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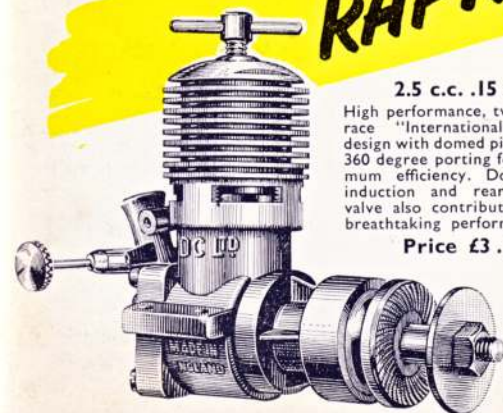
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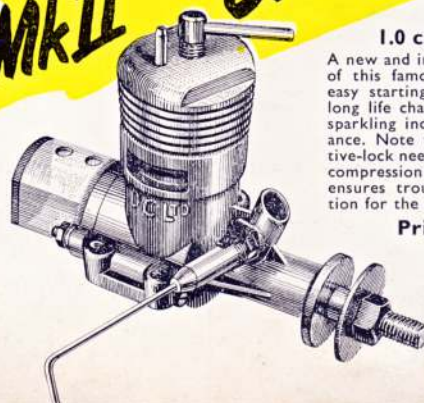


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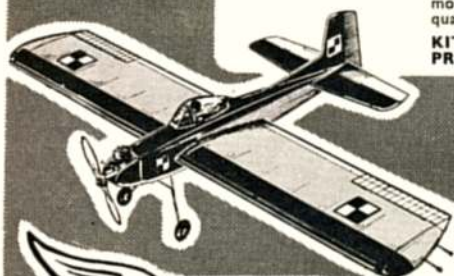
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THE Balsa STORY

by JOHN PATERSON
MANAGING DIRECTOR, SOLARBO LTD

PART I
of a series of twelve

ON THIS PAGE, month by month, I am going to try to tell you about Balsa Wood, in the form of a serial story.

It is, I think, first necessary to tell you something of my own background, both to support my ability to tell you this story and to show you why we deal with this Balsa business in a way different to any other firm.

I was trained as a Railway Engineer in Australia, and for ten years before the war had a particularly varied experience in London, covering both design and outside construction. So often in engineering a full consideration of the facts leads only to one logical solution, and I believe that my own original engineering training and experience gives me both a technical viewpoint and this logical approach to a problem.

This business was started by a Civil Engineer friend in 1938. It was all quite casual. Someone turned up from America with Balsa to sell and so, as a side line to a contracting business, it started by just selling bulk balsa. Soon machinery for cutting was added and then came the war and the Admiralty placed orders for a life-buoy designed

by the firm. Some 77,000 of these were made during the course of the war!

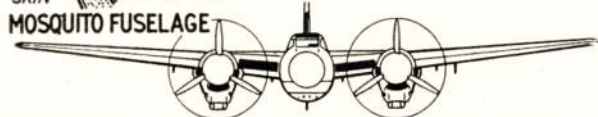
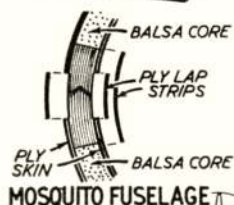
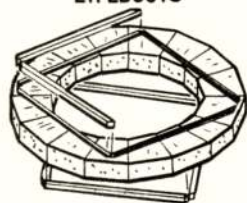
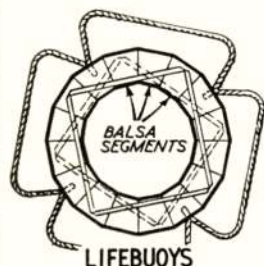
At this stage I knew little of Balsa, but I was somewhat of a specialist in costing and production and my friend asked me to do some reorganisation of the general production. It was at this time that "Mosquito" manufacture commenced and that brought the problem of selection of Balsa Wood for it.

What a beautiful aeroplane the Mosquito was! Its light weight gave it outstanding range and armament capacity, and its wooden construction and wonderful aerodynamic surface gave it speed. When the Mosquito was given top priority for production Balsa became a really important strategic material.

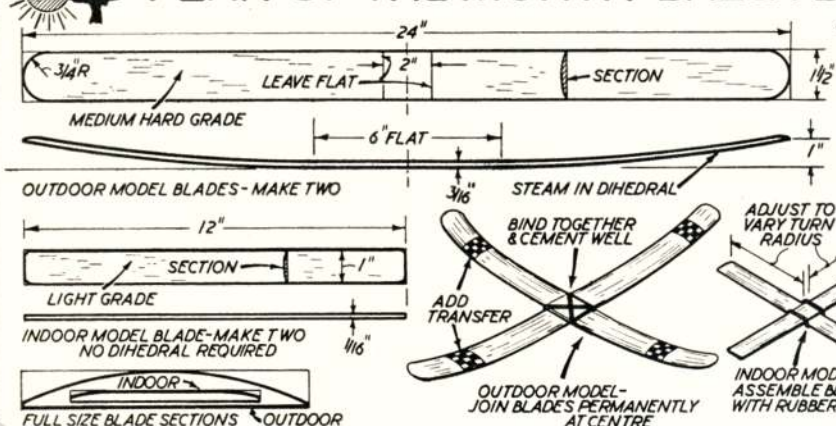
Why Balsa? Because it gave the greatest strength for the minimum weight. It was used for the fuselage as a core material 7/16 in. thick in a sandwich with 1/16 in. ply faces. Despite exhaustive tests no substitute could be found to equal its strength used in this way.

But the weight of Balsa was critical. It had to weigh not more than 8 lb. per cu. ft., and 9 lb. would not do.

Next month I will tell you how this selection for weight was made.



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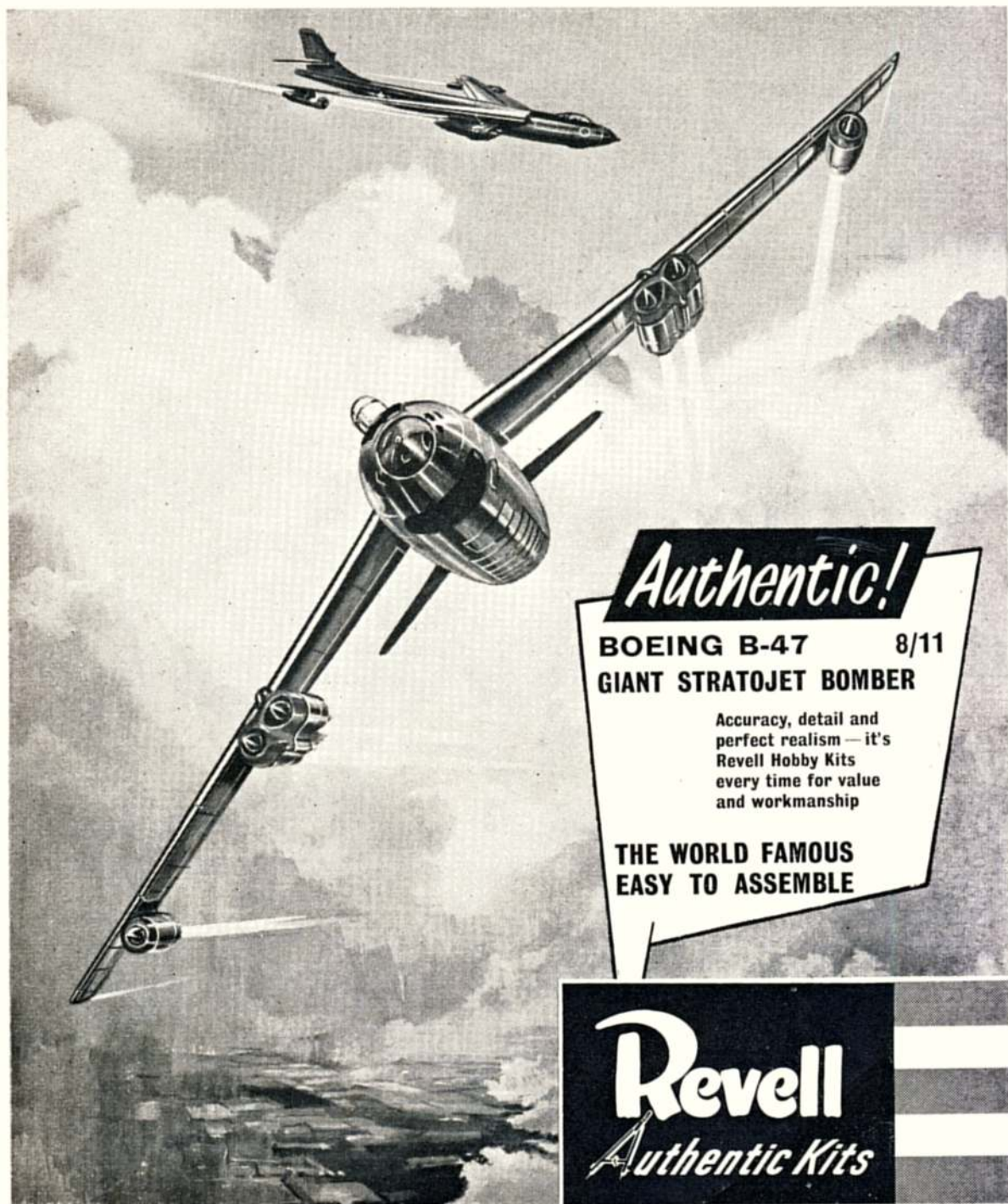
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*Their thoughts in the sky,
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air-crew blend courage
with careful skill.*

Per ardua...ad astra. *It is not easy to fly with the R.A.F.,
to lead others, to shoulder great responsibilities while still young. But in the
lasting satisfaction of this immensely worthwhile career...*

great effort
finds great reward



A YOUNG MAN'S DREAM may dwell on flying — on the exhilarating challenge in the airy spaces of sky. His common sense tends to call him back to earth—to consider the future and the building of a career.

Feet on the ground

In the Royal Air Force today you can satisfy both these demands — and the new appointment of Air Electronics Officers means more can now fly. These highly skilled men are trained to be responsible for all the electronic devices in the new V-bombers. But aircrew are much more than flyers. They are often seconded for other important work in Britain and abroad. Training others, international liaison, aircraft development — these are but some of the jobs that may come your way. And responsibility grows fast. You can be a Group Captain while in your early forties, responsible for perhaps fifteen hundred men and several squadrons of modern aircraft. Beyond that? There is no limit. Quality counts in the R.A.F. and there will always be room at the top for good men.

A sure future — good pay

You can join the R.A.F. through the Direct Commission Scheme, confident of a permanent career right up to pension age. Or you can choose a twelve year engagement, with the option of leaving after eight. If you leave after 12 years you take back to civilian life a tax-free gratuity of £4,000! Whichever you choose the pay is good. At the new rates, a Flight Lieutenant of 25 for instance, can draw, with full allowances, about £1,500 a year.

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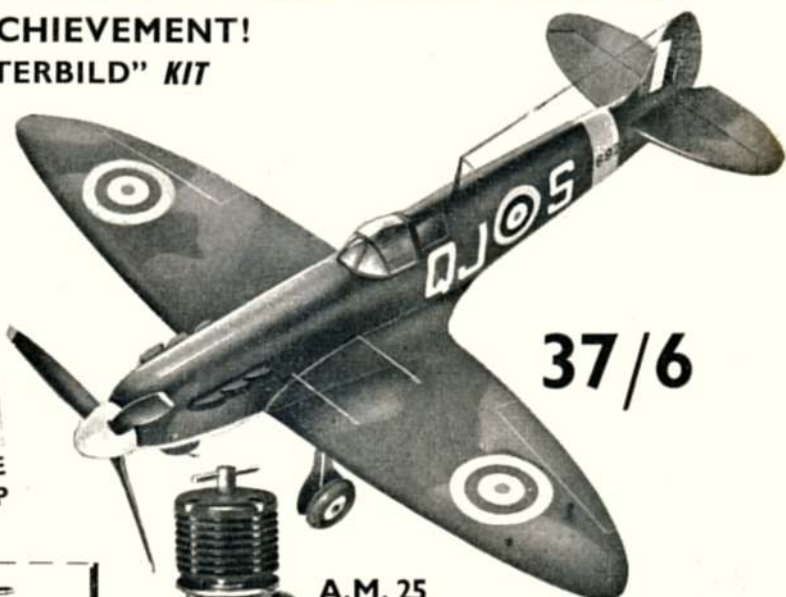
MERCURY'S GREATEST ACHIEVEMENT! THE SPITFIRE V "MASTERBILD" KIT

This is the finest kit ever issued under the world-famous MERCURY Trade Mark. All balsa parts are prefabricated and the solid balsa wing is cut to a true airfoil section which only needs sanding. At 37s. 6d. it is wonderful value. For the AM 25 and all similar motors. Every kit contains a full transfer sheet of authentic squadron markings.

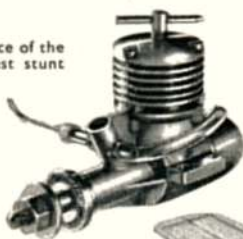
- Span 23 in. ● Length 21½ in.
- Wing Area approx. 100 sq. in.
- Weight 16 oz.



LOOK FOR THIS KIT OF THE
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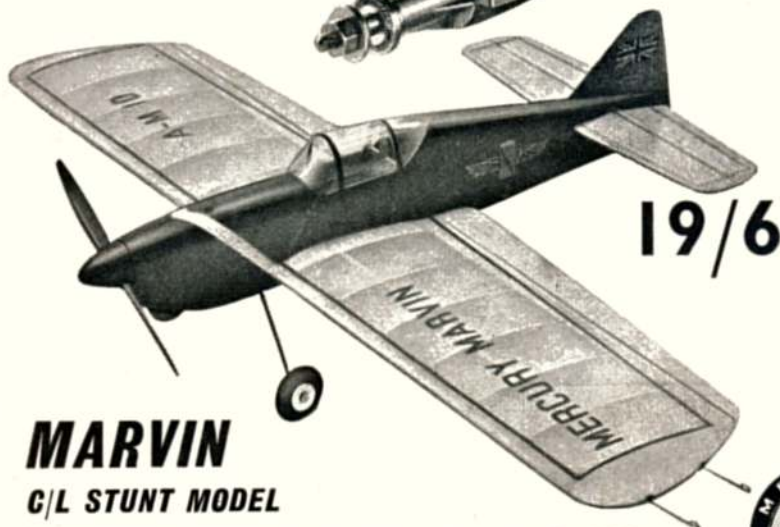
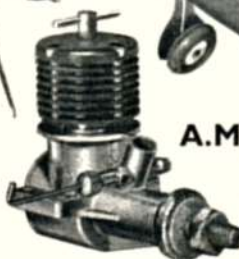


A.M.10 The terrific performance of the AM 10 makes possible a true contest stunt model for 1 c.c. for the first time. This is the best engine in its class in the world. **58/6** inc. P.T.



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VOLUME XXII
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Managing Editor - - - C. S. RUSHBROOKE
Editor - - - - - H. G. HUNDLEBY
Assistant Editor - - - R. G. MOULTON



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AEROMODELLER Incorporates the MODEL AEROPLANE CONSTRUCTOR and is published monthly on the 15th of the previous month by the Proprietors:

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When a young man's fancy lightly turns to . . .

AS WE WRITE these words the first day of Spring has just passed by and young men's thoughts throughout the land are turning, not only in the direction of the female species, but in the case of aeromodellers, more towards the local flying field.

The sun is shining, the birds are singing, the whirr of a Wakefield prop can be heard and above all the steady drone of a diesel motor or sometimes the howl of a glo-motor competes with Mother Nature. Mr. Brown, snoozing quietly after his Sunday lunch, recuperating after a week of honest toil sighs, eventually snorts, and then reaches for pen and paper to compile the inevitable complaint to the local council.

In many cases he does so with complete justification, for there is no peace to be had on a Sunday afternoon when the control line boys are in full session with a McCoy 60 stunt job. We do not blame the boys for wanting to fly, all aeromodellers feel the urge particularly at this time of the year whatever their aeromodelling inclination. We only point the moral that control line models are noisy, some very noisy. They can be tolerated for short periods but not through an entire Sunday afternoon when people are taking their well earned rest. Please pick your flying circles well away from residential areas and even more important *away from overhead power lines.*

After the continuous number of accidents, many of them fatal, that have occurred in past years, and in spite of the warnings published by ourselves and other journals, modellers still continue to fly beneath these highly lethal power cables with the inevitable disastrous results. Eighteen-year-old Arthur Barnish of Stoke-on-Trent is the latest victim. He is very badly burnt and very lucky to survive a 130,000 volts shock. We suggest to all control line fliers that they do not fly in any field where there are pylons. These high voltages can jump a considerable gap, particularly when the air is damp so it is better to take no chances.

But to return to Spring—we have received a letter from an American reader, Mr. Arthur Heinrick, of Baldwin, Long Island, New York, who says he is seventy, has been designing, building and flying model aeroplanes for fifty-two years, and wants to know if he is the oldest active aeromodeller in existence. He says that knowing England to be the oldest centre of model aviation he is more likely to find a challenger on this side of the Atlantic. His favourite model is a twin A frame pusher, in which class he reckons to have built "the lightest, strongest, and best flying type ever seen in the U.S.A. or abroad!"

What about it, you British old-timers! Here is an Early Bird of the 1909-1910 era who in his own words "is still going pretty good".

Congratulations, Mr. Heinrick, we may find you a taker this side of the pond before the Easter bonnets are about.

On the cover . . .

OF THE MANY varied duties for which the modern Helicopter is used, it is most suited to the role of rescue operations. Recovery of persons from the sea has always been a hazardous task; but now, thanks to the special scoop net devised by Lieut.-Cmdr. Sproule, it is possible for survivors of any misfortune at sea to be snatched from water and safely carried off through the air. Our cover shows an early experiment carried out by a volunteer crew, using the Sproule net from a Westland Whirlwind, the helicopter which is detailed on pages 256-258 of this issue. (Air Ministry photo.)



Eugene Roman adjusts the fin, and Harry Finch fits an engine pod to a \$100,000 model of the Convaair 880 jet airliner in the S. California Co-operative Wind Tunnel. Their modelling is part of a Convaair million dollar programme of research.

World A/2 Glider and Speed Championships

We have news from Czechoslovakia of the World Championships which will take place August 7th to 12th. The aerodrome is that of the Aero Club of Mlada Boleslav which is approximately 35 miles N.E. of Prague. Local fliers tell us that it is big enough for 3-minute flights whatever the strength of wind, and it seems a special circle is being built for the speed models. Programme runs as follows: *August 7th*—arrival and reception of competitors in Prague at the Automobile Club, which is about three minutes from the station, leaving for Mlada Boleslav in the evening; *August 8th*—Processing and test flying of gliders; *August 9th*—All five flights of glider contest and processing and test flying of speed models; *August 10th*—First and second rounds of speed contest; *August 11th*—Morning, third round of speed contest with flying display in afternoon and prize-giving dinner in the evening; *August 12th*—Departure of contestants.

Each nation may send four competitors and a team manager for each contest and an unlimited number of spectators. The organisers in conjunction with the Czech Tourist Office CEDOK will do all they can to assist visitors and to show them the worthwhile sights of Czechoslovakia, which, incidentally, features some of the most beautiful scenery in Europe. Fees for competitors and officials are 3 U.S. dollars per day, i.e., 18 dollars for the period which covers travel from Prague to the contest site, meals and accommodation. Visiting spectators will be charged at the rate of 5 dollars per day, i.e., 30 dollars for the 6-day period. Entries and applications from intending visitors must be submitted to the Aero Club R.C.S., Prague II, Smecky 22, by July 7th, 1957. Proxy models must arrive at the same address by August 1st, and proxy entry fees will be at the same rate as attending competitors, i.e., 3 dollars per day. (British aeromodellers attending as visitors should apply direct to the Czech Aero Club, and not through the S.M.A.E.)

Rule Changes

"Steady chaps! This is not an F.A.I. effort!" but merely slight modification to S.M.A.E. Radio Control and Control Line Aerobatic rules.

In radio the normal spot landing is modified to the "H" system and the rule governing landing points modified to exclude those who dive on the spot landing

HANGAR DOORS

marker. The bonus points for single channel entries when competing with multi-channel equipment has been reduced in the light of experience from 50 to 25 per cent. The points scoring system for all aerobatic radio contests has also been adjusted so as to give better credit to the more difficult manoeuvres, and the Immelman turn has been included in place of the previous "Special Manoeuvre" that appeared on the schedule.

Scoring has also been revised for S.M.A.E. Control Line Aerobatic contests and an additional manoeuvre, the *Double Wingover* included.

Full details are available from the Society and it is important to note that these new rules apply this season which means they will be in force at the Nationals.

British Nationals

Presumably on the principle of "Ye early bod catcheth ye riser" the S.M.A.E. announce that contests at this years Nationals will commence at 9.30 a.m. on the Sunday and 8.30 a.m. on the Monday. Full details of the meeting will be found in "Club News" and we do suggest that any aeromodeller who has not yet enjoyed the pleasure of a "Nats" should come along.

Sackcloth and Ashes Corner

In the article on "Smog Hog" in our last issue we gave sketches of various differential *aileron* systems and misguidedly captioned them *elevator* systems. In describing the German 8-reed unit manufactured by Martin Pfeil of Hildesheim in our March issue we referred to the switching frequency in *megacycles*, which should read *cycles*, as this is an audio-frequency unit and not ultra high-frequency.

Our apologies are due to readers and traders alike for the late arrival of the last issue of AEROMODELLER, which was delayed in despatch due to a breakdown at the printers. We very much regret the inconvenience and annoyance caused by the delay which was purely temporary. Any retailer or modeller who has difficulty in obtaining supplies of the magazine by the correct date of this or any future issue should contact us immediately.

Track suits for International Teams



Thanks to the Federation of Model Aircraft Manufacturers and Wholesalers, future S.M.A.E. International members will be equipped with the neat and practical track suits shown in the photo at left. Overall colour is royal blue with white and dark blue trimming. The Union Jack and letters "Great Britain" are across the shoulders. No doubt the reputation we have for fielding the scruffiest teams at International events will fast disappear when our contest fliers sally forth such pictures of sporting sartorial elegance.



From our Czech contemporary, "Letecky Modelar", we reproduce illustration of their enthusiasm to please at the coming World Champs. L. to R.: Recovery by Skoda 440 cars, by Sokol aircraft; saving space in c/l speed; full press facilities will be provided, and owners will be able to watch proxies in action via Television

Aeromodeller's Honour

Congratulations to Roy Panteney, well-known member of the Eastbourne club, who was awarded the British Empire Medal by Her Majesty The Queen for his work in Canada and Newfoundland on the newly laid Transatlantic Telephone cable. Roy, aged 36, was at various times Comp. Sec. and Tech. Sec. to the Eastbourne club, and had quite a lot of success with radio control flying, placing well in National contests.

Obituaries

It is with profound regret that we learn of the death of Robert (Bobby) Burns of Stewarton. Bobby's main interest was for a number of years centred on aeromodelling. Despite his constant ill-health he maintained his enthusiasm, and by his knowledge and friendly nature fostered in Stewarton and Ayrshire a love and understanding for modelling among both old and young.

We of AEROMODELLER knew him well, and his constant cheerfulness in the face of chronic sickness never ceased to amaze us. Scotland—and indeed all aeromodelling—has lost a great enthusiast.

A further loss to the modelling fraternity is occasioned by the death of Mr. D. S. Barton, governing director of the Humber Oil Co. Ltd., makers of the famous Britfix range of cements and dopes. Mr. Barton was the founder of the company in 1919 and since that time, by means of a magnetic personality and by strict adherence to the highest business standards, made for himself a host of friends both at home and abroad. Mr. Gerald D. Barton will take over governing directorship of the company, of which he has been a director since 1947.

Arch Whitehouse

Publication in this issue of the second of our World War I true story features by Arch Whitehouse may cause some of your younger readers to wonder as to the background of our newest contributor.

Born in Northampton, Arch was taken to the United States when he was ten years of age. At the outbreak of the war in 1914, when seventeen, he volunteered and returned to this country by working his way across the Atlantic on a cattleboat. He first joined the Northamptonshire Yeomanry, but soon transferred to the Royal Flying Corps in the field as an aerial gunner.

He served with No. 22 Squadron (Fees and Bristol Fighters) until January of 1918, when he was returned to Britain for his commission and single-seater (Camel) training. For the rest of the war he served with an East Coast home defence squadron at Frieston. While serving with No. 22 Squadron he was credited with destroying sixteen enemy aircraft and six kite balloons. He was wounded once and awarded the Military Medal.

Beginning in the pulp-thrillers of the day, he became one of the most prolific writers in the profession. He turned out 3,000 words a day for adventure, technical and other aviation outlets. Much of his work was

reprinted throughout the British Empire, Canada, Australia, New Zealand and even China. Many readers still remember his Casket Crew stories, the adventures of Billy "Buzz" Benson, and tales of Kerry Keen.

During World War II, Whitehouse again volunteered, but was not accepted by the R.A.F. Instead, he became a war correspondent with the Royal Canadian Air Force, and spent much time on anti-submarine patrols on the North Atlantic.

When the United States entered the war, Whitehouse was asked by the U.S. Writers' War Board to cover the activity of the U.S. Air Force in Britain, and for many months he was in England with the U.S. Eighth and Ninth Air Forces. He went into Normandy on the invasion and stayed with the U.S. forces until the fall of Paris. After that he went to Hollywood for two years, and turned out six motion picture scripts.

More recently, Whitehouse has written a motion picture script based on the life of Major William A. (Billy) Bishop, V.C., famous Canadian World War I airman who destroyed 72 enemy aircraft in five months.

Of late, Whitehouse has been gathering material for a book on the U.S. Tactical Air Command. The task has required that he fly aboard many new jet types and travel nearly 15,000 miles. He has been all over France and Germany living with the men of various tactical wings as well as on several of the N.A.T.O. establishments. At this writing, he is making one last trip for the work throughout the South-West U.S. and the Panama Canal Zone.

We hope to publish more of Whitehouse's World War I features in future issues of AEROMODELLER.





Learn to Stunt with ...

RASCAL

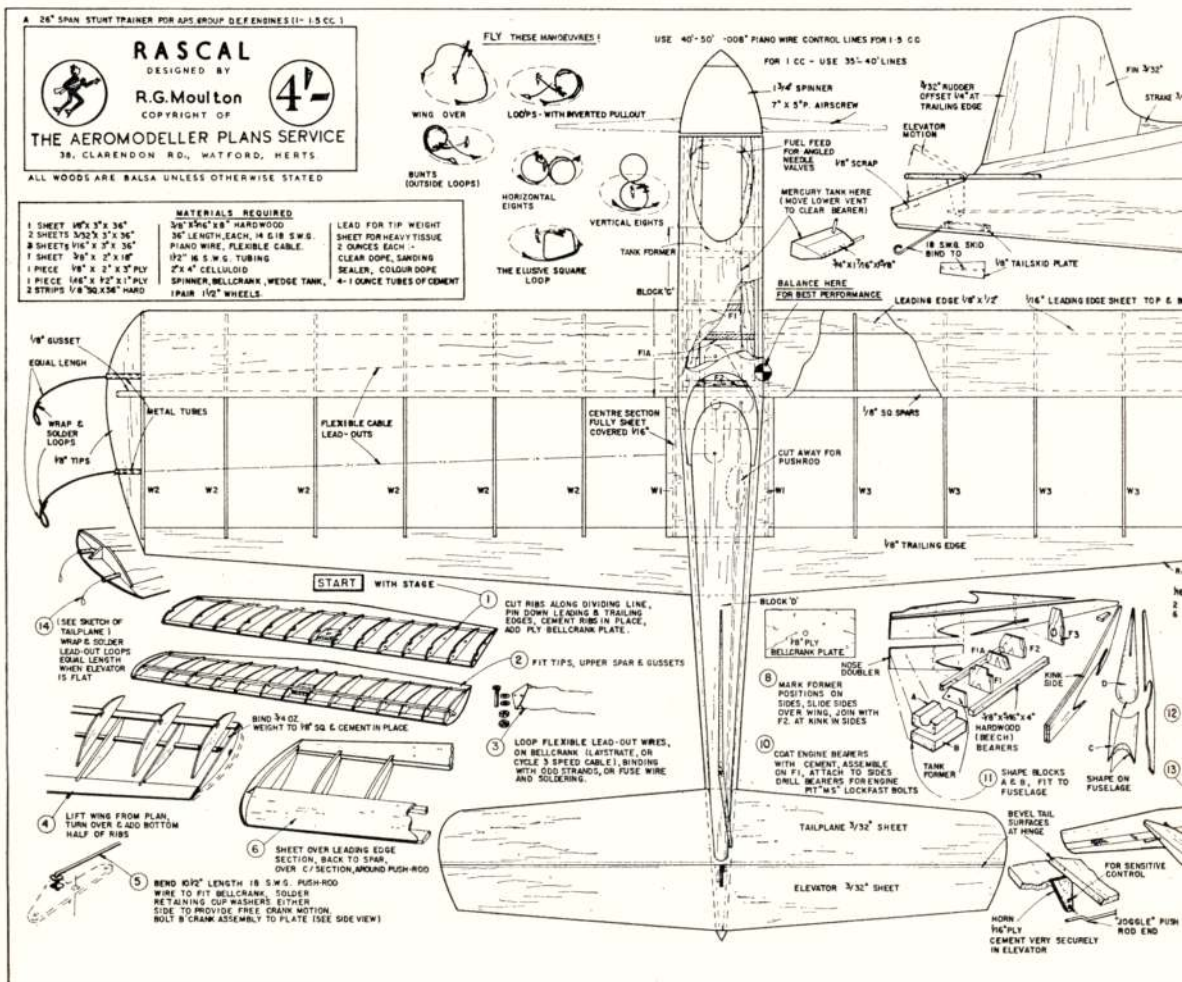
Follow the Reverend F. Callon's stage-by-stage illustrated instructions for this specially-designed stunt-trainer by Ron Moulton using 1-1.5 c.c.

FOR ANYONE with even a small amount of experience in the building of power models, RASCAL will offer no difficulty whatsoever; but both as regards building and flying, it does presuppose *some* previous experience. It is meant to be the model for someone who has already built and flown one or two simple control-line models, and who now wants to try his hand at stunt flying.

The 18 stage hints given on the plan and the accompanying photos should between them make the building procedure quite clear, so written instructions will be kept to a minimum. The general

order of assembly is important: you must start with the wing and elevator mechanism, and add the fuselage later; otherwise you will never get the push-rod inside the fuselage. So we start with the wing ribs. *Fig. 1* shows them blocked between two plywood templates. The seven port-side W.2 ribs should be separated and pinned together again while the two elongated slots for the lead-out wires are cut through them.

Now all the ribs have to be slit lengthwise along the line shown on the plan. *Fig. 2* shows this being done, but before starting it is well worth while

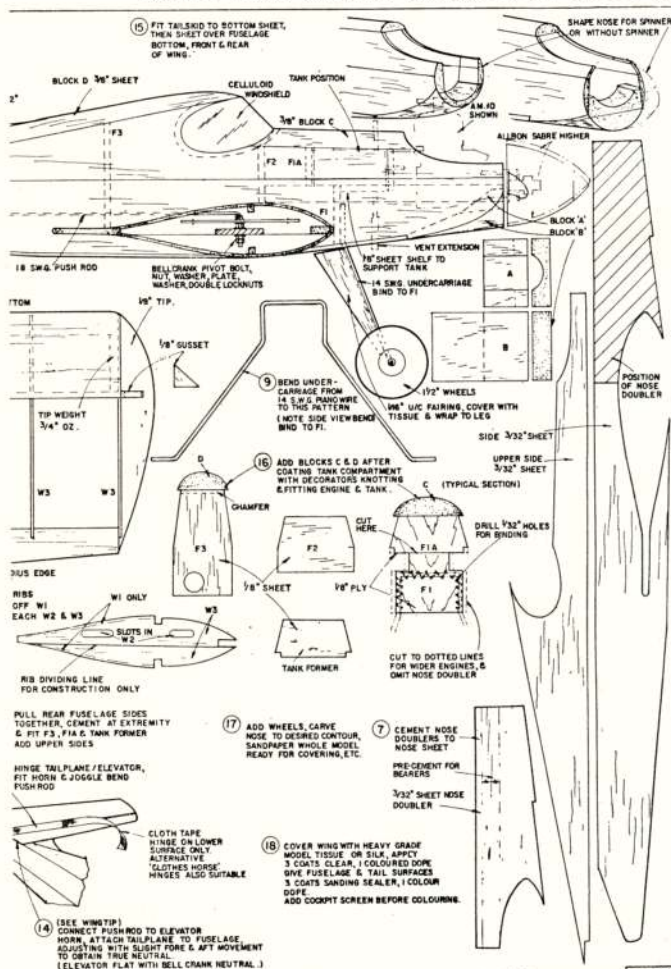
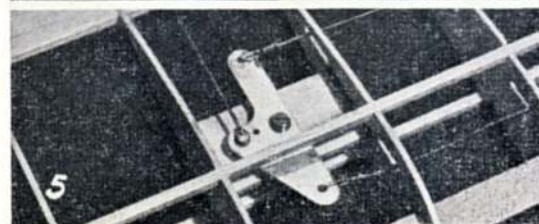
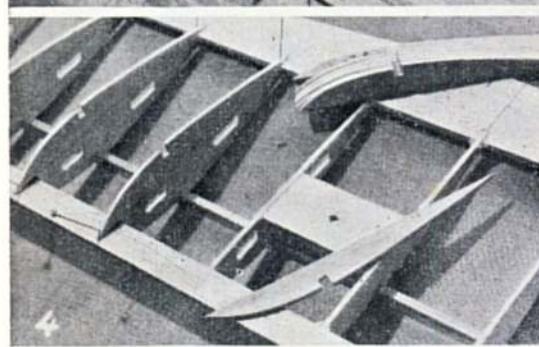
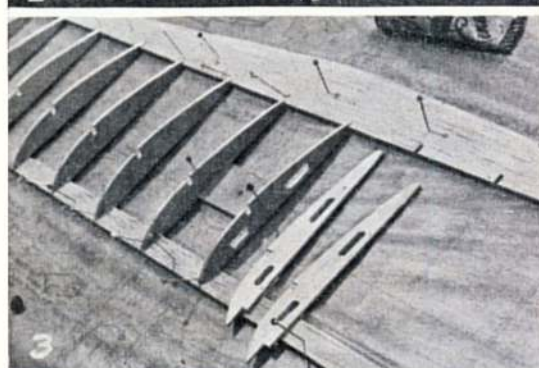
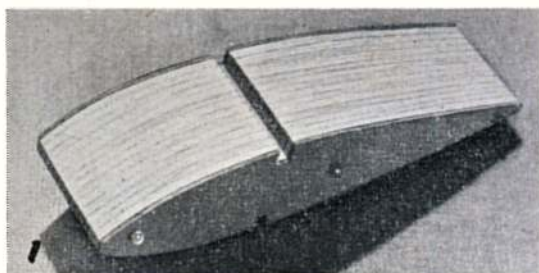


numbering each rib twice—above and below the cutting line—so as to be certain that the ribs will mate perfectly when cemented together later on. The two centre ribs will have to be trimmed down to take the centre wing sheeting, and a $\frac{1}{8}$ in. strip cut away from the underside of the LE of the upper half of each rib so that it will sit flush over the LE of the wing. (This is shown clearly in *Fig. 3*.)

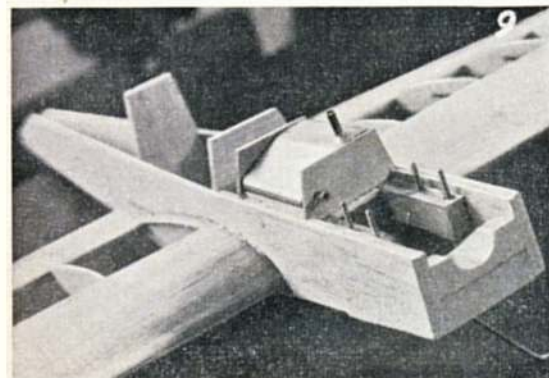
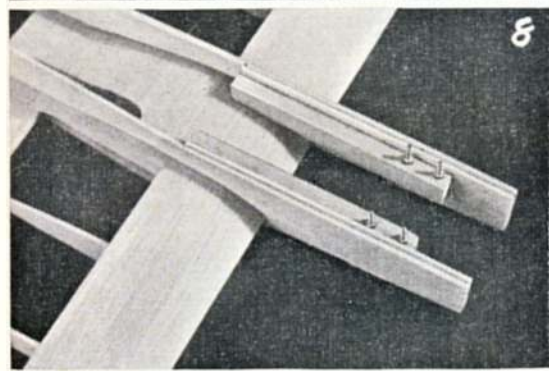
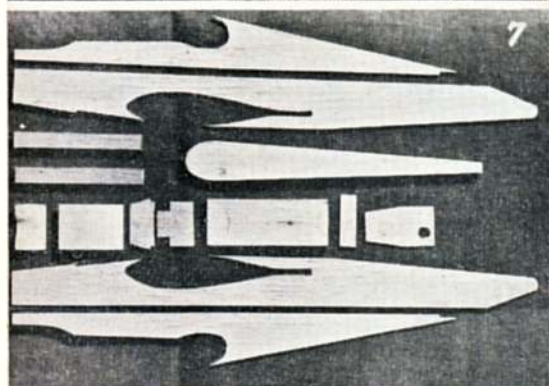
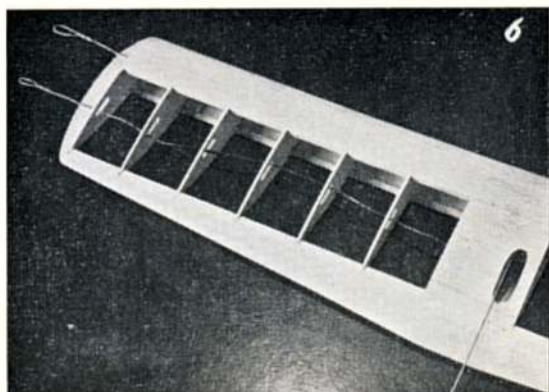
Laying out the wing

Cut out and notch the TE, and pin down over the plan together with the LE. Cement the upper halves of all the ribs in place, with the ply bellcrank plate, drilled for its bolt, sandwiched between the two central ribs. *Fig. 3* shows this stage. When all the ribs are down, the top spar is added in which the use of plenty of modelling pins for keeping the ends of the ribs down is advised.

In *Fig. 4* the wing has been removed from the plan, and the lower halves of the ribs are being cemented to the underside. The bellcrank unit with push-rod and flexible lead-out wires (in this case bicycle three-speed cable was used) is now added—see *Fig. 5* and detail on the plan. The brass tubes are cemented securely to the port wing tip, and the leadout wires threaded through them before (1)



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being bent back and bound and soldered into loops. At the other tip bind a $\frac{3}{4}$ -ounce leadweight to $\frac{1}{8}$ in. sq. and cement securely in place. The soft $\frac{1}{16}$ in. sheeting is now added as shown in *Fig. 6*.

If you are one of those people who likes to have all the parts cut out and ready before starting on a job, then *Fig. 7* should appeal to you. If an engine is used having a wider spacing between the mounting lugs, or if thicker engine bearers are chosen, then the doublers will have to be left out.

Cut the engine bearers to the correct length, drill them and put the bolts in position, keyed with a piece of wire soldered across their heads, or use the "MS" Lockfast bolt sets. Carefully mark the place for the bearers on the fuselage sides or doublers from the plan before cementing them there. Then slide the two fuselage sides over the wing tips and in towards the centre—*Fig. 8*. To make sure of the correct spacing for the engine mounting, slip it (*i.e.*, the engine) loosely in place over the four bolts, and leave it there while the formers F.1 (with undercarriage wire attached) and F.2 are cemented to the fuselage sides, and the sides cemented to the wing, with the rear ends joined together.

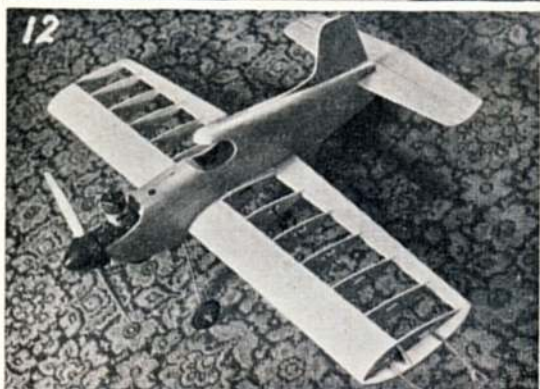
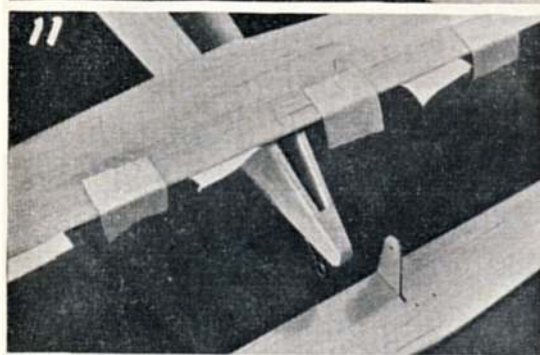
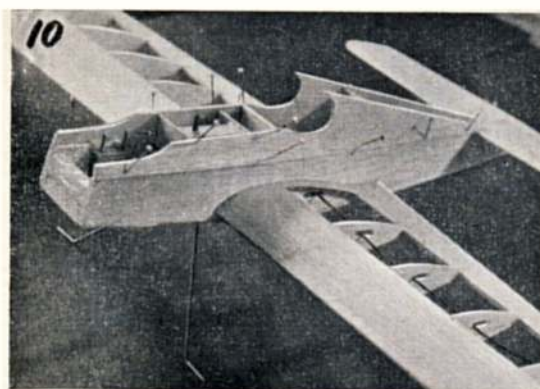
Next insert blocks A and B, and the former F.3 with the push-rod passing through it, and the tank shelf and former between and over the engine bearers—see *Fig. 9*. The upper sides of the fuselage are then added (see *Fig. 10*) and the tailplane and elevator.

Figure 11 shows a detailed view of the tailplane and elevator hinge—the latter inverted to show the horn. There is much to be said in favour of a hinge composed of a single strip of linen tape cemented along the underside of the TP-elevator joint as shown on the plan, but the under-and-over "clothes horse" hinges as illustrated seem more popular. The positioning of the elevator horn is an important and rather tricky stage in the construction; the correct position of the horn, with the joggled end of the push-rod passing through the hole drilled in it, has to be gauged exactly, so that the flap is quite level when the ends of the lead-out wires are both square on to the wing tip. Only when the horn is properly set in its slot should it be attached to the push-rod end. Then fit the tailplane to the fuselage, making slight fore and aft adjustment to obtain true neutral elevator.

Final Touches

All that now remains is to add the upper blocks, C and D, and the fin, shape the nose and the bottom sheet plus tail skid and sand up the fuselage until you get something like *Fig. 12*. Then cover the wing (with silk for preference) attach a celluloid windshield and $\frac{1}{8}$ in. sheet "Trousers" for the U/C, clear dope the wing, and give a couple of coats of sanding-sealer to the rest of the model, followed by a coat of coloured dope as desired. The original was coloured navy-blue and white as seen in *Fig. 13*.

Next month we shall be flying the *Rascal* and teaching you how to perform those exciting manoeuvres.



What's the Answer

? *Straight
glide
trim ...*



There's a lot of argument in our club at the moment about getting the best glide trim on a model. Our two best contest flyers use contrasting technique. Tom believes in a straight glide. Jim always trims for a fairly close circle. On result, there seems little to choose between them, and contrary to popular belief, Tom's straight flying model seems to pick up as many thermals as Jim's. Is there a reason for this?



... or a
tight
circle???

What would YOU do in a case like this! Think a moment then twist this page for the solution.

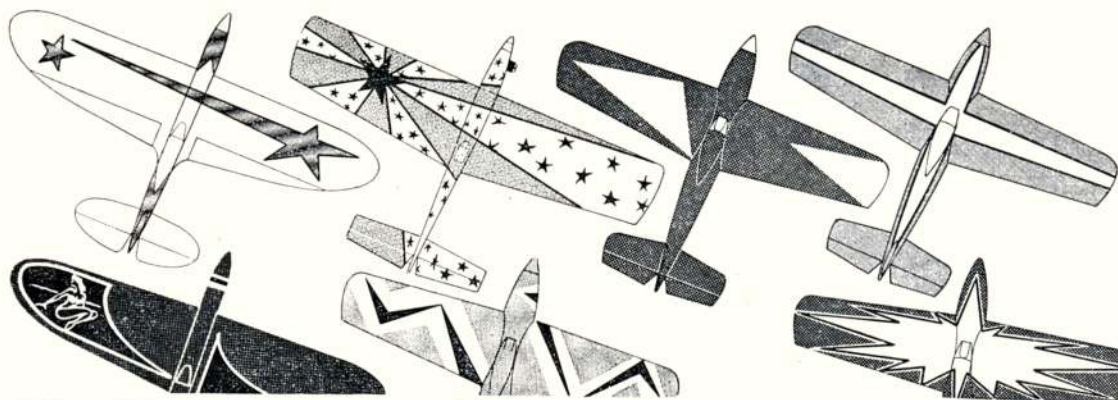
ANSWER: The ideal glide trim for best duration performance with any type of model is with the model flying just below the stalling point. Making a model circle tends to under-elevate it and the tighter the circle the more pronounced this effect. Thus if a model is normally gliding straight and you make it circle you must also increase the elevation (usually packing up the trailing edge of the tailplane) to get back to a comparable sinking speed. The main advantage of a circling glide is that the model is less likely to lose a lot of height if it does accidentally stall, whereas if a straight-glide model starts to stall it may keep on. A circling model will also stay in sight better than one which is flying straight.

If a straight flying model enters a thermal it will normally tend to circle in the thermal and so stop in the lift. A circling model will tend to tighten up its turn. Both are then slightly under-elevated, the more powerful the thermal the stronger this effect. But the more powerful the thermal the greater the lift, so both will go up!

What would YOU do in a case like this! Think a moment then twist this page for the solution.

RADIO CONTROL NOTES (Continued from page 261)

variety will do both. Insert meter between H.T. + lead and H.T. battery, switch on, which should produce a current of .2 milliamps. Squeeze H.F. Choke with fingers and current should rise about .5 milliamps. Switch off, insert T1 in holder making sure red spot is nearest the retaining bolt, and then switch on. Adjust variable resistor until meter shows a reading of approximately 1 milliamp. The adjustment here is critical and should be made to the point at which the current is just about to drop. Switch on transmitter and adjust tuning coil slug until meter shows a drop of .4 milliamps or more. Switch off and connect T2 in place, again making sure it is inserted correctly. Move the meter to a position between the relay and common negative (black). Switch on and adjust pot. until the reading is at approximately .2 milliamps and is just about to rise. Tune slug until maximum rise is obtained, completing final tuning at a range of 100 feet or more. Should the standing current be above .2 milliamps but the set working O.K. then a 10K resistor should be fitted between the base of T2 and H.T. plus or emitter.



Scheme those Colours!

by Dave Platt

VISITING MANY LOCAL and National rallies during 1956, the writer noticed that, while the majority of English Models are well built, they nearly all lack a smart colour-scheme. In America the reverse is usually the case, where models have been hurriedly built, but painstakingly finished in an attractive scheme. A British modeller, looking through an American magazine, is bound to notice these often vivid, always unusual, schemes on models built over there, and might well have an urge to finish his model in similar eye-catching decor.

In the main, this article concerns C/L models as free-flight models tend to be restricted on consideration of weight, visibility and the invariable transparent nature of the flying-surface covering. Some mention of equipment and methods of use is necessary.

For varied work, a **spray** is essential, but need not be large and expensive. On the contrary, excellent work can be done with an eight-and-sixpenny Modellers' spray of the air-bulb type.

Ruling pens will be needed in two types—those mounted in a pair of compasses, and normal hand-pen costing about one-and-six. One pen will serve both purposes if you have a pair of compasses built to take a pencil.



Sellotape is used for masking. The special "Masking tape" is not very suitable, being too thick to take two-way curves (e.g., on planked fuselages).

Brushes should range from very fine to large mop. Do *not* buy expensive brushes, as cellulose action will rot these as quickly as it rots the cheaper ones. This is sufficient equipment, and superb work can result without further tools.



Differing upper and lower schemes in Britfix Blue and Yellow on Ron Moulton's Super Ringmaster, brush finished without masking

Spray Work

Mottling looks very complex, and many scale models are left a natural colour for this reason. It is actually very simple. On a typical German aircraft the base grey or blue is applied to the entire upper surface. Then, with a mottle-colour in the spray, give a short light squeeze and one mottle will be formed. Move the nozzle two or three inches in any direction, squeeze again, and so on. Irregularity is the secret of appealing mottling, so do not make "rows" of mottles. A three-foot model is mottled in ten minutes, and the effect is gorgeous.

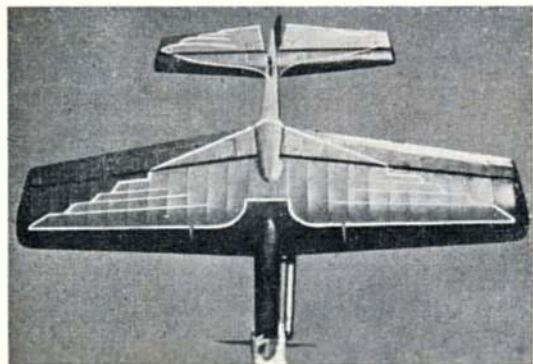
There is no knack to be obtained, and success comes at the first try. Most full-size aircraft with

camouflage have a "soft" line where brown meets green. This is easily reproduced with a spray, and looks much superior to a hard line obtained with a brush.

For spraying it is necessary to thin colour-dope to a 50/50 mixture, but no more. Too much thinning will make each coat faint, which is not satisfactory for mottling, etc., where one coat has to suffice.

Ruling Pens are used when a straight or curved thin line is required, and masking tape is unsuitable. The 50/50 dope can be used here, the main things to remember being:

(a) Once a line is started, do not lift the pen to refill it. Make sure that the pen has enough dope to do the complete line.



(b) Never go over a line again until the first coat is dry.

(c) Keep the dope in the pen soft by dipping in the dope-jar when temporarily out of use.

MASKING TAPE is in common use and the method will not need describing. However, it is as well to keep in mind that the tape must be peeled off while the dope is still wet, and to prevent dope creeping under the edge, make sure there is perfect contact along the required edge. Apply a lick of clear dope around the edge to seal the mask before colouring.

So much for the materials and uses, now for the actual colouring.

Most makers of dope carry, at the most, two shades of each colour. These can be increased by mixing, and this is strongly recommended. To avoid queer chemical reactions, choose your favourite make of dope and stick to it, and use the same brand of thinners.

Light shades are best for the base, or overall, colour of the model. Then there will be one or two trim colours which should contrast sharply with the base colour and each other. Whether or not there is sufficient contrast, the effect is vastly improved by a thin separating line of a neutral colour, *i.e.*, black or white. As an example, red does not go too well with black, but will be very colourful if a white line separates them. (See pic. above)

For practical reasons, it is best to make the front end of the fuselage a dark colour, or oil will spoil the model in very short order. Dark bottle-green, maroon, midnight, charcoal and black are very



Titanine Black, White and Orange in sweeping (masked) lines minimise wing area appearance on Ron Moulton's Cougar above, while Cellon Red birdcage effect, White outlined on Black underside provides a fresh view for onlookers during wingovers

suitable. For the same reason, white is not a good base-colour, although the model may look wonderful when first built. Pale colours will look clean much longer.

Registration numbers can be a further different colour, and again are best if given a neutral-colour outline. A model will take four or five colours before it looks over-decorated, providing each colour is not used too much.

Many modellers are shy of certain colours, in the belief that they never look good on a model. Admittedly, greens, browns and purples are more difficult, but can look well if the scheme is carefully thought out previous to starting the doping.

The darker colours look attractive, used as the base-colour, with paler shades for trim. This is the "negative" of the previous scheme, and has its advantages in practice, regarding cleanliness. As an example: Model doped all over charcoal grey, with vermilion trim separated by the neutral colour, *i.e.*, in this case, white.

When using "difficult" colours, keep to extremes of pale and dark shades. Pale green should be almost white, dark green will be mid-Brunswick or darker even than this. Dark chocolate brown matches well with fawn or beige. Likewise midnight goes with powder-blue. On all of these somewhat drab schemes, use bright lettering of figures to prevent the scheme getting dull. Reds and greys are very tractable, however, and all shades are good for colouring.

A word about *Design*.

We've all seen wings outlined in a trim colour. This is corny. This could be sprayed round the wing for a pleasing "different" effect. Many otherwise well-done schemes are spoilt by rigid attention to "balance". If you put a club transfer on one wing, you don't have to put something on the other wing to balance it. Asymmetrical schemes are quite as attractive as centred-layouts if carefully designed. Herein lies the secret of design. Plan the projected colour-scheme of a model on a reduced-scale drawing first.

Finally, seven suggestions are given which can lead builders on to further schemes of their own

VICKERS- ARMSTRONGS

WALRUS II.

**Amphibious model of the famous
'Shagbat'—for .75 to 1 c.c. engines**

THE WALRUS always has been an elusive scale model subject. Numbers of people have attempted the design, and found themselves in trouble with the centre of gravity position, thrustline, etc., and now, happily, all these problems are solved in this model for small diesel engines.

We were attracted by H. J. Wright's model at last year's All Britain Rally, Radlett, and it is his design which has provided the basis for the scale model presented here. Semi-symmetrical airfoils, upthrust on the engine, and simple sheet fuselage construction with knock-off wings from a rigid wire centre structure, make the Walrus a most attractive model and one which can be operated over land or water.



H. J. Wright demonstrates the starting technique for the Amco .87 on his prototype model. Scale refinements are incorporated in the APS plan. View of the model in flight was taken as it was gliding to a perfect landing on grass at the All-Britain Rally 1956



Construction

Cut two identical sides from 1/16th medium sheet, if using 3-in. wide sheet, join where shown. Then cut formers, reinforcing both faces of F5 and F7 with strips of 1 m.m. ply. Bend front and rear centre section wire to exact shape, bind with strong thread to N1 and N3, and then to F5 and F7, and cement well. It cannot be over-emphasised that this makes or *breaks* the model. Wrap celluloid u/c tubes and bind and cement to F5 and F7. Then bind sea rudder stay to F11. Assemble fuselage, working from the centre outwards, using rubber bands for positioning.

Roughly shape nose-block and glue into position. Install R1 after hollowing out for Sea rudder leg, fin, L.E. and R2, 3 and 4. The front hull to the step can be easily planked in four strips, the after-chine in two pieces, add top decking, sea rudder leg and shape R1, insert engine bearers through N1, N2 and N3, then plank nacelle with 1/16th sheet.

Centre section cross-bracing can now be bound in with fuse wire and soldered, giving a very rigid centre section. The centre section dowel spars can now be well bound into position, CS2, paper tubes, L.E. and C/S spar fitted, the whole covered with 1/16th sheet and then CS2 faced with CS1. Celluloid cabin, gun-pits, and gun-pit covers can now be added. Finish shaping nose-block and lightly sand fuselage. Cover with heavyweight Modelspan applied with dope and give a further two coats of thick dope.

The remainder of the structure is quite simple, and all that need to be emphasised is to waterproof all components thoroughly with banana oil or sanding sealer prior to applying the wartime camouflage. The Walrus has quite a slow flying speed and has exceptional stability, although hand gliding gives no true indication of performance and all test flights should be conducted with the motor running slowly to give it just enough thrust to prolong the glide. The prototype was flown with an ancient Amco .87 giving quite enough power and any of the present-day .8 c.c. diesel or glowplug motors would be ideal.



ILLUSTRATED BY
LAURIE BAGLEY

The epic story of

Lt. Warneford V.C.

BY
ARCH WHITEHOUSE

THROUGH THE eerie morning mists of June 7th, 1915, a decrepit British scout plane took off from a strip of soggy turf in Belgium. Before it was fully airborne a heavy fog swirled in from the North Sea to become the backdrop of the most thrilling air epic of World War I. From this weird admixture of foul weather, limp linen, slack flying wires and freak fortune, a 22-year-old youth's determination compounded the war's most exciting and rewarding adventure.

Not a minute too soon, either, for the climax brought succour, hope, resurgence of resolution and a jolt of courage that raised a stricken nation to its feet and propelled them on to eventual victory. No individual deed of that first global conflict caught the imagination of a grateful public, released such a paean of praise or put an end to so many sleepless nights, as did Flight Sub-Lieutenant R. A. J. Warneford's destruction of the German Zeppelin LZ.37.

Forty three years ago German Zeppelins were supreme and more than matched anything the heavier-than-air machines could accomplish. For years the more imaginative artists had produced prophetic pictures of hostile military airships. Much of this came to pass, for during the Tripoli campaign of the Balkan War of 1912-1913 airships and airplanes were actually employed, and before World War I was many weeks old, the fantastic plots of Jules Verne and H. G. Wells were being played out over the rooftops of Paris and London. Nevertheless, many Britons had believed that any such devastating war was inconceivable. War in the air was unthinkable. War delivered by raiding aircraft, dropping bombs on undefended cities and killing innocent people was—well, it was unlawful!

Yet during the first war Christmas of 1914 the Zeppelin raiders came and Britain's insular security toppled with one puff.

Whenever a British aeroplane took to the skies in a gallant attempt to intercept a Zeppelin, the German commander simply jettisoned his water-ballast and the airship shot straight up a few thousand feet. At that safe level he proceeded on his mission. No airplane of the period could compete with that and so the menace continued.

On the evening of May 31st a noted Zeppelin com-

mander, Hauptmann Karl Linnarz, carried out the first successful raid on London. He had taken off from an airship base located at Evere, just north of Brussels, gained operating altitude over his field, and then allowed a friendly wind to drift him in silence over the British capital.

Once more London watched the inadequate defences go into action. The searchlights lanced the skies but were unable to pick up the raider. The ineffective pom-poms grunted and growled but only showered the suburbs with jagged shrapnel. A few young Home Service gallants took off to do battle; but as usual nothing happened. The warning sirens shrieked and died down. The pungent smoke pall seeped across the Thames and hurriedly organised rescue teams clambered through the ruins and cursed a government that had failed to anticipate this form of warfare.

However, at a secluded aerodrome across the Channel on the coast of France something new had been added; much to the consternation of Hauptmann Linnarz.

"Feine Eindecker!" (Enemy monoplane!) "Gross Gott!"

A hundred feet below, dramatically highlighted by the yellow-blue exhausts of LZ.38's four Maybach engines, a tiny high-wing monoplane flaunted the red, white and blue cocades of the British service. From the oval cockpit under the centre-section cutout, a series of smudged flame flicks spat out. Gunfire. Single shots of desperation from a cumbersome shoulder weapon, but alarming and disconcerting nevertheless. After all the LZ.38's ballonettes were filled with hydrogen, and if a single bullet struck hard metal and produced a spark . . . Poof!

Hauptmann Linnarz floundered to his control board and bellowed for emergency measures, and as soon as the gasbag had lifted to safety he became the militant Prussian once more. He took a nearly engraved calling card from his wallet, and on it he wrote: "You English! We have come and we will come again soon to kill or cure! Linnarz." He snatched a weighted message streamer from the flag locker and inserted the card in the stitched pocket. "See that this is dropped as near the Dunkirk aerodrome as possible. We will fly over it on crossing the coastline."

Four thousand feet below Lieutenant R. H. Mulock of No. 1 Naval Aeroplane Sqdn. cut his gasping Le Rhone engine and eased into a gentle glide. He'd given it a try but the little Morane Parasol was unequal to the task.

"There's no use trying to swat one wasp with a wisp of straw," Mulock later reported to his C.O., Commander Spenser Grey. "A wise man would get a kettle of hot water, pour it down their hole and scuttle the blasted lot. That's what we've got to do. Blast them in their sheds!"

From that night on No. 1 Naval planned a new strategy and to add a dash of personal competition and private animosity to the proceedings, a wandering Navy artificer beachcombing along the Dunkirk dunes the next day came upon Hauptmann Linnarz's insulting message. He immediately turned it in to Commander Grey's office and the boys of No. 1 Naval Squadron took up the challenge.

When the Royal Naval Air Service obtained permission to set up its first overseas base at Dunkirk, Commander Spenser Grey decided to disperse the few machines allotted him around the countryside for safety. Dunkirk was too obvious a target; but Furnes just across the French-Belgian border was less conspicuous.

One three-ship flight under Lieutenant J. P. Wilson was therefore accommodated in three single canvas hangars set on the edge of a lush meadow. There Wilson, Sub-Lieutenant Mills and young Warneford made up the duty roster. Their mounts were what might be considered as stripped-down versions of the French Morane-Saulnier observation planes. The high wing was given a sharper angle of incidence, the rear seat covered over and a primitive form of bomb rack was bolted beneath the fuselage. Because of its weird wing arrangement the lads of the R.N.A.S. soon dubbed it the Parasol, and a more apt name couldn't have been selected.

The Parasol was as flighty as its name, tricky on the controls and devilish to land. It was relatively fast (70 miles per hour—perhaps) and powered with a seven-cylinder 80-horsepower Le Rhone rotary engine. Outside of six so-called fire bombs and a light carbine borrowed from the Belgian army, she carried no offensive armament.

On the afternoon of June 6th, Wilson's Furnes flight reported to Dunkirk where Spenser Grey had set up a council of war. The C.O. explained Mulock's abortive brush with the Zeppelin that had bombed London, and impressed his flight leaders with the obvious impossibility of engaging Zeps in the air. Grey fluttered Hauptmann Linnarz' message streamer and the belligerent calling card. "The man who dropped this challenge played merry hell over London less than a week ago. Mulock did his best, but Linnarz returned to his shed at Èvere unscathed."

"You say this message bloke and his gasbag are located at Èvere?" Wilson broke in.

"That, we know," Grey answered. "Keep thinking along those lines, Wilson."

On the way back to Furnes young Warneford muttered, "I wish I had explained to Spenser Grey that I've never been off the ground at night."

Wilson who was driving the car called back over his shoulder: "You'd better know how to night-fly. We're taking off as soon after midnight as we can make it."

"But I've never flown at night," Warneford insisted.

Nevertheless, the searching finger of Fate couldn't have selected a more British candidate for the hero role of this early war drama. Young Warneford was a lively composite of the Commonwealth of Nations. His parents

were cheery Yorkshire types who rattled about the Empire on various missions and pretexts, and Reginald Alexander John was born in India. Later, he spent some time at the Stratford-on-Avon Grammar School, and when the family drifted back to Calcutta he was enrolled in the English College at Simla. Although his education was devoted to the arts and classics, young Reggie appears to have shown marked preference for motor-cycles, odorous chemical experiments and mountain climbing. When the Warnefords trudged back across the world again Reginald was next booked into some unnamed institution of learning in Canada.

On the outbreak of the war in 1914 young Warneford darted over to England and joined the much-publicised Sportsman's Battalion, an infantry mob made up chiefly of well-known sporting and athletic figures. Unfortunately, the Sportsman's Battalion was slack in unfurling its battle flags, for it was discovered that its headlined athletes (as is so often the case) were physically unequal to the rigours of warfare as it is encountered by non-commissioned warriors; so they were granted a revision of training and prepared for the less bruising role of officers.

Warneford feared the war would end before this military phenomenon could be realised, so he put in for an immediate transfer, pointing out that he had volunteered to fight!

He made a good selection, for by June of 1915, or less than eleven months after the opening of hostilities, he was a Flight Sub-Lieutenant pilot on duty with the Royal Naval Air Service in Dunkirk. Half-a-dozen solo flight hours on a clattery old Horace Farman, two test flights aboard a Morane Parasol, and young Warneford was tabbed for honour and glory.

True to his word, Lieutenant Wilson had his flight ready and waiting on the oil-patched turf at Furnes by midnight. The racks were loaded with fire-bombs and the Belgian carbines rested in the brass prongs bolted beside the cockpit.

Warneford was flagged off first, and with deep trepidation he eased the throttle up the quadrant. Amazingly enough, the old Le Rhone gloried in the crazy experiment, sucked in great gulps of heavy night air, and her rev-counter indicated an unbelievable output of power. Before Warneford realised what he had signed up for, he was off the ground and thundering through a saffron-stained fog curtain. He stared wide-eyed trying to find the small grouping of instruments, but picked up only the stench of Castrol. A length of scarlet worsted knotted to a centre-section strut was flicking insistently at his nose, and he quickly realised this very primitive indicator was warning him that he was already in a dangerous sideslip.

Gradually his eyes became accustomed to the yellow-grey nothingness under his Triplex windshield, and he fixed his gaze on the white needle of the altimeter.

"'Struth! I'm already at 3,000!" he gasped, and looked around for Wilson and Mills. There was nothing anywhere but the exaggerated roar of the Le Rhone, the drip-drip-drip of condensation off the centre-section that needled his cheeks like a fretsaw blade. Below hissed a poisonous glow he had not encountered before—the blue-yellow flame pennon of his exhaust. It threw shuddery shadows against the fog screen and tauntingly suggested the possibility of carburettor fire . . . and carburettor fire aboard a flimsy oil-soaked Morane was a terrifying prospect!

His indistinct compass float dancing in a small window let into the bulge of his centre-section, showed something that looked like the letter "W", so he risked a turn hoping to pick up Wilson and Mills.

Young Warneford circled and circled for minutes, but no sign of his flight mates rewarded his patient patrol. Meanwhile he was becoming more accustomed to his strange experience, and as the area remained fairly clear he wondered whether he might not make himself useful, regardless of his failure to contact his flight leader and companion.

He had about decided to look for the Berchem St. Agathe shed which he remembered was located just west of Brussels, when something caught his eye a few miles to the north. Warneford blinked and looked again. That something was emitting the same blue-yellow flame as his engine. If that was Wilson and Mills, what the devil were they doing up there toward Ostend? And what in Heaven's name was that long black mass hanging above them?

Actually, Wilson and Mills had made immediate contact and had soon cleared the Furnes fog to head east for Brussels, 75 miles away. Because of the good weather Wilson decided to fly direct to Evere on the north side of the old city which they hit on the nose. Circling the area once, Wilson went in first; mainly to start a fire and give Mills a target. He released three of his bombs, but only created a billowing smoke pall. By then the German defence gunners woke up and began plastering the sky with high-angle gun explosive, and Wilson discovered that his last three bombs had become hung up in the rack. Young Mills finally went in, Parasol wings a-flutter, in the face of a wicked ground fire and pulled his plug. All six of his 20-pounders slid out and he was rewarded with a gigantic explosion that illuminated the sky for miles around. Wilson, who conceived and planned the raid had to return with little to show for his effort.

Two weeks later, the British Intelligence working out of Antwerp, reported that Hauptmann Linnarz' LZ.38—the same airship that had first bombed London—had gone up in flames during the raid on Evere. Thus the R.N.A.S. boys scored a sweet revenge for that caustic calling card.

That same night the LZ.37, commanded by Oblt. von der Haegen had been ordered to carry out a routine patrol from Ghent to Le Havre. There was nothing particularly offensive about the flight. It was intended mainly to give a number of airship designers, specialists and technicians from the Zeppelin factory, first-hand knowledge of the various problems experienced by the crews on active service. The LZ.37 was 521 feet in length and her 18 main gas chambers carried 953,000 cu. ft. of hydrogen. She was powered with four new 210 h.p. Maybach engines and manned by a select crew of 28 highly skilled airmen. For defence her designers had incorporated four machine gun posts built into the outboard gondolas that carried the engines. These positions provided good visibility, a wide arc of fire and offered complete defence on both sides of the airship.

After Warneford had been flying north for a few minutes he stared in amazement at what he had so fortunately encountered. A Zeppelin that seemed half

a mile long! He had to twist his head from east to west to take in its full leviathan proportions. From its underside hung several polished metal gondolas or observation cars. The gleam from the fan-tailed exhausts indicated that the rubberised covering was daubed a yellow ochre colour. What the devil kept a thing that big in the air at all?

"It's as big as the *Mauretania*. I had no idea . . ."

But there was no time for reflective contemplation or free-and-easy examination. The chattering machine guns spat their wrath from the gleaming cars above and the slugs clattered through the frail wings of Morane Parasol No. 3253.

Warneford wisely heeled over and cleared off out of range.

He glanced around and saw that the fog was breaking up below and that here and there he could see the Ostend-Bruges canal. The big gasbag was apparently heading for Ghent.

"Those observation cars are twice as big as this Parasol," he muttered to himself. Then, to his amazement the big snub-nosed gasbag actually shifted course and headed for him. Two more streams of tracer-flicking machine gun fire were spitting out from the front gondolas and converging a few yards away.

Warneford gave the Le Rhone all she could gulp and tried to climb but the criss-crossing tracers pencilled in a definite warning and he had to peel off and dive. He sat and studied the situation and wondered what his carbine would do IF he could hit something particularly touchy. After all, hydrogen . . .

He worried the little Morane back again and took the carbine from its prongs. He maneuvered to a point under the mighty elevator and rudder framework and gripped the control stick between his knees. Then sublimely confident that he had not been seen he began popping off a few .303 shells at the massive target above and ahead. The first clip of cartridges was soon spent and nothing untoward happened.

For the next few minutes Warneford stalked the LZ.37 and popped away with his carbine, but it was like aiming at a cyclone-propelled haystack with an air rifle. Whenever he came within range or within view the German gunners sprayed the sky about him with generous bursts of Spandau fire and time after time the impudent young Englishman was driven off.

Von der Haegen played it safe and dumped his water ballast over Assobroek and left young Warneford still potting away impotently at 7,000 feet. From there he upped his speed and roared away for Ghent.

Warneford realised what had happened, but refused to admit defeat. Instead, he settled back to keep the Zeppelin within view and at the same time tried to gain some height.

Now it was a race for safety, and while von der Haegen held his altitude Warneford was helpless, but this was not an ordinary mission. The German commander began worrying about his V.I.P. passengers



A Spanish-built Morane-Saulnier type parasol monoplane, similar to that flown by Lt. Warneford. Note absence of ailerons. Full description of this aircraft will be found on page 250

when he should have concentrated on maintaining a safe tactical procedure.

By 2.25 a.m. Warneford still stalking and trying to get above the LZ.37, was amazed to see the big airship suddenly dip down and apparently head for a hole in the 7,000 foot cloud layer spreading towards Ghent. He had manfully hauled his Morane up to 11,000 feet, hoping he might get into a position where he could use his fire bombs, since he had expended all his carbine ammunition. Now the LZ.37 was actually below him and for the first time he realized that the upper cover was painted with what seemed to be a dark green and that there was nothing resembling a gun turret on the top that could in any way harass him. The other guns were in the underside gondolas and he was shielded from them by the bulging sides of the main framework.

"She looks even *bigger* than the *Mauretania*," Warneford muttered, as he moved into position for his run-in. "You'd swear you could make a landing on her top-side."

The ground smear that was Ghent lay below slightly to the east when the little gnat-like Morane started for the 500-foot panel of the LZ.37. A few lights blinked here and there. The waters of the canal and the Escaut River caught the reflection and flicked it upward. A miniature train dragging a long streamer of white smoke crawled along the single track that passed through Evergem.

"Here we go," Warneford chuckled, as his wheels passed over the high elevator and rudder structure.

"One . . . two . . . three!" he counted as the tiny Morane jerked with the release of each bomb.

Later, Warneford explained that he had fully expected the Zeppelin to explode immediately when his first bomb pierced the envelope.

"Four . . . Five . . ." he continued to count, and then a monstrous explosion ripped up through the upper panels baring indistinct details of the framework. Completely spellbound, Warneford continued his run-in until the little Morane was swept up on a violent belch of blazing concussion. The impudent little gnat was blasted aloft and rolled over with a violence that would have catapulted Warneford out of his cockpit had it not been for his safety belt.

Warneford gasped, rammed his stick well forward and tried to get her into a dive. Chunks of burning framework hurtled by and he gradually came out of this aerial convulsion to streak down through a great pall of choking smoke. The next few minutes were devoted to skimming clear of the debris, getting back on even keel and frantically adjusting his air and gas mixture to overcome a series of gasping pops from his Le Rhone.

A few seconds later the doomed airship fell a flaming torch on the Convent of St. Elizabeth in the Mont St. Armand suburb of Ghent. This ungodly mass of hell engulfed a sanctuary where sisters of mercy and women and children refugees fought among the horror to escape. One nun was killed outright and several women were badly burned; but the helmsman of the Zeppelin had a most remarkable escape from death.

According to eye-witnesses, he actually jumped clear of the tumbling wreckage at about two hundred feet. He landed on the roof of the convent, crashed through as if it had been made of matchwood, and landed in an unoccupied bed. He suffered only minor injuries, and was the only crew member or passenger of the ill-fated LZ.37 to live.

Seven thousand feet above this carnage Warneford

sat waiting for his wings to part company with the fuselage. However, as Warneford thanked his gods for their many favours the Le Rhone snorted its wrath and contempt—and quit cold! The gleaming wooden prop wig-wagged to a halt. He calculated that he was at least thirty-five miles inside the German lines, but in spite of the mist, leaden darkness and the lack of ground lights Warneford put his battered machine down safely in an open field that was shielded by a long patch of woods. There was a darkened farmhouse nearby, but no one appeared to question his unscheduled arrival.

His first impulse was to destroy his plane, but after a short period of eerie silence, Reggie decided to check. He peered in the tank and discovered there was enough fuel to get back to Furnes, but further investigation disclosed that his violent aerobatics had broken the fuel line just behind the pump.

He still had a chance to escape. A quick search through his pockets and he came up with a cigarette holder. The outer end was just what the doctor ordered. He broke it off, fitted it to form a journal at the original break and bound it secure with strips of linen handkerchief. An experimental tug on the prop assured him that sufficient fuel was reaching the engine, so he decided to try to start the bus himself.

The engine, of course, was still warm, and after two complete revolutions of the prop to suck in the fuel, he cut in the switch and snapped her over. It was something of a scramble to get into the cockpit but he made it and roared away unmolested. Approaching the coast again he encountered more fog so he tooled up and down until he found a hole and dropped through. At 3.30 he checked in at Cap Griz Nez, ten miles below Calais, where he picked up more fuel and called his squadron headquarters at Dunkirk.

He sat out the bad weather and finally returned to Furnes at 10.30 a.m., and by that time the jubilant news was widely known, and within hours his name was ringing from one end of the Empire to the other. His photograph was flashed on hundreds of theatre screens that night, to the delight of wildly enthusiastic audiences.

That afternoon the C.O. of No. 1 Naval Aeroplane Squadron, in keeping with the traditions of the Silent Service, posted a notice which read: "*Though weather has been extremely unsettled our pilots have been active and busy.*"

The next day King George V recognised Warneford's great victory by awarding him the Victoria Cross. The French followed with their Cross of the Legion of Honour.

Flight Sub-Lieutenant R. A. J. Warneford lived only ten more days to enjoy the laurels of his victory. On June 17th he went to Paris to receive his Legion of Honour. After the ceremony he was ordered to pick up another French airplane at the Buc Aerodrome outside Paris. This time it was a Farman biplane. The machine was brand new. So new, in fact, that much of its necessary equipment had not been fitted. Most important, there were no safety belts in either seat.

An enthusiastic young American newspaperman, a native of St. Louis named Needham, asked to go along back to Furnes where he planned to write a story on Warneford and his Zeppelin victory. Warneford cheerfully agreed, and they both climbed in and took off. Almost immediately the Farman pitched and bucked for some unknown reason, and both Warneford and Needham were thrown out in mid-air and killed.

Thus ended the brief but glorious career of the first British airman to destroy a German Zeppelin in the air.



AIRCRAFT DESCRIBED

Number 84

by P. L. GRAY

MORANE SAULNIER

TYPE 'L'

ORIGINALLY DESIGNED in 1913 the Morane-Saulnier (M.S.3) type "L" saw considerable operational service during the first eighteen months of World War I. It was a parasol monoplane of typical contemporary construction, the fuselage being a normal wooden box-girder, wire braced and fabric covered except for the forward panels which were plywood covered. The wing, also a wood and fabric structure was, of necessity, fairly flexible to allow the lateral warp control to operate through three control wires to each panel, anchored to the rear main spar. Upper wires ran over a pulley in the pylon apex and lower wires were connected to operating cranks pivoted at the apex of an inverted Vee structure under the fuselage. The control wires crossed over i.e., the starboard wires were connected to the port crank and the port wires *vice versa*; at the forward end of the pivot spindle was the actuating crank which was connected to the cockpit controls.

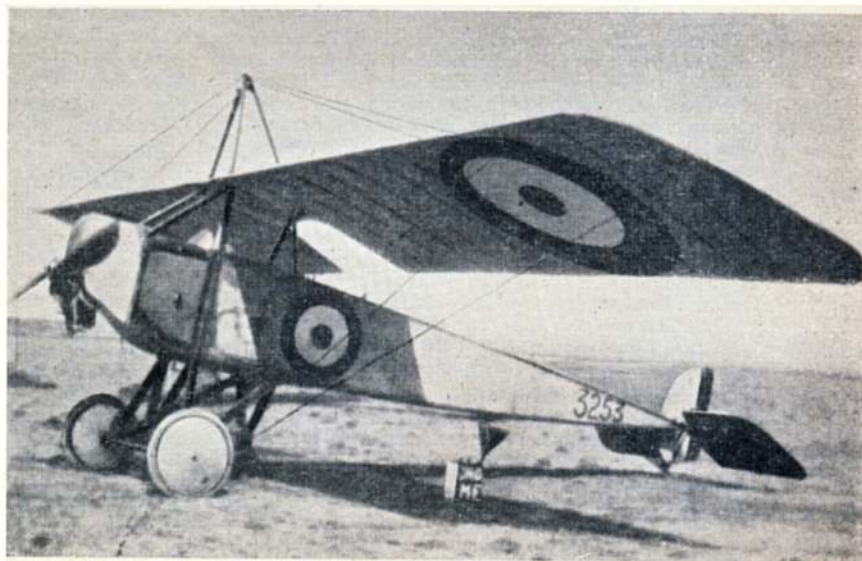
With no fixed tail surfaces, the Morane was tricky to fly, but the comparatively small rudder and elevator area, allied to the considerable wing area, doubtless reduced the sensitivity. The machine was originally powered with the seven cylinder 80 h.p. Gnome rotary, an alternative was the 80 h.p. LeRhône, which was the more reliable of the two.

Many M.S.3's were built including some constructed under licence in Sweden and Spain. Those used by the British were a direct purchase

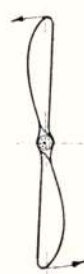
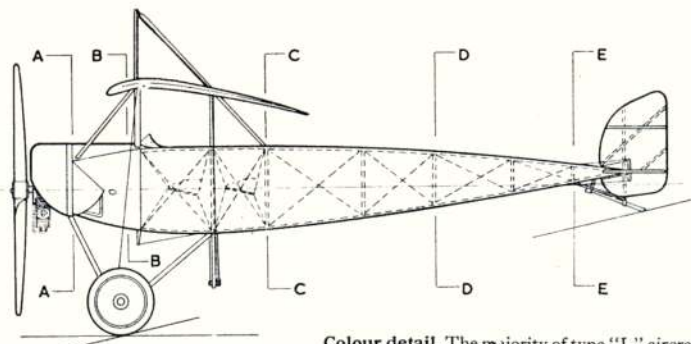
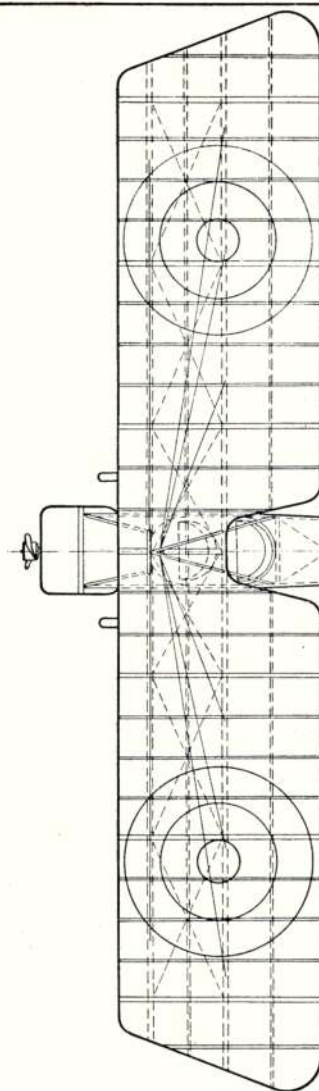
by G.H.Q., B.E.F., and some partly equipped Nos. 1 Sqn. R.N.A.S. and 3 Sqn. R.F.C., in which McCudden was then serving as an N.C.O. As was so often the case at that time, all sorts of modifications were effected in the interests of operational efficiency and the parasols used by these squadrons differed considerably from the original Morane-Saulnier prototype. They had 80 h.p. LeRhône engines; the front undercarriage legs were brought back to the second spacer and the whole chassis beefed up. There were slight mods to the rudder and elevator profiles, also the pylon was altered to a tripod structure, with only a single strut sloping rearwards to sit above the inverted Vee centre-section struts.

No armament, as such, was fitted—bomb racks to carry improvised bombs were "concocted" by squadron fitters and armourers, rifles were carried for air-to-air combat.

Later a more refined version with ailerons and a rounded fuselage, known as the type "LA" (M.S.4) was used by some units.



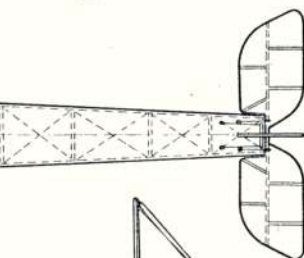
Heading shows a captured Morane-Saulnier type "L" with wing insignia over painted. (Real Photograph Co. picture.) At right is Warneford's actual aircraft from which he dropped bombs on the destroyed Zeppelin to earn the first R.N.A.S. Victoria Cross. (Imperial War Museum photograph.)



Colour detail. The majority of type "L" aircraft were in "natural" finish, i.e., unbleached linen fabric, clear doped, then given a coat of protective varnish which resulted in a pale yellowish (primrose) tint that aged to a greyish-cream shade. Roundels were carried both above and below the wing and the rudder was divided into three equal width stripes of red, white and blue with the blue foremost. Struts were painted black, likewise a wide border to the ply panel on the fuselage sides. Warneford's aircraft was serialised 3253 in black, as shown. It is thought, from photographic colour values, that the wing roundels on this aeroplane were of the original French type with the red ring outermost and with the tail stripes reversed.

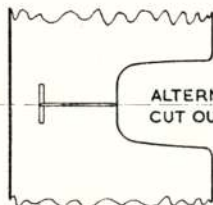
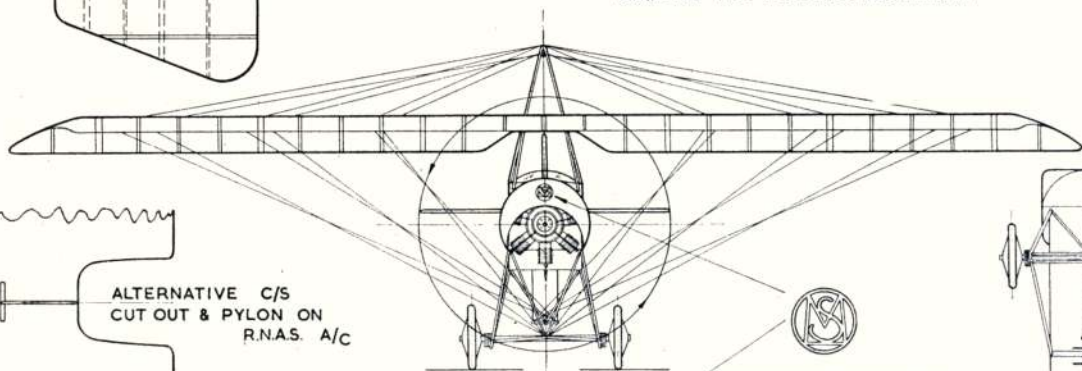
Manufacturers: Morane-Saulnier Soc., de Constructions Aeronautiques, Paris.

Prototype: Length: 20 ft. 9 in. Span: 34 ft. Area: 172 sq. ft. Useful load: 550 lbs. Weight loaded: 839 lbs. Motor: 80 h.p. Gnome rotary. Speed: Max. 76 m.p.h.; Min. 55 m.p.h. Climb: 345 ft. per min.



BLACK
OUTLINE
TO PANEL

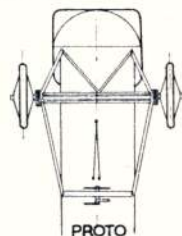
WARNEFORD'S A/C SHOWING
SERIAL & ROUNDEL LOCATION,
ALSO REVISED U/C & TAIL OUTLINES.
COWLING WAS POLISHED ALUMINIUM.



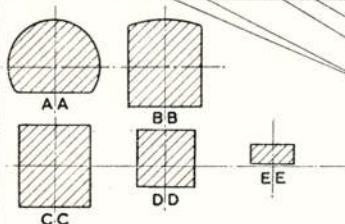
ALTERNATIVE C/S
CUT OUT & PYLON ON
R.N.A.S. A/C



MONOGRAM PAINTED IN
WHITE ON DARK COWLINGS
& BLACK ON ALUMINIUM
COWLINGS.



PROTO
U/C DETAIL. RIGGING
& CONTROL CABLES
OMITTED



MORANE-SAULNIER TYPE 'L' PROTOTYPE & R.N.A.S. MOD.

VIEW SHOWING LE RHONE ENGINE &
OPENED UP TRAILING EDGE OF COWLING
ALSO RE-SITING OF LOWER RIGGING
WIRES ON WARNEFORD'S MACHINE.
(SOME 9 CYL. ENGINES WERE USED)

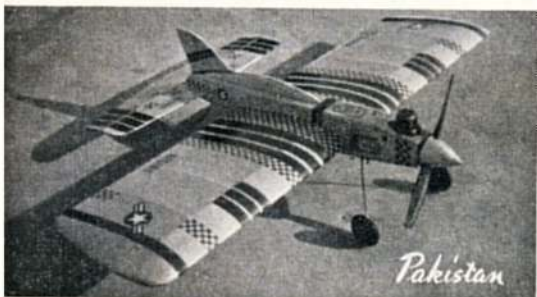
FT.

"J" TYPE 1/72ND SCALE REPRINTS OF THIS DRAWING AND "A" TYPE 1/48TH SCALE TYPE DIE-LINE PRINTS ARE AVAILABLE PRICE 6d. AND 1/- RESPECTIVELY FROM THE AEROMODELLER PLANS SERVICE, QUOTE DRAWING NO. 2685 WHEN ORDERING

World News



Russian modellers from Leningrad (The Red belles?—on wings) are Kolegov and Vasiljev (A/2), Captain Kusnetsov, Team Manager Sansar and Simonov and Filimonov (power). They competed in Finnish Winter contest—see report



AS ALREADY HINTED in these columns, **Russia** is to be host country for the *Criterium of Europe* for 1957, following the victory in Yugoslavia last year. This is not to be confused with the M.V.V.S. meeting, due to be held in Hungary. However, as the Criterium has always had little support—due to financial commitments for World Championships, from most western countries, it seems like the magnificent Yugoslav cup is destined to stay beyond the so-called Iron Curtain, for we see but little possibility for western representatives making the expensive trip to Moscow. On the other hand, Soviet modellers have already entered other Internationals this year, beginning with the February 17th Winter contest at Helsinki, **Finland**. A team from Leningrad (*photo above*) attended with all hardwood, rugged models, and though they did not win in the foggy and rainy weather, they earned considerable praise and generously distributed Russian motors, presumably the ball race Mk. 12 2.5 c.c. diesel, which is already showing itself in other east European states. Brief results are:—

Team: Helsinki, 1016.5 secs., Leningrad, 953.5 secs. (Power).
Helsinki, 877.4 secs., Leningrad, 762.3 secs. (A/2).
Individual 1. Hisinger (Helsi) 540; 2. Englund (Finn) 522.3;
(Power) 3. Simonov (Leningrad) 484.4. (Three flights.)
Individual 1. Tahkapaa (Finn) 523.1; 2. Haahtela (Finn) 521.2.
(A/2) Top Russian: 7th, Kolekov (Leningrad) 409.5.

A team from **Sweden** could not attend the Finnish meeting because they had their own Winter event at Stockholm on the same day. The club at Gamen topped the team results, with their members Lars-Gunnar Larsson and Hans Friis scoring perfect maximums to win the Wakefield and F.A.I. power classes. Results of the latter are worth tabling, for they give an indication of the strength of the Swedes had there been a World Championship for this class in '57. (*See next column.*)

At **PAKISTAN** Nationals, top: the Habib team starting an A.M.35 on their "Calypso". Centre: much decorated Blue Pants, winner of Concours d'Elegance for Mohammed Junaid; and bottom: a V.T.O. by Habib M. Habib's Y-Bar, which disappeared for ever at 4:50 rom 11 secs engine run—no dft!



1. Hans Friis (Gamen) ... 900 plus 5 : 59
2. Rolf Hagel (Malmö) ... 900 plus 5 : 15
3. Rune Olsson (Gamen) ... 900 plus 4 : 10

In the A/2 class, Rolf Hagel of Malmö placed top with 808 secs.

Moving to warmer climes, where aeromodelling is on a less competitive scale but followed with the same intense enthusiasm, we learn of the 7th All-Pakistan contests held on December 29th last. Teams of Air Training Corps cadets were flown into Lahore from places as far away as two thousand miles distant, and the private team from Karachi had a 1,500 mile trip. The unaccountable thing about modelling in this part of the world is that the dethermaliser is as yet unknown! This in conditions where a KK *Southerner* was making flights up to 4 : 42 off 21 secs. power run, and Mr. Habib's *Zian* (Elfin 2.49) was unofficially checked at 25 minutes off a 10 secs. run! The motor cyclist retrieving squad were hard put to chase across country after some of the flyaways. Because timers are not generally used, power events allow from 10 to 45 secs. engine run and the ratio of glide to power counts for points. Habib M. Habib, of Habib Bank, Karachi, averaged a 17 : 1 ratio to win in power.

Cambridge in New Zealand had a surprise visit on the local control-line pitch when a bright red Sikorsky S-55 helicopter of the U.S. Navy landed to find its whereabouts. The pilot was looking for a party of Naval Officers out on a fishing holiday, and the modellers were able to direct him on the correct route. Local press stated that "the Sikorsky appeared quite a monster when stationary in the model aero club ring"—with 53 ft. diameter rotor it should certainly have chopped away any overhanging foliage for the boys!

A new Australian magazine called *Model News*, published by globetrotter Adrian Bryant and Russell Hammond, at Kyogle, N.S.W. It is bright, full of good Australian comment and includes local designs, plus a number of adverts. mentioning Australian kits. We wish the new venture every success and hope that it will continue to boost the characteristic design trends that distinguish the Aussie models.



Top: Hoh Fang-Chiun, in Sweden with O/D models. Chinese writing means radio control on Yellow, Blue and Red 56-in. span design for Webra 1.5 at left, while the duration design is christened Eastwind, for another Webra 1.5 c.c. There are 2.5 and .3 c.c. versions of same model, all to F.A.I. rules. Unfortunately, being a "foreigner", Hoh Fang-Chiun cannot enter the Swedish National contests

Jose Rodriguez of Barcelona has a large Bristol Britannia with four Byra 2.5s which he hopes to take to the Criterium d'Europe in Brussels

Charlie Choong Eng Yeat of Penang sent this charming pic of his daughter holding Mercury Thunderbird in Orange and White colouring, has McCoy 29 power





—by Bob Howie

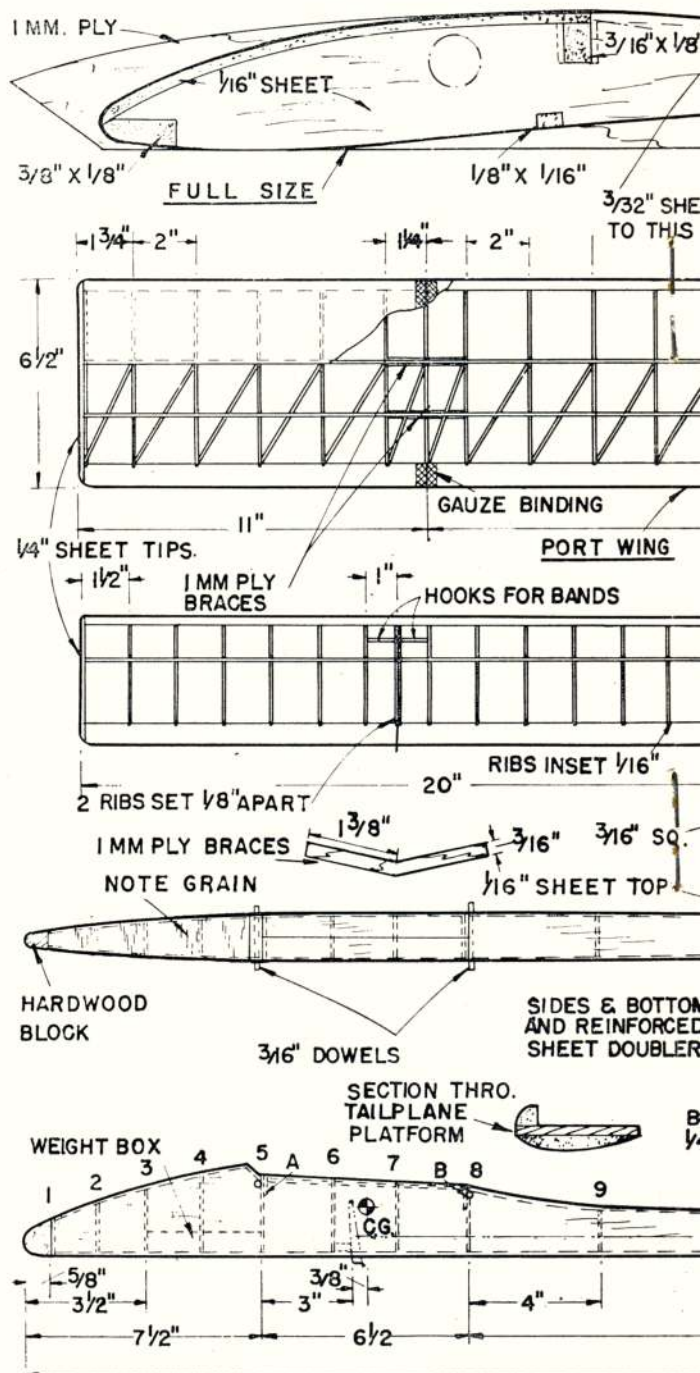
ONE OF AUSTRALIA'S most successful A/2 designs, Southern Sue, is the result of nearly seven years of development by Bob Howie, who leads the 1957 Australian A/2 Team. An article in the January AEROMODELLER for 1950 inspired Bob to build an A/2, and the original model won the Australian National Championships in December of that year, and a rebuilt version won two club events in 1951. Modifications were applied according to the trends appearing in AEROMODELLER, another club event was won in 1953 and the first major success came in December, 1954 Nationals, when a virtually untried model employing a drooped trailing edge section, returned two maximums (three minutes) before a faulty dethermaliser caused a fly-away, eventually landing seven miles away and being retrieved two days later. The South Australian Champs., 1955, saw a second place with another fly-away on the fifth flight and the following year the wing joint in the centre section was altered from tongue and box to dowels in tubes, and the model sent to Brisbane for the 1955 Australian Nationals. Unfortunately, the model arrived too late after its 1,800 miles trip for the event. However, the 1956 South Australian Championships was the scene of another first place with a three-flight aggregate of 557 secs., and latest success came at the 1957 Australian Nationals, reported last month, where Bob topped the A/2 Class and came second to his old adversary Russell Hammond in the open F.A.I. Class.

With such a contest record no one can deny that Southern Sue combines the many attributes of designs that have already appeared in AEROMODELLER and are included in Aeromodel Plans Service. One can see the *Quickie* and *Seraph* influence coupled with the designer's own particular whims. Its lightweight airframe, which can be made to weigh no more than 9½ ounces, calls for up to 5 ounces of ballast to bring it to the correct F.A.I. wing loading. Being simple in structure, no full-size plan is required and all of the details given on this drawing enable one to make the model without undue difficulty. All you need to do is to lay out the wing full-size, to the dimensions quoted, and apply the structure, full size parts for which are given in each case.

If you want a model that you can make quickly and that will provide minimum of flight trimming difficulties, Southern Sue should be your choice.

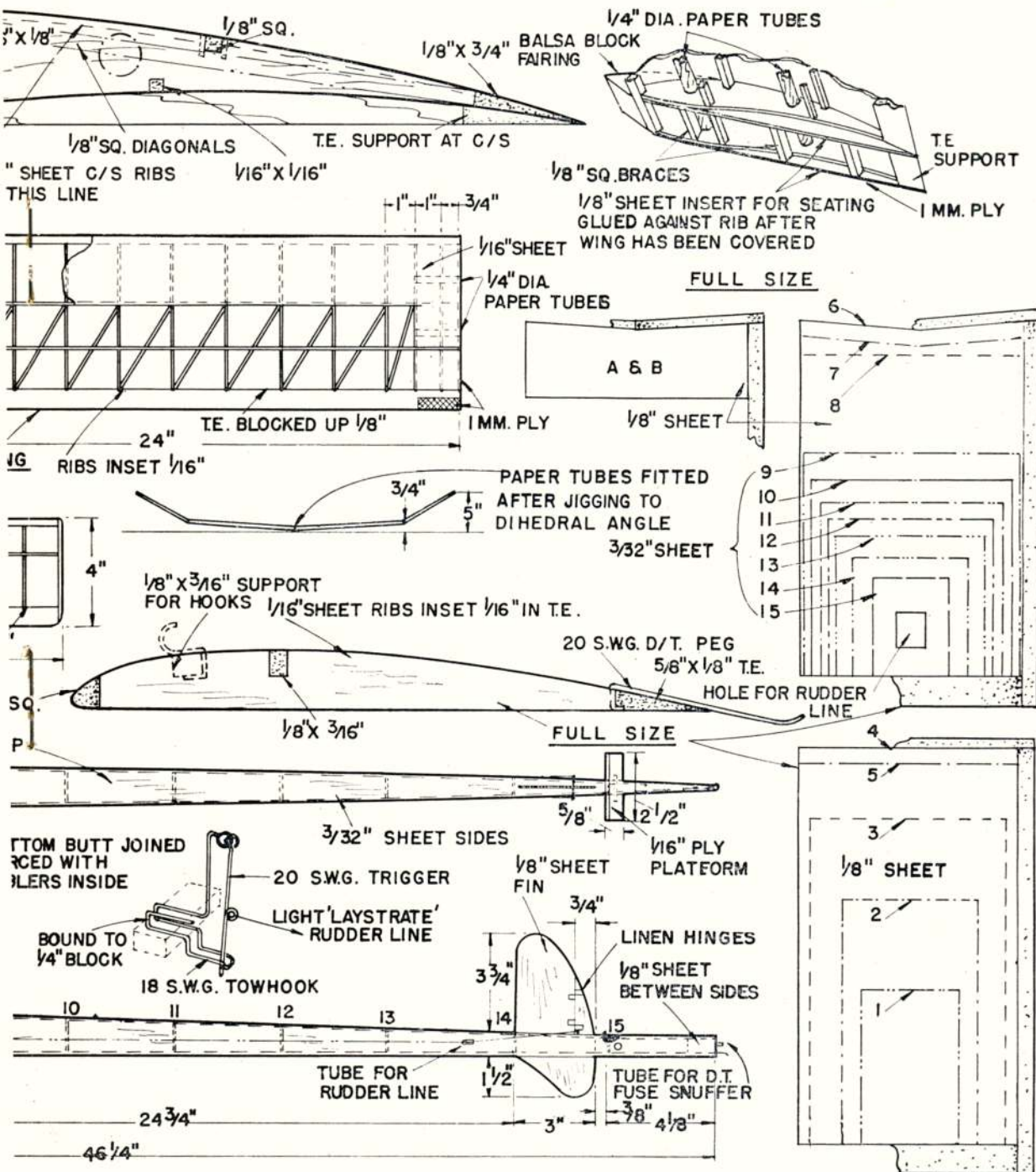
Build Australia's top

Full size parts and dimensioned



top A/2 glider SOUTHERN SUE

needed drawings are all you need for this successful model design





WESTLAND WHIRLWIND

TO IGOR SIKORSKY, Russian born, but now a naturalised American subject, is credited the design of one of the world's first "practical" helicopters, and from his long series of experiments stems the famous S.55.

The S.55 prototype was first flown on November 7, 1949, and it differed only slightly in general appearance and detail from the many variants of the type now flying. Powered by a Pratt and Whitney R.1340-S3H2 radial engine of 550 h.p. the prototype weighed 4,000 lb. empty, having a payload of 2,800 lb. The type was ordered into quantity production for the U.S.A.F. under the designation H.19.

In England, Westland Aircraft Ltd., who have built a considerable number of the earlier S.51 Westland Dragonfly helicopters under licence, made similar negotiations for the manufacture of the S.55, and it is now in full production at Yeovil for military and civil operators, being known as the Westland Whirlwind.

Design features of the Whirlwind are such that it affords the operator with unique characteristics and features not usually associated with helicopters. Of all metal, semi monocoque, construction in which much use is made of magnesium, the basic structure of the machine is the centre section. Built on longitudinal members with transverse frames, the fuselage has an unobstructed cabin 10 ft. long by 5 ft. 6 in. wide, and 6 ft. high, giving a total volume of over 3,000 cubic feet.

The pilot's cockpit has provision for two crew members, though normal operation is from the starboard seat, with full instrumentation on that side of the cockpit. The second crew member can gain access to the cabin from his position down a ladder on the port side of the front bulkhead. Independent entry to the cockpit can be made by means of steps in the fuselage side and through the large rearward sliding "rear-view" windows. An outstanding feature of the cockpit layout is the most excellent visibility for the crew. Provision is made for the fitting of dual controls. Conventionally mounted are the cyclic pitch control column and rudder

AEROPLANES IN OUTLINE No. 50

R.A.F. Mountain Rescue team has training session with the winch gear on a hovering all-yellow Whirlwind XJ 725. Note roundel and "RESCUE" positions. Photo: Jim Parry

bar, with the collective pitch lever which incorporates a twist grip throttle control, located adjacent to the left of the seat. The control systems are servo-assisted by power from the main hydraulic system, though reversion to manual control is possible.

The fuselage behind the rear cabin bulkhead contains two main compartments, the top one is used for baggage in the civil version, and survival equipment on military aircraft. Access to this can only be gained from the cabin. The lower space provides accommodation for radio equipment and batteries with associated electrical components. Attached to the rear circular frame of the baggage compartment is the light alloy tail boom, under the rear end of which are the fixed incidence pitch damping stabilisers. A tail skid projects sufficiently to protect the tail cone in the event of a tail down landing.

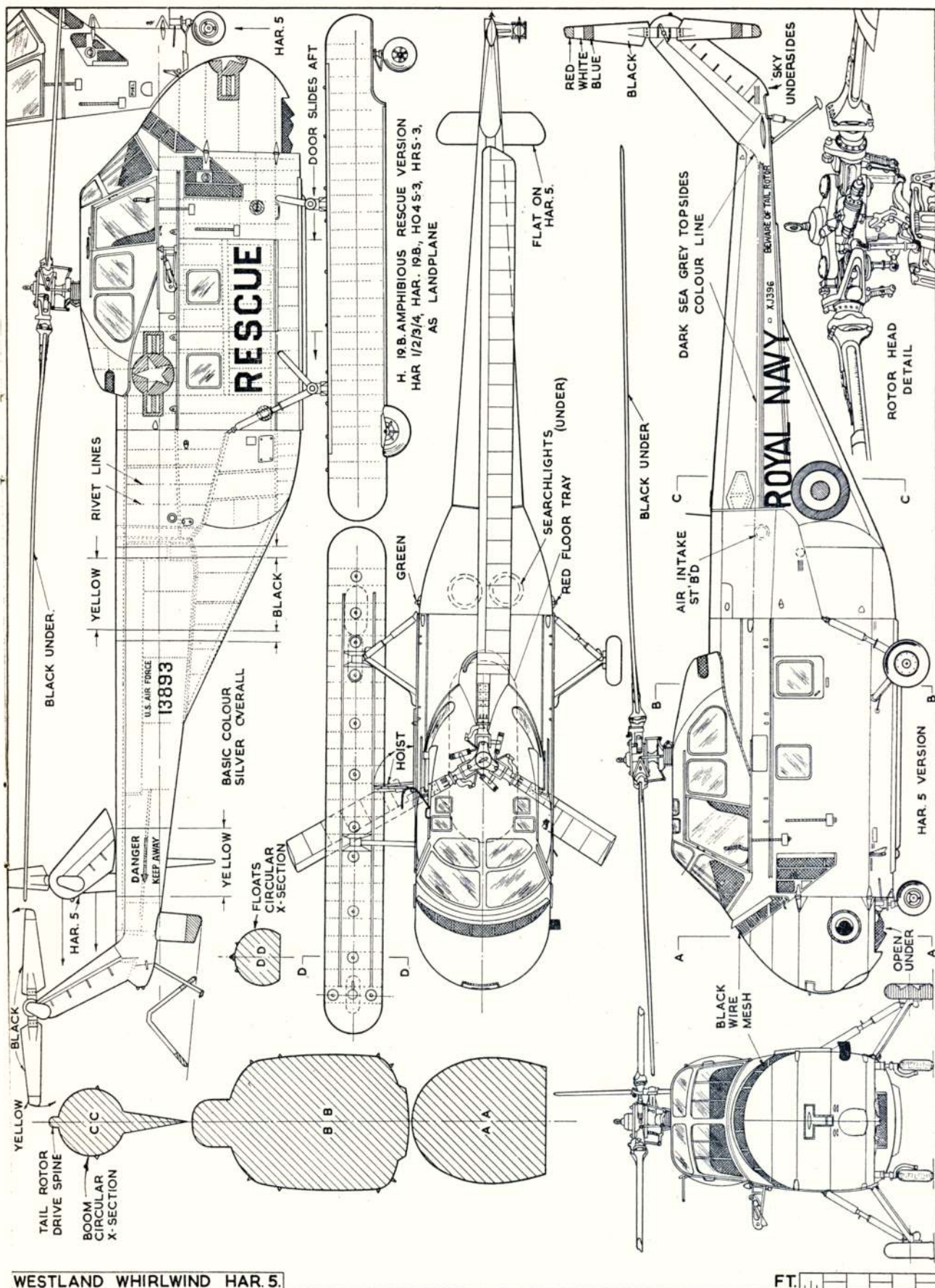
The all-metal anti-torque rotor is carried on the pylon at the end of the tail boom being driven through two local gear boxes from the main gear box by means of a shaft ducted along the top of the tail boom.

The main rotor blades, similarly of all-metal structure, are designed to afford maximum efficiency and serviceability under extreme conditions of humidity and temperature. Matched to a master blade during manufacture, they are completely interchangeable, and can be folded to reduce the storage space of the helicopter.

The internal arrangement of the commodious sound-proofed cabin of the Whirlwind depends on the nature of the duty which it is selected to perform. For normal civil operations, eight lightweight seats are installed, five facing aft, and three facing forward. Windows in addition to the standard arrangement can be provided, increasing the transparent area by 60 per cent. The large cabin door slides backwards to open. The fact that the main cabin is directly under the weight lifting rotor permits a reasonable latitude for freight loading. It obviates the necessity for careful ballasting usually attendant on helicopter loading. Up to eight stretchers can be comfortably accommodated, the communicating ladder permitting the second crew member to act as, attendant. A sling can be attached to the underside of the fuselage to facilitate the lifting and transport of bulky loads.

The latest version of the Whirlwind, the HAR 5, is fitted with an Alvis Leonides Major 900 h.p. radial. The engine installation is planned in such a manner that as a complete engine change unit it can replace the lower-powered engines of early machines. The most significant external features of the HAR 5 is the modified tail-cone and rear pylon. This modification, which effects a droop of 3° approximately, was introduced to provide greater clearance between the boom and main rotor blades. A spring-loaded tail-skid and horizontal stabiliser are fitted.

Operated by civil companies in large numbers for such purposes as whaling, survey and pest control, the Whirlwind has most convincingly demonstrated the case for inter-city passenger services. Notable amongst such operations are those of British European Airways from London Airport to the South Bank rotor-station at Westminster. This service, operated purely as an experiment, was introduced on July 25, 1955, and continued until May, 1956. It was considered necessary to fit emergency flotation gear to safeguard passengers in the event of a forced "landing" on to the River Thames, the course of which river the helicopter was obliged to follow from the perimeter of the built up area of the suburbs. A further non-standard feature



"J" TYPE 1/72ND SCALE REPRINTS OF THIS DRAWING AND "A" TYPE 1/48TH SCALE TYPE DYE-LINE PRINTS ARE AVAILABLE PRICE 6d. AND 1/- RESPECTIVELY FROM THE AEROMODELLER PLANS SERVICE, QUOTE PLAN NUMBER 2684 WHEN ORDERING.



HAR 5 of the Royal Navy, XG583, shows different roundel position and naval identification

considered essential for operation into the city was the Vokes silencer fitted to the engine exhaust outlet and mounted between the port float and fuselage. Of the fleet of three Whirlwinds operated by B.E.A., and known as the "King Arthur" class, G-ANFH, Sir Ector, was delivered on November 2, 1954, G-ANUK, Sir Kay, on December 10, 1954, and the third, G-AOCF, Sir Lionel, on August 29, 1955. The helicopters are finished in the standard red and white livery of the Corporation. From July 3, 1956, a service was operated by B.E.A. between Nottingham, Leicester and Birmingham to connect with London and Continental services, but was discontinued in November, 1956, as a fuel economy measure due to the Suez crisis.

Using S.55 helicopters, SABENA, Belgian World Airlines, introduced the world's first international helicopter service in August, 1953, linking eleven principal European cities, amongst them Lille, Rotterdam, Cologne and Dortmund, with the Belgian capital. Other civil operators of the type include Shell, Fison-Airwork, Sperry, Bahamas Helicopters, New York Airways, National Airlines, Mohawk Airlines, Los Angeles Airways Inc., and many other important business organisations.

The Royal Navy has gradually increasing numbers of the Whirlwind in service, No. 848 Sqdn. R.N., formed in October, 1952, received its machines directly from the United States of America under the Mutual Aid Defence Plan, and in January, 1953, was in action against the Bandits in Malaya. For these Malayan operations in 1953 the squadron was awarded the Boyd Trophy, which is awarded annually for the most outstanding feat of aviation in the Royal Navy. Numbers 705 and 845 R.N. Squadrons are equipped with Whirlwinds.

Number 22 Squadron of R.A.F. Coastal Command has Westland built H.A.R. Mk. 2 Whirlwinds for Air/Sea Rescue duties. No. 155 Squadron has been engaged in joint R.A.F./Army operations in Malaya using the H.A.R. Mk. 4.

Fison-Airwork Ltd., operate G-AODP, note the earlier tail surfaces compared with latest variant above. (Westland Photos)

During 1956 the first batch of Whirlwinds was delivered to the British Army for evaluation and other trials by the Joint Experimental Helicopter Unit at Middle Wallop. It so happens that these were used in the Suez operations during November, 1956, and were the first multi-seat helicopters to be delivered to the Army.

The United States armed services are, of course, the largest users of the S.55 in its many variants as indicated. In the Korean campaign the magnitude of the work so effectively accomplished by units operating the H.19 was such that it is difficult to accord them the praise they so worthily deserve. Many hundreds of sick and wounded personnel owe their lives to this helicopter. By no other means could they have been saved.

Westland Whirlwind

- H.A.R.1. Pratt and Whitney, R.1340-40, 550 h.p. radial. First production batch for Royal Navy.
- H.A.R.2. As H.A.R.1, but for R.A.F. non-tropical operations.
- H.A.R.3. Wright, R.1300.3, 700 h.p. Standard production version for Royal Navy.
- H.A.R.4. Pratt and Whitney, R.1340.57, 600 h.p. R.A.F. for tropical operations.
- H.A.R.5. Alvis Leonides Major, 900 h.p. Latest basic version.
- Civil. Whirlwind PW. R.1340.40.
- H.A.R.21. U.S. built as H.R.S.2. General utility duties. Equipment of 848 Squadron R.N.
- H.A.R.22. U.S. built as H.O.4S.3. Anti-submarine duties. Equipment of 845 Squadron R.N.
- H.19A. PW. R.1340.57, 600 h.p. U.S.A.F. Ambulance, troop carrier.
- H.19B. W. R.1300.3, 700 h.p. U.S.A.F. Ambulance, troop carrier.
- H.19C. As H.19A, for U.S. Army ground forces.
- H.19D. As H.19B., for U.S. Army ground forces.
- HO4S.1 and 2. As H.19A., for U.S. Navy Anti-submarine duties.
- HO4S.3. As H.19B., for U.S. Navy Anti-submarine duties.
- HO4S.2G. As HO4S. 1 and 2, but for U.S. Coast Guard. Rescue duties.
- H.R.S.1 and 2. As H.19A, but for U.S. Marine Corps. Assault transport.
- H.R.S.3. As H.19B, but for U.S. Marine Corps. Assault transport.
- H.R.S.4. W. R.1820, 1,025 h.p.

Specification

| | |
|------------------------------------|-------------------------------------|
| Rotor dia. 53 ft. (49 ft. H.19A) | Disc Area, 2,206 sq. ft. |
| Overall length, 62 ft. 0 in. | Empty weight, 5,045 lbs. |
| Gross weight, 7,500 lbs. | Max. all-up weight, 7,800 lbs. |
| Max. speed, 110 m.p.h. | Cruising speed, 86 m.p.h. |
| Still-air range, 390 miles approx. | Service ceiling, 12,000 ft. approx. |

Colour schemes

R.A.F. Search and Rescue Squadrons, e.g., 22 Squadron HAR. Mk.2. XJ.436, XJ.435. All Yellow. Roundel at forward end of tail cone. Serial number and the words "Beware of Tail Rotor" extend along the rear half of the tail cone. The word RESCUE in black letters is on the tail cone fairing below the roundel.

Transport Command. Normally Silver with White top (XJ.433). Joint R.A.F./Army. Camouflage Green and Brown overall. Mostly Mk.4.

Royal Navy. H.A.R.21 of 848 Squadron. Midnight Blue. Yellow edged roundel on tail cone fairing, serial forward end of boom under ROYAL NAVY, over which is H.R.S.2 all in White. Serials include WV.191, WV.189, WV. 186. Individual letter approx. 2 ft. high below cabin forward window. Recently R.N. Whirlwinds have appeared with the helicopters individual letter approximately 4 ft. 6 in. high on the rear fuselage, and the words Royal Navy in large letters occupying the forward half of the tail-cone.

Normal scheme is for Dark Sea Grey upper surfaces and "Sky" undersides with the roundel on tail-cone fairing, but will probably be superseded by the scheme with Dark Sea Grey upper and Light Sea Grey lower surfaces.

Machines of the U.S. services appear in a variety of colour schemes, examples of which are as indicated.

Rescue. Silver, Black edged Yellow band extending around tail-cone and fairing. The word "Rescue" in Black characters along the fuselage sides below cabin windows. Insignia is on the nose and above rear cabin windows.

Army. Silver. Insignia as above. The words TROOP CARRIER in Black along lower fuselage sides. Serial at forward end of boom.

Khaki, insignia below forward window. U.S. ARMY in Yellow on upper rear cabin sides or tail-cone, Yellow tail rotor warning band on rear end of tail-cone.

Marines. Midnight Blue, insignia on door. Unit code letters on boom fairing and nose. The word MARINES on upper rear fuselage side.

U.S.A.F. Some all Yellow for rescue duties, usually Silver overall with conventional insignia.





Radio Control Notes

The AEROMODELLER TRANSISTOR RECEIVER

Designed by Tommy Ives

Described and built
by the Editor

FOR SOME TIME my postbag has contained pleas for information on transistor receivers for the home constructor. I knew that Tommy Ives of "Ivy Receiver" fame had been successfully flying with transistorised equipment right through the 1956 season, and a visit to Tommy's workshop and subsequent demonstration soon convinced me that he had some first class designs.

As yet the fully transistorised receiver that uses no valves and operates on a single 9-volt supply is not quite within our reach as the right type of transistor for 27 m/c operation is not generally available. By adding transistor stages to our existing super-regenerative single valve circuits we can, however, effect considerable improvement. Firstly, and all important, 100 per cent. reliability and excellent range; secondly, a low standing current with a really healthy current rise on signal; thirdly, the use of only 22½ volts H.T. plus a 1½-volt Pencil for the filament with subsequent saving in weight.

A considerable amount of time has been spent on development work by Tommy Ives who has found that all types of super-regenerative receivers may be adapted for transistor amplification. Three such circuits are given and the constructor's choice will depend upon his personal preference and his ability.

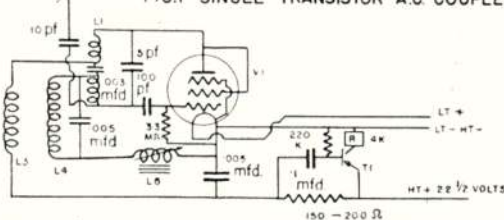
My own requirements and those of the average radio control enthusiast with little knowledge of radio, demand a set that is simple to build and easy to tune, with no unexpected "quirks" on its completion necessitating expert radio knowledge to sort them out. Circuit number 3 certainly has these qualifications, for at the time of writing no less than six examples have been built all of which have almost identical characteristics and all of which worked straight away with no difficulty whatsoever. Well almost! The Editor's first set worked a lot better after the transistors he had misguidedly inserted the wrong way round were re-inserted correctly! Before passing on to the constructional description of the set I will hand over to Tommy for his comments on the circuits generally.

"Fig. 1 is a very satisfactory system, easy to adjust, and with adequate range. It needs a precise arrangement of the relative R.F. and quench amplitude and is not

recommended to the novice. Fig. 2 is easy to construct and adjust, has great range and is quite stable in operation. Fig. 3 is easier to construct and has great range and after a pre-set adjustment of the variable resistor may be regarded as a single control circuit. All three circuits will give a change up to 10 milliamps, depending upon the type of transistor used and the resistance of the relay.

It will be noted that the relay is not included on the receiver panel for the following reasons: (1) The high cost of a relay is a factor to be considered. If used separately one relay will suffice for several receivers. (2) The mass of a receiver with relay is considerable and it is this factor that causes most of the damage in the event of a heavy landing or a prang. The relay has to be insulated from vibration, and when suspended on its own is a relatively small mass. (3) The type of receiver described is suitable for the "Relaytor" type of actuator which combines both relay and actuator and usefully dispenses with a component. Constructional details of a "Relaytor" will be following in our next issue

FIG.1 SINGLE TRANSISTOR A.C. COUPLED.



V1—3Q4, 3V4, D.L.96, etc. T1—Hivac T.M.I., Brimar TS3, Mullard O.C.72. L1 & L2—10 turns each 28G enamelled wire-slugged former. L3 & L4 Quench coil—½-in. core ½-in. winding space. L3—375 turns. L4 600 turns 40G wire. L5—5 to 15 turns to suit circuit—current in T1 to rise as slug is unscrewed

FIG.2 TWO TRANSISTOR D.C. COUPLED.

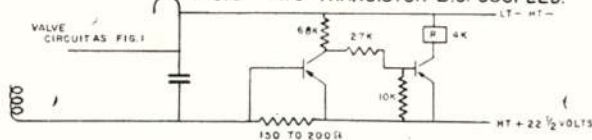
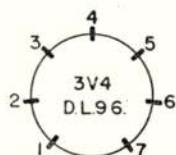
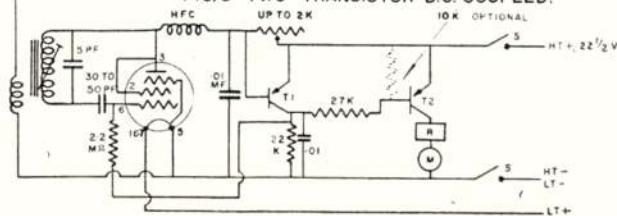
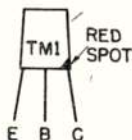
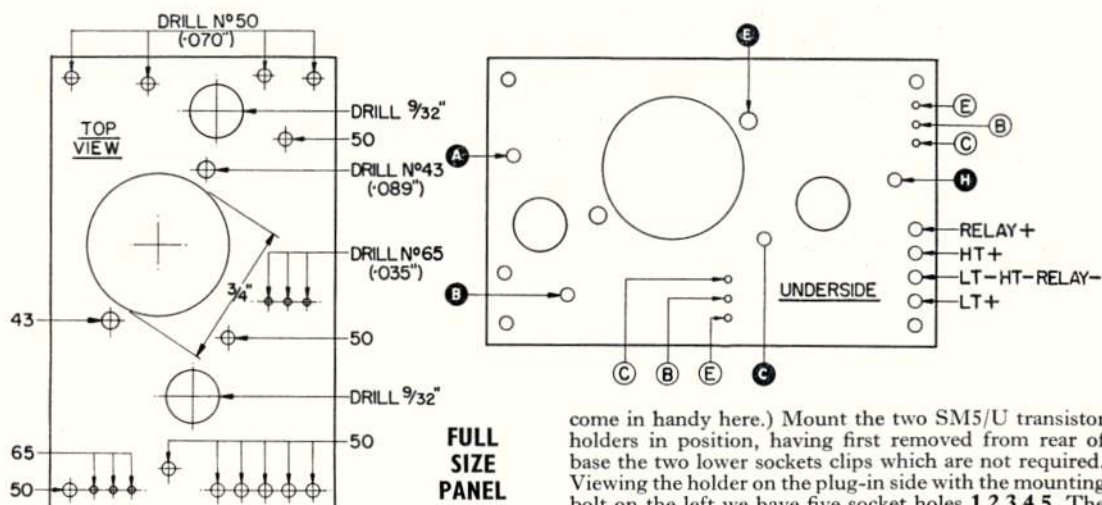


FIG.3 TWO TRANSISTOR D.C. COUPLED.



Valve base diagram is on left, note Pin 4 is not used. Hivac Transistor wiring code is on right and it is suggested that the red spot, i.e., Collector is always nearest to the mounting screw when using SM5/U holders





meantime here are the current rise figures at range according to the resistance of the relay used. 5K—3.5 m/a. 4K—4.75 m/a. 3K—5.5 m/a. 3K—6.5 m/a. 2K—9.5 m/a.

Construction

The following components are needed:—

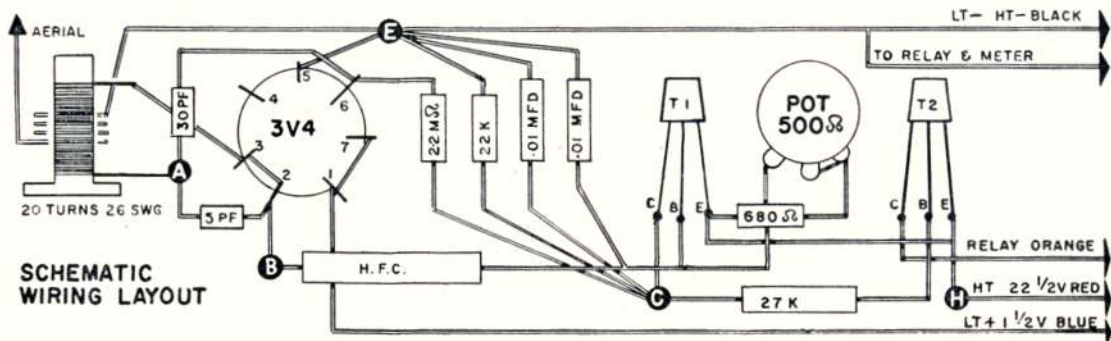
- | | |
|---|--|
| 1 piece of Paxolin $\frac{1}{8}$ in. x $1\frac{1}{2}$ in. x 2 $\frac{1}{2}$ in. | 2 SM5/U valve holders. |
| 1 $\frac{1}{2}$ in. Aladdin coil former and slug. | 2 Hivac TM1 transistors. |
| 1 30 to 50 pf. ceramic capacitor. | 4 10 B.A. $\frac{1}{8}$ -in. bolts, nuts, washers. |
| 1 5 pf. ceramic capacitor. | 2 8 B.A. $\frac{1}{4}$ -in. bolts, nuts, washers. |
| 2 .01 mfd. tubular capacitors. | 2 $\frac{1}{2}$ -in. lengths of $\frac{1}{8}$ -in. copper or dural tubing. |
| 1 2.2 m Ω resistor $\frac{1}{2}$ watt. | 1 2 ft. length of 26 s.w.g. enamelled copper wire. |
| 1 22K Ω resistor $\frac{1}{2}$ watt. | 1 $\frac{1}{2}$ -yd. length of plastic flex in following colours: Black, Red, Blue, Orange, Green. |
| 1 27K Ω resistor $\frac{1}{2}$ watt. | 1 1-ft. length of Systoflex. |
| 1 Potentiometer 500 ohm. | 1 1-ft. length of 24 gauge tinned copper wire. |
| 1 680 ohm. resistor. | 2 Single-sided tags. |
| 1 27 m/c H.F. Choke or 9 ft. of 40 gauge enamelled wire. | |
| 1 B7G Amphenol valve holder. | |
| 1 Miniature valve 3V4, DL96, etc. | |

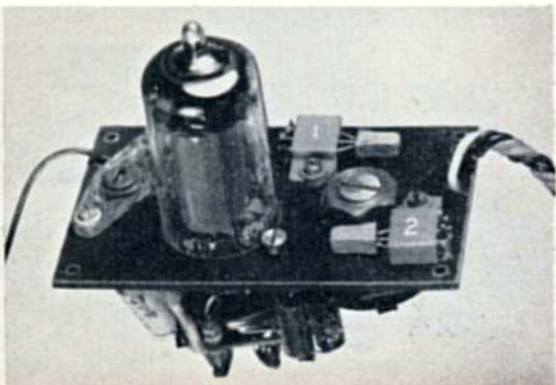
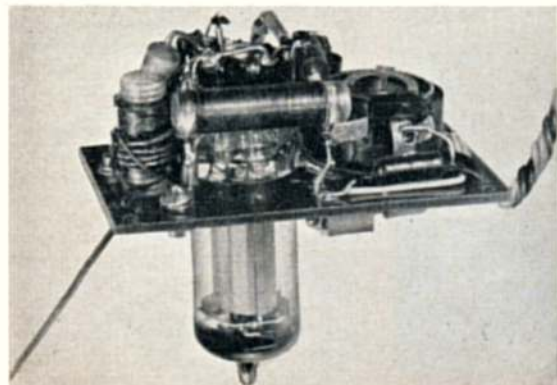
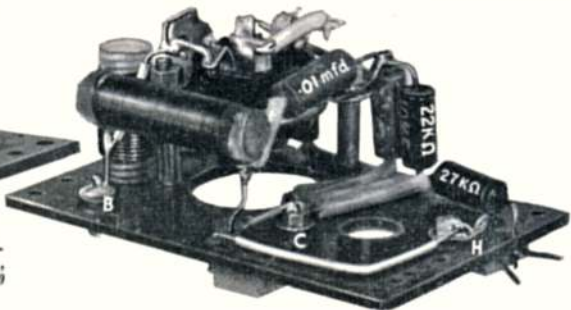
Using the full size template provided, accurately cut and drill the Paxolin panel countersinking the four corner holes which take the screws for the protective box. This, by the way, is easily made from $\frac{1}{4}$ th sheet balsa with vertical strengtheners in each corner which usefully coincide with the corner screw holes. Editor's own prototype receiver, shown in heading, had case made in this way which should be reinforced by covering.

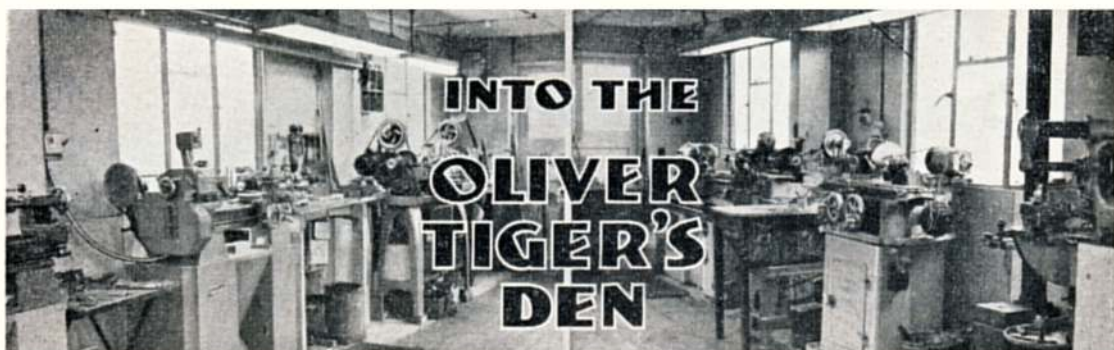
Fit valve base with 8 B.A. bolts, using $\frac{1}{2}$ -inch lengths of copper or dural tubing. (Discarded ball pen refills

come in handy here.) Mount the two SM5/U transistor holders in position, having first removed from rear of base the two lower sockets clips which are not required. Viewing the holder on the plug-in side with the mounting bolt on the left we have five socket holes 1.2.3.4.5. The transistor leads go Collector 1, Base 3, and Emitter 5, with 2 and 4 removed as previously mentioned. It is also necessary to file the corners of the transistor mounting lugs to clear the potentiometer retaining nut. The tuning coil is wound from 20 turns of 26 gauge enamelled wire on a former slightly smaller than the coil former which facilitates a nice tight completed coil. Mount the coil former on the base, remembering to put a tag under the bolt marked "A". Slide the pre-wound coil down over the former, solder top end to tag 3 of valve, work down the coil to obtain tight winding and spacing of turns and solder bottom lead to tag "A" which can then be rotated slightly on bolt for final tension of coil. Make sure both ends are scraped clean of varnish before soldering, which applies to not only these but all other connections in the wiring. Finally tighten bolt on tag and lock with solder. Use only resin cored solder such as "Multicore" and a small iron with a fine bit such as the Henley Solon Instrument model. Take extreme care when working near condensers and resistors, using a heat shunt where necessary. The iron should be sufficiently hot that only a touch on the joint is necessary for the solder to flow, this prevents prolonged heat contact and subsequent damage to components. To complete tuning coil bind ends with silk or thread and seal with polystyrene cement or low loss shellac.

Connect Pins 1 and 7 on valve base, i.e. the valve filament connections. Pins 2 and 3 are likewise bridged and the 5 pf. condenser connected from Pin 3 to Tag "A". Also from Tag "A" runs the 30 pf. condenser which is connected to Pin 6 of valve base. Connect Pin 5 to Tag "E" which is the earth connection situated





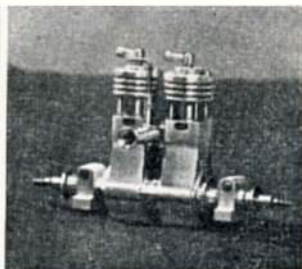
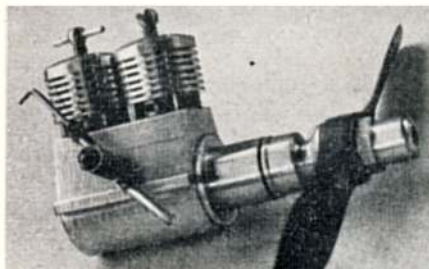


FOUR SKILLED HANDS, a spotless workshop and years of "know-how" are the three basic reasons why the Oliver Tiger diesel has set the highest standard in its class and earned the respect of all aeromodellers throughout the world.

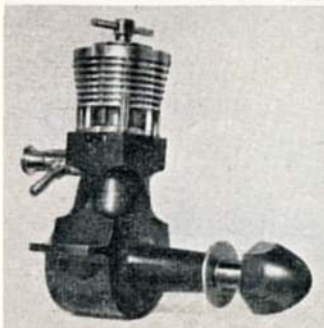
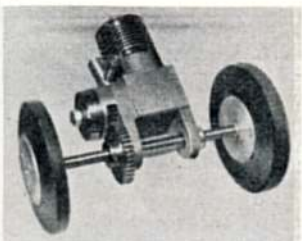
During a recent visit, we asked the John Olivers, both Senior and Junior, whether they could step up their rate of production from the present 12 per week in order to shorten the delivery period. Mrs. Oliver who handles the bookwork,

told us that over 750 units are on order—and they agreed that while they could improve the output, they would certainly lose the superior performance. After spending a day with them in the specially-built workshop at the end of their lovely four acre home, on the downs behind Bournemouth, we could only agree that their programme is the right one. For the Olivers, time is nothing. They work until 2 a.m. if need be, they set no production time for any component, they fit and try each mating part until it passes the Oliver grading through a series of gauges that ensure top performance, and absolutely nothing is left to chance.

The first stage in making up a Tiger comes with the machining of the two race housings—a problem of alignment that is the bane of many manufacturers. On the Tiger, a special pilot tool, Oliver devised and christened the "guided missile" ensures concentricity: but even then, the ball races, although precise enough for general engineering, are made to wider tolerances than permitted in the Oliver system, so races have to be paired by selection ($\frac{1}{4}$ in. American "New Departures" at front and British $\frac{1}{4}$ in. R.M.'s at rear) and the shaft set up for a stringent rev. test by John Jr. This consists of a four-way spin up to 18,000 r.p.m. with heavy side load on the K.E. 805 (65 ton steel) shaft front at 90 degrees spacing. If the shaft doesn't spin like a Viscount's RR Dart Turbine, then down it comes and the next gauge of race is tried. In the meantime, John Sr. will be fitting the EN.8 hardened steel cylinder assembly, Delapena honed to .550 bore, with one of 12 sizes of piston. There will not be a thou' between smallest and largest in this piston grading; but a quick micrometer check and years of



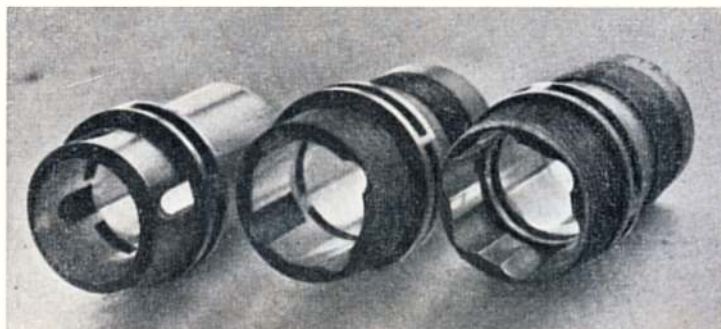
OLIVER PROGRESS. Latest 2.5 c.c. experimental twin compared with early double 5 c.c. Battleaxe. Twinshaft Tiger Mk. I was forerunner of the integral geared unit Mk. II, with drive spur between ballraces for small frontal area, a great achievement



Aero versions. Left, first 2.5 Jaguar, sideport with four-square exhaust compared with one of many short stroke reed valve experiments on Mk. III

Heading shows the workshop machines from L. to R.: Box-Ford Tool Making Lathe, Box-Ford Piston Lathe, Delapena Cylinder Hone, Atlas General Lathe, Atlas Capstan for small repetition work, Colchester 6-in. Centre Lathe for shafts, Internal Cylinder Grinder, Cylindrical Grinder for shafts, big-end pins, and Cylinder External, Miller and Drill Press (out of picture)

Above: Three stages in design progress in the Tiger. Extreme right, first Arden type porting on screwed assembly with annular collector ring for transfer, later modified as in centre, and finally, developed into the traditional Oliver system of squared broached ports angled through cylinder wall



experience, tell J.A.O. the exact size he can expect to use. The piston will already be turned, rough stoned and hone finished in Harpers Meehanite; but that final touch by the maestro as he hones the last surfacing in the cylinder is the reason why the Tiger comes out at a constant top grade.

These two basic fits occupy a lot of time. Add to them the critical contra-piston fit, the inimitable Oliver square broached transfer ports, the beautifully fitted con-rod ends and the fine external finish of shot blasted gravity die cast crankcase and polished cylinder head, then one begins to realise how enthusiastic this father and son combination is on the question of maintaining the quality standard.

But lest we give the impression that the family life is one long drudge of keeping up the Tiger production, we hasten to assure modellers that there is also a constant quest for increased performance through design changes. (There is also the admirable spare time diversion of father's 16 ft. Dolphin class Dinghy *Pat* to sail from Poole Harbour, or younger John's programme of fast car re-builds—currently a 750 special plus his regular M.G. TD).

All avenues are explored for new design approaches. Reed, web valves, twins, bore/stroke changes, curly carbs., and component sizes are but few of the items that have come up for review. Some of them are already dismissed as inferior, other lines are being explored, especially in the 1.5 c.c. size. In particular, we liked their twin. Revolutionary induction, smooth on a small prop, and a most impressive hunk of 2.5 c.c. that could *never* be produced for resale at anything less than £20, it took so long to make.

Skilled hands at work: at left, John Oliver, Senr., caught in a happy mood as he checks piston fit on a cylinder, while at right, John Oliver, Junr., tightens the last holding down screw of the week's batch prior to a testing session

Yet it taught the Olivers something, and they made it during the Christmas holidays so that it would not interrupt the flow of Tigers.

One only has to consider the Oliver engine history to realise that the Mk. III cannot be the ultimate.

John Oliver had been making precise Bofors gun parts during the war, and when he learned of the pioneer Swiss diesel, the Dyno 2 c.c. and he was quick to emulate the Continental invention. A brief series of these 2 c.c. "Battleaxes" were made, including the twin pictured opposite, both in aero and car versions. A cleaner variant, the "Fury" was modified later to 2.5 c.c. and subsequently appeared as the "Jaguar" with four, instead of the accepted style twin opposed exhausts. Now this was the real beginning. The milled transfers slotted through the cylinder walls originated in the Jaguar and a commercial version, the Raylite "Panther"; yet the one vital change had still to come.

This was the move from sideport induction. It was introduced in the Tiger Mk. 1, designed and made

in four days, with twin shaft for car drive, and winner of the International in Sweden with the unprecedented speed of 64 m.p.h. So impressive was this unit, that 50 aero conversions were made specially for Swedish orders—and as for the name, well it came after a Gerry Buck suggestion, when John Jr. was awarded a first prize at Stoke by none other than speedway ace, "Tiger" Stevenson.

It was not until the 53/54 season that the Aero Mk. II with plain cylinder retained by four long studs set the pattern we know so well today. Team race proving by the Foresters Club and free flight achievements by Tom Smith and Dave Painter were swiftly followed by a flood of orders that extended far beyond British shores. Think of any country, and there's bound to be an Oliver there—Russia included, and read the results of any Nationals, U.S.A., Australian, S. African, N. Zealand, Swiss . . . anywhere in fact, and one finds winning appreciation for the product of this most happily situated family business in the model trade. R. G. M.





ENGINE ANALYSIS Number 35

From Italy, the

Barbini

B 38



reviewed by R. H. Warring

Actual size
photo

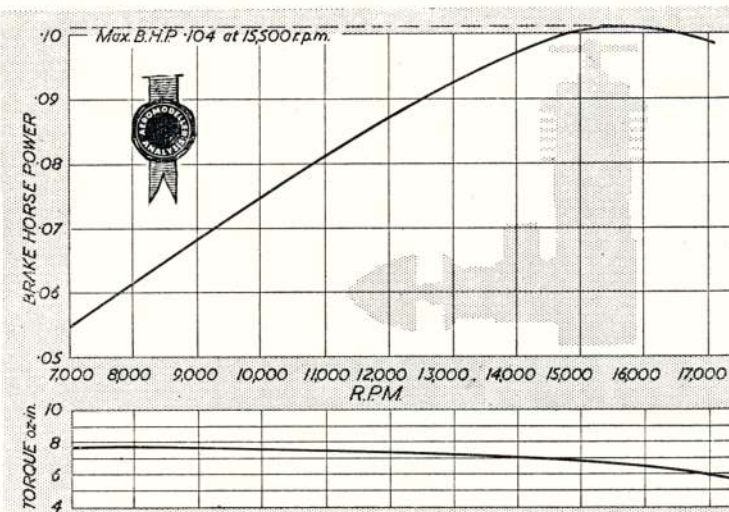
THIS IS A remarkably fine Italian diesel, rather old fashioned in external appearance but with interior workmanship and finish of the highest possible order. In other words, maximum attention has been given to the parts which need it most, with apparent disregard for "eye appeal" in the finished product. Its performance is outstanding for an engine of this size, with a specific output of 1 B.H.P. per c.c. It is also small in overall size and quite light (under two ounces). It is essentially a high speed engine, peak power being developed at 15,500 r.p.m., which is appreciably higher than usual with a plain bearing engine.

The B.38 tested had pleasant starting characteristics, requiring only a couple of finger chokes to prime. Compression adjustment is non-critical and the engine can be "throttled" by reducing compression. The engine will continue to run on all sizes of propellers with the compression backed off to its limit and on all propeller tests had, in fact, to be stopped by grasping the spinner nut. This was done in preference to closing down the needle valve as this adjustment can be left alone for starting and running, although opening up a little helps starting and optimum performance with any load is, of course, found by closing down the needle to the finest mixture setting at which the engine will continue to run consistently.

One fault which did develop during the test runs was that the liner rotated inside the cylinder jacket, blanking off the exhaust ports and gradually "throttling" the engine down. To prevent this taking place, the hold down screws had to be tightened really hard when the engine was hot. These are quite small screws (approximately 8 BA size) with small diameter heads, so this does not appear an entirely satisfactory arrangement. On the other hand, the cylinder liner itself has a very generous wall thickness and quite free from distortion when tightening down, so there are no troubles in this respect.

The interior discloses a number of features of high-class engineering workmanship. The connecting rod, for example, is machined from steel to a thin, flat section, subsequently hardened and tempered. The big end is left fully hard with a generous length of big end bearing (3/16 in.), which is also slotted for lubrication purposes. The gudgeon pin is hollow, located in the piston with tiny circlips, so that its ends are well clear of the piston exterior surface.

The cylinder (liner) is of steel, formed with a conventional "collar" into which are cut the diametrically opposed exhaust ports. The transfer ports under the exhaust ring are end milled upwards at an angle and their effective opening overlaps the exhaust to a considerably useful extent, probably the key to the fine performance. They are extremely generous in depth, giving appreciable sub-piston induction. The intake closes very early,



SPECIFICATION:

Displacement: .973 c.c. (-059 cu. in.)
Bore: .3955 in.
Stroke: .483 in.
Bore/Stroke ratio: 0.82
Weight: 1½ ounces.
Max. power: 1.04 B.H.P. at 15,500 r.p.m.
Max. torque: 7.8 ounce-inches at 8,000 r.p.m.
Power rating: 1.07 B.H.P. per c.c.
Power/weight ratio: .0555 B.H.P. per ounce.

Material specification

Crankcase: Gravity die casting in light alloy
Cylinder: Hardened steel
Piston: Cast iron
Contra Piston: Cast iron
Cylinder jacket: Dural (anodised red)
Crankshaft: Hardened steel
Main bearing: Bronze
Connecting Rod: Steel, hardened and tempered.

British Agents:

Solaria Ltd., London, S.W.1.

Retail Price:

(Italy) 4,250 Lira

indicating the sub-piston induction is used deliberately rather than "accidentally". There is quite a narrow space for the transfer passage (between the bottom of the cylinder and the crankcase casting), but at the bottom, twin gas passages are grooved to correspond to semi-circular cut-outs in the bottom of the liner, although the main function of the latter is to provide clearance for the con. rod.

The exhaust porting on the crankcase casting is cut away completely at the top, the cylinder bedding down on a shoulder below the bottom line of the port. The cylinder jacket is of dural, anodised red, and formed with a rather "old fashioned" domed head. Interesting feature on the head is a vent hole drilled to relieve air pressure over the contra-piston.

The piston is of cast iron, reasonably light, perfectly plain with a slightly conical top and grinding marks on the bearing surfaces.

The crankshaft is of generous diameter (6 mm. or .236 in.) with a 3.5 mm. (.1385 in.) crankpin machined on. The crank web is cut away at the crankpin side to give an attempt at counterbalance. The crankshaft runs in a bronze (or possibly brass) main bearing and is extremely well finished and fitted. All the interior work, in fact, is very well done with the running fits just right. The cylinder appears to have been internally ground and lapped, with adequate taper relief at the bottom end to give minimum sliding friction. Very little running in time was required to ensure that the engine was completely free.

By comparison, the external appearance of the crankcase is quite rough, this being a gravity die casting with a minimum of machining to finish. It is not even a very accurate casting as regards external geometry. A nice touch is the fitting of a thin steel washer behind the propeller driver, the latter being an aluminium or dural machining pressed over a splined section of the crankshaft. Propeller retention is by means of a turned spinner nut. The length of shaft is adequate to accommo-

Large transfer ports, angled to overlap exhaust are obvious in this view of dismantled B.38

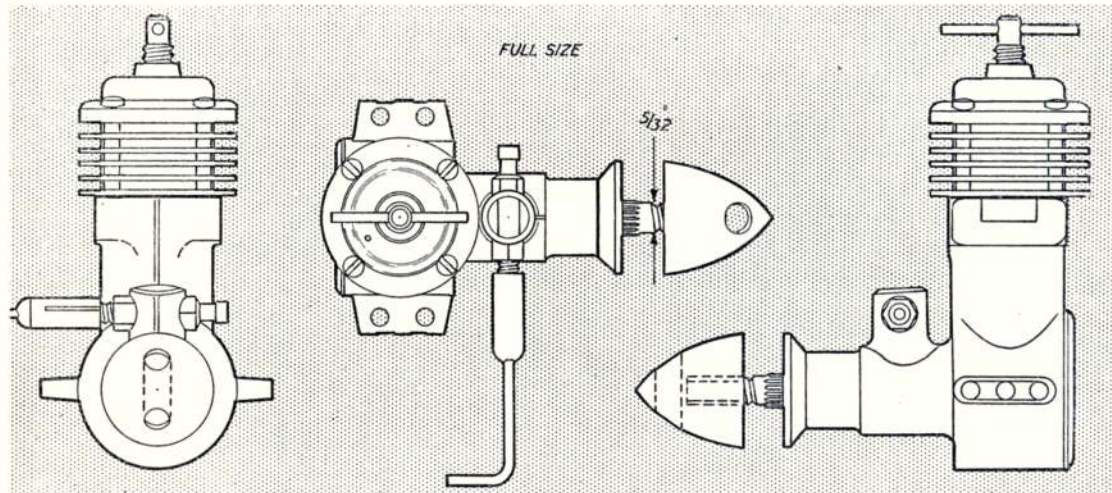


date any of the propeller pitches likely to be used with this engine.

Summarising, the real merits of this engine are hidden under a rough exterior. It is extremely well made where it has to be and its performance puts it in the outstanding class for its size. Maximum performance would appear to demand a propeller size giving around 13-14,000 r.p.m. static—e.g., something like a 6 x 4 or 7 x 3 for free flight and a 5 x 6 or 6 x 6 for control line. Certainly it should give a good account of itself in either category.

| PROPELLER TEST DATA | |
|---------------------------|--------|
| Propeller dia. x pitch | r.p.m. |
| 6 x 4 (Stant) | 13,400 |
| 7 x 6 (Stant) | 8,800 |
| 8 x 4 (Stant) | 8,600 |
| 8 x 5 (Stant) | 8,000 |
| 6 x 6 (Stant) | 11,200 |
| 7 x 4 (Stant) | 10,800 |
| 6 x 3 (Trucut) | 13,300 |
| 5 x 3 (Trucut) | 16,000 |
| 6 x 4 (Frog nylon) | 16,300 |
| 6 x 9 (Tiger) | 8,800 |
| 8 x 3½ (Tiger) | 10,400 |
| 8 x 4 (Tiger) | 9,000 |

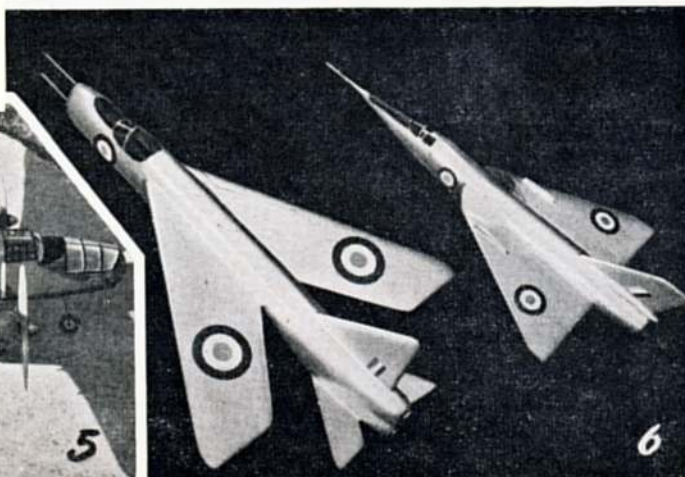
Fuel used: Mercury No. 8

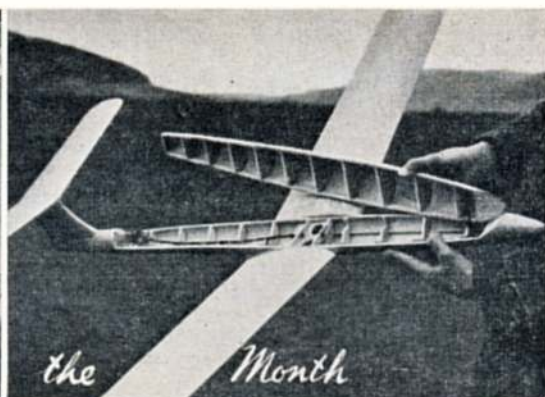
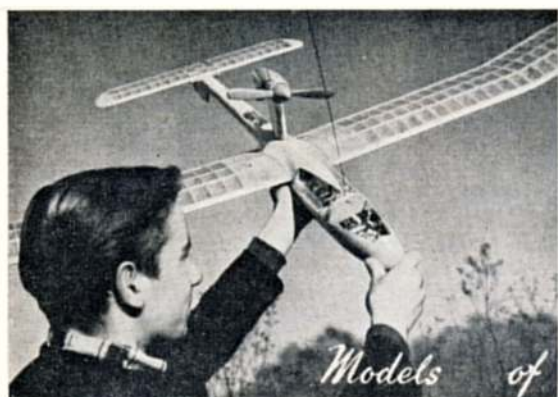




Model News

*Latest news in model shapes as
selected from our readers' pictures*





THERE'S A BOOM on in radio control. We are getting more and more diversity of design, and for originality, we must give most of the credit to the German modellers. A glance at our Models of the Month will show what we mean. At left is Bernd Rehm with his convertible (power or no power) r/c "glider". The motor unit plugs on to the fuselage by means of two steel pegs. An AERO-MODELLER receiver with twin stage transistor amplification, double OC 76 transistors, gives a safe two mile range, all made by 16-year-old Bernd as his first attempt at R/C. Right, is a Helmut Bruss design monocoque fuselage for easy access to parts on a slope soarer, the radio equipment has yet to be installed.

Over now to No. 1, a 48 in. span Martin B.26 Marauder for a pair of E.D. Racer diesels and covered with metallised wallpaper. Built by J. G. Barthram of Yarm, Yorkshire, it weighs $4\frac{1}{2}$ lbs. and flies at up to 50 m.p.h. when both motors are going flat out. A detailed cockpit and home-made transfers complete a fine model which will land softly on a fully sprung (8 s.w.g. wire spring loaded in brass tube) undercarriage.

Another scale model appears in picture 2; but what a difference! This one is a Curtiss F-11C-2 Goshawk, freeflight for a Kalper .32 c.c. diesel and using pendulum elevators. The tiny 21 in. span Goshawk will take-off realistically, and while builder F/O J. C. Ewens, now at R.A.F. Leconfield, was stationed in Germany, it enjoyed many hours of consistent sport flying. The vertical take-off by a power duration model in 3 is a characteristic view of the *Scarlet Pimpernel* a popular design down Oxford way, by David White, specially for the A.M.10 diesel. This size of model is more popular than ever this season, thanks to the influx of good power units, and we expect to see a high proportion of 1 c.c. entries at the Nats.

Over to sports flying and in 4 we have a much modified *Eros*. The tail is down lower, it has elegant spats and owner Stan Newby of

Gloucester has equipped it with radio control, using a two-speed engine throttle—very nice too Mr. Newby!

Another control-line twin, the North American Mitchell Bomber in 5 was designed and built by Sergeant Rogers at R.A.F. Ballykelly in Northern Ireland for two E.D.246's. Sgt. Rogers will soon be on his way to Christmas Island in the Pacific, and we understand that F/O Norman, who wrote to us from that faraway spot in February issue, has now returned from there, so it sounds like a swop of aeromodellers! Anyway, Sgt. Rogers' Mitchell III is camouflaged, spans $45\frac{1}{2}$ in., weighs 3 lbs. $5\frac{1}{2}$ oz. and is 36 in. long. The wing section is symmetrical R.A.F. 30 and the whole job covered with sheet for robustness. With both engines at full revs., it flies at 60 m.p.h. and single engine performance is quite safe.

Two solids form the subject of 6 and we have a display by R. D. Allen of Caversham, Reading, of Britain's fastest pair, the English Electric P.1 and the World Speed Record holding Fairey Delta 2. Note how a dark background emphasises the outlines of these silver models. More solids are shown in a different view by Laurence Turner of Potters Bar in 7. This realistic pose of a Veron Canberra and KeilKraft Hunter to 1/72nd scale, was taken with the background 6 in. away from the models, being painted paper with a silhouette added. Figures drawn in ink are positioned correctly by the models, and just show what can be done with the most simple equipment.



GADGET REVIEW

A MOTLEY ASSORTMENT including something for everyone no matter where your interests rest in the hobby. We start off with **A** sent in by S. Perry of Gloucester, who made a novel test block for bench running-in motors on the field. The ever-present noise problem often rears its ugly head when one has to live in crowded suburbia, and this little gadget will be found quite useful to many others. Just take a block of 3 in. x 3 in. (usually found lying around building sites as an off-cut) and fix a stout spike on one end so that the block can be firmly rammed into the ground. Across the top of the block, screw the engine bearers with appropriate spacing and fit a couple of cup hooks on either side to take the elastic bands which secure the fuel tank. It is essential to be able to remove the fuel tank in order to "wham" the spike firmly into the ground, especially in frosty weather.

Three ideas have come from T. Costello of Dublin, and we start with **B** which is extremely simple and a quick solution to the needle valve which will not hold its setting due to vibration and is one of the split thimble type so cannot be tightened. Just snap a length of rubber band into the needle valve body before screwing it on to the spraybar and you have a tight friction fit. In **C** Mr. Costello advises fibre glass tape as a strengthener for Team Racer leading edges. We go one step further and suggest the same idea for Combat models and why not leave it fairly rough to snap those streamers? Idea **D** is the best we feel, for it solves the situation where one has to fix the dowel positions into the fuselage and yet it is obvious that the wing must be shifted forwards to obtain the correct trim without having to add extra weight. Just a couple of lengths of 14 gauge wire bent as shown, one for each side of the fuselage and you have a running rail which provides an infinite variety of wing positions and even allows different wings to be fitted with changes of chord.

Idea **E** may have limited use for it really only concerns Vee tails mounted on top of the fin on a glider. Submitted by S. Kemp of Streatham Hill, London, it replaces the usual cumbersome platform and is simply a "Y" shaped piece of plywood which drops into a tube in the fin and locates itself in the corresponding slot in front of the tail spar. One can also use a "Tee" piece for conventional flat tailplanes. For dethermaliser action, the slot in the tail must be fairly free fitting, in fact, Mr. Kemp advises that the slot is $2\frac{1}{2}$ times the thickness of the "Y" piece. Elastic bands can pass through the leading edge of the fin via the front tube down to a hook under the fuselage.

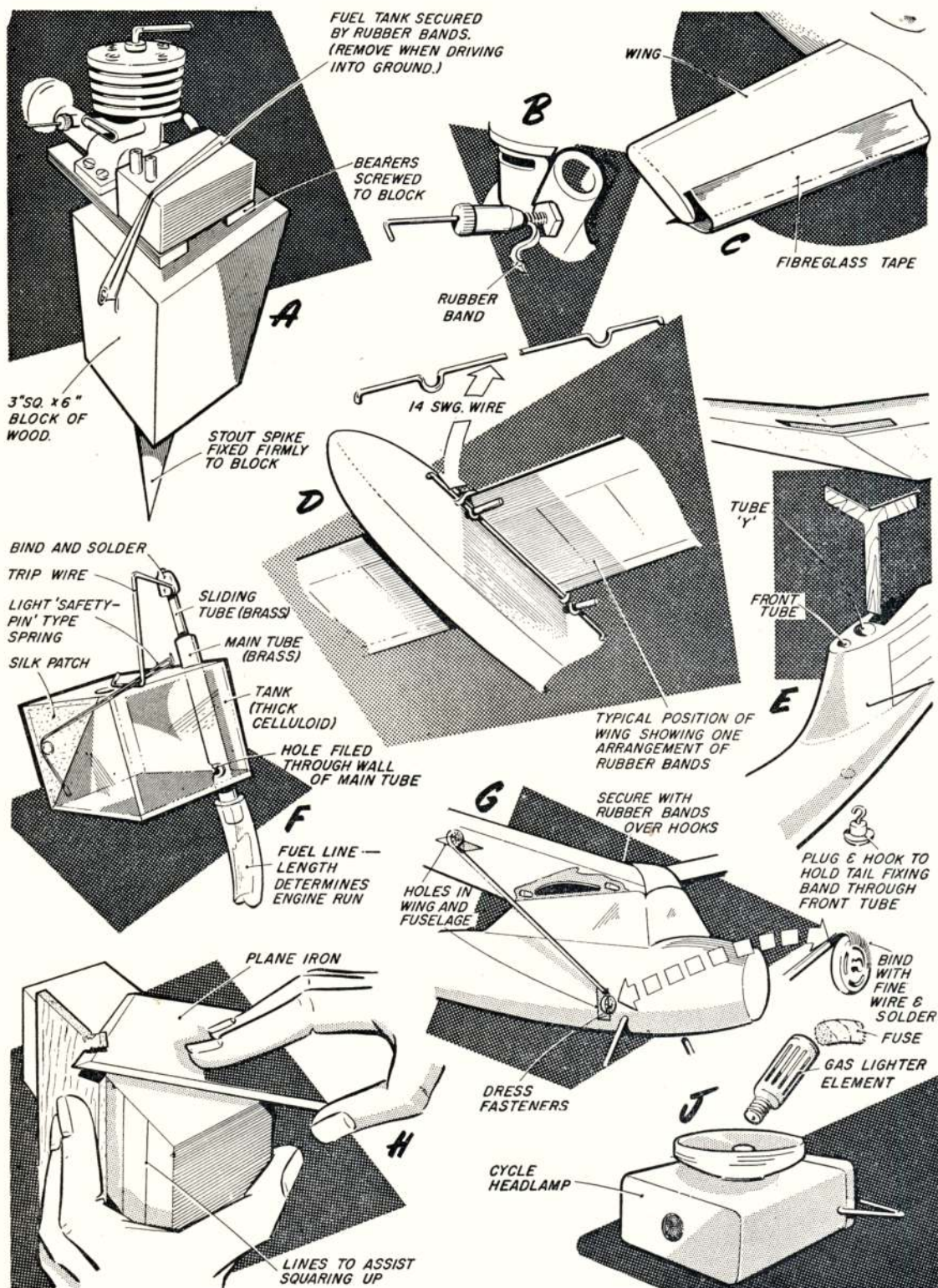
That ever popular feature of Gadget Review, the home-made tank, shows itself in **F**, but this time we have one with a difference from R. E. F. Hill of Watford in that it incorporates a cut out system allowing for a limited power run in flight. For

ground running, fuel feed from the tank is via the hole in the side of the brass tube, but when the trip is turned from the cocked position, it slips down the face of the tank and the fuel supply is cut off from the tank interior. Because the plunger is hollow and open to atmosphere, the fuel line is drained by the engine and the actual length of line will determine the engine run. Points to note are that plunger tube should be an easy slide fit in the main one which, if slightly roughened, can be cemented in place with Durofix. From B.A.O.R. P. W. Williams of the Royal Artillery sent us idea **G**, which employs the popular dress snap fasteners for wing attachment—with a difference. Mr. Williams uses dress fasteners vertically, and so all of the wing loads are taken on the "pip" of the snap. Providing the snap fasteners are firmly bound and glued to the spar and fuselage former and you make sure that the snap part of the fastener works effectively, this system can be put to very good use on a large number of designs.

Now for a refreshing idea sent in by G. Riall of London S.W.3. Mr. Riall found it difficult to get clean right-angled cuts through thick balsa, especially across the grain. As seen in sketch **H**, you remove the cutting iron from the plane and by holding the sheet balsa against a guide, one can prepare the edge of the sheeting with a most professional squared edge. We do emphasise that the planing iron must be well and truly sharp. **J** is something we have seen on the flying field in many quarters and has been used by some of our most successful flyers including Hugh O'Donnell. This idea has been submitted by K. Pearson of Redcar, and shows the improved possible conversion of a cycle headlamp with the gas lighter element as a fuse lighter. If you do not smoke and find it difficult to get matches to work effectively in windy weather, this little gimmick will save you from losing your patience during those critical moments when the timekeepers are waiting for you to get your model in the air. Care should be taken to see that the fuse does not push against the gas lighter element, breaking the platinum wire. A converted glowplug would be quite effective, bound tight to the terminal of a 1.5 volt battery and short-circuited with a loose lead where one is to light the fuse.

Without Illustration

Still on the subject of D/T fuses and ignition of same, do you know that a blob of cement on the end of your fuse will give windproof ignition even on the most blustery day? Vic Dubery tells us about this one, and from George Harrison of Hull we have a novel tip concerning sandwiched ribs for a pair of tapered wings. George cuts his ribs from one block, not two separate blocks, and sorts the ribs out to make one wing thicker than the other. This produces a turn on the glide without rudder and is particularly useful for gliders.



WELL THE GAMAGE CUP was another "Damage Date" in my part of the world with gale force winds, rain . . . the lot. I look forward to seeing the list of 116 hardy types who ventured out in the tempest to make their entry. E. A. Barnacle of Leamington won with 7:39.

London

The LONDON AREA proposal concerning withdrawal of the Wakefield Cup from international competitions under the F.A.I. jurisdiction did not go through, but it reflected a common feeling throughout the competitive modelling movement in this country. The interesting thing is that the proposal came only from the London Area and even then from some power fliers, which just goes to show how few people care to voice their sincere opinions when the occasion arises. Another example of the London Area taking some action is their proposal that the S.M.A.E. should adopt A.M.A. stunt rules, and this has yet to go through, but has a lot of commonsense to support it. London Team Racing League is well under way, there was a good turn out at Heston on March 3rd. Following meetings are on April 7th, May 5th and July 21st and 28th. Bearing in mind that London is the largest city in the world and that Heston provides good surface for Team Racing and speed work, the actual turn out is somewhat less than expected. Perhaps this is a reflection on present enthusiasm.

Rally organisers have been quick to follow our suggestion that they log their dates and from DARTFORD M.F.C. I learn that the Annual C/L Rally will be on Sunday, May 26th, at the usual site with A and B Team Racing and Combat taking motors up to 5 c.c. Processing starts at 10 o'clock and events at 12.30. Enquiries can be sent to D. Tucker, 6 Lodge Avenue, Dartford, Kent. ENFIELD & D.M.A.C. announce their Rally date as July 7th covering Team Racing, A and B, Combat and Handicapped speed programme. The club got away to a good start at the L.A. T/R Meeting and in spite of an unexpected extra stop in the heat, won Class B with a time of 7:47 by D. Walker/R. Tuthill. These 105 m.p.h. racers are really tearing the air and the final at the Nationals ought to be worth watching. ST. ALBANS M.A.C. announce their Annual All Britain Rally date as September 22nd at Radlett and also take pride in the fact that their club room is redecorated, the process was hastened for the visit of a V.I.P. Vice-President and European Sales Manager of United Aircraft Corporation, the American group who own Sikorsky, Pratt and Whitney and Hamilton Standards, Mr. H. Jolly, went along to introduce his company's film "We Saw It Happen", which covers aviation history in the U.S.A. They were also privileged to see a new De Havilland film, "Comet Capabilities". R.T.P. is in full swing on club nights and Carl Simeons is keeping the members flat against the walls with a Dart-powered projectile!! Another club with R.T.P. activities is the DEBDENAIRS M.F.C. who fly regularly on Sundays at Grange Farm Centre, Chigwell. They hope to have a permanent club room of their own in the future and ask if we know of any practical-minded kind fairies. I would suggest like many other clubs which originated in that aviation-minded quarter of Essex that they look around for a lock-up garage which can be obtained for a few bob a week.

The Radio section has been busy at the NORTHWICK PARK M.A.C. and at least three Hill twin-valve receivers have been completed. Sixteen-year-old Peter Babb has completed his in a fibre glass case and although this is his first attempt at radio, I understand that the workmanship should put some of the old hands to shame. A/2's are also receiving attention in readiness for the eliminators and I fancy we are going to have big entries throughout the country for this only free-flight World Championship of 1957. The Annual Exhibition on March

Club News

2nd in aid of the Handicapped Scouts by the SIDCUP A.S. was not so well attended as they had hoped (a proof that prior advertising is important). A number of fine models were on show including Ray Gibbs' World Record holder and a collection of new Carter motors. Mike Templeman and Mike Bassett took first and second at the L.A. T/R meeting and Class A was actually an all-Sidcup-final resulting in a win for Mike Bassett, while they were also third in Class B.

Down at FARNBOROUGH M.A.C. Mike Young's Elfin 2.5 power R6B is said to be fast and furious. There is an increasing success with rubber models in the club all-in contest and so they have had to step up the power run of the engine wallahs to 12 secs.

British Nationals— Advance Notice

The Nationals will be held at R.A.F. Station Waterbeach on June 9th and 10th, when the programme will be:

June 9th

*Thurston Cup U/R Glider
Short Cup 2/5 c.c. Class
Gold Trophy PAA-Load
S.M.A.E. Trophy C/L Stunt
Davies Trophy Radio Control
Speed—All Classes Team Race "A"
A/2 Tailless International Trial
International Trial

June 10th

*Sir John Shelley Cup U/R Power
*Model A'craft Trophy U/R Rubber
INTERNATIONAL T'LESS A/2 Glider Spec.
Super Scale Trophy Power Scale
Aeromodeller Trophy Radio Control
Davies Trophy Team Race "B"
Speed—All Classes International Trial
Combat

*Area Championship events

Competitors should note that the Council has fixed the starting time as 9.30 a.m. on June 9th and 8.30 a.m. on June 10th.

As previously, camping will be permitted adjacent to the 'drome, at a charge of 2s. 6d. per tent. Intending campers should apply for their camping permit as soon as possible.

Cars may be parked upon the 'drome at a charge of 2s. 6d. per day. Competitors may obtain a ticket covering parking on both days at a charge of 2s. 6d., providing this is asked for with advance entries, i.e., not later than May 31st. This "two day" ticket will not be available at the gate. Competitors should note that cars will have to be parked where directed and cannot be used as general transport or for recovery purposes.

Pre-entries to all the competitions at the normal fees will be accepted up to the first post May 31st. These should be sent on the appropriate form, and with the correct amount to the Hon. Comp. Sec., Londonderry House, 19 Park Lane, London, W.1, marking the envelope "National Entries" in the top left hand corner. Camping and Parking tickets should be applied for at the same time. Late entries may be accepted on the field at double fees, but late entries for Team Racing will NOT under any circumstances be accepted.

One entry form has been issued to each Club and it is requested that Secretaries will as far as possible send in bulk entries for their clubs.

Additional entry forms may be had from Londonderry House, but a stamped addressed envelope must accompany each application.

South Eastern

A very full contest calendar for 1957 is included in the SOUTHERN CROSS A.C. news sheet, and arrangements are being made to book a coach to get to the Nationals, and even in R.T.P. on February 16th produced a good turn out. One speed model produced by Grahame Gates complete with a wicked-looking metal snout (the model, not Grahame) proved most impressive until the line tension demolished the base of the pole, pulling it asunder from beneath the four bricks holding it down. It would have also demolished the Social Secretary had he not, in common with other spectators, been hiding behind a chair. In the argument the chair proved to be stronger than the model.

Southern

EPSOM AND D.M.F.C. have a branch in LEATHERHEAD and I understand that some of the DORKING members also get along to the same club meetings. They have been asked to give a display on June 10th at Hindhead and any modellers in the district who want to partake, are urged to contact the Secretary at 21 Orchard Close, Fetcham, Nr. Leatherhead, Surrey. A four-engine Vikings Vanguard for two A.M. 35's and E.D. 2.46's is on its way.

South Midland

May 12th is definitely the rally day for the HIGH WYCOMBE M.A.C. control line meeting at Kingsmead Recreation Ground and there will be both classes of Team Racing, plus Combat. For those with petrol difficulties there is the London Greenline bus which runs right past the ground, the 711 from Reigate to London, whilst the Loudwater Railway Station is only half a mile away. On May 5th the Area will be running a RADIO RALLY at Woburn Park, the ancestral home of the Duke of Bedford (see separate note); this is going to be quite an affair, for the park is an ideal flying site for R/C and C/L and with the presence of the world famous Howard Bonner and Bob Palmer fresh from their journey from Los Angeles to Johannesburg, radio modellers should learn a lot. This rally is intended to be a social event and just the place to take the wife and kiddies, to see the famous home and beautiful grounds.

East Anglia

Good weather in NORWICH made possible pleasant many week-end's flying—lucky people—and Combat has been attracting large audiences. Indoor and R.T.P. models have kept the meetings "on the move", but because of the lack of sizeable flying ground accommodation outdoor flying has centred on control line.

A move to reduce the number of contests during the year run by the CAMBRIDGE M.A.C. had the opposite effect when the club held a special meeting to consider the idea. It was ex-Comp. Sec. Len "Codger" Woods who suggested that the club's 11 annual contests should be drastically reduced. After a long debate the club thought otherwise and voted for 16 events during the year. This means that members will find themselves flying in Club S.M.A.E. Area or rally events every fortnight on the average.

East Midland

Membership is continually increasing in the CLEETHORPES & D.M.A.C. and the lads are eagerly awaiting the start of the contest season with a number of new and interesting models. At the club Social and Prizegiving on March 8th, Bob Brown provided an interesting slide show of the club in action and Tony Balding walked away with the Victor Ludorum Trophy.

Midland

After a very active indoor season, outdoor contest interest in the COVENTRY AND D.M.A.C. includes a Trans-Atlantic postal event between the club and the Alamo Aeromodellers of San Antonio, Texas,

SPECIAL NOTICE

OPEN RADIO CONTROL, C/L STUNT, & C/L COMBAT RALLY
at Woburn Abbey Park, Woburn,
Bedfordshire (route A.50)

Sun., May 5th, commencing 11 a.m.
This Radio Rally, with impromptu events and full facilities for unrestricted flying, will be the first model meeting to be held at the Duke of Bedford's estate, an ideal site for radio controlled flying. All visitors to the famous Abbey and estate are charged a nominal entrance fee: but PRE-ENTRY by the participants will enable them to enter the ground free of charge.

Among those attending this meeting will be world-famous and leading radio control and control-line fliers, Howard Bonner and Bob Palmer of Los Angeles, U.S.A., National Champions in their own country, they will be able to pass on many useful tips on advanced design for aerobatic models.

Send pre-entry (no charge) to: Hon. Sec., 7 Church Lane, Sarat, Herts. Phone (evenings): Kings Langley 2829.

which includes J. Mayden, the U.S. National Class B winner and other noted American fliers. Provisional date for the contest is Easter week-end, but I fancy the Coventry boys will be at a disadvantage weather-wise. **WOLVES M.A.C.** had their one-design club contest for the A.P.S. Aiglet on February 6th, and winner was D. Russell with three flight total of 5:12 followed closely by D. Mountney with 4:55. Several 2-min. maximums were obtained from 50 metre tow lines and the models proved ideal for this type of event.

Crowds of spectators watch the **WEST BROMWICH M.A.C.** Combat event and were treated to a full ration of thrills and one of the best prangs seen yet was when two club models collided. The only pieces left that were recognisable were the two Oliver Tigers. Some kind person stole three of the best models at the Local Cinema show, but this did not deter them and they followed up with a second display two weeks later in connection with the film "Man in the Sky". The only difference was that two boys were on duty every night to see that nobody took any of the models. A new club, **GLOSSOP & D.M.M.S.**, has been formed by twelve founder members on March 6th having keen interest in R/C, restricted at the moment to model boat activities, due to lack of flying room. Unattached modellers should go to the Halpin Model Shop, 130 High Street West, Glossop, Derbyshire, for details.

North Western

The 3s. 9d. type scale model kits have proved very popular at the **MERSEYSIDE M.A.S. R.T.P.** meetings and several of the club's special juniors' designs were made and proved quite successful. Radio enthusiasts have been saying a lot for themselves as to what they are going to do in the coming season—I wonder how many clubs enjoy the same braggartry?

The **NORTH WESTERN AREA** have decided to hold their **SECOND ELIMINATORS** on April 28th, the same day as the Weston Cup and Lady Shelley decentralised events at Ternhill Aerodrome. Cameras are not permitted at R.A.F. aerodromes without prior permission and this particularly applies at Ternhill, so watch it! Proposed date for the **WOODFORD RALLY** is June 16th, but until this is definitely confirmed will not be put into our "For your Diary" section.

North Eastern

"No Name" is the title of the newsheet for **TEESIDE** modellers put out by **STOCKTON D.M.F.C.** and if anyone wants to keep in touch with developments in that club, send 1s. 6d. to T. Chambers, 17 Westmoreland Grove, Norton, who will

supply you with a year's subscription. **WEST YORKSHIRE M.A.C.** have been re-formed and meet on the first Friday of each month at Victoria Central School, Dewsbury, where all will be welcome. Most outstanding flight in recent weeks has been Neville Thompson's 46 min. slope soaring over Baildon (with heavy pliers strapped to the nose). Another new club has been formed at **HARTLEPOOL** where the club room is at 1 Victoria Terrace, West Hartlepool, Co. Durham. I am told that the local Model Shop have full details. Junior member J. Green lost his Y-Bar one Sunday morning and after searching for one or two hours gave up hope when he found two money-minded gentlemen (?) waiting on his front doorstep to claim a reward. I hope he gave it to them.

Northern Ireland

LARNE M.F.C. have the use of a control-line area outside the club room with a large area of concrete for take-offs and have permission to chuck out anyone who causes trouble. They suffered four feet of snow over Christmas and were unable to get to the flying field for a proposed winter contest, and the second attempt made on January 20th was a blow out. There is an increase in membership with an interest in Team Racing, etc. There are no less than ten A.M. 10 engines in the club and the motley assortment of other A.M. 25 and 35's all proving that there is a keen interest in this corner of the Emerald Isle.

PEN-PALS

Wanted for lone junior modeller Barry Abbott, 57 Allier Avenue, Longsight, Manchester, keen on A/2. For a correspondent in German for Czech modeller, Ludek Nosek, Vyssi prumyslova skola stavebni, Kadan kr: K. Vary Cechy, Czechoslovakia. For Anthony Smyth, 62 Rosemary Lane, Formby, Lancashire, and D. Blackwell, 57 Melbourne Road, Earlsdon, Coventry—both keen modellers wanting U.S.A. Pen-Pals.

And that, as the monkey said when he sat on a revving McCoy, is the very END.
THE CLUBMAN.

SECRETARIAL CHANGES

BROMLEY M.A.C.
A. W. Evans, 61 Sunray Avenue, Bromley, Kent.
CAMBRIDGE M.A.C.
D. Miller, 12 Babraham Road, Cambridge.
CHEADLE AND DISTRICT M.A.S.
J. E. Wingate, 62 Ogden Road, Bramhall, Cheshire.
CHESTER M.F.C.
P. Gilhooley, 106 Cholmondeley Street, Widnes, Lancs.
CLACTON & D.M.A.C.
J. Jackson, 23 Blenheim Road, Clacton-on-Sea.
CRYSTAL PALACE M.A.C.
M. Ballentyne, 4 Kingsthorpe Road, Sydenham, S.E.13.
DEBDENAIRES M.F.C.
P. Oliver, 148 Torrington Drive, Loughton.
EPSOM D.M.F.C.
D. L. Jeffery, 3 Pantiles, Cox Lane, West Ewell, Surrey.
HENDON A.T.C. M.A.C.
M. Allan, 23 Haverford Way, Edgware, Middlesex.
MILL HILL & D.M.A.C.
J. E. Lane, 84 Hale Lane, Mill Hill, N.W.7.
NORWICH M.A.C.
R. J. Howard-Alpe, Bracondale, Wymondham, Norfolk.
PLYMOUTH M.F.C.
A. H. Thomas, 38 Pembros Road, St. Budeaux, Plymouth.
SARNIA M.F.C.
c/o Mr. A. N. Hall-Willis, Sandor, 89 Victoria Road, St. Peter Port, Guernsey, C.I.

For Your Diary

April 13th/14th
Indoor Rally—Corn Exchange, Manchester.
May 5th
Radio Rally—Woburn Park, Woburn, Bucks—With C/L Line Stunt & Combat
May 12th
C/L Rally—King's Mead Rec., High Wycombe—T/R, Combat.
May 26th
C/L Rally—Dartford Rec., Dartford—T/R, 5 c.c. Combat.
June 23rd
Northern Heights Gala—All Classes—R.A.F. Halton.
July 7th
Enfield Control-line Rally—T/R, Combat and Speed.
July 7th
Hyde Rally—F/F all classes—R/C, Combat—Hyde, Cheshire.
July 28th
Slope-Soaring Rally, Epsom D.M.F.C.—Box Hill—Albatross Trophy.
August 25th
South Midland Rally—All Classes—Cranfield.
September 22nd
ALL BRITAIN Rally—Radlett—All Classes.

SHARSTON D.M.S.

J. White, 70 Greenwood Road East, Benchill, Wythenshawe, Manchester, 22.
SLOUGH M.A.C.
R. Corgill, 63 Essex Avenue, Slough, Bucks.
SOUTHAMPTON M.A.C.
D. J. Rogers, 97 Oxford Avenue, Southampton.
ST. ALBANS M.A.C.
I. Crawshaw, 5 Amberley Close, Harpenden, Herts.
TROWBRIDGE & DISTRICT M.A.C.
G. Pavitt, 18 Avonfield, Holt, Nr. Trowbridge, Wilts.
WANSTEAD A.C.
E. Vernon, 189 The Drive, Ilford, Essex.
WEST LONDON M.A.C.
P. G. Rabbjohn, 5 Reporton Road, Fulham, S.W.6.
WEST MIDDLESEX M.F.C.
S. Taylor, 12 Rose Gardens, South Ealing, W.5.

NEW CLUBS

A.T.C. AEROMODELLING CLUB, 585 SQUADRON
C. Claxton, 4 Concrete Houses, Pill, Milford Haven, Pems.
BRINNINGTON M.A.C.
G. Thomson, 6 Sandleigh Avenue, Brinnington, Stockport.
GLOSSOP & D.M.M.S.
A. Beesley, 3 Lynns Court, Glossop, Derbyshire.
HAFOD-Y-WERN M.A.C.
C. Green, 115 Deva Way, Queens Park, Wrexham.
SHIRLEY MONARCHS M.A.C.
H. Bashford, 28 Grove Road, Sparkhill, Birmingham 11.
WEST YORKSHIRE M.A.S.
E. Humphrey, 9 Kilpin Hill Lane, Stancliffe, Nr. Dewsbury, Yorkshire.

Contest Calendar

April 28th
WESTON CUP: — } De-centralised
Unrestricted Rubber
LADY SHELLEY CUP: — }
Open Tailless
May 19th
ASTRAL TROPHY: — } Area
F.A.I. Power
GUTTHRIDGE TROPHY: — } Centralised
Wakefield

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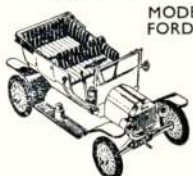
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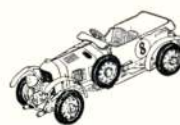
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| Thunderbolt | ... | 9/11 |
| Corsair | ... | 9/11 |
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| Jap Zero | ... | 7/11 |
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| Canberra | ... | 4/11 |
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| Douglas D.C.7 | ... | 4/11 |

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| Venom | ... | 5/3 |
| Sea Hawk | ... | 5/3 |

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| Attacker | ... | 5/3 |
| S.55 Whirlwind | ... | 5/9 |
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| Meteor | ... | 5/11 |
| Javelin | ... | 7/6 |
| Canberra | ... | 8/6 |
| D.H. 110 | ... | 8/6 |
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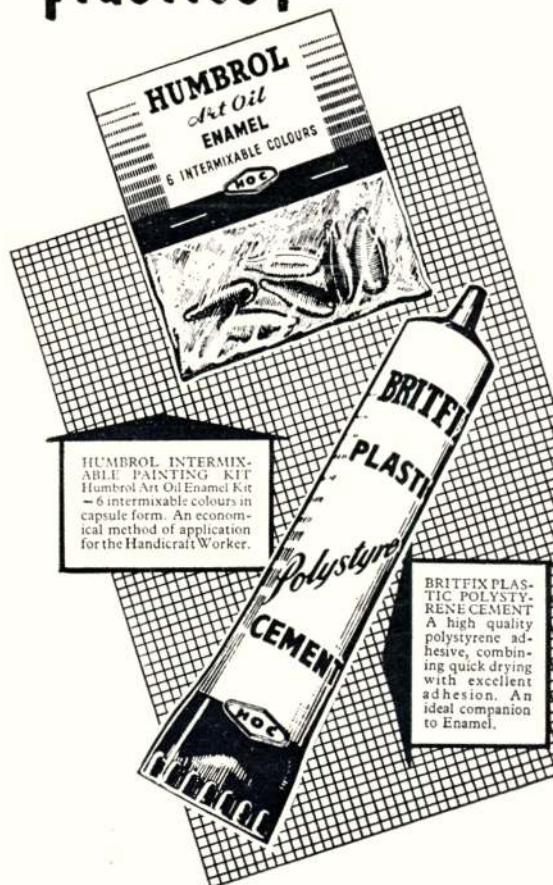
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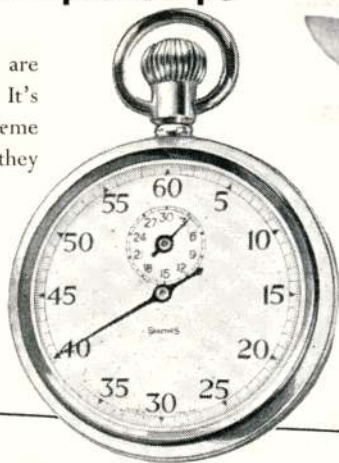
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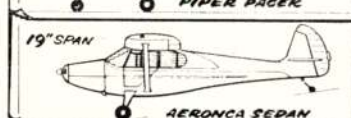
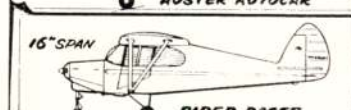
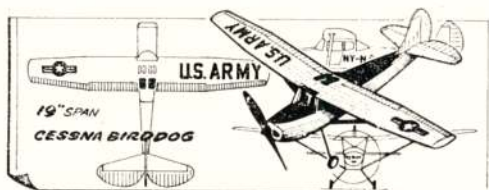
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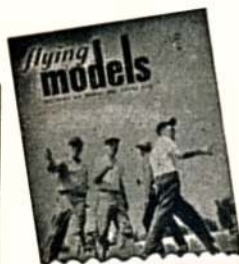
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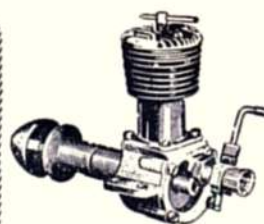
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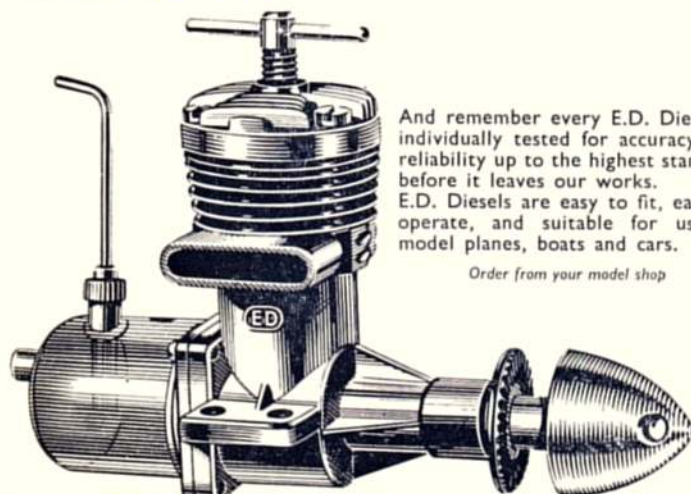
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