had not enough. Improvisation is a great game, but not at midnight after a hard day's work ; anyway, we got through.

We felt that in view of the enthusiasm of the youngsters we would let everyone help, but it was a mistake. Yes, you've guessed it—too many helpers.

Then, all of a sudden, when we were really fed up, it seemed to clear and we were in business. A quick clear up and off to bed. Back bright and early in the morning.

Came the dawn. Rubbing our eyes, we staggered down to the show. It looked a bit rough, but we would improve as we ran. We threw the doors open at 10 a.m. ready for the visitors, and nothing happened !

The shock of that first morning, when no one came, did something to Bill Brown. Feeling it was his baby, he spent a week moving models round, sweeping the floor, thinking up ways to get the show going.

But we needn't have worried. By Thursday we had the expenses in, and the three days left gave us a handsome profit. In spite of the greying hair, ulcers, and nightmares, one thing is certain—we are going to make it an annual event, but with the experience gained, we are going to prepare now, not six weeks before, if I have anything to do with it !

USING THE NEW *WET STRENGTHENED* MODELSPAN TISSUE

A FAILING of most model aircraft tissues is their very low strength when wet. It was with some interest, therefore, that we subjected samples of the new "wet strengthened" Modelspan to various tests, the results of which proved to be most favourable. Without unduly altering the other characteristics of Modelspan tissue, here is a covering material which can readily be handled in the wet state, simplifying a number of covering problems.

All papers, as most people know, are made from pulp or base fibre mixed with large quantities of water, the mixture flowing on to rotating or travelling wire screens, when excess water is drained off. Binders are used to hold the paper together, when dried, and on the type of binder largely depends the wet strength of the paper. With ordinary sizing compounds, which dissolve readily in water, the wet strength of the paper is very low. By using water-resistant binders, however, papers with quite high wet strengths can be produced. Such papers are not *waterproof* in the sense that water runs off them, but are water-resistant to the extent that they still retain the bulk of their tensile strength. They are still capable of absorbing water, which is a desirable feature in a covering material. It is in the balance of wet strength and water absorption that the new Modelspan tissue appears to have reached an excellent compromise.

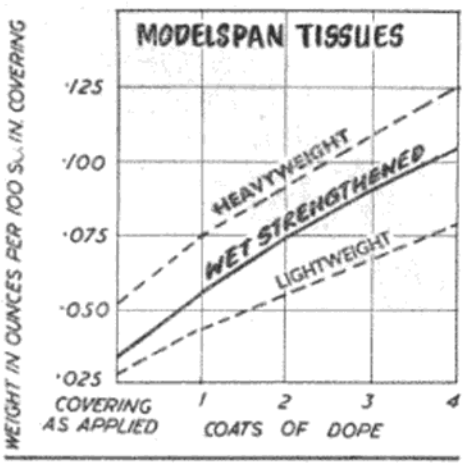
The new tissue can be applied dry, just like any other tissue. The only advantage in this case is that a "wet" covering paste or adhesive can be used without fear of tearing the edges of the covering as it is pulled taut over the frame. It is waterspayed to tauten in the normal way, although the tightening up on drying is less than with standard Modelspan.

To utilise the "wet strength" properties to full advantage, the tissue should be applied damp. We found it quite possible to screw up a panel of tissue into a ball, thoroughly wet under a tap, squeeze dry and then unravel without damage to the tissue. Less drastic treatment is to be preferred, however, such as laying the dry tissue over a newspaper and then waterspraying or painting.

In a dampened state, the tissue can be pulled to shape over curved surfaces without leaving wrinkles—e.g. wing tips covered integral with the top surface; streamlined fuselages covered in larger panels, etc. If such damp tissue covering is pulled even reasonably taut it will tighten right up on drying and need no further waterspraying. Nor is the latter advisable, if some little slackness appears to remain. Rely on the dope coatings for final tightness in such a case.

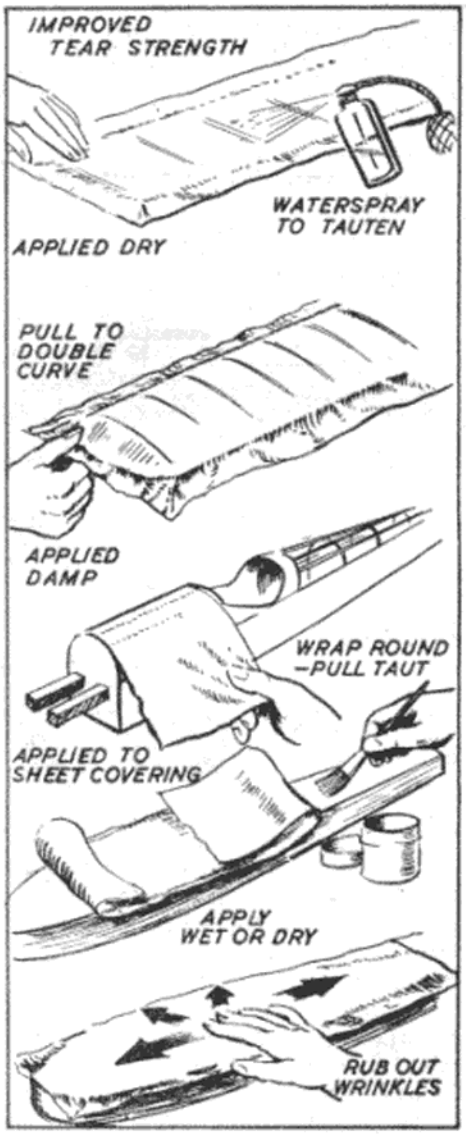
Where the "wet strength" tissue probably scores most of all is in application over sheet covered surfaces. Some authorities recommend doping tissue on to sheet surfaces, but some considerable practice is usually necessary for successful results with this method. A well watered down photo paste is much easier to use and "wet strengthened" tissue can then be slapped on and worked over with a finger or brush as hard as you like, pulling up taut and rubbing out all wrinkles. You can even peel part of the covering back and re-lay—something quite impossible with ordinary tissues.

Apart from enhanced wet strength, other properties are appreciably similar to standard lightweight Modelspan. "Dry" weight is .0316 oz. per 100 sq. in. which is roughly trebled by the application of three coats of dope. A minimum of three coats of dope appears necessary completely to fill the pores of the tissue. With four coats, waterproof qualities are excellent and the covering is free from a tendency to brittleness, which is a fault common to an American covering tissue with high wet strength.



The comparative curves for "lightweight" and "heavyweight" Modelspan on the graph must be taken with reserve. These are generally accepted figures for the materials concerned, but do not necessarily represent the same application technique or dope used. Thus with a thinner dope the "wet strength" curve might well parallel the "lightweight" curve, rather than diverge from it.

We understand that although Modelspan "wet strength" tissue is being manufactured only in white at present, it will eventually become available in a complete range of colours. In the meantime, however, it should be appreciated that the white tissue can be coloured by dipping into any suitable dye solution without affecting its other properties.



FW 190A3

by P. L. Gray

This attractive one - seventy second scale model was built by the author.

A SOLID MODEL FEATURE

THE FW 190A3 and subsequent marks of the type formed the backbone of the Luftwaffe in the later stages of World War II, proving an equal match for our own fighters of the period.

Its pugnacious lines can well be incorporated in a solid model, and when finished in the accurate colours looks very attractive.

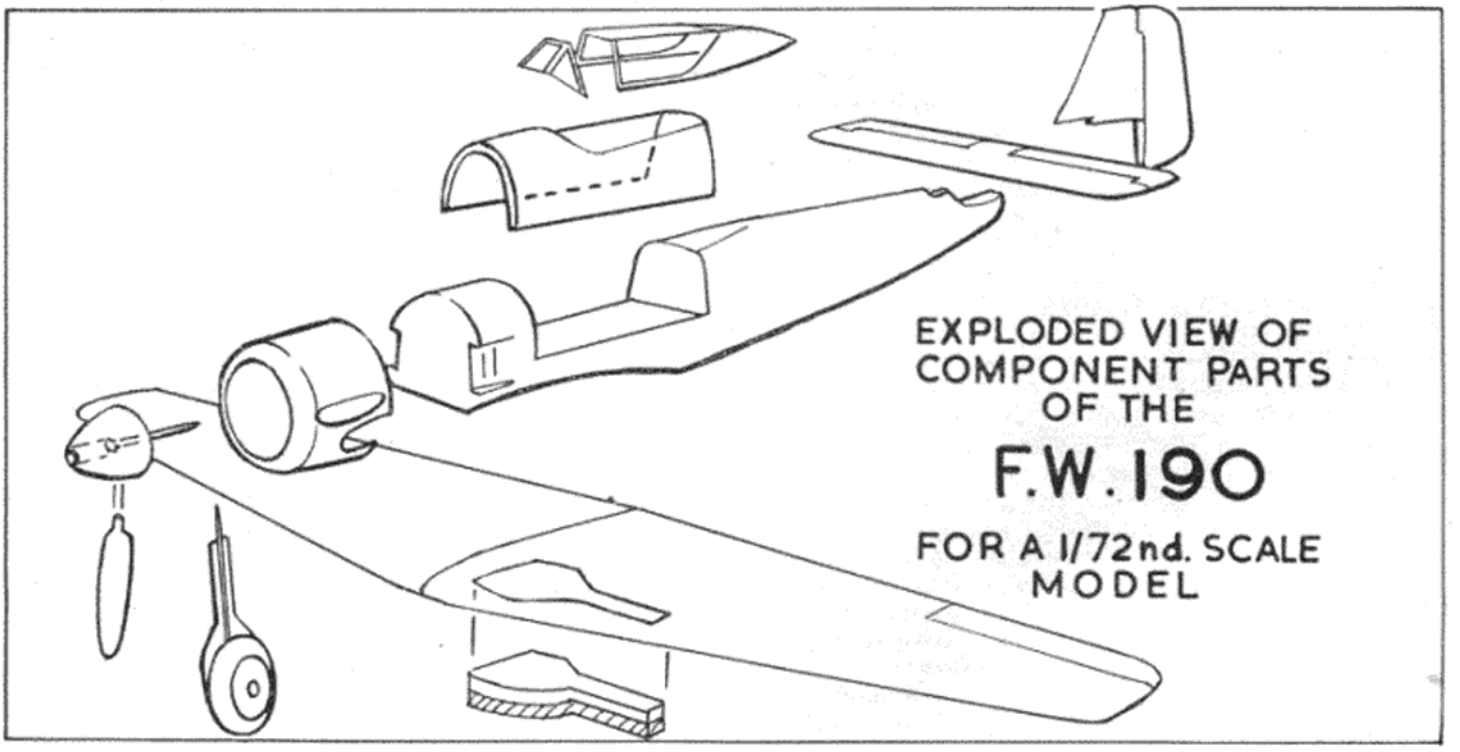
Almost any scrap timber off-cuts can be used—my own model had a balsa fuselage with obeche wings and tail surfaces. Construction is quite orthodox, but the following notes on this particular model may be found helpful.

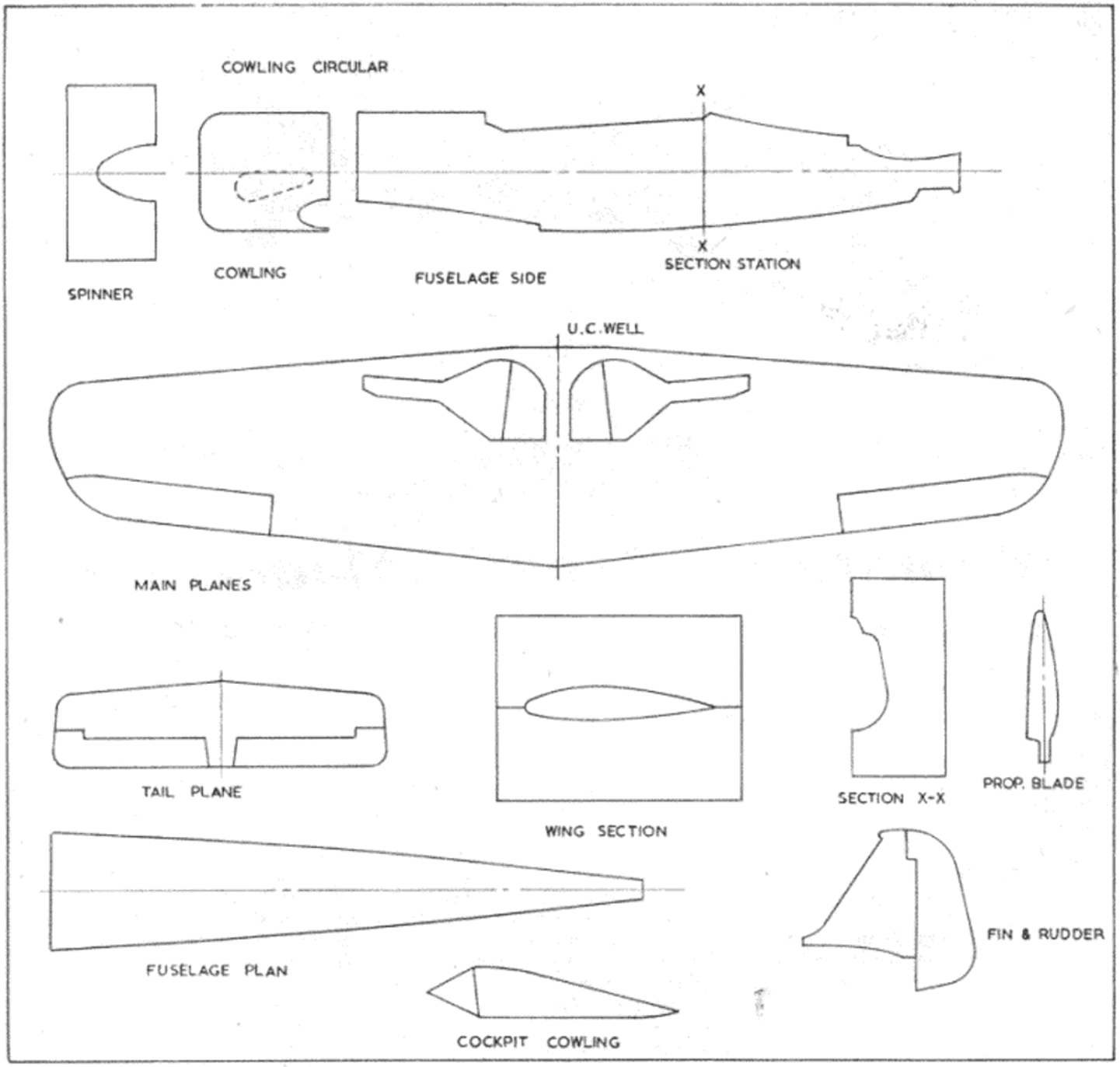
First step, of course, is to trace the templates on to thin card, and then a start can be made on the fuselage. The circular cowling is carved separately, the final profile being obtained by threading it on a long machine screw, fixing it in a hand drill clamped in a vice, and applying fine sand-paper as the drill handle is turned.

The fuselage is carved in the usual way with the cut-out to take the one-piece wing being carefully shaped. The cockpit section is removed (as shown in the exploded drawing), hollowed, and the interior painted in a matt pale green. Instrument panel, seat, and other equipment can also be added now if you are incorporating the finer details. The completed section can then be cemented back into position—the final grain filling will hide the joints.

The wing is made in one piece as I consider this method results in increased strength ; it also makes lining up on the assembly easier. Before shaping to section, the undercarriage wells are cut out with a fret saw—a metal cutting blade makes a clean job then planed or sanded down to half thickness and glued back into position, leaving the well underneath.

After carving wing to section, but before grain filling, saw half-way through on the centre line from the bottom surface so that the necessary dihedral can be applied. A small piece of $\frac{3}{16}$ in. sq. strip, under the centre section, with the wing tips held down by drawing pins, aids this operation. Fill the saw cut with





cement and a wedge of hard wood and then leave overnight to harden. Finally, smooth the joint with fine sand-paper.

The undercarriage is fixed in the down position. The spats are cut from thin brass sheet (a cocoa tin does equally well) with old scissors and sweated to the wire legs. Leave the wire well over length so that you have sufficient to grasp while soldering—but use pinchers, not fingers! Bend to shape and cut the wire to length when unit is completed.

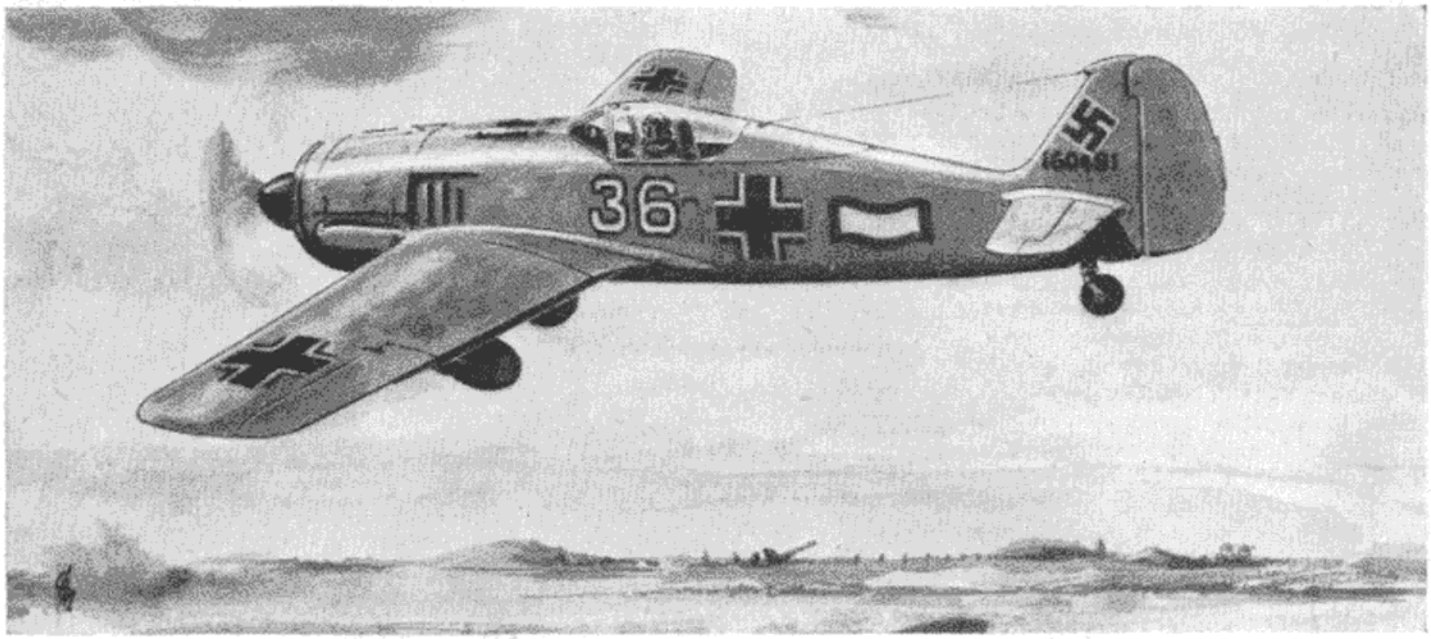
The cockpit is best fabricated in two pieces—windscreen and hood. Due to its angular shape, with a little care it can be made from celluloid sheet without recourse to moulding. Control surfaces are indicated by carefully removing a fine "V"-shaped sliver of wood with a pointed fragment of razor blade.

After assembly, three or four coats of sanding sealer are applied, sanding between each coat, and leaving sufficient time for drying between each application. It is absolutely essential on a model of this type to use matt dope. My model was finished as follows :—

First it was painted all over in a pale blue/grey shade. Then the upper wing surfaces and fuselage to about two thirds down the sides were stippled over with a medium shade of grey. Over this was stippled a still darker shade of grey/green mainly concentrated down the fuselage spine and the centre of the wings, giving an overall patchy mottled effect. The crosses are commercial, although they are not unduly difficult to apply with a ruling pen. The airscrew and spinner are finished black.

An alternative colour scheme, and one which is quite authentic, is a yellow ochre all over ; mottle the top surfaces with a grassy green and then go over that again with an olive shade in irregular patches.

The mottled effect is obtained by using well thinned dope and dipping in the merest tip of the brush. And stipple lightly—or you will end up with a surface like a gravel path!



Prototypes Worth Modelling

No. 48. The Focke-Wulf 190 . . . . . by C. B. Maycock

THE Focke-Wulf 190 was certainly one of Germany's most successful fighters in the second world war, and was designed by a team headed by Dipl. Ing. Kurt Tank. It was fast and highly manoeuvrable, heavily armed and armoured, and was at its best around the 20,000 ft. mark. The power plant was a B.M.W. 801 two row 14 cylinder radial, with a 12-bladed fan geared to approximately three times engine speed, which, in conjunction with the long chord cowling, gave adequate cooling at high revs.

The heavily armoured leading edge of the engine cowling protected the annular oil cooler, which was mounted directly behind the fan. The cowling, with a maximum diameter of 4 ft. 4 in., had no gills to disturb the air flow, and at the trailing edge, nestling into the slightly flattened fuselage sides, were 14 exhaust stubs. The power developed was about 1,600 h.p. and drove a three-bladed airscrew of 10 ft. 11 in. diameter.

The airframe was the usual all metal low wing monoplane with fabric covered control surfaces. The wings had two spars, the main spar being cranked back at the centre section to allow the undercarriage wheels to retract into wells in the leading edge of the wing and forward of the spar. Frise type ailerons were employed, and there were split flaps between these and the fuselage underside.

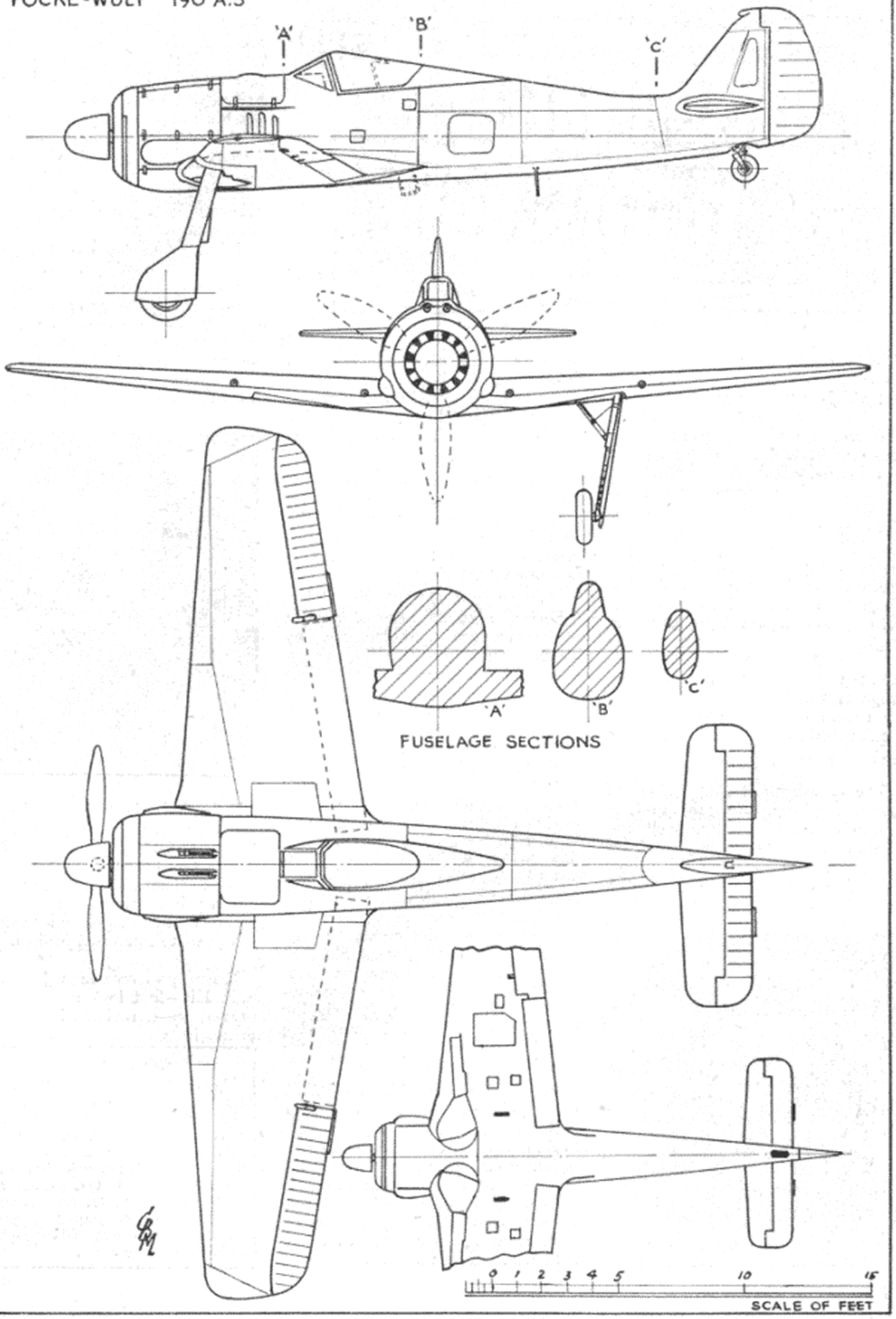
A one-piece tailplane was formed about a tubular spar which passed right through the fuselage. The control surfaces of the tail unit were fabric covered. A 350 × 135 mm. tail wheel, mounted in a fork, was semi-retractable and was linked with the main undercarriage retraction mechanism by an ingenious cable arrangement. An unusually high and wide undercarriage gave the F.W. 190 good ground stability. The wheels were fitted with 700 × 175 mm. tyres. Each oleo leg had a travel of 15 in.; the inwards retraction was by worm and pinion driven by an electric motor.

The cockpit cover slid backwards on a central rail. The windscreen sloped back at 63 deg. from the vertical and the side panels were flat. The sliding rear portion was a one-piece moulding. The control column was a single stick with the gun firing button and safety plate mounted on the top. Two 7.92 mm. machine guns were mounted either side of the centreline on top of the cowling, and with the two 20 mm. cannon mounted in the wing roots, were synchronised to fire through the airscrew. Two 20 mm. Oerlikon guns were mounted in the wings outside the airscrew arc.

The author is indebted to Mr. P. L. Gray of Luton for the following information on colour schemes and markings. The machine featured in my wash drawing had the number 36 in yellow in front of the cross and a wavy banner of yellow outlined in blue aft of it. Beneath the swastika on the fin was the number 160481 in black. Upper surfaces of the machine were dark and medium grey mottle with pale blue-grey undersurfaces. The famous Richtoven Geschwader had yellow noses with olive and emerald green undersurfaces and yellow underneath. Yet others were mottled olive green and yellow ochre with paler yellow for the undersurfaces with red noses ; these were observed near St. Omer in 1943.

The leading dimensions were as follows : span 34 ft. 6 in.; length (F.W. 190A5) 29 ft. 7 in.; wing area 203 sq. ft.; speed 326 m.p.h. at low boost and at 4,500 ft.; at high boost and at 18,000 ft., 375 m.p.h. Top speed at 20,000 ft. was 390 m.p.h.

FOCKE-WULF 190 A.5



OVER THE COUNTER

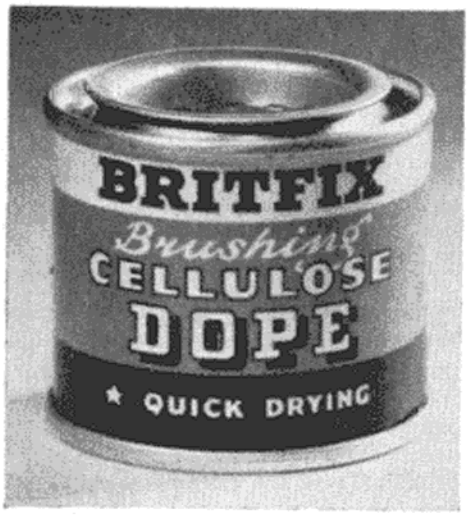
Scale modellers who prefer the bigger solids (¼ in. to the foot) will find all their " markings " problems solved for them by Minikscale Ltd., who make the fine Avian kits. This firm markets a range of eleven sets of transfers, matched to individual aircraft. These include national markings, serial numbers, squadron letters, etc., as appropriate. World War I types covered include the *Camel*, *S.E.5*, and *Albatros*; and World War II, *Hurricane*, *Spitfire*, *Tempest*, *Me* 109, and *Mustang*; and right up to date, the *Super Sabre* and *Swift*.

* * *

Latest addition to the Mercury range of kits is the *Mercury Mac*, a team racer which is tailored around the Allen-Mercury " 25." Kit price is 17s. 6d.

* * *

The Humber Oil Co., makers of Britfix products, are now making available their brushing cellulose dopes in tins. The handy sized tin sells at 1s. and each has the colour painted on the lid. This Britfix brushing cellulose is smooth and easy to work, and gives an excellent finish which is oil and petrol proof. Apart from its modelling uses it will no doubt be found eminently suitable for re-touching jobs about the house.



* * *

American modellers can now buy dope in spray cans—just a press on the lever at the top of the can and the dope is delivered in the form of a pressurised spray for direct application to models.

* * *

Several notable items of aircraft equipment are manufactured by Venner Ltd., for the full-sized industry, among them the lightweight silver-zinc accumulator. But indirectly they have also made an invaluable contribution to modelling in that these accumulators can easily be used in radio controlled models.

Hilton O'Heffernan, holder of the world's duration record, used two Venner H105-accumulators of this type in his *Sky Sedan*. They each weighed only 1⅛ oz. and supplied power to the electric motor actuating the rudder; one H105 supplied current for the valve filament in the receiver. At the end of the flight all three cells showed 1.45 v on load. Smallest of all the Venner accumulators is the minute H075 weighing a mere 0.75 oz. and measuring 9/16 in. × 1⅛ in.

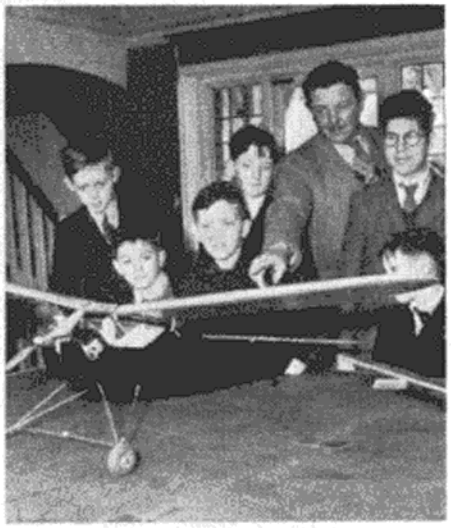
* * *

Prospective users of Messrs. Wolf's Cub equipment can now buy these tools through an Easy Savings Scheme. A special savings card is issued upon which is entered the amount of money paid in. As equipment is purchased from the money accumulated, the amount withdrawn and balance outstanding is then shown on the card.

Electronic Developments Ltd. have asked us to say—to prevent any misunderstanding—that the model that successfully flew the Channel was a *Radio Queen* designed by E.D's, but for the purpose of the flight, the actual model was re-named *The Junior Express*.

* * *

A good example of enterprise by a model shop is a competition organised by G. R. Langley, the proprietor of " Dee's " of Wallington. During the year, with each kit or plan sold in the shop, is given a form entitling the purchaser to enter the model, when it has been built, in a competition held at an exhibition of the models at the end of the year. The 1953 competition was highly successful, and this year the 1954 competition



will be judged at the Collingwood School, Wallington, on January 29th Prizes, given by the model aircraft trade, are to be awarded for five classes. The picture shows G. R. Langley indicating some of the finer points of the models on exhibition last year, to interested juniors.

* * *

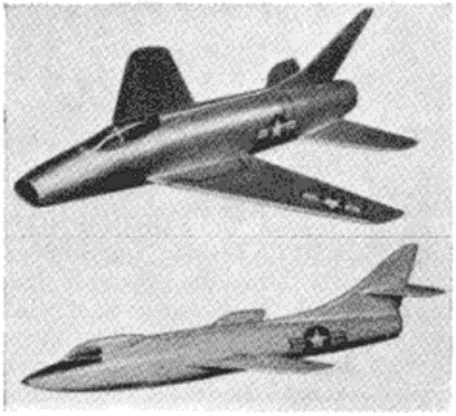
Recently we received a Jetex Space Ship Kit—first look in the box impressed us—a review will follow in a future issue.

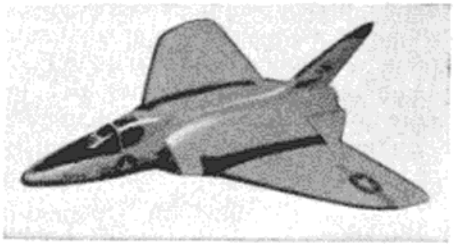
CORRECTION

In our " Solids Review " kit table last month we inadvertently gave the prices of Avian kits before purchase tax was added. All Avian kits, with the exception of the *Super Sabre* and *Swift*, are priced at 5s. 7d. including purchase tax, the *Sabre* and *Swift* retailing at 6s. each including purchase tax. We must apologise for any inconvenience caused through this unfortunate oversight.

OVER THE COUNTER KIT REVIEW

The JETEX Tailored KITS





Realism is the keynote of these Jetex models of the F-100 "Super Sabre" Douglas "Skyrocket," and Douglas F4D "Skyray," shown in that order from top to bottom. Enough detail can be incorporated to satisfy the most fastidious scale modeller, and their flying characteristics are well up to the usual Jetex standard.

JETEX now offer three models in their Mach one plus series of "Tailored" flying scale kits—the *Skyray, Super Sabre* and *Skyrocket.* A main feature of each of these kits is the moulded sheet balsa fuselage shells (two laminations of 1/32 sheet, bonded together), formed under heat and pressure in steel moulds to exact finished shape. Tail surfaces are die-cut sheet, whilst wings are solid sheet (*Super Sabre* and *Skyrocket*), or built up and sheet covered (*Skyray*). The result is a model with "solid" realism but total weight well within the values required for a flying model.

Kit pre-fabrication is extensive. Apart from the accurately formed fuselage shells, all sheet parts are die cut, the accuracy and quality of this die cutting being of the highest order we have ever found in a commercial project. Detail parts include a Jetex clip riveted to a plywood base, hatch catches, clear moulded canopies, moulded fuselage nose (*Super Sabre* and *Skyrocket*), etc.—absolutely everything to finish the model, in fact, including cement.

Naturally the price of these kits is high. Each must represent development and tooling costs running to well over a thousand pounds, the gain to the buyer being that he has everything to complete a first class model without being called upon to exercise any particular skills. His job is simply to assemble the kit parts, in order, as detailed in the instructions. Short of being a very poor modeller, he cannot fail to end up with a professional looking model.

However, do not think that these are models to be put together in an hour. Construction follows logical steps, but at times is quite intricate. All three models employ fuselage keels and formers, the *Skyray* being "skinned" after assembling the basic fuselage and the *Skyrocket* and *Super Sabre* fuselages being built as half shells in special card jigs. The latter are die-cut to exact shape and simply need cementing together. It is difficult to go wrong, but care must be taken to ensure correct fitting and alignment. Anyone who has criticised a pre-fabricated kit as "taking the fun out of building models" will find this trio directly contradictory to such arguments!

Our own impression after tackling the first model was that the kit was far in advance of the plan. That is to say, whilst the engineering of the kit is way ahead of normal standards, the plan is still quite "ordinary." Not that the instructions are inadequate, but we could not help feeling that the way this should have been treated was a series of step-by-step drawings, illustrating each and every stage in turn, rather than comprehensive printed instructions and scattered scrap views. By the time we started the second model this did not seem to matter so much, for the method of assembly was now familiar.

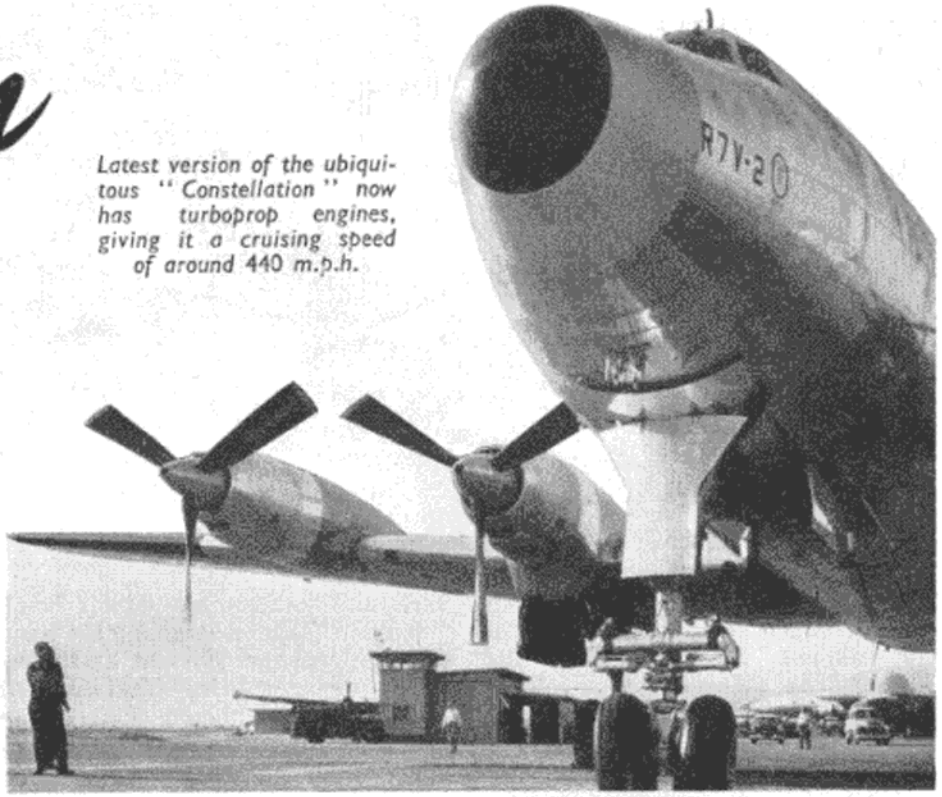
As to the finished models themselves, provided reasonable care is taken there should be no difficulty in ending up with a job virtually indistinguishable from a "solid," and therefore with all the scale realism that this type of model gives. Pay particular care to levelling and joining the fuselage shells and it is quite easy to achieve an invisible joint line. When the complete model is assembled it pays to give two coats of grain filler (or clear dope), sanding down smooth with very fine sand-paper after each coat before thinking about finish colours. The extra smoothness resulting is certainly worth while.

Both the *Skyray* and *Skyrocket* aircraft are finished in white (with a certain amount of colour trim in the case of the *Skyray*). White is the heaviest colour of all, so excessive colour doping must be avoided. Two fairly thin coats should be adequate. Alternatively, the *Skyray* can be finished in dark blue (U.S. Navy colour), although this produces a far less attractive model.

Summarising, we started by thinking that these kits were possibly over-priced, but after we had built them had no hesitation in deciding that they were worth every penny. Quality does cost that little bit more, and here you certainly have "quality" kits. Incidentally, too, these are the only scale kits on the market designed specifically to take the "50B" augmenter tube. All three use the 50B motor, and in addition the *Super Sabre* can be powered by the Atom 35 with augmenter tube. We look forward with real interest to more models being produced in this series.

Aviation NEWSPAGE

by J. W. R. Taylor



Latest version of the ubiquitous "Constellation" now has turboprop engines, giving it a cruising speed of around 440 m.p.h.

Britain's lead in **TURBOPROP TRANSPORTATION** was never more clearly shown than by news that the U.S.A.F. is forming a special six-plane Military Air Transport Service Squadron of turboprop aircraft "to test the new-type power plants under routine operations," two years after the *Viscount* went into regular passenger service with B.E.A.

U.S. commercial airlines will be kept informed of the squadron's activities and may be invited to fly the aircraft, which comprise two Convair YC-131s (Convair 340s with two 3,750 h.p. Allison T56s), two Boeing YC-97J *Stratofreighters* with four 5,500 Pratt and Whitney T34s, and two Lockheed YC-121Fs, which are re-engined military versions of the *Super Constellation* air liner.

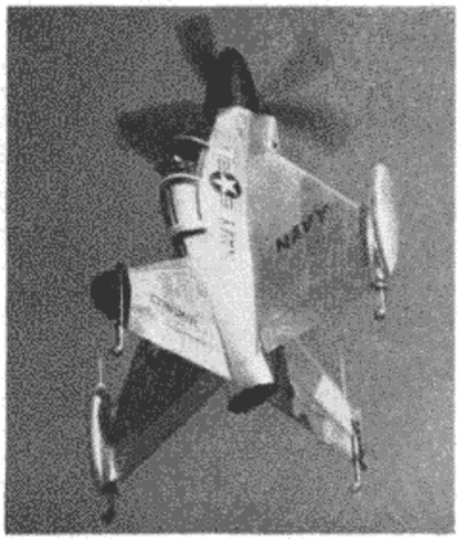
The YC-121F is the most interesting of the three types, because its four T34 turboprops give it a top cruising speed of 440 m.p.h., making it the world's fastest and most powerful propeller-driven transport aircraft. It will be basically similar to the U.S. Navy's two R7V-2 prototypes, one of which is illustrated in our heading photo, with a loaded weight of 150,000 lb. and payload of up to 106 passengers or 17 tons of freight. With 600 gal. wingtip tanks, it could fly the Atlantic, New York to London, with one stop, in 8¾ hours.

Confounding its critics, Convair's revolutionary XFY-1 experimental **VERTICAL TAKE-OFF FIGHTER** is making almost daily vertical take-offs, high-speed horizontal flights, and tail-first landings at Brown Naval Auxiliary Air Station, near San Diego. Flown by "Skeets" Coleman, it usually arches into normal flight within 200 ft. of the ground, beginning the transition only a few feet above its 50 ft. square concrete "runway." For landing, it is often brought in at less than 50 ft., nosed up until it is hanging above the runway on its big contra-props and then backed down to a feather-light landing. Powered by a 5,850 h.p. Allison YT40-A-14 twin turboprop, the XFY-1 has a horizontal speed of over 500 m.p.h.

☆ ☆ ☆

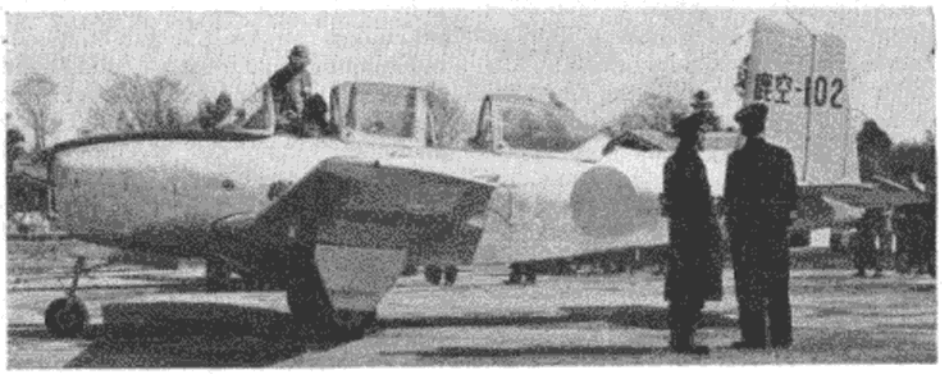
Last July, I wrote in "Aviation Newspage" that the little tandem-seat **BEECH T-34 MENTOR** primary trainer was a "plane to watch." It had then been ordered by the U.S.A.F., R.C.A.F. and the air forces of Chile and Colombia.

Now the U.S. Navy also have standardised on the *Mentor* and have awarded Beech an initial contract for several hundred T-34Bs. They will be used by every Naval pilot for the first 70 hours of flying training, instead of the more powerful and



Left: Convair test pilot "Skeets" Coleman takes off in the XFY-1 Navy vertical take-off fighter. This unusual prototype opens up interesting possibilities for fixed wing aircraft and tests to date have proved completely satisfactory.

Below: From our correspondent in Japan, Hideya Ando, comes this photo of the first "Beechcraft Mentor" built under licence by the Fuji company. One hundred of these trainers are on order for the "Japanese Self-Defence Force."



In spite of the wing struts, the high aspect ratio wing of the Hurel Dubois H.D.32 has less drag than the ordinary cantilever wing.

expensive North American T-28Bs, which at present combine the duties of primary and intermediate training. Salvador too has chosen the *Mentor* ; and it is being built in Japan by Fuji Heavy Industries for the Japanese National Safety Forces.

☆ ☆ ☆

Big **SNAG WITH JET BOMBERS** has been to persuade released bombs to leave the bomb-bay during high-speed flying. Aerodynamic forces tend to make them hang-up, and the pilot is left with the unpleasant prospect of a very sudden and unwanted vertical take-off boost from his undelivered cargo if he makes a heavy landing back at base.

Douglas are now trying out on one of their ASD *Skywarrior* naval bombers a spoiler, rather like a dive brake, which can be opened ahead of the bomb-bay to deflect the airflow away from the bombs.

☆ ☆ ☆

News that **CANBERRA T.Mk.4** dual-control conversion trainers are in service with the Royal Air Force has been followed by an announcement that the U.S.A.F. have also ordered *Canberra* trainers from the Glenn L. Martin Company, who are producing the British twin-jet bomber under licence in the States. They will be designated B-57C.

Unlike the T.Mk.4, which has side-by-side seats for instructor and pupil, the B-57C will have tandem seating similar to the B-57B night intruder bomber, but with the rear seat slightly raised to give its occupant a forward view over the shoulder of the front man. It will retain the full operational equipment of its bomber counterpart.

☆ ☆ ☆

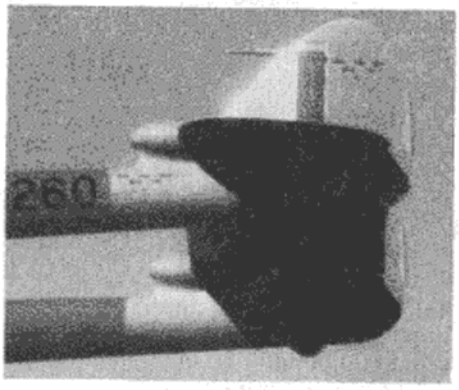
The new **VISCOUNT V.802 AIR LINER,** due to enter service with B.E.A. in the spring of 1956, will have a 9 ft. 3 in. longer cabin than the Corporation's present *Viscount* 701s, with alternative seating for 53-70 passengers, Its four higher-powered Rolls-Royce R.Da.6 Dart turboprops, with a total output of 6,788 h.p. for take-off and 3,768 h.p. for cruising, will raise the normal cruising speed at 20,000 ft. to 318 m.p.h., compared with 302 m.p.h. of the V.701. Take-off weight will be 5,000 lb. greater at 62,000 lb. and the maximum stage length will go up to 1,480 miles with full fuel reserves. B.E.A. have 12 *Viscount* 802s on order, with an option on 8 more.

Meanwhile, their designer, George Edwards, has said that Vickers' successor to the *Viscount* might be a high-wing machine ; and Trans-Canada's president says it will weigh 120,000 lb., which would fit in exactly with the future plans of T.C.A. and other airlines. Engines would almost certainly be four of Rolls-Royce's new RB.129 turboprops.

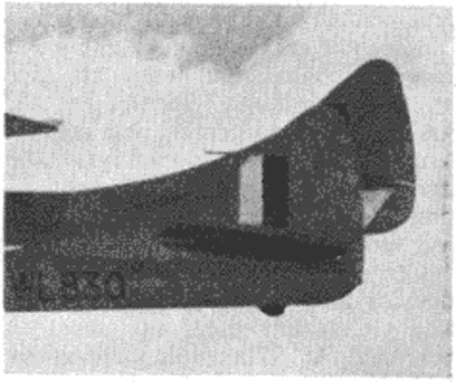
TAIL - PIECE. The prototype Hurel Dubois H.D.32—the French transport with the incredibly high-aspect ratio wing—is now flying with a single large tail-fin in place of the previous twin fins and rudders. Powered by two Pratt and Whitney R1830-92 engines giving a total of only 2,400 h.p., it recently took off in 1,216 ft. in 19 seconds at an all-up weight of 16½ tons. Air France have ordered 24 H.D.32s, and the French Navy are reported to want 100 for anti-submarine duties.

Photographs of the latest *Venoms* show that this aircraft's long-suffering tail unit is still being modified. In fact, each of the four marks now has an entirely different tail end, as can be seen in the accompanying photographs.

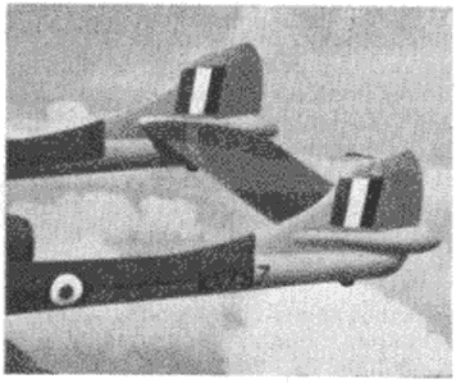
VENOM F.B. 1



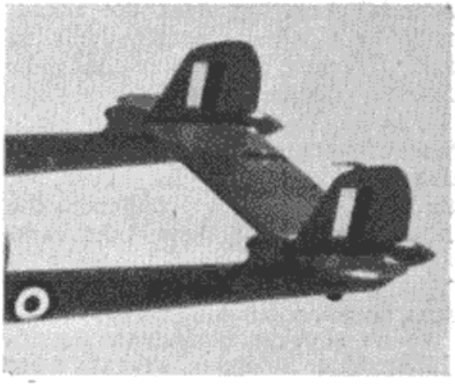
VENOM N.F. 2



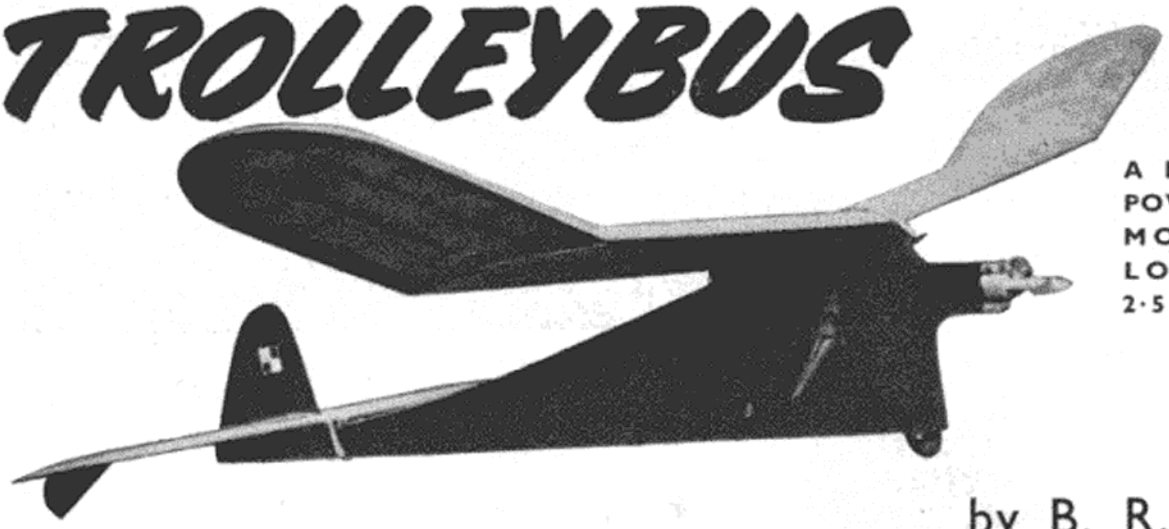
VENOM N.F. 3



VENOM F.B. 4



TROLLEYBUS

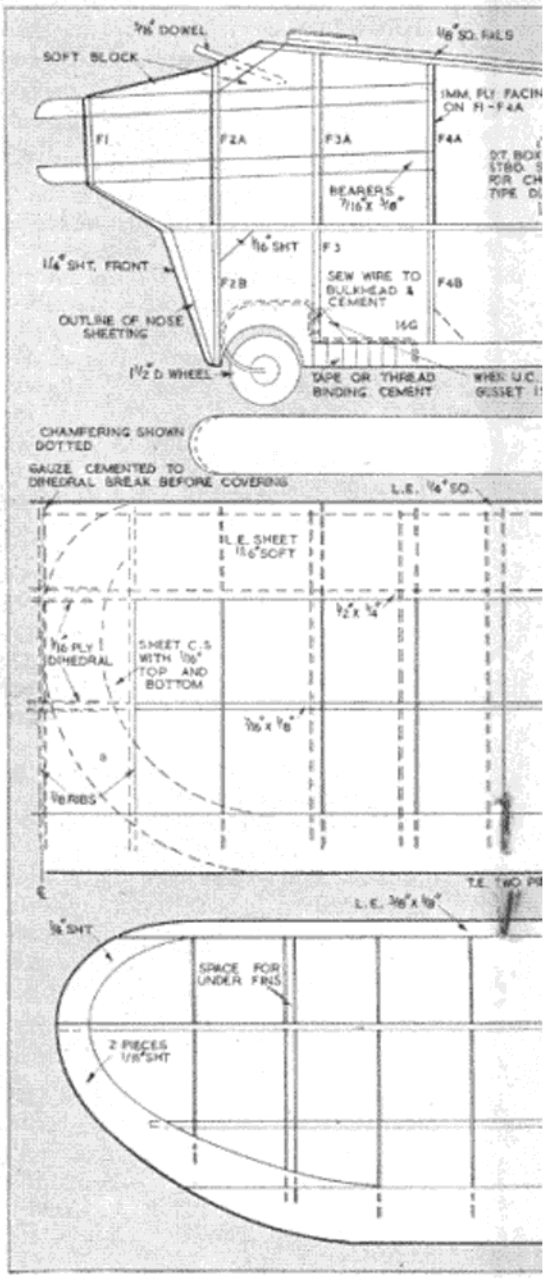


★

A PRIZETAKING POWER DURATION MODEL WITH A LOW C.L.A., FOR 2·5 c.c. ENGINES

★

by B. R. Newman



Fuselage

COMMENCE by cutting out all formers from 1/16 in. sheet (F1, 2A, 3A and B, and 4A from hard stock). Face those indicated with 1 mm. ply and leave to set. Continue by cutting out fuselage top decking and master longeron from 1/16 in. sheet and making gussets from scrap.

Select a length of medium 1/2 in. × 1/4 in. for the keel member and cut to correct length. Pin down and ensure that it is straight. Next, erect lower halves of the two-piece formers (except F2B) and also F7, 8 and 9, using a setsquare and the scrap gussets, which are lightly cemented in. When set, add the master longeron and cement on F5A and 6A.

Now cut engine bearers to correct length and chamfer ends to give 10 deg. right thrust. Thread F1, 2A, 3A and 4A onto bearers and cement firmly. Make sure assembly is true and square, and then cement in position on top of the master-longeron.

Cement front part of fuselage decking firmly to the top of F3A, 4A and 5A, adding the 1/4 sq. gusset to rear of F5A. When this small gusset is firm, remainder of decking may be cemented in place, the whole assembly removed from the board, and the soft block under the wing L.E. (marked B on plan) may be fixed in position.

The monowheel U/C leg is made from 16 g. and the gusset removed from the rear of F3B. Push leg through the bulkhead and into the crutch, and firmly sew, bind, and cement. A 1/4 in. sheet gusset is then fitted ; see note on plan.

One side of the fuselage may now be sheeted with 1/16 in. medium. A piece is spliced onto the end of a sheet for this. When the splicing is done, arrange the sheeting on the model so that the splices are at opposite angles. Before positioning the sheet, sand well. When sheeting one side, ensure that frame is not distorted. Having completed sheeting of one side, remove the scrap gussets and sheet remaining side. The sheeting should now be trimmed to size and correct nose contour cut. The remaining block, "A," 1/2 in. sheet nose pieces and 1/8 in. sq. rails on top are added, and the fuselage, sanded, covered and doped. Now the wing and tailplane dowels (but not platforms) may be fixed. Fuel proof around the nose well.

Now the D/T box is made. The correct aperture for the box should be carefully cut in the starboard side of fuselage. The box is cemented in position, and the panel removed is then hinged at front end with tape and now forms the door. A fuse or timer, whichever system is preferred, is used to actuate it, and thus release the D/T parachute.

Wings

The lower half of the T.E. is pinned down, with suitable packing under front edge. The rear spar, also with suitable packing, is likewise pinned in position, after which the ribs are cemented in. The tip rib is trimmed down to correct size. Lastly, the top spar and L.E. are added.

FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1, 6s. 0d., POST FREE

Remove the whole structure and add lower half of the tips.

Dihedral is incorporated by cracking and cementing the tips, at the appropriate stations, until they are at 4½ in. The centre of the wing is now cut, bent, and cemented so that 3 in. may be measured under the end of one centre panel. This gives the necessary 1½ in. under the end of each panel.

Pieces of ply, of appropriate thickness, are cemented and clamped (clothes pegs make good clamps) each side of the spars at the dihedral breaks. When dry trim to shape. The T.E. and wing tips are now chamfered and the top halves of these members added, also the leading edge sheeting, which must be pre-sanded. The whole wing is given a final sanding and the gauge strengtheners added where indicated.

The wing platforms and tailplane platforms are now cut. The wing platforms should be cut, bent and cemented, and pinned under the wing centre section to dry, so that they conform to the correct angle.

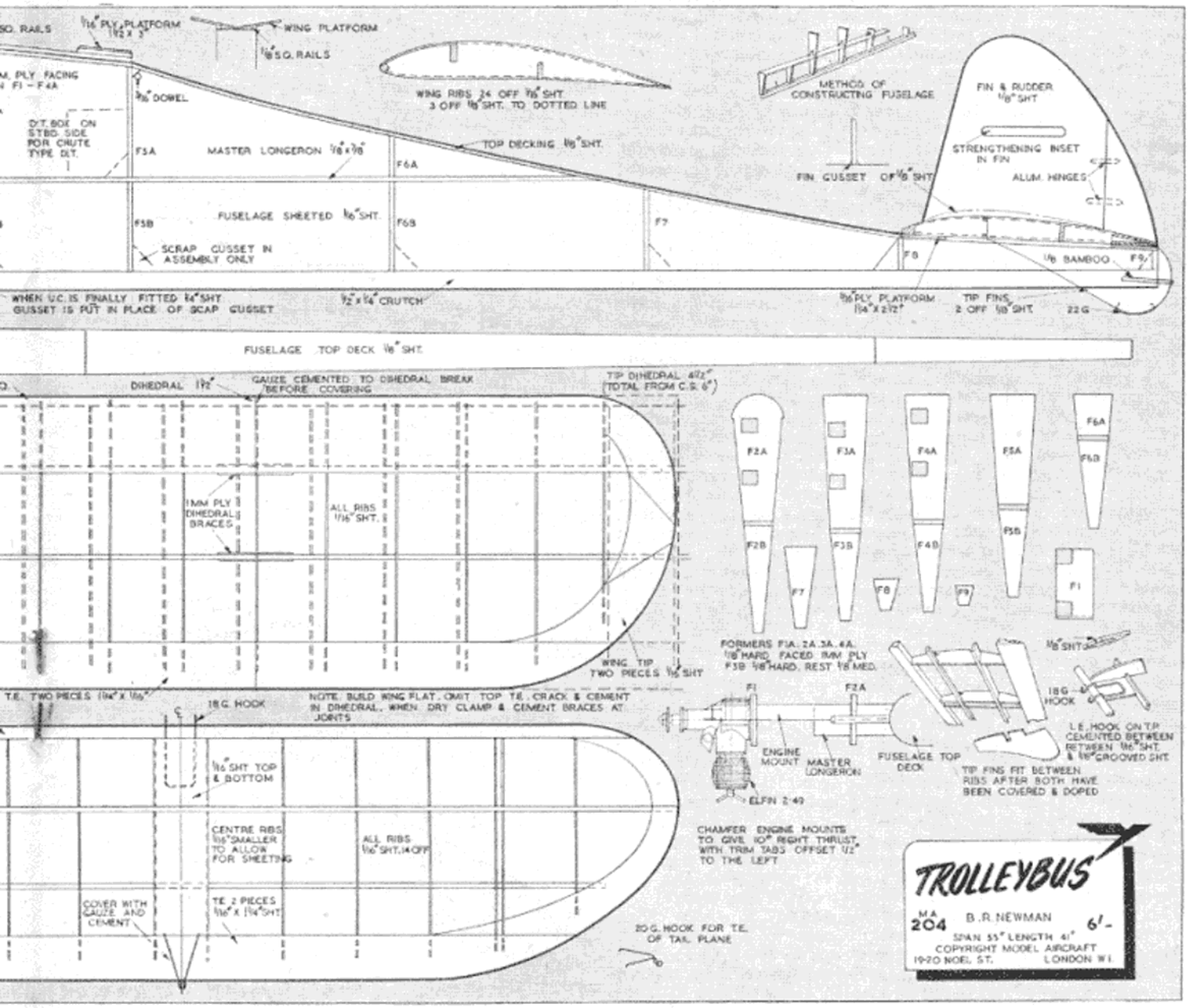
The tail unit is straightforward, although don't forget the 22 g. wire skids under the tip fins, or a sad reduction in fin area will result after the first couple of take-offs !

Flying

Using an Elfin 2.49, and the rigging indicated, i.e., 10 deg. right thrust and the rudder offset ½ in. to the left, make a few test glides. Aim for a steady glide with no trace of soaring. When satisfied, bolt the prop on the wrong way round and using half power and an engine run of 5 or 6 sec. launch gently. Incidentally, I use a Frog 9 × 5 in. prop.

Do not attempt any *left* turns under power, as it is fatal. Aim at a steady right-handed spiral climb, and glide circles of approximtaely 200 ft. dia. Any tendency towards inverted climbing may be counteracted by a bit more right thrust.

For R.O.G. purposes the U/C layout is adequate, the machine never yet dropping a wing on take-off. The unstick is very rapid, perhaps three or four yards. When doing an H.L. there is no need whatsoever to push the original (I just let go !).



MODEL AERODYNAMICS No. 2

1. It is an unfortunate fact that a model aeroplane is inevitably less efficient than a full size aeroplane. A model glider, for instance, can never achieve the very flat gliding angle of a full size sailplane, whilst a scale power model would require more power, pro rata, to sustain it in flight than its full size counterpart. Just considering the simple geometric scale involved gives a clue as to why this should be so. For instance, suppose we have a 30 ft. span full size aeroplane which flies at 150 m.p.h. A typical 1/10 scale (3 ft. span) model would fly at about " scale " speed—1/10 of 150 m.p.h. or 15 m.p.h. A little thought will soon show that the " length of air " traversed per second by each aircraft (model and full size) is quite different.

2. To take just the wing as the most vital part of an aeroplane : for a 5 ft. chord wing and a 6 in. chord wing of the same section to be reacted upon similarly by the air, the 1/10 size wing will have to fly at *ten times* the speed—Fig. 2. Then both wings, model and full size, could be expected to produce an identical aerodynamic reaction. Actually, of course, this is a purely hypothetical case. To fly the model wing at 1,500 m.p.h. would be quite impossible. Even if it were possible, compressibility effects would then be present, completely nullifying the original argument. That is one of the difficulties associated with using model wings for tests in wind tunnels.

3. This illustration does, however, define what is meant by *aerodynamic scale*. The aerodynamic scale of any aircraft is the speed or velocity multiplied by a length—the wing chord if we are concerned with the characteristics of the wing (average chord on a tapered wing), or the fuselage length, if we are considering only the fuselage—Fig. 3. Speed or velocity is measured in feet per second and the " length " factor in feet.

4. Usually, the most important " length " is the wing chord. In the case of models, this may range from a few inches up to a foot. This factor is easily measured, but the speed of models is not so well known. It varies both with the type of model and frequently during a particular flight. For instance, rubber and power models fly faster under power than on the glide. It is usually best to consider the slowest operational speed in such cases. Typical VL values then work out something like Fig. 4.

5. This table, it will be noticed, introduces an additional column —the Reynold's number. The two are simply related. For normal air, Reynold's number = the VL value × 6,300—nothing more complicated than that. Reynold's number is quoted more frequently in full scale work, since it includes the air characteristics as a factor of the aerodynamic scale. Using compressed air it is possible to get a higher Reynold's number in a wind tunnel test for a given " V " and " L," and other similar tricks can be worked. Full size designers normally want test data applicable to high Reynold's numbers. Model designers want data for very low Reynold's numbers. In fact, they rarely use the term Reynold's number at all, preferring " VL " as a measure of scale. The significance of either is that wind tunnel data established at a certain VL or aerodynamic scale value is no good to model designers unless that VL value *is in the range they want to use.*

6. What normally happens is that as the aerodynamic scale number (VL) decreases, an aerofoil becomes progressively more inefficient—Fig. 6. Now for any given flying speed (i.e. size and weight of model), the greater the value of " L " (i.e. the chord of the wing), the greater the aerodynamic scale value VL. This is a strong argument in favour of using low aspect ratio wings on models, where the chord is large relative to the span. However, for other reasons, efficiency tends to *increase* with *increasing* aspect ratio. The two statements are conflicting, but true. The two effects arise from dissimilar causes.

7. What it really boils down to in practice is that there is a limit to the " L " value for model wings—a chord of 3–3½ in.—below which all sections appear to give about the same lift. The only marked effect of the shape of the aerofoil is on the drag it produces. A flat plate would produce the least drag, and so below this chord figure, a flat plate aerofoil is probably superior to any other kind. Carry the chord reduction to extremes, and by the time you have got down to about ¼ to ½ in. chord, even the flat plate has " given up " as a provider of lift and it is now mainly a drag producer.

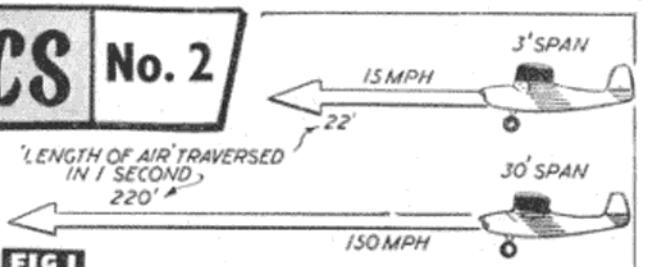


FIG 1

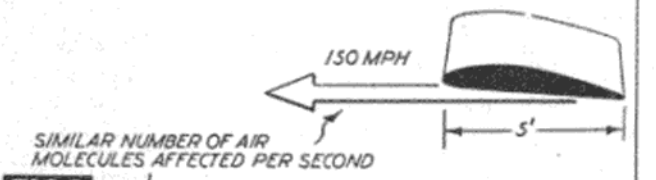


FIG 2

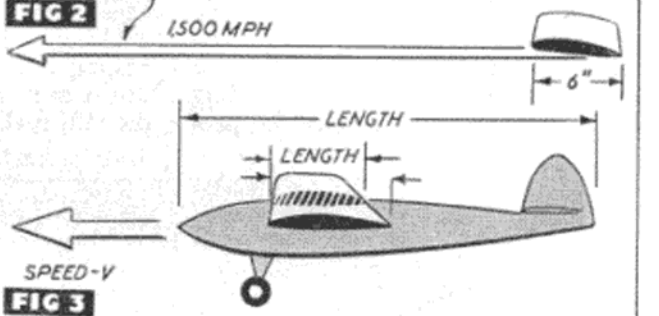


FIG 3

AERODYNAMIC SCALE = SPEED X LENGTH = VL

TYPE OF MODEL	VL	REYNOLD'S No.
INDOOR	1-2.5	6 - 10,000
CHUCK GLIDER	6	37,800
LIGHTWEIGHT	5	31,500
WAKEFIELD	7.5	46,250
A2 GLIDER	8	52,400
POWER	20	126,000
RADIO	30 - 50	189,000 - 315,000

FIG 4

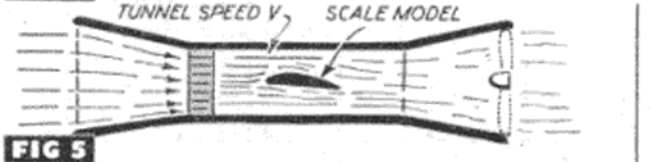


FIG 5

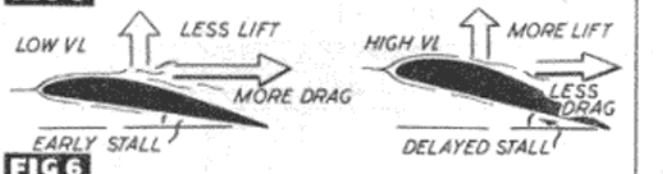


FIG 6

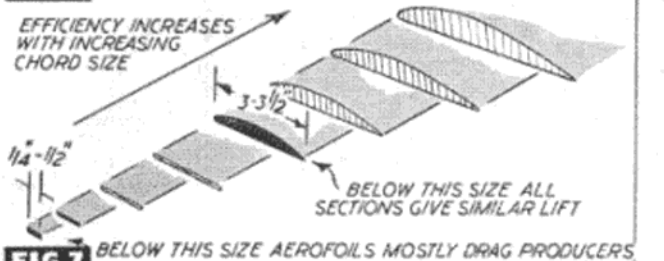


FIG 7 BELOW THIS SIZE AEROFOILS MOSTLY DRAG PRODUCERS

Topical Twists

Lost Cause

We trust that the bod who lost his large R/C model into the blue, without first providing it with the customary "if found" label, was able to control his emotions better than his departed model. Anyway, the incident does remind us how essential that label is ; in fact, it is discourteous to leave it off. After all, the lucky finder is always curious to know how far the model travelled before it became his property, and in the case of a large R/C model it can be more than discourteous, it can be downright cruel.

The finder of a reasonably small model can at least get some fun out of the thing, even if it's only a matter of gliding it down from the bedroom window, but a large R/C model can be a positive embarrassment. The kids start crying because it is too heavy to chuck about, there's no room in the garden shed to store it, and any suggestion of lumbering the thing round to the nearest police station is met with wifely hysterics at the thought of getting mixed up with the police. How much more human would it have been to have put an owner's tag on the thing. Relieved of his suffering the finder would be on the doorstep in no time at all, aglow with the expectancy of a large fat reward. And, who knows, some worthwhile odds and ends might be salvaged from the wreckage.

Large Order

From the Himalayan Foothills comes a letter asking this journal to recommend a suitable engine for use on control line models at a height of 6,000 feet. Now, since our model engines are a little on the small side for this sort of line length no doubt the enquiry will be duly forwarded to one of the larger jet manufacturers.

Even so, it's encouraging to hear that our old friend, the Abominable Snowman, has been bitten by the model bug. Possibly he would have tried his hand at the game years ago but was understandably discouraged by the endless processions of Everest explorers scrambling all over the flying area. Now that things have quietened down a bit in the area he can at last lay out his lines in peace.

Having been given this warning, the future Everest explorer should not be unduly surprised if he hears a stentorious voice thundering across the glacier : "Mind those abominable lines!"

Flying Scotsmen

We are informed that next year's biggest spot of homely fun will be the newly instituted Scottish Rally. Thus, model flying, which used to be an old southern tradition, has moved to the rugged northern wastes in search of pastures new, or, come to that, any pastures at all. Down south, rallies have become little more than static exhibitions on pocket handkerchief airfields (though even these are not to be sneezed at) with just an occasional bod sending up a sacrificial model as a sort of defiant gesture.

Now with the emphasis having shifted north of the border, a crushing answer is provided to all those sly, Sassenach digs about the primitive state of life in the Land of the Thistle. More and more "Macs" are banding themselves into MACs, and all the feverish model heaving has given a new significance to the Highland fling. Most types of model can now be seen flitting over the burns and braes, but, naturally, there is evidence of a strong preference for free flight.

Which raises another point. It is generally believed that thermals cannot survive in the rigorous Scottish climate, but it is now known that a hardy species, able to survive without direct sunlight, were imported from an airfield near Manchester. So active have they become that the more modest of the kilted Scotsmen have been obliged to flout tradition by affecting underwear. Another indication of their abounding vigour is that Scots modellers are now seeking forms of D/T fuse other than the popular lamp wick. A necessary step since the acute shortage of wick has been responsible for a serious decline in Scottish model building—well, it's not so easy by candlelight.

Tail-Enders

Since modellers have given up using undercarriages in favour of collapsible bits of bent wire, the r.o.g.-ing business has been getting completely out of hand. Providing you are not crude enough to give the model a too obvious shove you can get away with almost anything ; even in this country, where, unlike some others, the stringent system of eliminators precludes anyone getting into the team merely by using a little push.

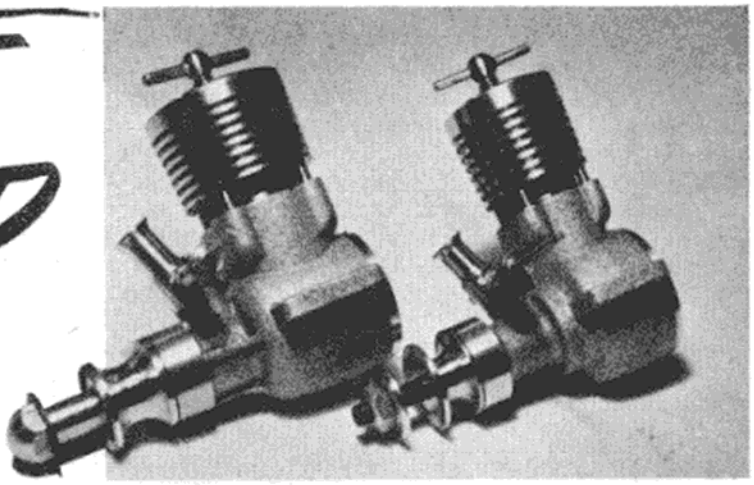
Sleight of hand methods vary, of course. The praying mantis type of release is as popular as any : a ritualistic flurry of hands so mesmerises the timekeeper that a waist high launch is readily achieved by the more adept. For the really ambitious, who aspire to a full, shoulder high launch, it is necessary to have a retracting mechanism of

such complexity that sufficient helpers can be called upon to completely obscure the model from the timekeepers. The procedure calls for careful organisation, since all helpers must be at least six feet in height and trained to rise from the crouching to vertical position at one and the same time.

Of course, we might again remind the bent wire brigade that, in the event of a disqualification, they wouldn't have a leg to stand on.

Pylonius

ACCOUNT RENDERED 1954

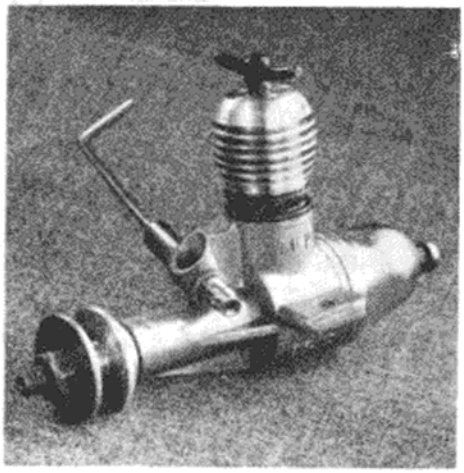


Two outstanding engines of the year. The Oliver Tiger Mk.III 2.5 c.c. and the Oliver Tiger Cub 1.5 c.c. are both unsurpassed for performance in their respective classes.

ACCENT ON POWER
by
P. G. F. CHINN

FOR stealing the above title, we must apologise and make due acknowledgments to *The Motor*, whose noted technical editor prepares, under this heading, an annual report on his much envied experiences in the world of motor-cars. It is with due deference that we seize upon Mr. Pomeroy's apt choice of a title and apply it to our own personal recollections, humbly offered, of 1954 model developments.

Last year, whatever its failings in the weather department, was quite full in regard to technical developments and new products. The year opened with the promise of a new Davies-Charlton Allbon engine, the Bambi. The Bambi prototype, started as a 1 c.c. unit, was subsequently increased to .136 c.c. and, by the time we received the first example from the initial production batch, had progressed to .15 c.c. Even so, the Bambi was established as the smallest internal combustion engine ever to be put into production, just bettering the .16 c.c. French Allouchery of 1946/7 (which, however, was not a " production " job in the accepted sense of the word) and, so far as our own personal acquaintance is concerned, only slightly exceeding the .14 c.c. Cameron " one-off " diesel earlier described in MODEL AIRCRAFT.

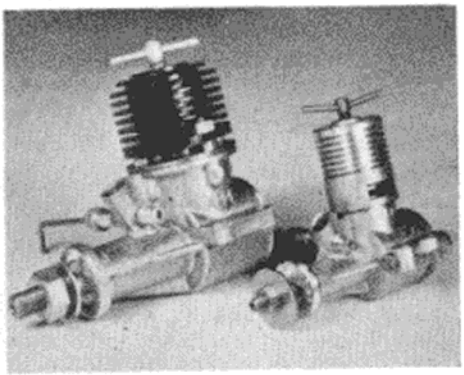


March, 1954, saw the introduction of the smallest production i.c. engine ever built, the Allbon " Bambi " of .15 c.c.

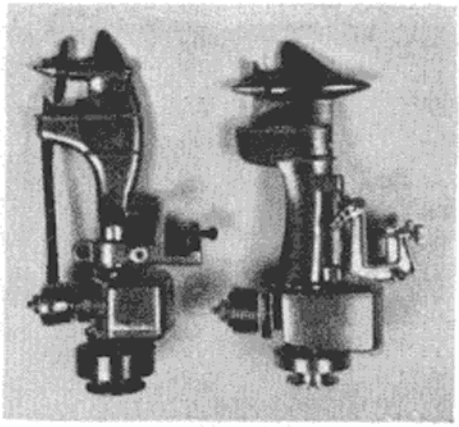
Our initial impressions of the Bambi suggested that it was not an engine for the beginner and, after a telephone conversation with Mr. E. H. Davies of D-C, it was agreed to emphasise this in published comments. Difficulties plagued early Bambi production due to the much stricter control necessary with such minute component parts, but Messrs. Davies-Charlton now seem to have all the problems worked out. Complaints heard regarding the Bambi are surprisingly few and many people find the engine easier to handle than we at first suspected. That the required high standards of production are realised only at some considerable expense is obvious from the fact that, to the makers, the Bambi, at an inclusive retail price of 108s. 11d., is not such a good manufacturing proposition as their new Merlin at less than half this price.

The Merlin, incidentally, appears to have got off to a good start and we found it easy to handle. For beginners it is not so easy to start as D-C's Spitfire, perhaps, but is remarkably good value at 47s. 6d. with purchase tax. Thus, during 1954, D-C have produced both the smallest and the cheapest engines on the British market. Some big strides have been made by this company, who are now one of the largest, if not *the* largest, producers of model engines in Britain. To Davies-Charlton testers, starting up 160 new engines is a normal day's work. Large numbers of D-C engines go overseas and the Merlin is selling in the U.S. at only $6.95, thus making it the cheapest imported engine available there to date.

Mention of large scale production and exports brings to mind the German Webra manufacturers. Since we first mentioned this company's product in MODEL AIRCRAFT a little over two years ago, Bragenitz & Co., who trade under the name of Fein und Modell Technik, have gone from strength to strength and by late 1954 were producing 2,000 engines per month, with production later reaching 1,000 per week. The outstanding Webra motor is, of course, the Mach 1 on which we have previously reported. At the moment this appears to be the one international class engine capable of getting near our own Oliver Tiger Mk. 3. Its one



1954 also saw the introduction of an entirely new make, the moderately priced A-M 25, and of Britain's cheapest engine to date, the Allbon Merlin selling at a basic price of only 40s.



One of the most interesting engine developments of 1954 was the advent of the model outboard motor in the shape of the Allyn and Atwood .8 c.c. models.

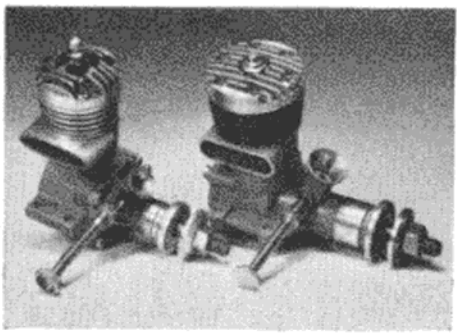
failing, so far as team race enthusiasts are concerned, is its rather excessive thirst.

Turning away from engines for a moment, a quite ingenious and original product appeared early in 1954 in the shape of the Elmer variable-pitch prop. The only trouble we had with this was in getting the blades to feather properly, although it must be admitted that the method of adjusting blade tension was not of the best. Later this was improved and the complete blade mechanism was made detachable. We managed to get this British product some attention in the U.S. and it is now being exported there is useful numbers.

In America, 1954 was notable for the fact that two leading makers of "half-A" model aircraft motors, Atwood and Allyn, produced, almost simultaneously, a pair of remarkable little outboard motor boat engines. Our experiences with both engines, having regard to the initiatory nature of their design, seemed to indicate that they were surprisingly free from faults. Bill Atwood tells us that little trouble has been had with either the aircooled or watercooled versions of the Atwood.

Most of us have been aware of the existence of a number of different makes of Japanese engines, details of which have been published in these articles from time to time, but few, perhaps, have realised the extent of the progress made in Japanese engine design and production. Two of the six Japanese engines we received during 1954 brought this home to us particularly forcibly. They were the Enya 19 and the latest O.S. product, the Max-1, which is available in .29 and .35 cu. in. versions. The latter is a big advance on the same company's well-known O.S. 29 model and both makes are, in most respects, comparable with the better quality European products. The finish is much superior to that seen on some earlier Jap motors and, in fact, both these engines, as can be seen from the photograph, are rather attractive in appearance.

Virtually all the current Japanese models are glowplug engines. Incidentally, an unusual point about them is that several use 2-volt glowplugs. By 2-volt we do not mean the nominally 1½–2 volt plugs to which



1954 model engines from Japan, the Enya 19 and O.S. Max-1 are of a quality which now establishes Japan as an important model engine producing country.

one often hears of a full 2 volts being misguidedly applied. These Japanese plugs need a well charged 2-volt accumulator and will then generate a heat equivalent to that of a standard 1½-volt plug operating on the correct voltage.

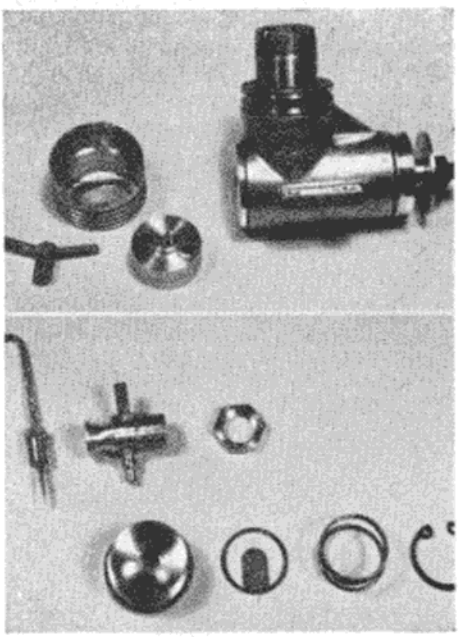
The Enya 19 is of 3.2 c.c. capacity. It is one of the nicest handling motors we have tried for a long time. Nitromethane being even more difficult to obtain in Japan than it is here, the Enya, like most Japanese motors, is designed to operate on a methanol/nitrobenzene/castor mix. It runs very well on this relatively inexpensive fuel. The maximum power output (using nitromethane) of slightly over .30 b.h.p. is not as high as the hotter American 19's, but is better than the average 3.5 c.c. European diesel, added to which one has a smoother running unit.

The Max-1, unlike the previous O.S. 29, which was unusual in that 360 deg. porting was used in a 5 c.c. g.p. engine, is of the standard cross scavenged two-port shaft valve layout, with bronze bearing and lapped piston, similar to that used by such makers as Veco, Fox, and K. & B. The finish of the interior parts is pleasing and much improved.

Another of the bigger types of glowplug engine to come our way during 1954 was the K. & B. Torpedo Stunt-35. Disappointment at finding, at first glance, a design which appeared to have the Torp 15 as its basis, rather than the more impressive 19 model, was allayed after closer acquaintance with the motor. Despite a slightly utilitarian appearance, the 35 undoubtedly has a first class performance.

So far as British engines are concerned, we have, after a quite considerable period of inactivity, seen one or two outstanding developments. The most impressive diesel of 1954 was, in our opinion, that Oliver Tiger in its new Mk. 3 and Cub versions. Starting and running qualities, power output, fine construction and superb finish, lift these engines far above the average. Actually, the sheer power of the latest Olivers has given rise to some structural complications and, following some crankshaft failures with early production models, has resulted in the manufacturer adopting, after investigation by steel specialists, a new crankshaft material, K.E. 805, having a max. stress of 65 tons per sq. in. The Oliver has, in fact, now reached a point in its development where further increases in power may require the abandonment of the shaft valve induction system, so successfully exploited by the Olivers, solely because of the inherent weakness of drilled shafts.

Although the Olivers are higher priced than other engines of similar



Exhibiting the first major changes in British engine design for many years, 1954's Elfin BR. 1.49 has reed-valve, new crankcase and cylinder layout.

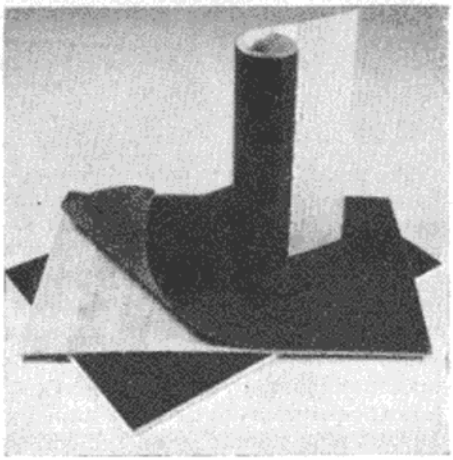
The initiative shown by the makers of Jetex was sustained in 1954 by the new Jetex 50B powered jet fighter series of kits in which a revised type of moulded fuselage shell is used.

capacity, they are by no means expensive, having regard to their high quality construction. The demand for them is considerably greater than the present rate of supply and we feel bound to add the warning that intending purchasers for the 1955 competition season would be well advised to place their orders immediately if they have not already done so.

Another British engine which has greatly impressed us is the Elfin B.R. 1.49. Original and highly practical design resulting in quite exceptional performance marks this as the most interesting mass production engine of 1954.

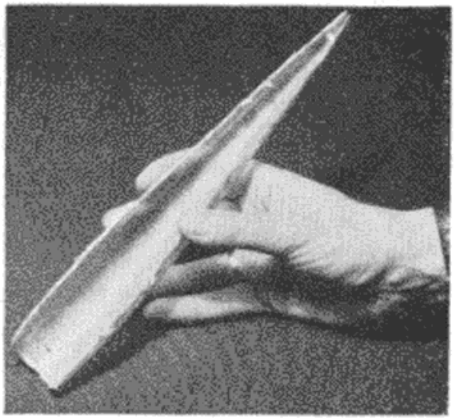
An engine of a new British make appeared during the year, the Allen-Mercury 25. Modestly priced and of fairly orthodox layout, this 2.5 c.c. engine's general handling, as well as its appearance, reminds one of the original Amco 3.5 produced by Anchor Motors. We found starting to be good, while power output is in the region of .22 b.h.p. at 12,500 r.p.m. A small point, perhaps, but one which is characteristic of a strictly practical engine, is the sensible crankshaft length to accommodate all standard prop pitches.

Turning now from engines to airframe construction, we have made acquaintance with several alternatives to normal strip and sheet balsa construction. One of these, the moulded balsa shell type structure introduced into the Jetex scale kits, is not strictly a 1954 feature but, from the original tissue paper reinforced type shell used, the newest additions to the range now have a two-ply shell construction with the bonding medium between the plies. An additional feature of these kits is the introduction of a cardboard jig in which to build the moulded balsa shells.



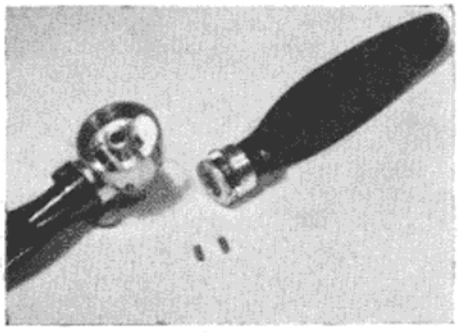
Another new airframe material comes with Solarbo resin bonded paper surfaced balsa. Earlier in 1954, Solarbo were experimenting with resin-linen reinforcement as shown.

Another recent innovation is Solarbo's impregnated paper faced balsa sheet. This follows on some experiments earlier in the year with resin bonded linen reinforced sheet balsa, of which we were privileged to receive samples, but which were naturally somewhat more costly than the paper reinforced variety. Thirdly, we tried Klebmetall, the German-made aluminium covering that can be fixed over a balsa frame with special cement. This latter needs to be treated with great care if the beautiful finish that is possible with it is not to be marred. For the practical modeller its uses are somewhat limited, but it should appeal to the control-line scale concours enthusiast.



1954 saw the introduction of glass-fibre reinforced plastic kits for model use, following lead given in "Model Aircraft" articles.

Finally, there are the glass-fibre reinforced plastics for which, personally, we have a great liking. The only tedious part about fibreglass is the making of the formers, etc., for moulding parts. In return, however, one can rejoice in almost indestructible, fuelproof components of excellent finish. In other fields, fibreglass is making tremendous progress and it may be that sometime in the future we shall see a kit manufacturer (probably by the flock preform process) mass-producing ready made fuselages. While of no great interest to free-flight contest enthusiasts, glass-fibre reinforced plastics are excellent for R/C model fuselages and for C/L models.



Another 1954 "first" was the introduction of constant speed variable-pitch props for models. Shown is latest detachable hub version of the Elmer 9 in. propeller.

MODEL AIRCRAFT

Engine Tests

(*Continued from page 49*)

to a brake mean effective pressure of slightly over 60 lb./sq. in., which, again, is the highest recorded for a 1.5 c.c. engine in this series.

In view of the many new features of the design, the B.R. 1.49 was subjected to a somewhat more protracted and searching test than normal, but no mechanical deterioration was detected following a total of some ten hours' running on two units.

The makers' recommended prop sizes should give satisfactory results. For maximum performance for power-duration work, a slightly smaller prop than the 9 × 4 specified may be better, however, and experiment with an 8 × 4 is suggested. A speed of approximately 11,000 r.p.m. on the ground should be realised with a prop of this size.

Power/Weight Ratio : (av. of 2 units tested) 0.64 b.h.p./lb.

Specific Output : (av. of 2 units tested) 107 b.h.p./litre.

BOOK DEPARTMENT

All About Aircraft. *By D. M. Desoutter.* Faber and Faber. 25s. od.

Any author attempting to cover aviation in general and at the same time provide a useful reference book is inevitably faced with the problem of what to include and what to leave out. At best, the final result can be only a compromise, but Mr. Desoutter's choice of material is excellent and he has succeeded in giving us a book that will answer many questions on a subject that is noted for its diversity.

The 21 chapters of "All About Aircraft"—each sub-divided—vary in length according to their relative importance. For instance, 15 pages are devoted to the problems of aircraft flying at, and above, the speed of sound and by the time the reader has reached the end of the chapter he is left in no doubt of the factors involved. In this particular section the meaning of Mach numbers, aerodynamic heating, wing shapes, movable tailplanes and so on is explained in a lucid manner and excellently illustrated with photographs and sketches.

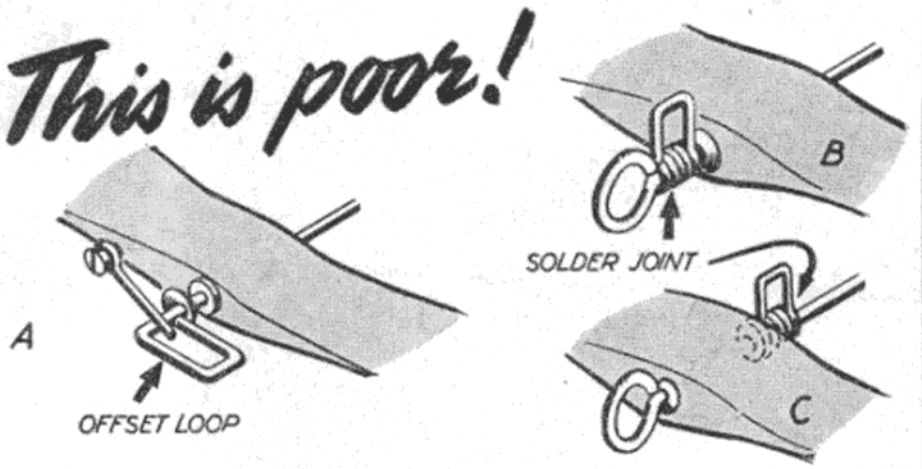
Obviously we cannot mention all the interesting sections of the book, but particularly noteworthy are the many tables spread throughout the 21 chapters. Among them are complete results of the King's Cup air race from 1921 onwards, Schneider Trophy results and notes, World speed and altitude records, and tables of piston and jet engines with the relevant details.

Also useful is the glossary of aeronautical terms and the list of Important Dates in Aviation from 1783 onwards. The flying and gliding clubs of this country are also listed, together with descriptive notes on the various aviation organisations.

The final chapter is entitled "Modern Aircraft Summarised" and in addition to describing and illustrating over 100 aircraft with 3-view drawings and photographs, it explains the nomenclature used for designating British and American aircraft. One pleasing point is that the date of each aircraft's first flight is given.

When you realise how much information is packed into "All About Aircraft" you will appreciate that the book certainly lives up to its title.

DESIGN TIPS No. 2



Freewheel clutches on rubber models are frequently badly made, yet this is a vital part. If the clutch slips or the hook opens up, then you are almost certain to have a broken fuselage on your hands.

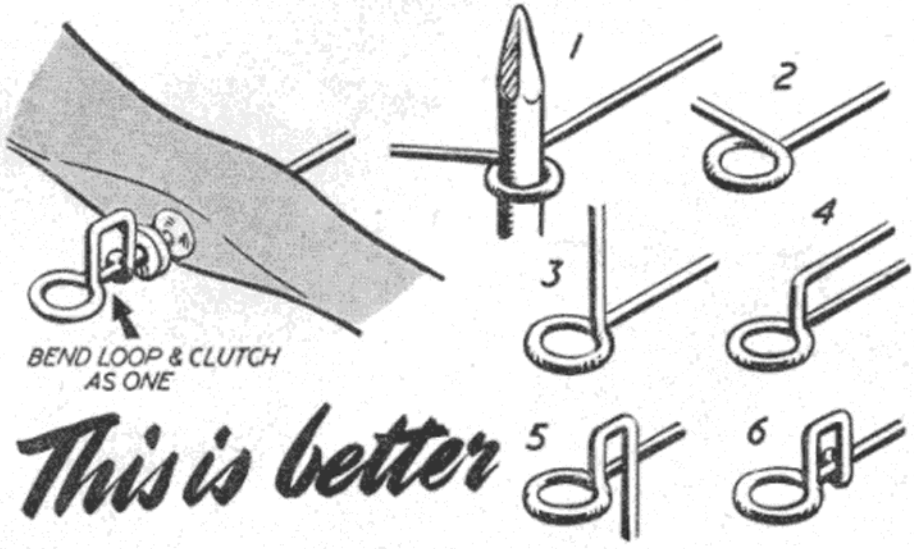
Type A is a common example. A square loop, offset on the shaft, serves the purpose of both freewheel clutch and winding loop. It is satisfactory for small models but gives uneven winding. Also the loop is prone to open up when stretch winding. Types B and C are better in that a round, symmetrical hook is used for winding. The clutch coil is usually bent from 20 s.w.g. wire, soldered to the shaft. This solder joint is always a weak spot. It can let you down on the flying field when a repair is almost impossible. Type B, with the clutch in front of the propeller, is better than type C. With the clutch between the propeller and the noseblock, shaft overhang is increased, which means a bent propeller shaft in almost any rough landing.

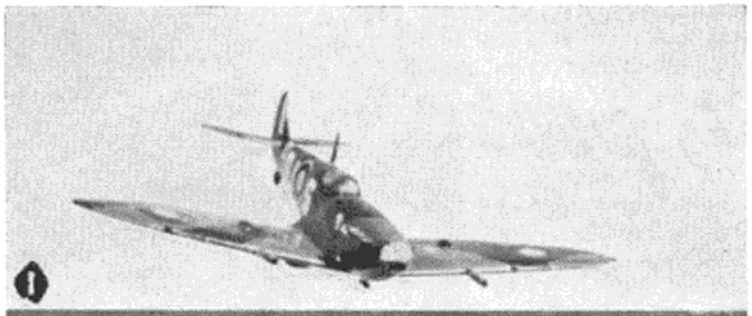
If you do use a coil-type clutch, tin the clutch wire before forming. Wind so that clutch pressure tends to close the coils and make the coil so tight that you have to screw it onto the shaft in the first place. Better still, bend the winding loop and clutch integral with the shaft, as in the lower sketch.

Bending winding loop and clutch as one should eliminate failure. It can readily be done in 16 s.w.g. wire with practice, and is strong enough to take the most powerful Wakefield motor. Use 18 s.w.g. wire for the shaft for motors not exceeding 8–10 strands of $\frac{1}{4}$ strip rubber.

The loop can be bent up in the sequence of operations shown in the last sketch, with the aid of two pairs of flat-nosed pliers, or in a vice with one pair. The first bend should be made round a nail or thick wire. Use a flat washer behind the clutch loop (or a thrust race, if preferred), bearing against the propeller bush.

The main trick is to make all bends as sharp and close as possible. This may require a little knack to master, but wire is cheap and you can try bending four or five different shafts until you are satisfied that you have got a good one. Make it well and it will never let you down. Above all, do not try to soften the wire by heating it before bending. This is likely to make it brittle and useless.





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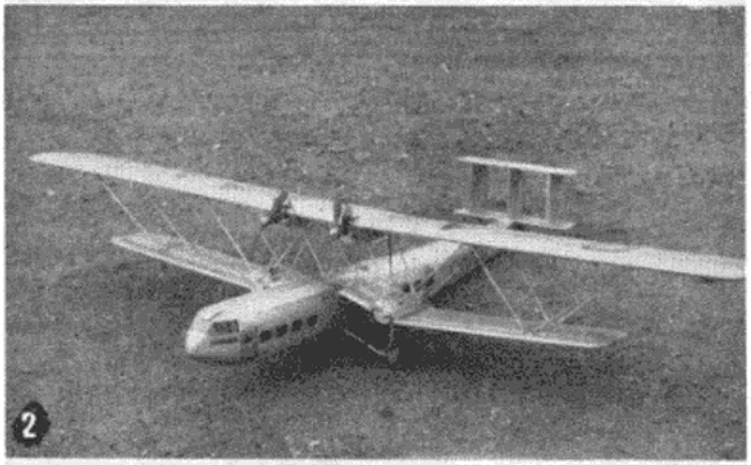

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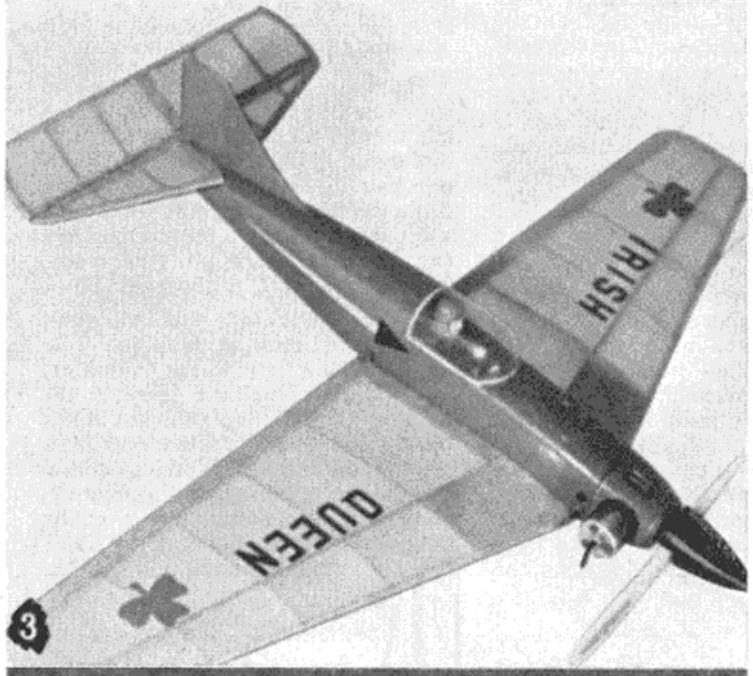

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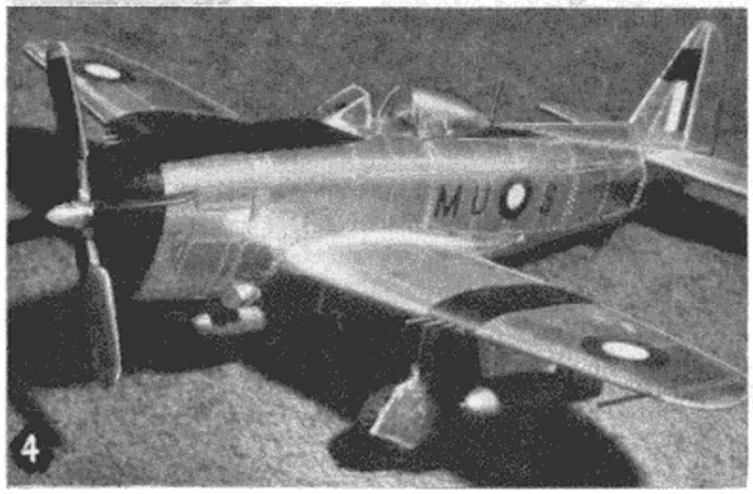


4

PHOTONEWS

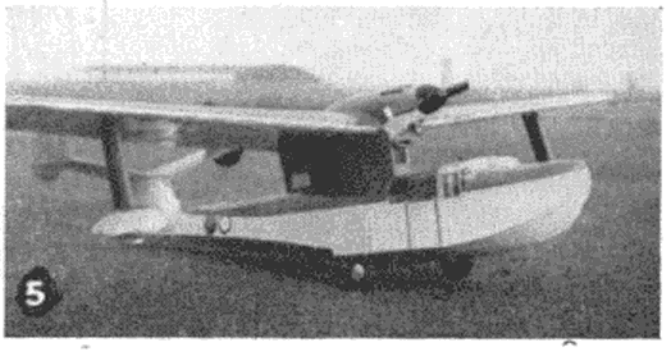
WHEN choosing the illustrations for Photonews each month, we have often wished that the standard of photography could equal that of the modelling. But we appreciate that proficiency in two such exacting arts is asking a bit too much of any man—even an aeromodeller!

However, a photograph reached our office recently which, we considered, did full justice to the model, and the result can be seen in photo **No. 1**. It shows a *Spitfire V* solid, which was made by B. A. Smith and realistically posed and photographed by our old friend J. E. Banks.

Equally well photographed is this model of the old Imperial Airways *Hannibal* seen in photo **No. 2**. It was built by Corporal J. Newton of the R.A.F. and photographed by Peter Hoskison, and proved one of the biggest (in more ways than one!) attractions at the Battle of Britain celebrations at Debden Airfield last year. Scaled up from 1/72 plans, this 4 ft. span biplane is a C/L job powered by two Mills .75 diesels. Speed is 40 m.p.h. The model is most realistic in the air and will even fly on one engine.

Without recourse to colour printing we can't do justice to the attractive appearance of L. Robson's *Skystreak* in photo **No. 3**. This C/L model has a 25-in. wing span and the fuselage is finished in British racing green, the flying surfaces in green-tinted clear dope, with the fuselage arrow in cream with a black head. As if this wasn't enough it has the name "Irish Queen" on the wings plus a couple of shamrocks!

After reading the articles on covering solids with metallised paper that appeared in "M.A.," reader Dennis Malin thought he'd try his hand at it and the excellent result can be seen in photo **No. 4**. This is a *Thunderbolt II* of 60 Squadron of South East Asia Command, and the interesting point here is that Dennis actually flew *S for Sugar* when he was a flight commander in the Squadron.



5

A scale flying boat makes one of this type's rare appearances in Photonews and **No. 5** shows a Supermarine *Seagull* built by J. T. Percival from M.A. plan No. 83. To date this model has made over 150 flights, logging approximately 5 hours actual flying time. It placed third in the F/S event of the R.A.F. M.A.A. Championships ; second in the Scale Concours at the Technical Training Command Championships, and third in the Scale Concours at the All-Britain Rally. Quite a record !

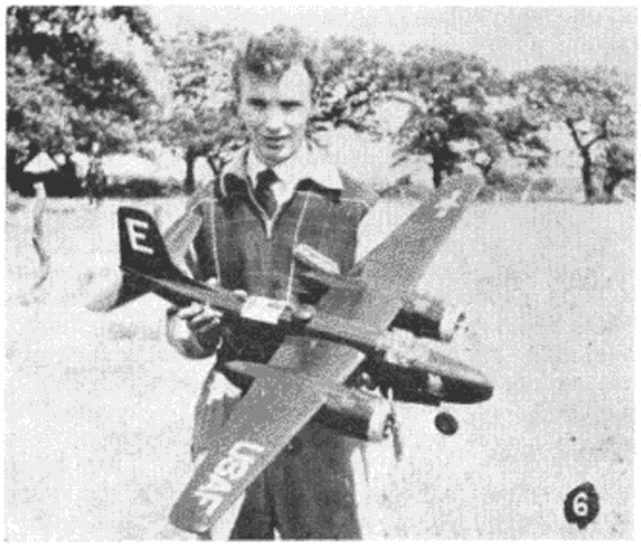
Photo **No. 6** features another scale job, this time a B-26 *Invader* built by J. M. Bodey, chairman of Heswall M.A.C. Man behind the camera was D. Stewart. Powered by two Javelin 1.49s, the *Invader* has a top speed of 55 m.p.h. Span is 46 in. and the total weight 43 oz.

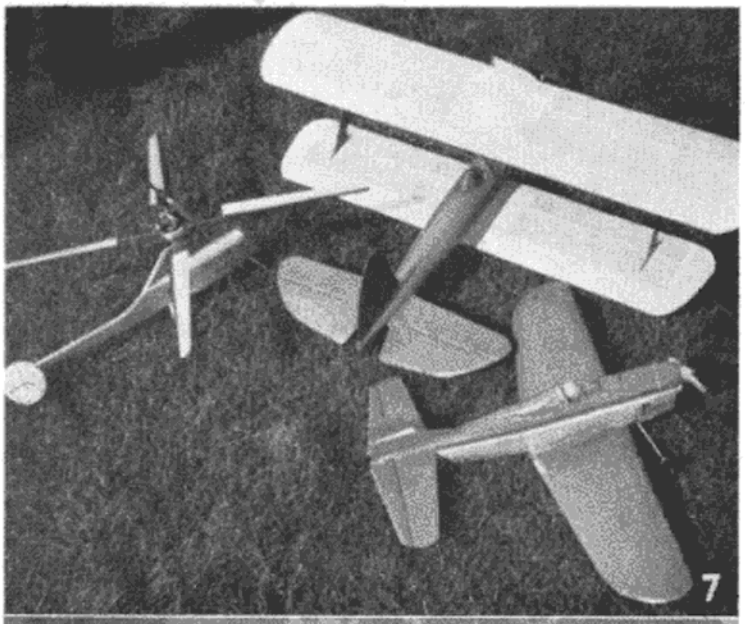
The trio of models shown in photo **No. 7** were built by members of the Leven and District M.A.C. The clean-looking stunt biplane is the work of G. Halley, who tells us that it " does the book " with ease. Span is 40 in. and power comes from an Atwood Glo-Devil. The four-bladed helicopter is by J. Couper who uses an Allbon Dart for power. T. Bailie is the owner-pilot of the Class " B " team racer which gets its urge from an Amco B.B. 35. Nice work, boys, but what is the rest of the club doing ? Admiring your models ? Let's see some pictures !

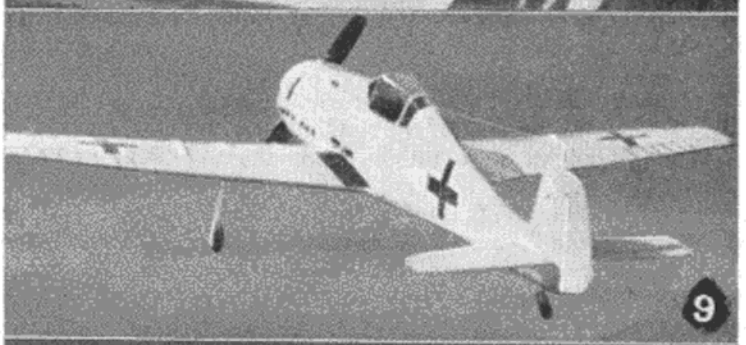
When the boys of the Lincoln M.A.S. hold an exhibition they certainly do things in a big way. Photo **No. 8** shows part of the scale and semi-scale section of a show they put on last year, when a total of 600 people passed through the turnstiles—and this is no mean achievement if you read Eric Fearnley's " Show Business " on page 50. In addition to their own models, the boys also borrowed a few from A. V. Roe's, and, to set the exhibits off, a backcloth showing a panoramic view of an airfield proved ideal.

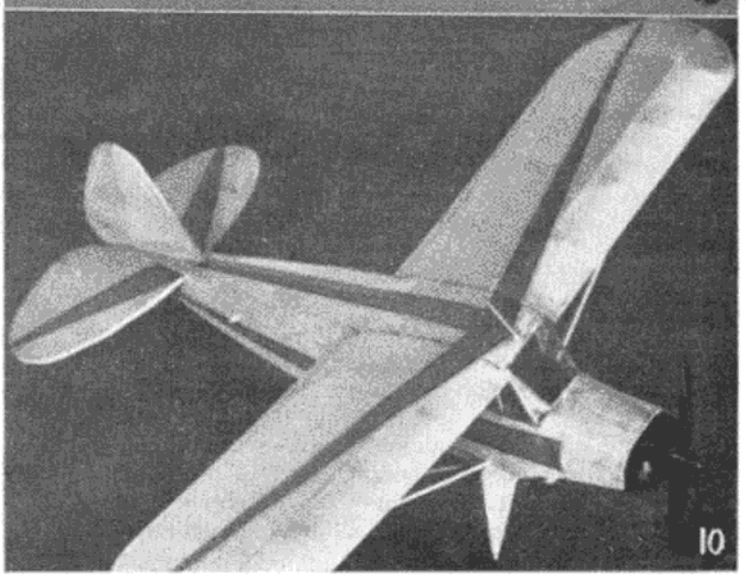
The FW 190 pops up yet again in this issue with the model depicted in photo **No. 9**. Built by P. Ingham, this C/L scale job has a 24-in. span and is powered by a Frog 150.

Reader Geoff. Roderick sent us two photographs of high wing cabin monoplanes from his stable and we chose the one seen in Photo **No. 10**, a 19½ in. span Stinson *Station Wagon* built from a Keil Kraft kit and finished in blue and yellow. Photo was taken by John Cameron.

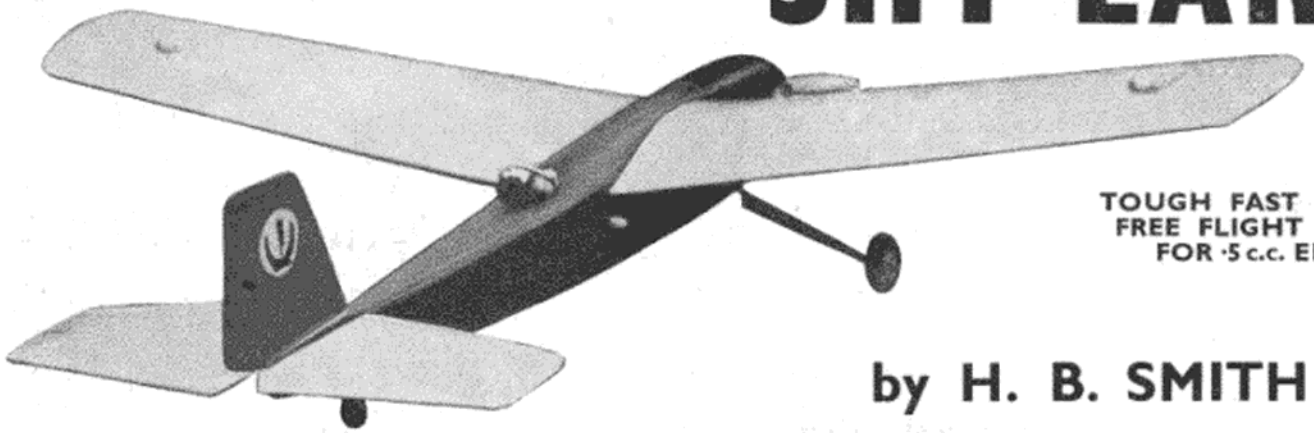








SHY-LARK



TOUGH FAST FLYING FREE FLIGHT MODEL FOR ·5 c.c. ENGINES

by H. B. SMITH

BEFORE I explain the reason for building a strong, or more correctly a tough fast flying model for the popular smaller diesel engines, perhaps a brief pen picture of myself may be of interest—I always like to know a little about other modellers.

First—Aged 32 and have been aeromodelling since I was "so big." Building was slowed down a little during the war but flying was speeded up after joining the R.A.F. — commissioned — demobbed — joined the Volunteer Reserve—more flying — reserve completed — private flying licence—more flying? That's where we come to the *Shy-Lark*.

It was a surprise to me just how many young modellers we had in Leeds M.F.C. who simply used to fly a model round and round (control-line I think it is called) and the reason most of them carried on in this manner was because they had made attempts at free flight but without success. Having broken their models after a couple of launches they didn't feel inclined to try again—I wonder how many more clubs have similar members?

To give these lads heart and for those who want a model suitable for any weather, get started on *Shy-Lark* right away.

On its first real public outing, at "Rufforth" early in the year, a Dart .5 proved ample power to tow off one of G. Joyce's (Leeds M.F.C.) smaller gliders. The *Shy-Lark's* weight incidentally is 10 oz.; even Silvio found the time to have a quick look—then back to his K. & B.

The weather was very windy (usual northern stuff!) and most other models were still packed away. Two or three people from other clubs asked if I'd care to lend out the plan, and the only way I could oblige all at the same time was through the medium of MODEL AIRCRAFT; so here it is.

Fuselage

Cut out bulkheads and sheet sides, form undercart and sew to F4; cement liberally over sewing. Cement F4, F5, F6 to fuselage sides, then follow on with the remaining bulkheads.

Cement on sheet underneath fuselage to sides and bulkheads. Fit bearers and dowels followed by $\frac{3}{8}$ in. balsa sheet under fuselage front end.

Next add $\frac{1}{8}$ in. sq. along the top of bulkheads. Mark and cut out hole for cockpit. Cut and fit tailplane platform (note grain direction).

All that is required to complete the fuselage is the addition of the nose block, sanding off the corners, edges, etc., and covering all over with heavyweight Modelspan tissue (pre-cementing is always a good tip).

Wing

Cut out wing ribs using smallest rib as a template for the next in size (see plan) and build up the wing in a normal manner i.e., pin trailing edge, fit ribs, leading edge, top spar, bottom spar then wing tips.

Give $2\frac{1}{2}$ in. dihedral under each wing tip. Add gussets then W3, W4 and W6, following with WA, again sanding off corners where required and cover with heavyweight Modelspan.

Tailplane and Fin

Cut out the tailplane and fin from fairly hard balsa and then carefully sand to a streamlined shape. Again, cover this section with heavyweight Modelspan.

Completion

Add windscreen, wheels, undercart fairing—made from celluloid, folded around wire undercart and cemented. A couple of bulldog paper clips are handy to clip onto celluloid until the cement hardens. Fit fuel drain tube (paper cemented and rolled).

Cut out starboard front of fuselage for engine fitting, and two engine nut access slots on front port side (see plan). Fuel proof engine bay and fuselage. Drill engine bearers; fit engine and spinner.

Colour and Flying

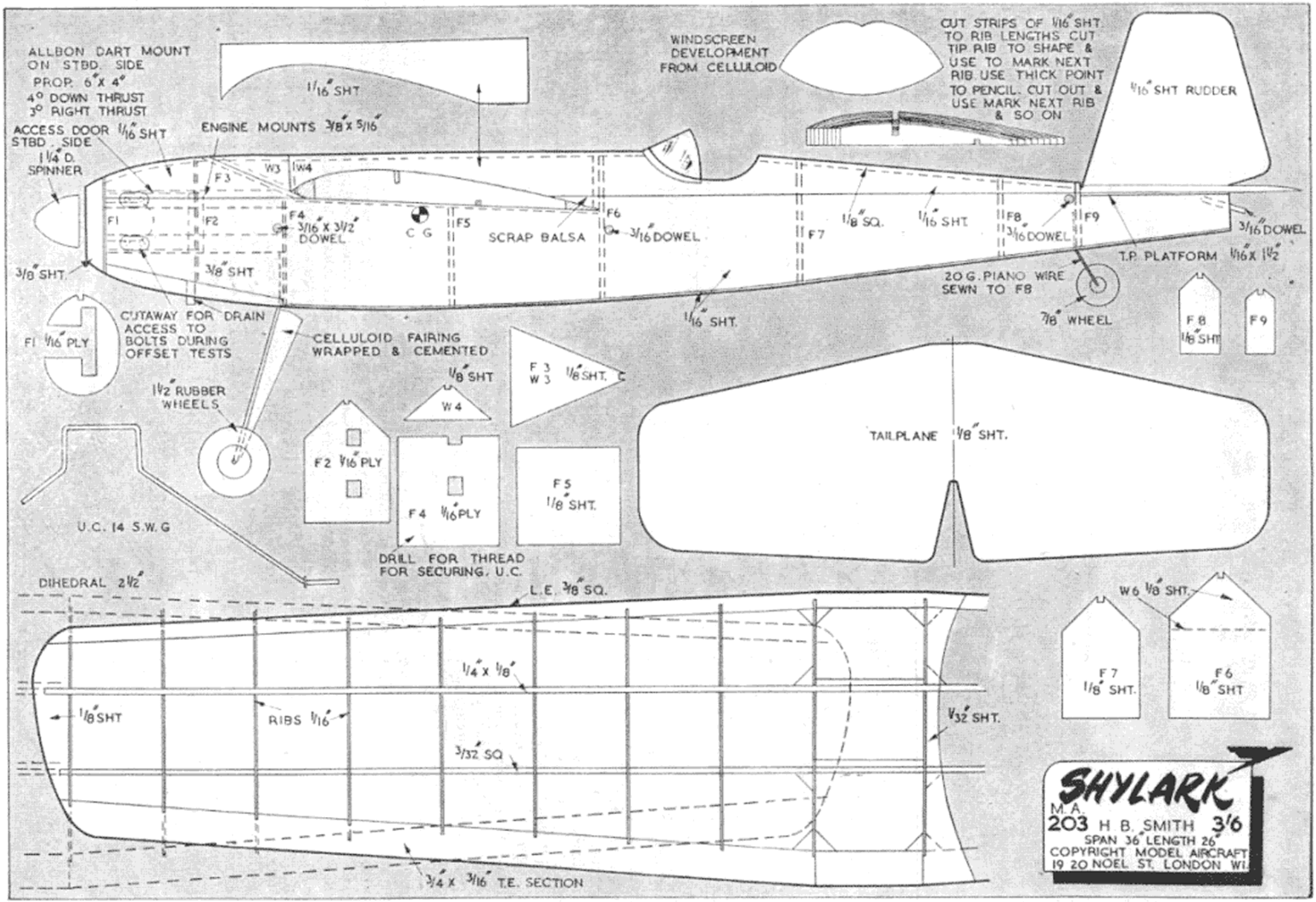
The original was covered with red tissue on fuselage and fin with white flying surfaces, which were silver doped, the wing having two coats of shrinking dope before applying the silver.

The engine settings that I found most suitable were 3 deg. downthrust with 2 deg. right thrust with the Dart .5 and using a 6 in. × 4 in. nylon prop. *Shy-Lark* Mk. II, in which I fitted a Mills .75, had 4 deg. downthrust 3 deg. right thrust and used a nylon prop $7\frac{3}{4}$ in. × 5 in.

The original model made two or three attempts at staying out more than one night—it did finally get lost with very little fuel aboard; so, beware! If whoever found the original ever gets tired of it please return it to the address underneath the fuselage!

Before your first power trip do a test glide, which should be fairly flat—if not, put a thin packing under the tailplane trailing edge, or, if the model shows a little stall, a thin packing under leading edge of the tailplane. The packing required should not be more than $\frac{1}{16}$ in. thick or there's something wrong with your building!

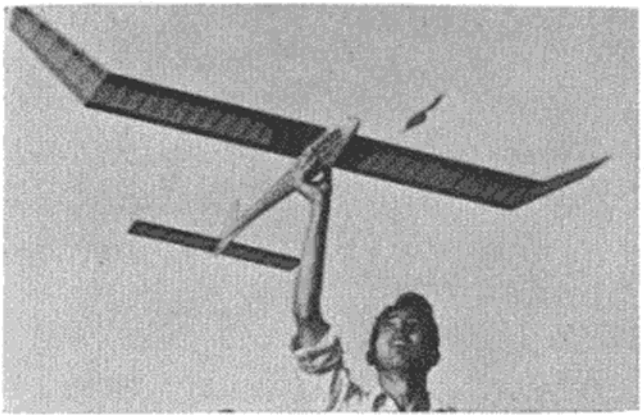
Trim the model for flying left, it is much safer, and watch those take-offs—there is no nosing over every time, nor on landings.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT
19-20, NOEL STREET LONDON, W.1, 3s. 6d., POST FREE

MATERIALS FOR MODEL AIRCRAFT : No. 2

HARDWOODS



The illustration on the left is a typical example of the best use of hardwoods in model construction. 1952 World Glider Champion Boric Gunic, of Yoguslavia, used spruce longerons and ply formers for the fuselage, with a balsa tailplane and wings. The latter unit utilises ply wing root ribs, plugging on to a ply tongue.

BALSA, strangely enough, is classed as a hardwood. Yet spruce, considerably stronger, harder and heavier than balsa, is a softwood. This is according to the standard definition of the timber trade, where hardwoods are those timbers derived from broad-leafed trees and softwoods from species with needle-like leaves, usually conifers. As far as the modeller is concerned, however, any structural wood other than balsa is always harder than balsa, and therefore classed as a hardwood.

As regards principal airframe structures, the normal hardwoods (model definition) available are obeche, birch and spruce. Birch and spruce are "traditional" model aircraft materials, almost completely replaced by the faster-working easier-cementing balsa. Obeche, strictly speaking, is a wood of very indifferent quality and properties which really came into prominence during the war years, when supplies of all timbers were severely controlled. It is, at best, a poor substitute for balsa, brittle and heavy. It is certainly stronger than balsa, but by no means comparable with spruce, which is only a little heavier. Nevertheless it has remained in use as a model aircraft material and is marketed in sheet, block and strip form like balsa. Its principal attraction is its low price.

As a general rule, hardwoods are more consistent in performance than balsa. That is to say, a single length of birch or spruce of "aircraft" grade should show a consistent strength along its length ; and should also be consistent in weight, as compared with other random lengths of similar section. Whilst there will be some variation in density and strength, we do not get the same grades (based on density) as with balsa. Weight control is therefore less of a problem and random lengths should conform to the figures summarised in Tables I and II. These are based on the recognised density figures of 24, 28 and 40 lb. per cu. ft. for obeche, spruce and birch, respectively.

Birch and spruce strip was originally cut in 48 in. lengths. This is still done today, but a fair proportion of current stock may be found in 3 ft. lengths. Obeche strip is normally stocked in 3 ft. lengths ; also obeche sheet.

Wartime shortage of balsa encouraged a reintroduction of hardwoods into airframe design, but since only non-critical woods were available, this meant, mainly, obeche (in this country). More recently the question of using hardwoods as an *advantageous* material has arisen, particularly in the construction of modern glider wings with a very low thickness-chord ratio. To get adequate bending strength into these extremely thin wings, mainspars have had to be turned sideways, when the effective depth of spar is much reduced. Balsa is not particularly strong in thin sections and a birch spar may be a much better proposition—Fig. 1. There is no weight penalty, for most gliders of this type need to be ballasted to bring up to weight anyway. The only disadvantageous effect is to increase the inertia of the wings.

Birch is preferred to spruce in such applications because it is stiffer and stronger. On the other hand, in the case of a glider wing of more normal section thickness, the use of a single birch spar for added strength may represent an unnecessary weight increase. In this case, a spruce spar would probably be a better solution. Only one spar is needed and the bending strength of the wing is increased enormously as a result. The penalty to be paid in weight is easily found. Simply compare the weight of the length of spar involved—one in balsa to the grade which would be used (see "Balsa Wood" in the January issue), and the other in similar, or slightly reduced section in spruce. In "reducing" a section to save weight, leave the depth dimension unaltered.

It is not commonly realised that ash, birch or spruce strip can be used for longerons in medium-size rubber models. The former two materials are best. Ash is slightly heavier than birch, but is a very good wood for steam bending to curves. The exceptional toughness and rigidity of

TABLE I. WEIGHT OF HARDWOOD STRIP (4 ft. LENGTHS)

Material Density lb./cu. Ct	Obeche 24	Spruce 28	Birch 40
1/16 sq.	.0404	.0486	.6694
1/8 × 1/16	.0808	.0972	.1389
1/8 sq.	.1616	.1944	.2778
1/4 × 1/8	.333	.389	.556
3/16 sq.	.3636	.4375	.5650
1/2 × 1/8	.667	.778	1.111
1/4 sq.	.667	.778	1.111
1/2 × 1/4	1.333	1.555	2.222
1/2 sq.	2.667	3.111	4.444

TABLE II. WEIGHT OF OBECHE SHEET

Sheet size	Weight (oz.)
36 × 3 × 1/16	12
3 × 1/8	9
3 × 1/16	6
3 × 3/32	4½
3 × 1/8	3
3 × 1/32	1½
36 × 4 × 1/16	16
4 × 1/8	12
4 × 1/16	8
4 × 3/32	6
4 × 1/8	4
4 × 1/32	2

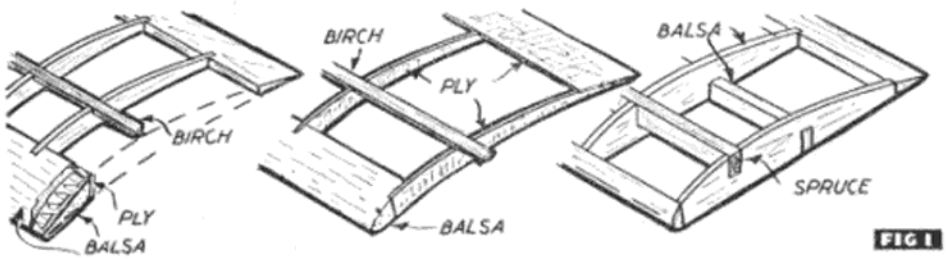


FIG 1

these woods, compared with balsa, means that longeron sections can be reduced to almost comparable finished weights. Covered with silk, such a fuselage will take a breaking motor without structural damage, if all joints are properly made.

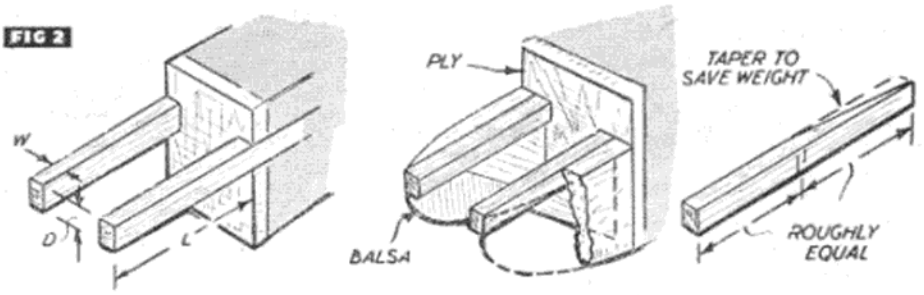
It is probably this question of jointing hardwoods which has kept them in the background. However, with the improvements common to modern slower-drying cellulose adhesives, good butt-joints can be made with hardwoods, although double-cementing is necessary. Alternatively one of the newer synthetic resin adhesives may well be considered for the purpose. Although slower drying, they will give a superior joint strength. The commonest source of failure in a hardwood assembly on a model airframe is in the joint itself, rather than the material.

The one hardwood which has remained useful throughout is plywood, but even this has undergone remarkable changes. Modern resin-bonded plywoods to aircraft or marine specifications are completely waterproof and the plies themselves quite free from peeling. Since these plywoods are so vastly superior to cheaper plywoods, any little extra cost is more than worth while, particularly in view of the small amount of ply used in a model aircraft.

Chief uses of ply are for wing dihedral joint braces, front formers on rubber and power models (in the latter case becoming the " firewall " and also usually the anchorage for the undercarriage) and, in continental Europe, glider wing construction. A number of outstanding examples of those " thin " wings previously mentioned use ply ribs, perhaps also a ply trailing edge and even a ply-reinforced leading edge. The latter is a particularly interesting development, consisting of a balsa-ply-balsa sandwich, which is subsequently carved to aerofoil shape. The ply centre imparts an amazing degree of rigidity.

Many of the continental European countries are luckier than we as regards availability of thin ply. It is difficult to purchase ply thinner than 0.8 mm. in Britain ; this is still a little on the thick (and therefore heavy) side for structural work. Ply one half this thickness (0.4 mm.) is fairly readily available in Finland, Austria and Sweden. British modellers use a variety of thicknesses up to 5/64 in. thick for dihedral braces and rubber model nose formers, and up to ¼ in. thick ply for power model

FIG 2



firewalls. Some comparative weights of the different thicknesses are given in Table III.

TABLE III. WEIGHTS OF PLYWOOD

Type	Thickness	Weight oz./sq. in.
BEECH	1/32 in.	.0176
	3/64 in.	.0256
	1/16 in.	.0336
	5/64 in.	.0416
	3/32 in.	.0496
	⅛ in.	.0624
	5/32 in.	.0752
	3/16 in.	.0880
	¼ in.	.1120
BIRCH	1/32 in.	.0160
	3/64 in.	.0240
	1/16 in.	.0320
	5/64 in.	.0368
	3/32 in.	.0448
	⅛ in.	.0576
	5/32 in.	.0704
	3/16 in.	.0832
	¼ in.	.1090
BIRCH	0.4 mm.	.0080
	0.8 mm.	.0160
	1.0 mm.	.0192
	1.5 mm.	.0288
	2.0 mm.	.0368
	2.5 mm.	.0464
	3.0 mm.	.0576
	4.0 mm.	.0768
	5.0 mm.	.0928
MAHOGANY	1/16 mm.	.0240
	1.5 mm.	.0290

The only other " universal " use of a hardwood is for motor bearers. A wide variety of woods are sold in " bearer sizes," some highly suitable, some of dubious virtue. Probably the four best woods for this purpose are ash, beech, birch and maple. These are all tough, resilient woods which are not likely to split or fail under normal working life. A number of designers specify mahogany, but following such a recommendation may lead to trouble. So many woods are now marketed under the name " mahogany," ranging from hard, durable woods to soft, pithy stock, that it is probably best to ignore " mahogany " altogether to be on the safe side. Similarly these " recommended " woods may appear under other names, e.g. sycamore for maple. Probably as good a test as any is to see if a finger nail will easily indent the wood. If so, it is too soft to make satisfactory bearer stock.

From the design point of view, it must be remembered that wood is a springy material. Therefore if bearers have a large amount of unsupported overhang, any engine vibration may be aggravated. As a general rule, it is best to make the bearers as short as possible from where they project through the firewall. If a fairly large overhang (L) is necessary, then the " D " or depth dimension should be about 50 per cent. greater than the " W " or width dimension—Fig. 2.

Fairing in the whole assembly with balsa sheet is then not just a concession to appearance. A triangular hard sheet balsa gusset underneath, and flanking blocks of medium balsa, as in the second sketch, will go a long way to reducing motor vibration and strengthen the whole mount. Some bracing of this form is almost essential on long bearers, i.e. those which have to accommodate an engine fitted with an integral tank behind the crankcase. Such treatment can generally be ignored where the bearers extend only an inch or so. It pays, generally, to use generous size bearers, up to one quarter of the weight of which can then be saved by tapering off the portion of the bearer which comes behind the firewall.

TABLE IV. ENGINE BEARERS (WEIGHT (OZ.) PER INCH LENGTH)

Size	Ash	Beech	Birch	Maple
¼ sq.	.0260	.0266	.0232	.0243
¼ × ⅜	.0390	.0400	.0348	.0365
⅜ sq.	.0585	.0600	.0522	.0547
⅜ × ½	.0520	.0532	.0463	.0486
⅜ × ⅝	.0780	.0798	.0696	.0729
½ sq.	.1019	.1065	.0926	.0972

TABLE V. WEIGHTS OF HARDWOODS

Wood	Wood lb./cu. ft.	Wood oz./cu. in.
ASH	44	.41
BEECH	46	.426
BIRCH	40	.37
LARCH	45	.417
MAHOGANY	39-53	—
MAPLE	42	.39
OBECHE	24	.222
PINE	30-50	—
SPRUCE	28	.26
WESTERN HEMLOCK (SPRUCE SUBSTITUTE)	31	.287

Letters

Continued from page 43

Patée were indeed the product of Hollywood, but this is not through ignorance of the correct scheme. They were so painted because of the superior result on film, over those carrying the straight or Latin cross.

I have in my possession a genuine piece of *Fokker D7* fabric. The lozenges are a rectangular shape but pointed at each end, being 14 in. long (point to point) and 8 in. broad. The more regular hexagon shape was found quite often on the heavier German aircraft such as the A.E.G. and L.V.G. series.

The spelling of Richthofen was also corrected I believe (I did not see the November issue), so I think Allmenroeder should also gain benefit here, with an e after the o.

Yours faithfully,
FRANK YEOMAN,
Thirsk, Yorks. (F/O, R.A.F.)

PS.—Beware of Hollywood's *D7's*, as, of all the specimens used for this film work, only seven were genuine, the others being converted *Travelair* biplanes of very similar appearance. The seven *D7's* were bought from the U.S. Army, which equipped a full squadron with them after the war.

DEAR SIR,—May I add a word in defence of Mr. Gray's very fair criticism of Mr. P. M. H. Lewis's article in the November 1954 issue of "M.A." Mr. Gray is correct in saying that the colour of the Richthofen circus was scarlet; blood red would be an equally good description; this is borne out in the "Red Air Fighter" published in 1918 (and edited by the late C. G. Grey) and is more precise than red. He is also correct in the spelling of Richthofen's name with two "h's"—see reproduction of the Baron's signature and as quoted in Ernest Udet's book "Mein Fliege Leben" published by Ullstein of Berlin in 1935 and from which I quote.

Fokker D7's may have been swarming out to the front during the final days of 1917, as quoted on page 182, chapter 15, not 14 as quoted by Mr. Lewis. My copy of Anthony Fokker's book was published in 1931 by Routledge. It is highly unlikely that any *D7's* reached operational status until 1918, as the rest of the quotation from Fokker's book implies. The photo of a *D7* on page 191 shows no markings on the machine whatsoever, which goes to show that they were dispatched from the factory "plain."

Regarding the illustration of a *D7* on page 452 of November MODEL AIRCRAFT, the hexagons shown are too large. There were two standard hexagon printed fabrics, large for big machines and small for small machines. To show this difference see illustrations of *Fokker D7* A.E.G. type G.105, and *Gotha G.II* on page 20 of "Camouflage 14-18 Aircraft" by O. G. Thetford.

Mr. Lewis complains that no suggestion was made as to how they could be improved. They could have been more accurate if traced from the existing plans of any of the 1914-18 types which have been published from time to time and this would have at least ensured a more accurate outline.

Yours faithfully,
Barnet, Herts. C. B. MAYCOCK.

DEAR SIR,—Mr. P. M. H. Lewis would appear to have shot down in flames my original letter which was intended in a spirit of friendly criticism, so may I reply as briefly as possible to his comments.

(*a*) I accept his reasoning on the colour of the Richthofen scouts.

(*b*) A photographic facsimile of both Manfred and Lothar von R's signatures which I have, confirms my correction.

(*c*) The para. in Fokker's book referred to does not mention *D7's* at all, at least not in my copy. The book however does spell Richthofen correctly.

(*d*) The official competition for German scouts from which the *D7* emerged supreme was held in February 1918. After additional refinements this aeroplane went into production in March of that year.

(*e*) I still maintain that the Roland and Halberstadt scouts were more widely used than the *Fokker D6*, and are not so unlikely to be modelled as the *D6*.

(*f*) Roundels did not vary so much as the drawings show. Were a model entered in the M.E. Exhibition with roundels of the proportions illustrated on *Pup*, *Nieuport* and *Spad* sketches I venture to suggest the judges would knock off a few points.

I was pleased to note he had corrected some of the second part of his article and would add that *Woodcocks* and *Gamecocks* also only carried squadron insignia forward of the roundel.

I am pleased to see the emergence of more World War I solid kits, and hope some authentic looking models will soon be seen in "Photonews."

Yours faithfully,
Luton, Beds. P. L. GRAY.

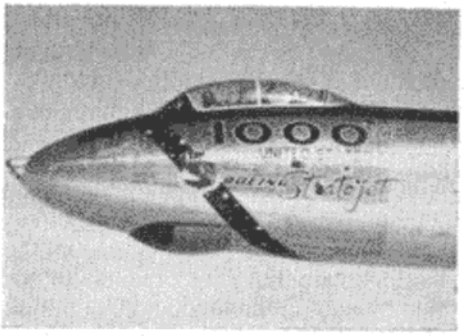
DEAR SIR,—Despite Mr. P. M. H. Lewis being ready to accept O. G. Thetford and *Flight* as authorities on spelling, Richthofen is correct. *My* authorities are Mr. C. G. Grey, than whom there could be no better on the British side; "The Rise and Fall of the Luftwaffe," by Hauptmann Hermann, published by John Long; and finally a wonderful book I "souvenired" in Germany, "Fliegen und Siegen," published by Otto Schönstein, München. From this I quote verbatim:—

"Hell leuchtet in ihr der Name des Rittmeisters Freiherrn von Richthofen und seines Jagdgeschwaders."

Yours faithfully,
Cambridge. A. A. C. JORDAN.

DEAR SIR,—As a postscript to Mr. Lewis's very interesting article on "Colour Schemes," I thought your readers might be interested in the enclosed mobile advertisement of the fact that Boeing's Wichita Division have turned out 1,000 B-47 Stratojet bombers. The aircraft shown also carries on its nose the insignia of the U.S.A.F's Strategic Air Command. This consists of a sky-blue band sprinkled with silver stars and can be seen on a variety of aircraft, including A-bomb-carrying *Thunderjets*.

Yours, faithfully,
London. J. W. R. TAYLOR.



The 1,000th B-47 Stratojet showing S.A.C's insignia, which encircles the fuselage. Serial number of this B-47 is 2609.

S.33 Berline

DEAR SIR,—I am following with interest your feature "Prototypes Worth Modelling" by C. B. Maycock and you may be interested to know that I have a photograph of a Spad S.33 *Berline* which I took at Croydon Aerodrome in May, 1925. This machine bore the registration letters F-ACMI.

The colour scheme was as follows:—

Fuselage, fin and rudder, and interplane struts, chrome yellow (or gamboge) all over with black lettering and AIR UNION in black letters across the fin. Wings, ailerons and tailplane and elevators, chrome yellow (or gamboge) undersurfaces and white upper surfaces with black registration letters. All the Air Union (forerunner of Air France) machines of that period were painted in the above colours. On the Farman *Goliaths*, however, the registration letters on the fuselage were black on a white rectangle while the F on the fin was black on a white square.

Yours faithfully,
Bristol. K. A. WINKLEY.

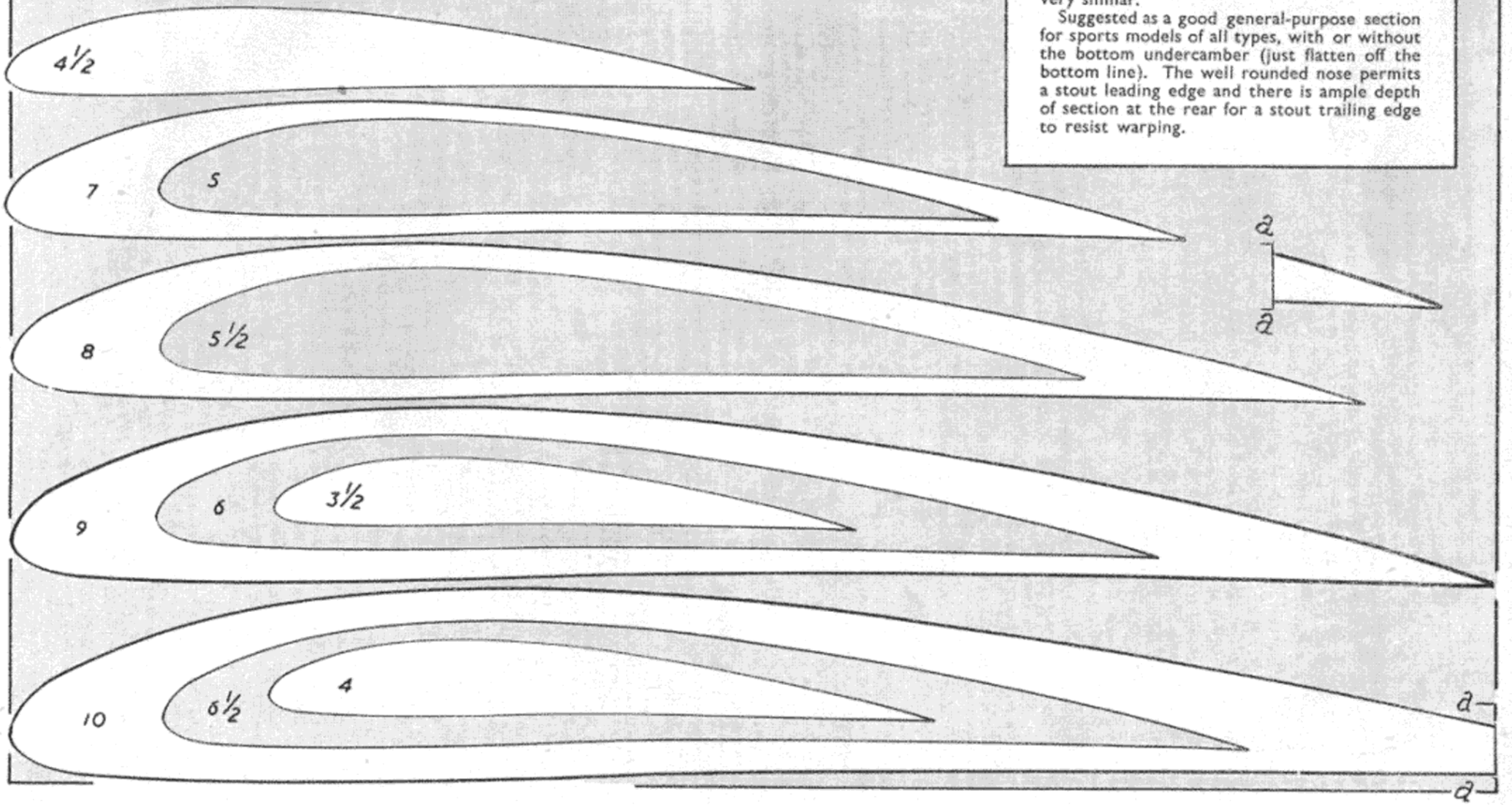
The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

USA 35B

A change for the "flat-bottom" aerofoil enthusiasts. Similar in thickness to the well-known Clark Y, the USA 35B has a blunted nose entry and very slight undercamber on the lower surface. Lift and drag characteristics are very similar.

Suggested as a good general-purpose section for sports models of all types, with or without the bottom undercamber (just flatten off the bottom line). The well rounded nose permits a stout leading edge and there is ample depth of section at the rear for a stout trailing edge to resist warping.

STATION	0	2·5	5	10	20	30	40	50	60	70	80	90	100
UPPER	2·8	6·1	7·5	9·45	11·3	11·8	11·4	10·3	8·8	7·1	5·0	2·7	·15
LOWER	2·8	·6	·3	·1	·05	·15	·3	·4	·45	·4	·35	·2	·15



Club News

AND NEWS FROM THE S.M.A.E.

HORNCHURCH M.A.C.

Our first winter club comp. was the club's most ambitious project to date—an "All Classes" speed event. The idea was to handicap each entry according to type and capacity of engine used, worked out on a basis of known performances for the various units. Many of the twelve entrants were newcomers to the speed game, and not a few came to grief through lack of experience. Even so, six of the entrants managed to stay airborne over the prescribed distances, and for a club speed event the results were more than satisfying. Specialists P. Fraser and B. Cobbett, both flying E.T.A. 29s, competed for top honours, with P. Fraser taking first place with an actual speed of 112 m.p.h.

SOUTH BRISTOL M.A.C.

Subscriptions have been reduced, and the club is being reorganised generally after a period of little activity mainly due to the weather and the fact that the flying field at Lulsgate, though large, is in an exposed position six miles from Bristol. Several alternative sites are under consideration, and increased interest is anticipated as a result.

Indoor rubber team racing is to be commenced for which additional meetings will be held.

Prospective members are welcome at our meetings, held at St. Mary Redcliffe Church Hall on the first Friday of the month.

BUSHEY PARK M.F.C.

The club recently held a scramble competition on Hounslow Heath, and strange to relate it was not raining! Although the entry was small it proved to be a very interesting event, with Bill Carter's *Little Amazon* showing great promise.

There was a big turn out for the S.M.A.E. dinner and dance—twelve of our members being present. Sid Allen and George Redlitch received a few pots, and then in company with Ted Hemsley knocked back a bottle of champagne.

Then, after a very enjoyable evening, we all made our way home to bed, and the aspirins!

CRYSTAL PALACE M.A.C.

At the club's annual dinner the president stressed the need for more activity in this year's competitions.

He presented Mike Ballentyne with the "Crystal Palace Advertiser" Cup and the Shield to Ron Chivrall for the *concours d'elegance*.

Films were shown, which were lent by Shell Mex, and then "For Those in Peril," an air-sea rescue story.

This has not, fortunately, converted our members to boats, perhaps because filling the clubroom with water on Monday nights would definitely be frowned upon!

WHITEFIELD M.A.C.

Members attended the N.W. Area A.G.M. and then adjourned to the "Swan With Two Necks," for a very enjoyable hot-pot supper. After which prizes were presented by Mr. Frank Nixon.

The evening finished with a film show, given by Eliot Horwich, which included a feature film on "Model Flying," with shots of the main events throughout the country.

The club held their first winter scramble competition in December. One hour's flying time was allowed, after which the entrants were extremely fatigued (so would anybody after they had charged through mud, water, barbed wire, etc.). Messrs. Bob Howarth and Geoff. Smith came out victorious with an aggregate of 10 min. plus.

ANGUS & DIST. A.L.

The league had its A.G.M. at Montrose and a dozen representatives were present from five of the eight member clubs. Cash balance (very important!) showed a slight increase over '53, reflecting a larger entry in league competitions. The contest report showed that average flight times had improved satisfactorily over the season. The league's first 1-c.c. P.A.A. competition was an innovation to be repeated this year. It was decided to have an F.A.I. power event on the same day instead of R/C as last time. The "sparks" event fell through last year.

The Strathmore Trophy was formally collected by leading club Montrose, while W. D. Guild, of Dundee, was the first to win the new solid silver "Angus Cup," which goes to the league's individual champion.

It was decided to consider purchasing another smaller cup as the first of a series of eight, to be presented annually to the winners of each of our competitions. That is looking far ahead, of course.

Then the general matters arising and the victuals were dealt with and the clans dispersed till the month of May.

President: D. G. Inglis, Dundee (re-elected). Vice-president: A. McCallum, of the Model Shop, Kirriemuir. Remainder of committee same as last year.

Arbroath: With Ian Ross in the R.A.F., only three seniors hold the fort against a horde of juniors. C/L enthusiasts overdid it a bit with engine noise in the town, but now meet with public tolerance provided they use the smaller and less disruptive engines.

An educational film show has been held for the benefit of the juniors and friends of the club. Titles of films included: "How An Aeroplane Flies" (lift and stability); "Air Parade," "Airscrews" and "Take It Easy" (no need to tell juniors that!).

Carnoustie: Members are flying two diesel-powered free-flight delta models and two 1 c.c. P.A.A. load designs, while they have 15 names on the list with five keen types doing the building. Flying ground at Buddon is shared with Dundee, who go in mostly for scale models, which, with a membership now at 34, is a very creditable state of affairs. They have, of course, a group of F/F duration enthusiasts, including the younger Guild, who swept the board in his home club as well as in the league.

Junior interest is hardly evident despite everything possible being done to help beginners. Club room is said to be an engine test bed for C/L department. Has anyone ever heard of a C/L type getting an overdose of fumes from the exhaust after a lengthy indoor session?

Kirriemuir is now a league club and has a 2:1 bias in favour of C/L, although interest in F/F is increasing. They have nine keen members and have a reasonable flying ground at Kingoldrum not far away.

Montrose members still manage an hour or two with their new designs, testing them out of doors, despite the cold, in anticipation of activity on a much bigger scale this year.

Indoors, main work is tuning the club radio, priming the stove, and winding the clock, although Petrie, Campbell and Whyte have a new power job and two Wakefields respectively—all club designs.

The Wakefields are folding prop., retracting u/c jobs at last, after many years with free-wheelers. Latest Wakefields still retain longish fuselage.

Tom Hendry has obtained his civil pilot's licence so we now have three solo pilots out of a membership of a dozen. We hope to compete in the big show on the West Side next summer—you will recognise us by the slide-rules in our sporrans.

READING & DISTRICT M.A.C.

Much discussion took place at the A.G.M. on how to cater for the sports fliers. Various suggestions for payload and Bowden-type contests were met with the objection that these required a lot of rules for fair running, and this might deter potential entrants. Also, the existing "scramble" contest was primarily intended for the sport flier. Eventually it was decided to let the "sport-only" types alone, and the meeting approved proposals for an "unorthodox" contest and a C/L combat this coming season.

Opinion on the winter programme was in favour of more outdoor flying and a break with the traditional series of six or seven indoor

This fine "Auster" carried off first prize at Crystal Palace M.A.C's annual concours d'elegance held in their clubroom. Built by Ron Chivrall, it made a qualifying flight of 48 sec. at Epsom.

When an expert gets down to the job the result can be seen in this model of a "Mercury IV," built by Mr. Dunster of Folkestone & District M.A.C., who even designed and made the 10 c.c. glowplug engine.

meetings. The first of the outdoor meetings was held at the beginning of December, with a reasonable attendance, although there were more spectators than fliers. One bod came well prepared with a float-equipped pylon job, but it lacked enough power to "unstick." A couple of our new members put in a fair amount of flying time.

The club held its third annual dinner and dance in November, about 100 members and friends enjoying a successful evening. The P.R.O. still recalls the "morning after" with a distinct shudder!

BRADFORD M.A.C.

The club recently held its A.G.M. and trophy winners for the 1954 season were announced. Silvio wins the power trophy (as usual!) and also the Brown Maff senior championship trophy, whilst C. P. Miller retains the Driver Cup for rubber models.

Other awards were as follows: Silvio Cup (gliders), J. Oxley; Coultas Trophy, C. P. Miller; Adcock Junior Championship Trophy, J. B. Creak.

The committee remains largely unchanged, except that S. Eckersley succeeds Trevor London as secretary and J. A. B. Pannett becomes area delegate in the place of Silvio.

In his report, the retiring secretary announced the end of a very successful season in national and international contests, but, owing to a combination of appalling weather and greatly-reduced membership, the club events had received very poor support—though we did manage to fly all seven of them!

A scheme for the partial amalgamation of the Bradford and Leeds clubs is under joint consideration. It has, in fact, already been ratified by Bradford, and the essentials of the plan will permit all our members to become non-voting members of Leeds, and vice-versa, and the pooling of each other's trophies in a combined competition programme for 1955.

CHELMSFORD M.A.C.

Unlike most clubs we were unable to record any major wins last season. However, we did manage to place fifth in "The Model Engineer" Cup.

Les Sayer is still developing his Wakefields and George Foden is still expounding his theory of "low wings for high times."

A number of rubber models are soon expected as the club "Owl Goblet" trophy will be awarded for this type of contest this coming season. Neville Willis, mainly by virtue of being competition secretary, managed to carry off both club silver pots last season.

An exhibition is being arranged for next Whitsun and all East Anglian clubs are cordially invited to display their models.

FARNBOROUGH M.A.C.

An exhibition will be held any time now and committee members are asking the lads to put their best models in cold storage for a while. Of special interest will be a 7 ft. tailless power job (there's a rumour that it actually flies!) and "Rod" Walter will be displaying some of his "hot" speed models alongside his even "hotter" engines. Members busily butchering their fingers have the consolation of knowing it's for a good cause!

THORNABY PATHFINDERS M.F.C.

The club is now well established and the lads are beginning to pull together. The clubroom is in constant use, and regular flying sessions take place every Sunday. The F/F section is hopefully waiting for the first day of spring, and in the meantime stubby little combat jobs are on the stocks. The total model strength is being built up in readiness for some displays which we hope to give in the near future.

Talk around the clubroom recently has centred on home-brewed engines. Main difficulty will be finding someone genned up on the subject. Also, secret experiments with potent fuel-brews are taking place, doubtless with the help of a hand-book on "Black Magic."

WALLASEY M.A.C.

The club finished its run of contests with the Jetex, held in very calm, dull conditions.

The aggregate ratios were:—

(1) J. Done, 22.73 (200 Jetex unit); (2) J. Hannay, 20.62 (200); (3) C. Bryan, 20.30 (100); (4) S. Hinds, 19.55 (200); (5) R. Sutton, 13.99 (50); (6) J. Robinson, 11.56; (7) N. Chatten, 5.75 (200).

We participated in the Merseyside Regional Council of Model Aero Club's exhibition, where J. Hannay collected prizes in both the glider and rubber concours.

SEAHAM D.M.C.
North Eastern Area

At a recent meeting Thos. Oliver was re-elected chairman and treasurer, and Lance Robinson as competition secretary. Owing to our former secretary leaving the district, Bill Hume, 56, Daphne Cres., Seaham, Co. Durham, was elected as secretary. We would like to thank Malcolm Bainbridge, one time Gamage winner and still a fine modeller, for all the work

INTERNATIONAL RECORDS
(NEW LISTING)

This latest list of International Records published by the F.A.I. shows that the list of World Records has now been reduced from 63 categories to 30. Of these, so far only 21 have been claimed. The old list was rather unwieldy and the F.A.I. Model Commission are to be congratulated on such a wise move. Reference should be made to the table on page 40 of the January issue, which clearly shows the various categories.

1	RUBBER	Duration	Kiraly, M.	(Hungary)	20/8/1951	87:17
2		Distance	Benedek, G.	(Hungary)	20/7/1947	50.260 km.
3		Height	Poich, R.	(Hungary)	31/8/1948	1442 m
4		Speed	Davidov, V.	(Russia)	16/9/1947	107.08 km/h
5	POWER	Duration	Koulakovsky, E.	(Russia)	6/8/1952	*361:00
6		Distance	Boricevitch, E.	(Russia)	14/8/1952	*378.756 km
7		Height	Lioubouchkine, G.	(Russia)	13/8/1947	*4152 m
8		Speed	Stiles, E.	(U.S.A.)	20/7/1949	129.768 km/h
9	HELICOPTERS	Duration	Evergary, G.	(Hungary)	13/6/1950	74:3
10		Distance	Roser, N.	(Hungary)	9/4/1950	238 m
17	GLIDERS	Duration	Ainadinov, S.	(Russia)	6/7/1950	198:00
18		Distance	Szomolanyi, F.	(Hungary)	23/7/1951	139.8 km
19		Height	Bendek, G.	(Hungary)	23/5/1948	2364 m
20	RADIO	Duration	O'Heffernan, H. L.	(G.B.)	7/10/1954	151:20
22		Height	Velitchkovsky, P.	(Russia)	3/8/1952	845 m
23		Speed	Stegmaier, K. H.	(Germany)	21/3/1954	58 km/h
24	GLIDER	Duration	Bethwaite, F. D.	(New Zealand)	16/5/1954	120:00
27	C/L SPEED	Class I	Prati, A.	(Italy)	6/6/1954	190.47 km/h
28		Class II	Muller, G.	(U.S.A.)	23/8/1952	217.20 km/h
29		Class III	Sugden, R.	(U.S.A.)	24/8/1953	248.80 km/h
30		Jet	Vassiltchenko, M.	(Russia)	9/1/1953	*264.70 km/h

(*Absolute World records)

BRITISH HOLDERS OF "C" CLASS CERTS.

504	Anderton, A. F.	(Cheadle)	533	Brooks, A. J.	(Grange)
450	Chinn, J. I.	(Norwich)	496	Cooke, A.W.M.	(Henley)
366	Gorham, J. A.	(Ipswich)	872	Mole, K. D.	(Tynemouth)
509	North, E.	(Halifax)	862	Pollard, R. C.	(Tynemouth)
228	Tubbs, H.	(Leeds)	215	Willmott, D. T.	(Belfairs)
			407	Wriggley, A.	(Prestwich)

he has done for the club as secretary.

At the same meeting a reorganisation programme, designed to attract and hold new members, was agreed on. We are to hold an exhibition in Messrs. Gray's windows this month and a programme of talks, discussions and building nights has been organised. Consequently if there are any experienced, "donesome" or would-be aeromodellers (15 or over please) living anywhere near Seaham, why not pop down to Rock House, (opposite the Police Station !), Seaham Harbour, some Friday night? We have a workshop, two rooms, building accommodation, a treeless F/F field, a concrete T/R and C/L pitch, R/C equipment, as well as a hall for r.t.p. or mike stuff, so roll up.

We have our radio kings and a very large R/C project is to be built. A design for a small, simple, yet high, performance contest sailplane is being built to crack the Pilcher and Frog Junior Cups. This design *Prester John* has already won a contest—the Canal Zone Championship—where it was lost after being clocked by a few worthies for 15-20 min. Bill Hume's new racer, *Little Waister*, has been developed by Jack Armes until, at the end of last season, it was doing 50-55 laps at over 75 m.p.h., with an Oliver Tiger.

LUTON & DISTRICT M.A.S.

Vice-president Mr. J. Emmerton started off the winter programme with an entertaining film show. R. Brown won the Winter O/R comp. with his lightweight model designed by Ron Warring. Members enjoyed a happy evening at our dinner and social recently. Among those present were Mr. and Mrs. H. Hundleby and Mr. J. Lamble. Cups and certificates were presented to winners by Mrs. Hundleby. Senior and junior club champions were R. Brown and P. Mitchell, respectively.

The "Collins Shield" (Wakefield) went to D. Wood a member in his first full year of contest work. Our very able M.C. for the evening was popular Bob Minney, now back with us again after his national service. On January 27th, Mr. K. Wingrave will show us the results of his cine camera work at club camps, and rallies, etc.

Later in the year we hope to stage an exhibition, Flying and Static, to boost club membership.

BRITISH NATIONAL MODEL AIRCRAFT RECORDS
DECEMBER 1954

RUBBER-DRIVEN					
Monoplane	Boxall, F. H.	(Brighton)	15/5/1949	35 : 00	
Biplane	Young, J. O.	(Harrow)	9/6/1940	31 : 05	
Wakefield	Boxall, F. H.	(Brighton)	15/5/1949	35 : 00	
Canard	Harrison, G. H.	(Hull Pegasus)	23/3/1952	6 : 12	
Scale	Marcus, N. G.	(Croydon)	18/8/1946	5 : 22	
Tailless	Woolls, G. A. T.	(Bristol & West)	10/5/1953	3 : 03	
Helicopter	Tangney, J. F.	(Croydon & U.S.A.)	2/7/1950	2 : 44	
Rotorplane	Crow, S. R.	(Blackheath)	23/3/1936	0 : 40	
Floatplane	Parham, R. T.	(Worcester)	27/7/1947	8 : 55	
Flying Boat	Parker, R. A.	(Kentish Nomads)	24/8/1952	1 : 05	
Ornithopter	White, J. S.	(Barking)	20/6/1954	1 : 55	
SAILPLANE					
Tow Launch	Allsop, J.	(St. Albans)	11/4/1954	90 : 30	
Hand Launch	Campbell-Kelly, G.	(Sutton Coldfield)	29/7/1951	24 : 30	
Tailless T.L.	Lucas, A. R.	(Port Talbot)	21/8/1950	22 : 34	
Tailless H.L.	Wilde, H. F.	(Chester)	4/9/1949	3 : 17	
A/2 T.L.	Allsop, J.	(St. Albans)	11/4/1954	90 : 30	
A/2 H.L.	Campbell-Kelly, G.	(Sutton Coldfield)	29/7/1951	24 : 30	
POWER-DRIVEN					
Class A	Springham, H. E.	(Saffron Walden)	12/6/1949	25 : 01	
Class B	Dallaway, W. E.	(Birmingham)	17/4/1949	20 : 28	
Class C	Gaster, M.	(C/Member)	15/7/1951	10 : 44	
Tailless	Fisher, O. F. W.	(I.R.C.M.S.)	21/3/1954	4 : 12	
Scale	Tinker, W. T.	(Ewell)	1/1/1950	1 : 37	
Floatplane	Lucas, I. C.	(Brighton)	11/10/1953	4 : 58	
Flying Boat	Gregory, N.	(Harrow)	18/10/1947	2 : 09	
Radio Control	O'Heffernan, H. L.	(Salcombe)	7/10/1954	151 : 20	
Class I Speed	Wright, P. L.	(St. Albans)	7/6/1954	111.28 mph	
Class II Speed	Powell, D. R.	(East London)	7/6/1954	132.7 mph	
Class III Speed	Davenport, R. F.	(East London)	11/7/1954	152.17 mph	
Class IV Jet	Stovold, R. V.	(Guildford)	25/8/1949	133.3 mph	
LIGHTPLANE RUBBER-DRIVEN					
Monoplane	*Wiggins, E. E.	(Leamington)	11/7/1954	40 : 13	
Biplane	O'Donnell, J.	(Whitefield)	18/5/1952	6 : 46	
Canard	Lake, R. T.	(Surbiton)	7/4/1954	7 : 32	
Scale	Dubery, V. R.	(Leeds)	14/7/1951	1 : 11	
Floatplane	Taylor, P. T.	(Thames Valley)	24/8/1952	5 : 15	
Flying Boat	Rainer, M.	(North Kent)	28/6/1947	1 : 09	
LIGHTWEIGHT POWER-DRIVEN					
Class A	Archer, W.	(Cheadle)	2/7/1950	31 : 05	
Class C	Ward, R. A.	(Croydon)	25/6/1940	5 : 33	
Tailless	Fisher, O. F. W.	(I.R.C.M.S.)	27/7/1954	3 : 02	
Floatplane	Mussell, A.	(Brighton)	11/10/1953	2 : 53	
LIGHTWEIGHT SAILPLANE					
Tow Launch	Green, D.	(Oakington)	11/4/1954	36 : 02	
Hand Launch	Redfern, S.	(Chester)	11/7/1954	11 : 15	
Tailless T.L.	Couling, N. F.	(Sevenoaks)	3/6/1951	22 : 22	
Tailless H.L.	Wilde, H. F.	(Chester)	11/7/1954	9 : 51	
Canard T.L.	Caple, G.	(R.A.F. M.A.A.)	7/9/1952	22 : 11	
INDOOR					
Stick H.L.	*Read, P.	(Birmingham)	10/10/1954	23 : 58	
Stick ROG	Monks, R.	(Birmingham)	12/9/1954	20 : 30	
Fuselage H.L.	Parham, R. T.	(Worcester)	12/9/1954	13 : 16	
Fuselage ROG	Parham, R. T.	(Worcester)	12/9/1954	12 : 10	
Tailless H.L.	Monks, R.	(Birmingham)	12/9/1954	4 : 13	
Tailless ROG	Parham, R. T.	(Worcester)	18/8/1951	2 : 28	
Ornithopter H.L.	Parham, R. T.	(Worcester)	9/1/1954	1 : 10	
Helicopter	*Monks, R.	(Birmingham)	19/11/1954	5 : 01	
Rotorplane	Parham, R. T.	(Worcester)	23/1/1954	0 : 40	
RTP Class A	Muxlow, E. C.	(Sheffield)	10/12/1948	6 : 05	
RTP Class B	Parham, R. T.	(Worcester)	20/3/1948	4 : 26	
RTP Speed	Jolley, T. A.	(Warrington)	19/2/1950	42.83 mph	

(*Ratification pending)

AEROBODS OF NOTE

SILVIO LANFRANCHI

Power contest flier of international repute. Although a Swiss, his many contest placings have won considerable prestige for Britain. He placed second in the Free Flight Power at the 1954 Model Air Olympics.

HYDE M.A.C.

Weather of the foulest kind has caused hibernation of our chaps to the building of models for "summer."

We will cautiously note the weather as "Summer" approaches so as to hold our rally, cancelled last year for obvious reasons, sometime round July.

R. Wilson's failure to capture height record last June has made him prepare three models for record attempts. Junior 60 for height (R/C).O/D "Cu Nimbuster" (R/C) for duration attack, the special tank holding sufficient fuel for 6½ hrs. Special actuator requires no rubber, no batteries, merely the normal actuator battery. And lastly, "Sea Nymph" (R/C) to cross 54 miles of salt water. (Not the Channel !)

Latest flight by Ron Wilson with R/C was 1 hr. 10 min. and the model kept only 30 ft. off the deck.

SECRETARIAL CHANGES

Farnborough M.A.C. J. Webster, 4, Alma Square, Cross Street, Farnborough, Hants.

Bradford M.A.C. J. Stanley Eckersley, 65, Calverley Moor Avenue, Thornbury, Bradford.

E. Anglian Area. M. D. Gates, 90 Whitehall Road, Cambridge.

Cardiff M.A.C. J. Henderson, 103a, Glebe Street, Penarth, Glamorgan.

Oldham & Dist. M.A.C. M. R. Johnson, 3, No. 4 Court, off Hobson St., Oldham.

NEW ADDRESS

Bristol & West M.A.C. D. C. L. Francis, 7, Fremantle Square, Cotham, Bristol, 6.

NEW CLUB

A new club was formed in December in the Worcester area, and is known as "The Freemasons Arms Aeromodelling Club (Worcester)."

The following are details of officers elected:—Chairman, F. Brown, Ronkswood, Worcester; Vice-chairman, K. Bozward, 51, Carden Street, Worcester; Secretary, B. Cooke, 172, London Road, Worcester; Vice-secretary, R. Murphy, 27, Lich Street, Worcester; Treasurer, E. T. Baddeley, 56, Friar Street, Worcester.

Committee: T. Corfield, 39, Hillary Road, Worcester; F. Rodway, 18, Tallow Hill, Worcester; D. Barratt, 31, Knight Street, Worcester; G. Rowberry, 16, Rogers Hill, Worcester; J. Rider, 53, Woodland Road, Worcester; S. Williams, 3a, High Street, Worcester.

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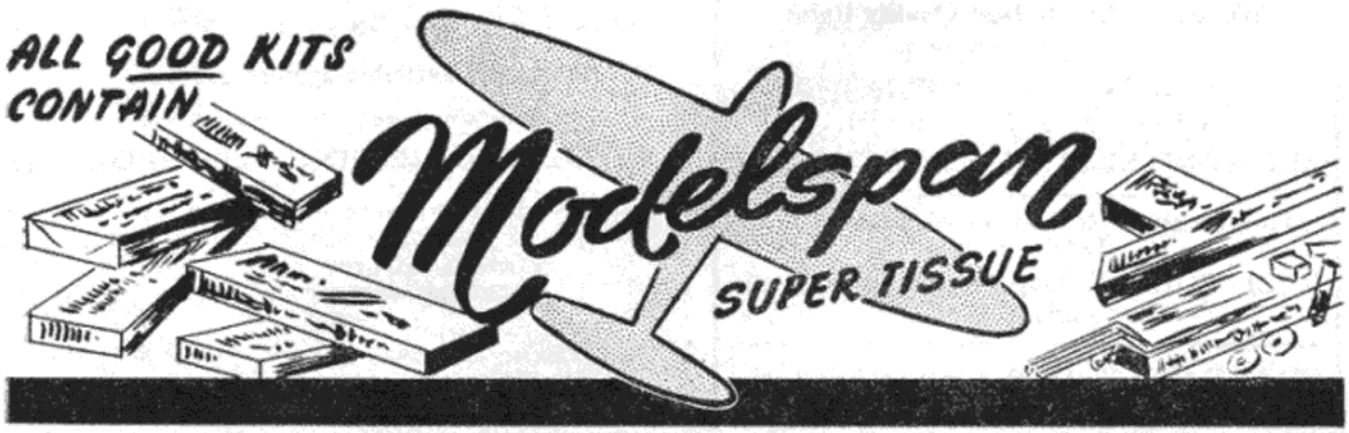

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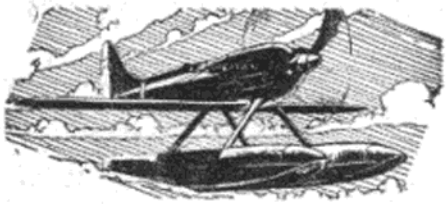
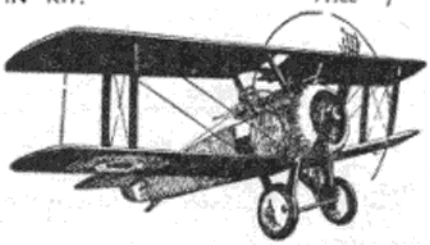


● **SUPERMARINE S6B** Model of type that won the Schneider outright for Britain in 1931. KIT INCLUDES PLASTIC PROPELLER. *Price* **5/7**

● **ALBATROSS DIII** Model of machine flown by Baron von Richtofen during 1914/18 War. PLASTIC ENGINE PARTS AND PROPELLER INCLUDED IN KIT. *Price* **5/7**

● **SE.5a.** This is the SE5a flown by the famous "Micky" Mannock (No. 74 Squadron) in World War I. SCALE PLASTIC PROPELLER ALSO LEWIS GUN IN KIT. *Price* **5/7**



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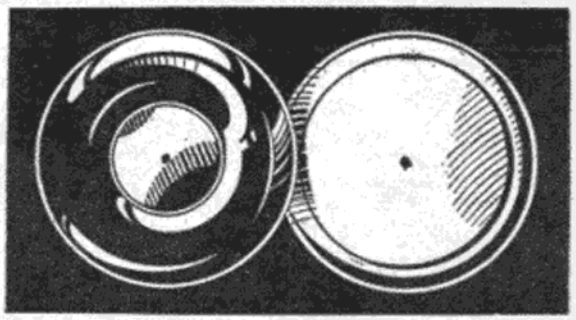

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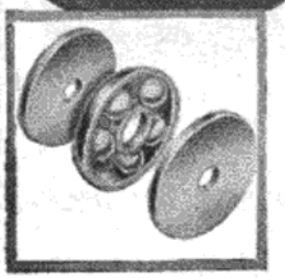

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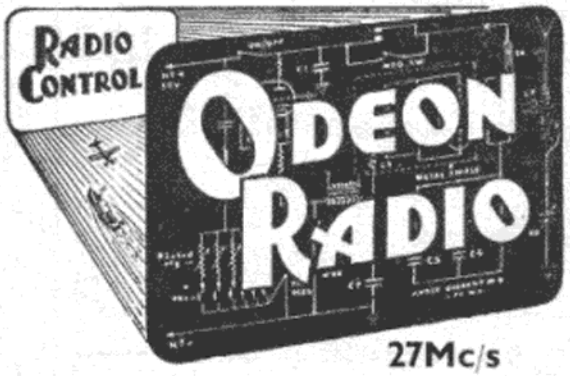

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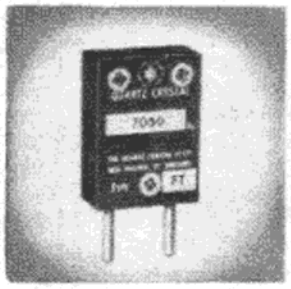

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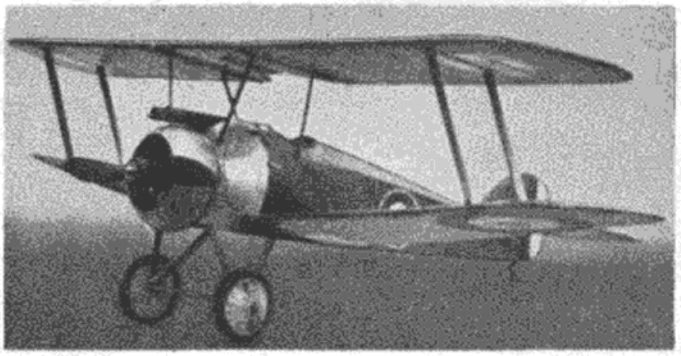

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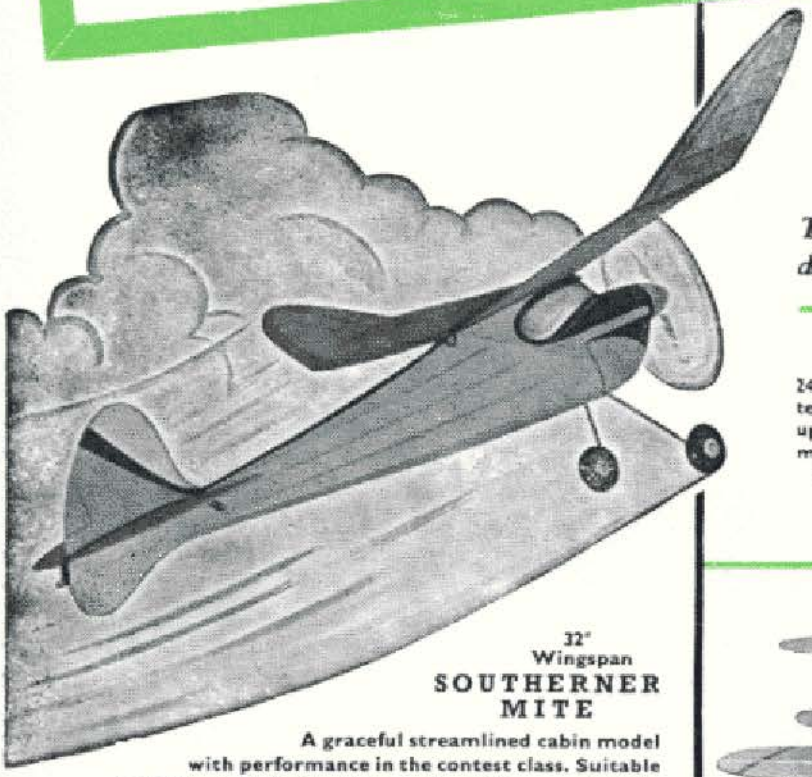

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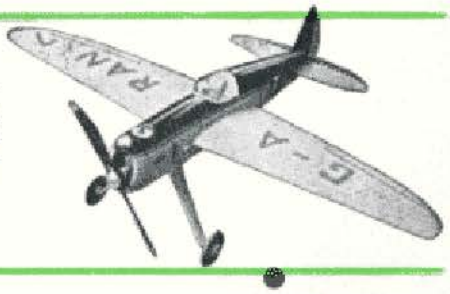

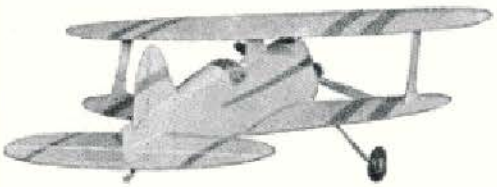

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