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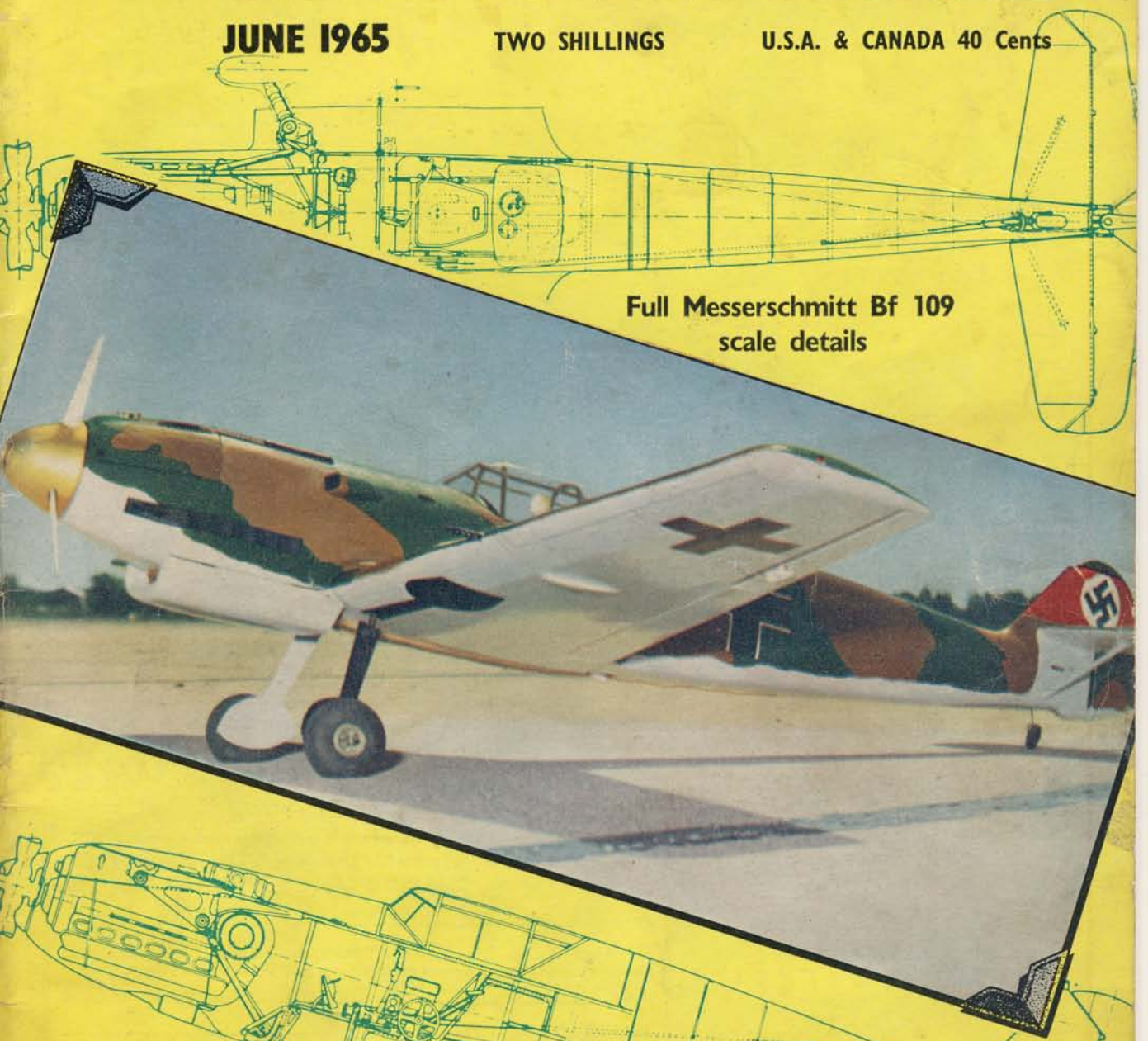

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AERO MODELLER

MAP HOBBY MAGAZINE

June 1965

VOLUME XXX No. 353

other modelling angles . . .

June **Radio Control Models & Electronics** sets the beginner on the right road from Multi Channel with a special feature on how the editor equipped his DeBolt "Jennie" with multi channel gear. Sketches ensure that the most slap-happy modeller will start on the right lines. Pylon racing is photo reported and full size plan is for a 14 in. electric drive Grand Prix Race car for Gemini single channel and Botomatic actuator. Boat modellers will find installation information and technical fans will like the features on tuned filter systems and a trim servo amplifier.

Emphasis on faster model motoring in June **Model Cars.** Barrie Wade provides simple ways of getting more out of motors on the "horses for courses" principle. Warring writes on hotting-up motors, whilst a further contribution deals with speed controllers. In more decorative vein are two related articles on making model drivers and details of their helmets and dress in the full-size world. Prototype car drawings include the eagerly awaited latest high exhaust type B.R.M. (as raced for first time this year in South Africa) plus the unusual Alfa Romeo Tipo 512.

June **Model Maker** offers complete drawings for an elaborately decorated river steamer. This is a model that offers a challenge to any enthusiast. Two informative articles are given on the types of boats and equipment best suited to radio controlled steering and also non-radio straight-running models. For the yachtsman there is a new Marblehead design, there are also articles on vane gears and variable camber rudders. Other features include a working model of a brigantine for period ship lovers : drawings for the "Athenia", a steam tug, an "0" class destroyer of 1941.

contents

cover

Bill Bertrand's Messerschmitt Bf 109 B as entered in the U.S. National Championships. Wing span is 65 in. giving an area of 735 sq. in., and the wing loading 23.6 oz. per sq. ft. A Fox 59 drives a 12 x 6 three-blade airscrew and control is by "Micro-Mite" proportional on rudder, elevator, motor and ailerons. Hailing from Indian city Michigan, Bill is to be congratulated for being one of the first to make a radio version of the famous Fighter. A kit for the 109 F was announced at the recent Nuremberg Trade Fair in Germany.

next month . . .

Practically every club has now turned to Radio Control in a big way. Local field use demands a knockabout design and sometimes the confined areas demand special flying techniques. Eric Clutton provides such a special model and technique description next month when full-size plans for his up to 1.5 c.c. powered single channel **"Sharkface"** appear. This presents an entirely new approach to radio flying and is well worth study even by the most experienced flyer. More on finding that lost free flight model by Martin Dilly with a **review of compasses,** a smallish stunter on simple lines **"Ketchup"** joins Plans Service and should prove to be very popular for those who like to build their models quickly, reports on the first major international event of the year in Austria plus other events in the U.K. and Scale News, design details, Over the Waves, and our other regular features, out June 18th.

Editorial and Advertisement offices
38 Clarendon Road, Watford, Herts

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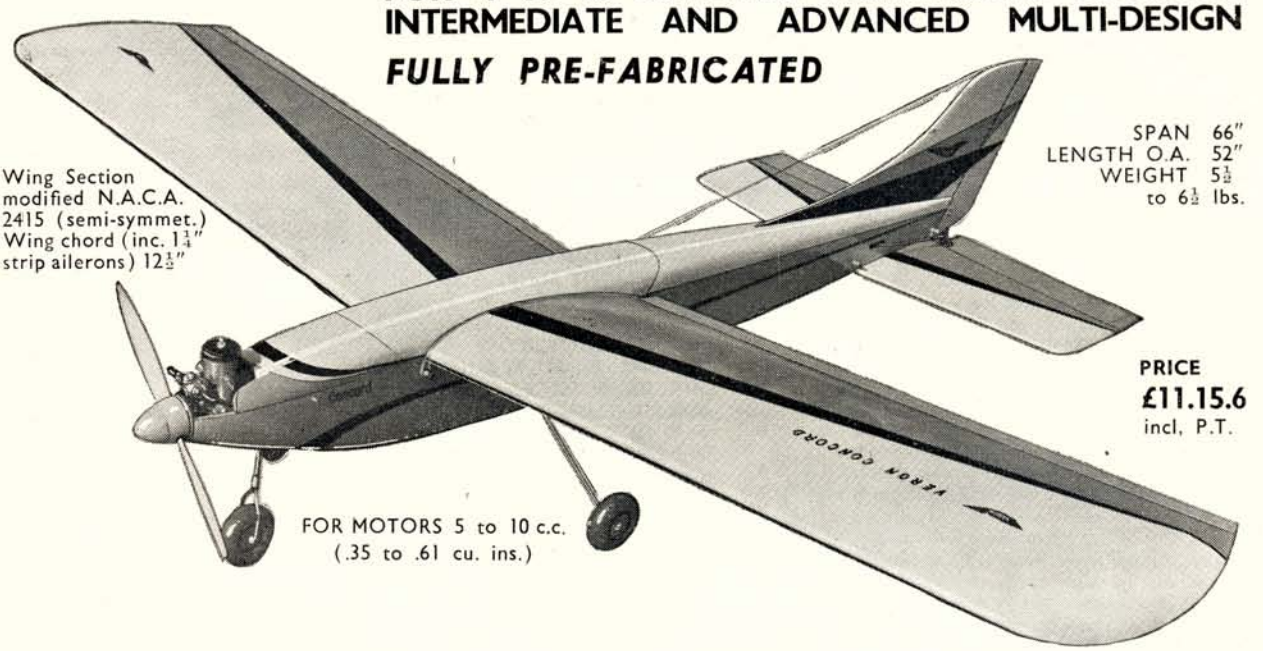

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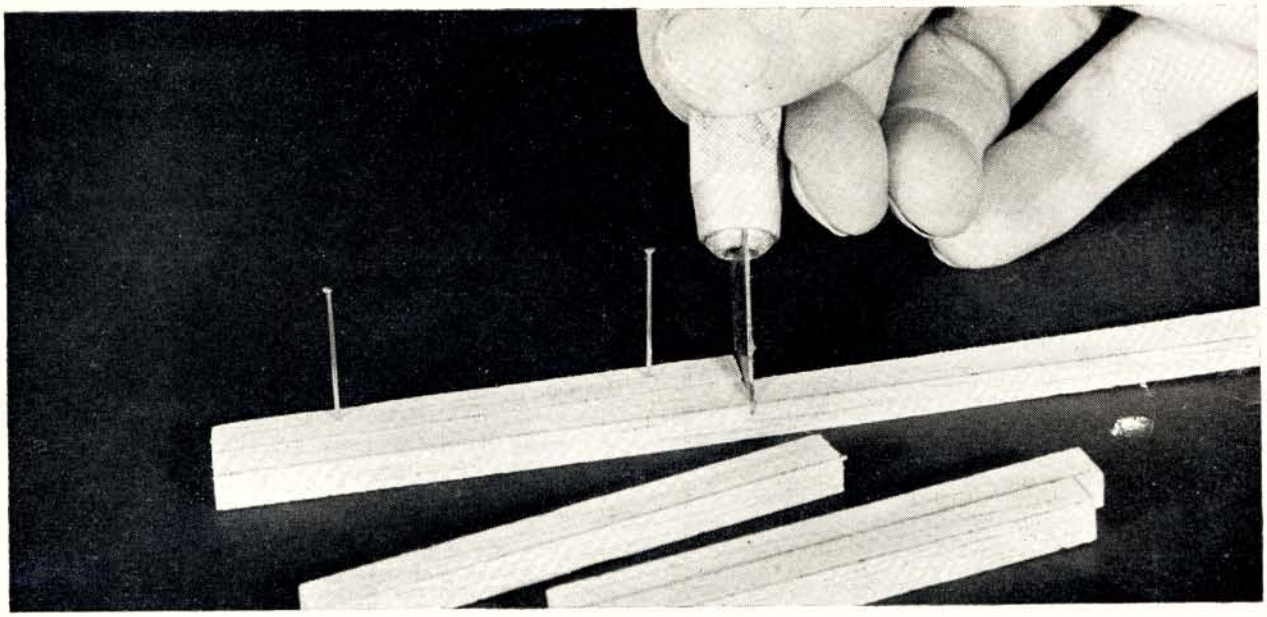

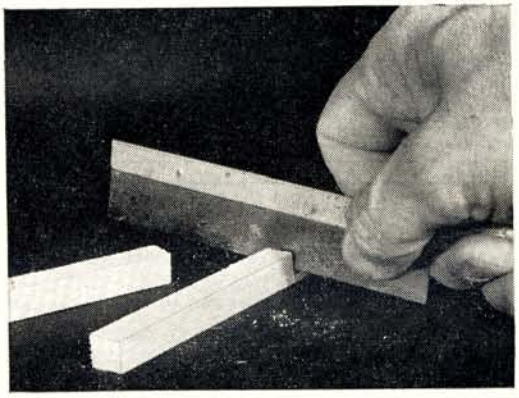

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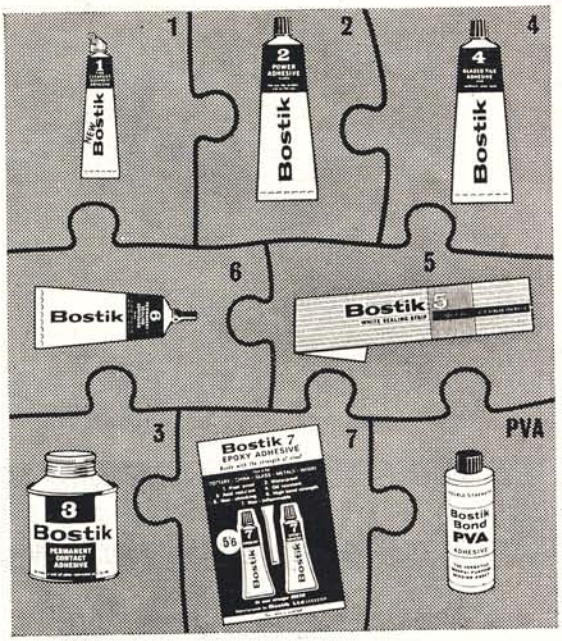

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Vapour trails arcing their way in a clear blue sky. Packed formations attacked by straining Merlin-powered Hurricanes and Spitfires. The abrupt rattle of gunfire and crump of anti-aircraft guns. The wail of a stricken aircraft plummetting to earth. These thoughts recall a summer which was to go down in the annals of history, generally known as the "Battle of Britain".

Having already published drawings of the Hurricane and Spitfire we now turn to the Messerschmitt Bf 109 for the period. Thanks to considerable research through official handbooks and direct measurement of a preserved example, it is our pleasure to produce the drawing on the centre pages of this issue.

It was the Bf 109E retained by the Royal Air Force Historical Branch at Biggin Hill that became the subject of our "operation Tapemeasure", and the heading photograph illustrates this machine in a situation that could hardly have been foreseen by the Luftwaffe 25 years back, in that summer of 1940.

The Law of Common Sense

Controversy rages over the utility of the S.M.A.E. regulation that all members shall have silencers fitted to their engines. The number of words expounded on this subject over past years in our columns should have given readers a full indication of our own views on the matter; but we would like to state now that we have no time at all for the prevalent approach of trying to get away with an absolute minimum to the extent of merely fitting a manifold or hollow tube device.

Regulations which were made jointly by the S.M.A.E. and the Model Trade Federation committees were clearly intended to improve public relations with the reduction of noise annoyance and those who scratch at the rule obtain little advantage for themselves at a considerable disadvantage to the official organization.

At the same time, views have been expressed overseas citing the S.M.A.E. regulation as being the example to be followed throughout the World. Far from it. We would never like to see such a regulation enforced upon modellers where silencing is neither an advantage nor desirable. A case in point is that in New Zealand where at the Annual General Meeting of the N.Z.M.A.A. at the beginning of the year a proposition for application of silencers to engines of over 2.5 c.c. from 1966 onwards was defeated.

Auckland wanted silencers to recover lost flying fields. Other clubs successfully opposed the motion on the grounds that silencers were virtually unobtainable and that the problem of noise did not rise elsewhere.

Obviously the subject will continue to be a vexed question for a long time to come but the law of common sense must prevail if we are to preserve our flying fields in the United Kingdom. Full evidence of the effect of local silencer regulations has been seen at Chobham Common, the popular London flying venue where in recent weeks numbers of unsilenced engines have been seen in use creating more noise than ever before. These "refugees" who refuse to comply with regulations applied at Epsom and elsewhere are now embarrassing a situation which has at times been delicate enough for regular Chobham flyers.

Far Travellers

South Africa is scheduled to be represented in person at this year's World Championships. Details of the Radio Control team can be found in our "Over the Waves" feature and in Free Flight those widely experienced modellers Robby Rowe, John Swallow, and Peter Visser will be travelling up from the Southern hemisphere to Finland in July to fly in each of the three Free Flight classes. First doubts that the Northern venue would discourage attendance seems now to be unjustified but we must comment on the fact that the team representing Great Britain will be (according to information at the time of writing), completely without any financial aid and the eight individuals (Derl Morley has now withdrawn from Wakefield, John O'Donnell taking his place) will meet the entire costs out of their own pockets including the official entry fee.

Radio Control Symposiums

The annual technical symposium organised by the district of Columbia Radio Control Club, U.S.A., is now firmly established in the American modelling calendar and the annual issue of printed lectures has become an invaluable technical reference. Copies of the 1964 symposium are available through the

Academy of Model Aeronautics and include such items as details of the Phelps Feedback servo, Axelrod (of "Topflite") on propellers, Elliot on proportional pulse width and pulse position and full details of the Klinetronics proportional system including circuits. The radio control technician will find that these lectures yield a considerable amount of information on advanced techniques.

Film Models

Special effects for aviation films have often employed model techniques but these have usually been of a wire controlled nature. Now, the film studios are developing the use of radio controlled models not only of aircraft but also of high speed powered boats. We understand that several films in current production make use of radio control in some way or another and it is interesting to note that the Japanese magazine "Radio Control Technique" has carried a pictorial feature illustrating a R/C Zero, a Corsair and a Douglas DC-3 which are used for film scenes. These models have their wheels fixed in the "up" position and take off from wheeled dollies.

Postal Increase

With the introduction of increased postal charges from May 17th the annual subscription rates for magazines are unfortunately increased slightly by the amount of 1/- per annum. Future subscribers are forewarned that regular supply of AEROMODELLER direct by post from the printer is now 29/6d. for a year's supply.

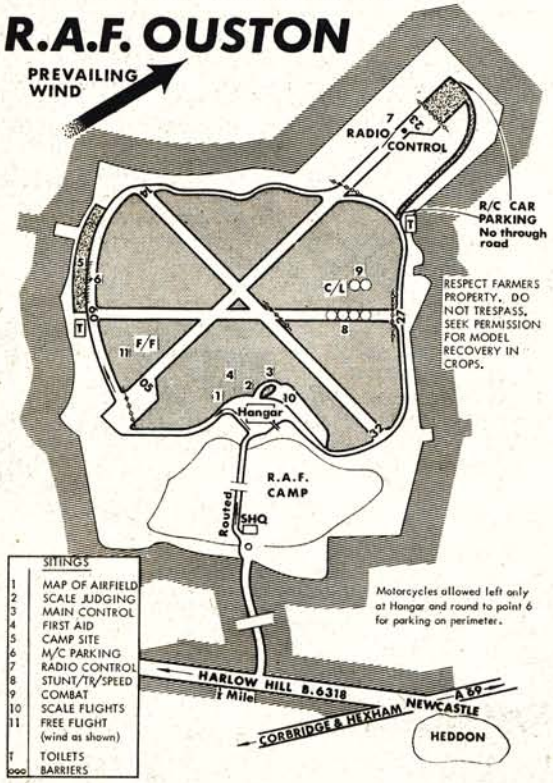
The dollar rate for overseas subscription orders will remain unchanged at 4 U.S. dollars.

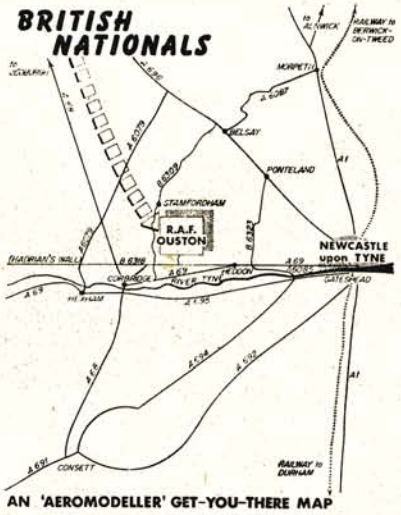
All roads lead to the Nats

Maps on this page give the direction of approach to and details of R.A.F. Ouston, situated approximately 14 miles west of Newcastle-Upon-Tyne which will be the scene of the 1965 British National Model Championships. The special train idea has not received sufficient support from Southern modellers but there is a very fast 4 hour express service from London to Newcastle for those who cannot travel by car.

This will be the first British Nationals with facilities akin to those in New Zealand, Australia, South Africa, and the U.S.A.

Accommodation has been offered in Service Quarters for a complete charge of only 35/- for two meals per day and two evenings lodging. Applications for this accommodation should be made with remittance to the Competition Secretary, S.M.A.E., 10 Storer Road, Loughborough, Leicester.





AN 'AEROMODELLER' GET-YOU-THERE MAP

The meeting is open to the public and promises to be a first class display of model flying for those who wish to travel just to watch. Admission will be by programme and this informative booklet will be on sale at the main entrance gates.

What's On

The meeting starts at 10 a.m. on Sunday, 6th June, with the following simultaneous contests:

Thurston Cup—(Free Flight Duration Contest for Gliders).
Women's Cup—(Free Flight Duration Contest for Rubber, Power driven and Gliders, restricted to Lady Competitors.)
S.M.A.E. Trophy—(Aerobatic Contest for Multi Channel Radio Controlled Models.)
Knokke Trophy—(Control Line Scale Flying Contest.)
Radio Control Scale—(Precision Flying of Radio Controlled Scale Models of full-size aircraft.)
Gold Trophy—(Aerobatic Contest for Control Line Models.)
Davies 'A' Trophy—(Team Racing for models with engines up to 2.5 c.c.)
Handicap Speed—(Speed Competition for Control Line models from 1.5 c.c. to 10 c.c. matched on a Handicap System.)
Combat—(Preliminary Heats of a "knock-out" Combat Contest for Control Line Models.)

The meeting continues at 10 a.m. to 4.45 p.m. on Monday, 7th June, with the:

Model Aircraft Trophy—(Free Flight Duration Contest for Rubber driven Models.)
Sir John Shelley Cup—(Free Flight Power Duration Contest.)
R.A.F.M.A.A. Trophy—(Team Racing Competition for Control Line Models with engines up to 1.5 c.c.)

And final rounds for Combat, Handicap Speed, the S.M.A.E. trophy for multi channel radio control, and judging accuracy of the scale models.

INTRODUCING . . .

Free-flight Slope Soaring

. . . by I. ANDERSON

BEFORE the invention of the tow launch, slope soaring was by far the most popular form of model gliding. Today, interest is again on the upswing.

Although it is undoubtedly one of the most tiring of all branches of the hobby, the beauty of a model gracefully soaring in the lift from a slope is not to be missed. It rules out the need for large airfields or flat expanses and devices such as towlines and autorudders which seem to bring so many complications to the normal glider flier. It is the retrieving up and down the slope chasing after a misbehaving model that wears one out, but it all becomes worth it when the perfect soaring flight is obtained.

In order to achieve these flights, one must first find a decent slope. This is usually easy; most clubs discover that they have a reasonable site nearby when they begin to seriously explore for one. A slope for successful soaring should preferably be between 250 and 500 ft. high, but anything above 50 ft. will produce excellent flights even with simple all-sheet models. The prevailing wind should be perpendicular to the slope—if it is anything more than 15 deg. from the perpendicular, most of the lift will be lost. The minimum slope angle is about 35 deg. Of course, conical hills must be avoided as the air current tends to split and flow round the side of the hill rather than over it.

Next, a model. Dig into your scrap wood pile and find enough wood to build a small solid soarer. A perfect design to build is the *Appleknocker* which is this month's full size plan and which has been rivalling the larger sailplanes. On the other hand, if you have an old towliner (or contest power job minus engine) which you have retired, drag it out of its corner and set to work on patching it up. While you are doing this, instal a ballast box under the C.G. and, more important, a nose fin (see models in accompanying photographs). This should be of medium to high aspect ratio and smaller than the tailfin. It is surprising what an improvement such a fin can make to the wind holding capabilities of the model as it helps to cancel out the effect that oblique gusts would have on a model with only a tail fin.

When ready, take your creation out to your previously discovered flying site, in about a Force 2 wind. Go a few yards back from the top of the slope or ridge before launching the model. This enables the normal flying speed to be reached before the model gets into the lift, and will give flights of shorter duration for trimming.

The model is now in the air and flying (we hope). The ideal flight should be holding straight into wind and continually soaring while working along the ridge and back until the point is reached where the model is hovering on top of the lift cushion. Faults can be ironed out as follows:

(1) Model flies straight on, gaining little height.
Remedy—wait for more wind.

(2) Model is blown backwards or is tossed back violently by each gust.
Remedy—add ballast gradually under the C.G. until flight is correct (see section on penetration).

(3) Model weaves into wind, eventually building up into a side slip.
Remedy—reduce area of nose fin, increase area of tail fin.

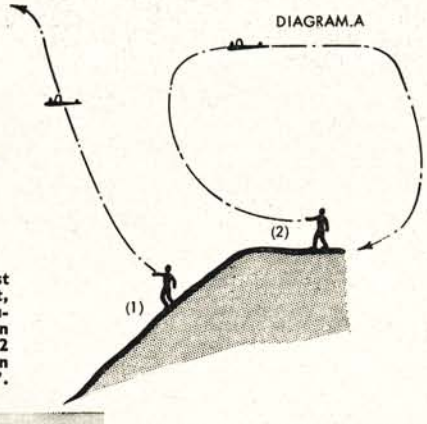
(4) Other faults such as stalling, excessive turn, etc., can be corrected by the normal glider trimming methods.

When the model has been trimmed, the launch point is moved down over the edge of the ridge, giving a far superior flight pattern. See diagram 'A'.

Penetration

This is a term that has heen somewhat condemned in certain quarters but is nevertheless most useful when applied to the art of slope soaring. The *Penetration* of a model depends on the inherent stability it possesses. A model which has good resistance to wind gusts and can move in the opposite direction (relative to the ground) to the oncoming airstream is said to have better *Penetration* than one which is tossed like a leaf and carried away down-

DIAGRAM.A



(1) The normal launch point, the model steadily soaring to the top of the lift cushion. (2) The launch point and typical flight pattern for initial trimming flights. These two contrasting flight patterns are explained by the fact that the smooth airflow up the face of the slope breaks into turbulence above and behind the ridge. The extent of this varies from slope to slope and with wind conditions prevailing.

St. Albans Free Flight soaring aces at last year's Luton organised slope contest. Left, winner Don Edwards, with 70 in. pendulum Nose Vane "Super Woggis" design which weighs only 22 oz. and takes 22 hours' building time! Below, is Colin Morris with 34 in. all-sheet "Woggis". Note use of forward fin.

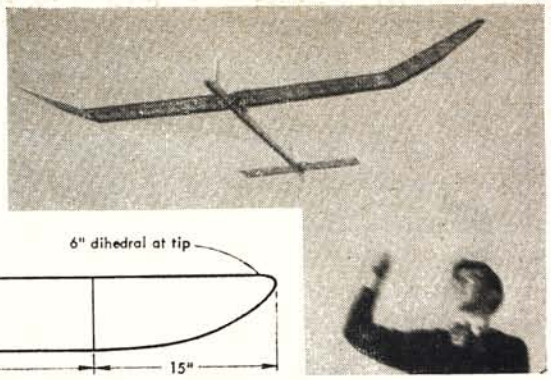
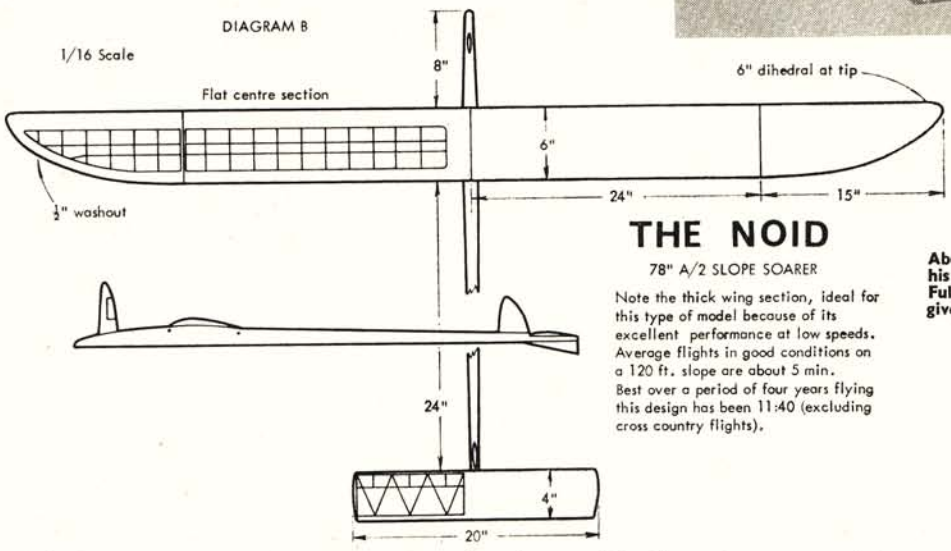


DIAGRAM B

1/16 Scale



THE NOID

78" A/2 SLOPE SOARER

Note the thick wing section, ideal for this type of model because of its excellent performance at low speeds. Average flights in good conditions on a 120 ft. slope are about 5 min. Best over a period of four years flying this design has been 11:40 (excluding cross country flights).

Above, author launches his "Noid" design. Full size airfoils are given at foot of page.

wind. However, wrong the term may sound to the aerodynamic experts amongst us, it is a proven fact that if one reduces the moment of inertia of the model by concentrating weight around the C.G., the improvement in stability will give it a better *Penetration* as described above than a similar design with weighty extremities. This problem of producing good *Penetration*, coupled with directional stability is the major one which affects the success of a slope soarer intended for flights of contest-winning duration.

When you have been flying your first soarer for a few weeks and have worked out the basic technique of trimming and flying these models, you can build a larger model specifically for slope work. Something about A/2 size should be right, although a larger model will be more effective. A good start would be *The Noid* shown in diagram B (which uses a wing adapted from the Contest Kits *Empress* design, itself an excellent model for soaring) or an A.P.S. *Pjerri*.

If you design your own, a number of rules should be followed.

(1) **Light weather model.**
Thin wing section, long moment arm, small tailplane, slim fuselage, high aspect ratio wings 1:12-1:16) with straight or elliptical dihedral or polyhedral with long centre panels.

(2) **Heavy weather model.**
Thickish wing section, shorter moment arm with larger tailplane, thick fuselage, low aspect ratio wings (1:8-1:10), flat wing centre section with tip dihedral. Heavy construction, Ballast box at C.G.

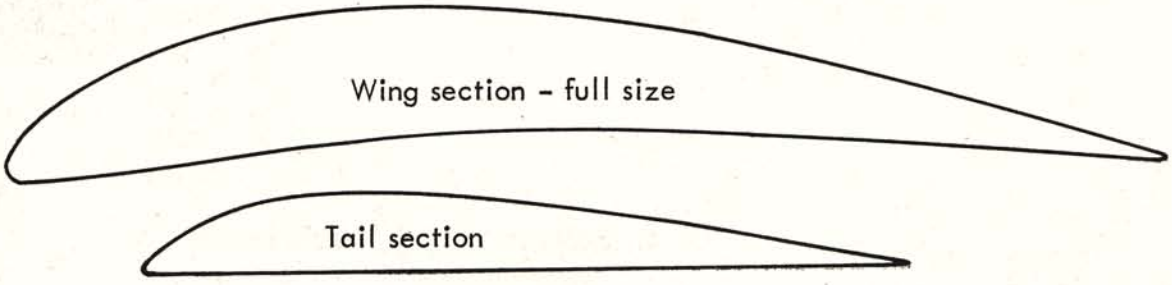
(3) **General purpose model.**
Somewhere between the first two, such as *The Noid*.

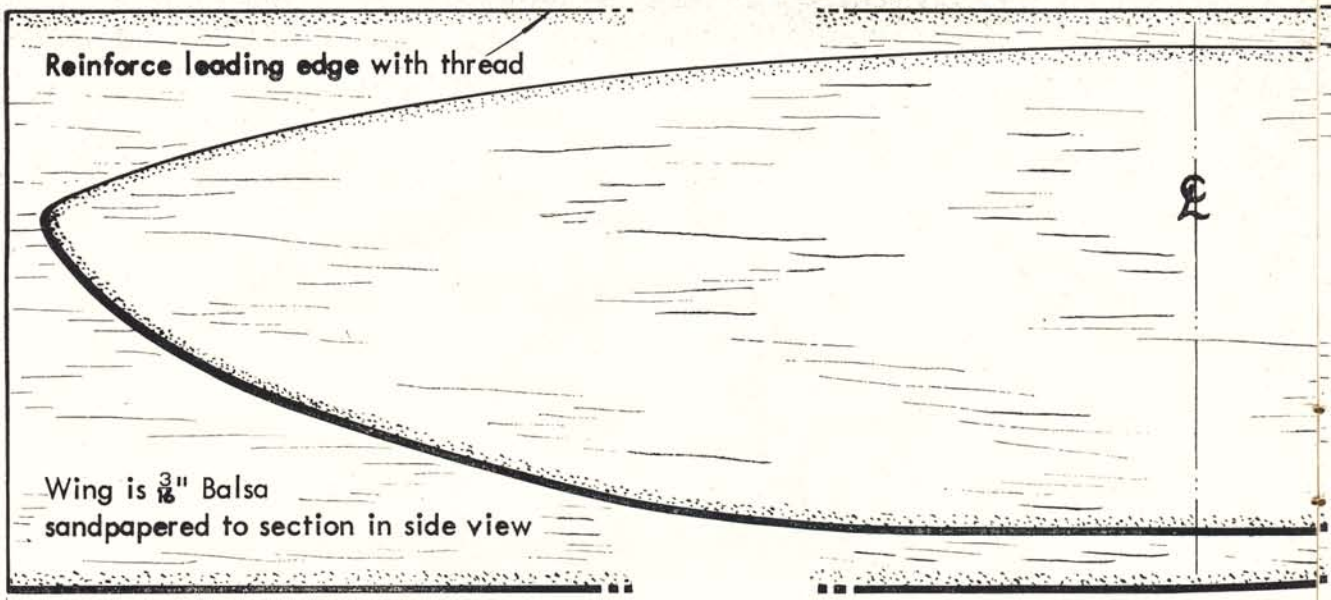
Constructionwise, the model should be built STRONGLY, especially in the fuselage nose, wing centre section and dihedral joints. Hardwood spars are advisable for models of A/1 size and above, provided that they are used sensibly; likewise for fabric covering. The wings, while mounted firmly, should freely skew or knock back in landing as it is invariably the wingtip which hits the slope first. A good idea is to use two thick (say ¾ in.) ribs at the dihedral joint glued face to face with no dihedral braces. This gives a tough joint which in the event of a hard crash will break clean rather than shatter the whole area. A D/T is usually dispensed with, for although cross-country flights are risked D/T landings on slopes are fatal.

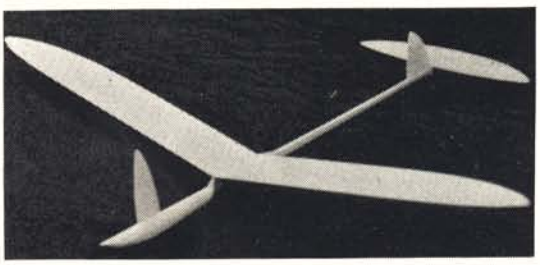
When this new model is flying well, take it along to one of the few slope rallies held each year and compare it in performance and style with the other models that appear. Such an experience is invaluable for the number of different approaches to the subject is amazing.

This article has, of course, only been a basic introduction with the object of bringing this somewhat neglected aspect of model gliding to a wider popularity. Another article will be following in a future edition dealing with the problems of the more advanced subject of magnet steering, which has so far been virtually ignored in Britain in spite of its wide continental following.

Happy mountaineering!







'Apple knocker'

36" Slope soarer

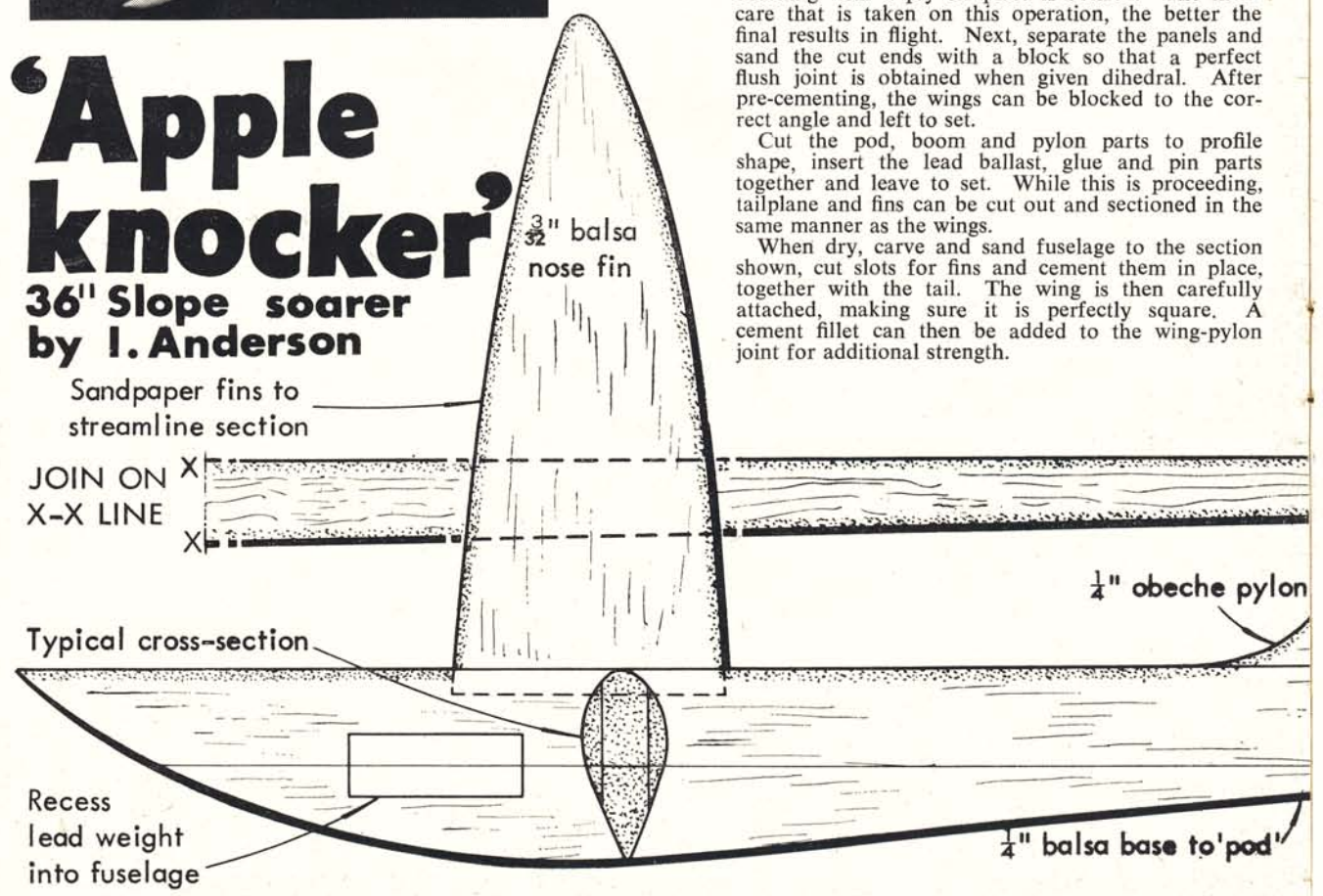
by I. Anderson

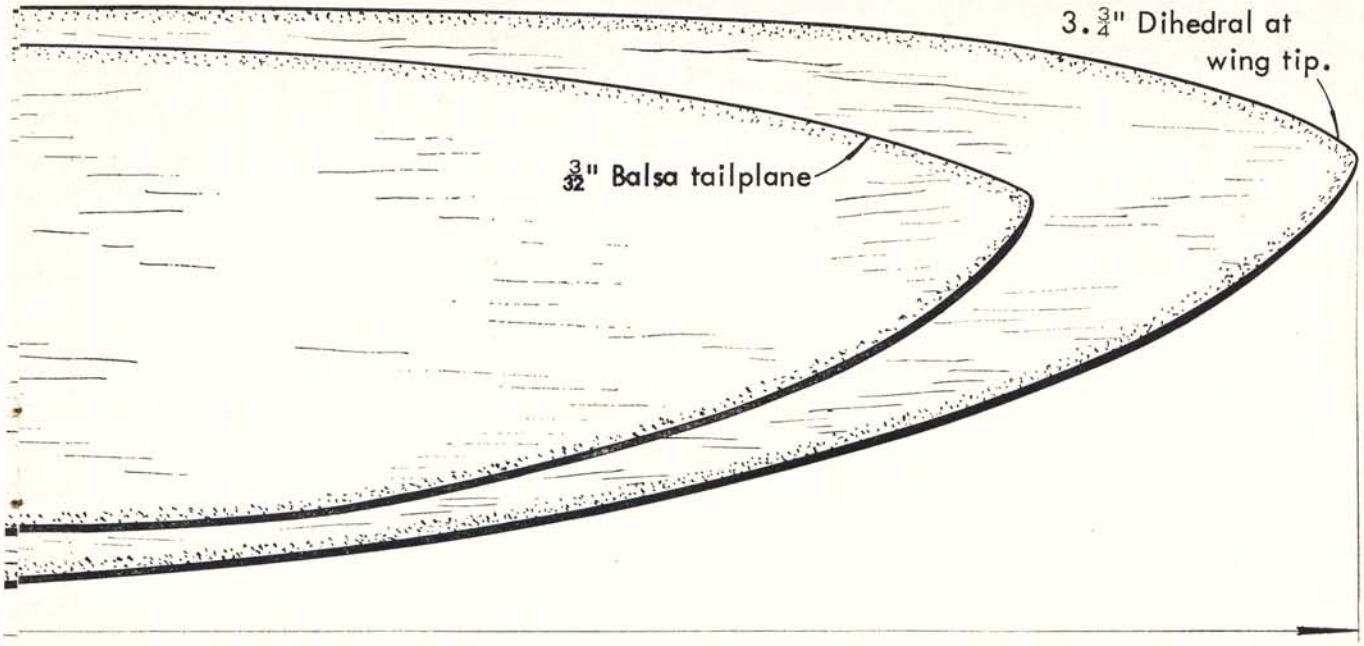
THE FIRST STEP towards the building of a successful slope soarer, even of such a simple type as this, is the selection of wood. All pieces chosen should be very even grained, especially that for the wings, so that the C.G. is situated in as central a position as possible in the plan view. A good straight grain will also add considerable strength to the fuselage boom.

Commence construction by cutting out the wing to its correct shape, then carve and sand to section, checking with a ply template if desired. The more care that is taken on this operation, the better the final results in flight. Next, separate the panels and sand the cut ends with a block so that a perfect flush joint is obtained when given dihedral. After pre-cementing, the wings can be blocked to the correct angle and left to set.

Cut the pod, boom and pylon parts to profile shape, insert the lead ballast, glue and pin parts together and leave to set. While this is proceeding, tailplane and fins can be cut out and sectioned in the same manner as the wings.

When dry, carve and sand fuselage to the section shown, cut slots for fins and cement them in place, together with the tail. The wing is then carefully attached, making sure it is perfectly square. A cement fillet can then be added to the wing-pylon joint for additional strength.



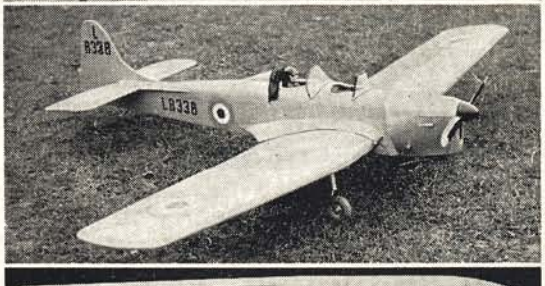


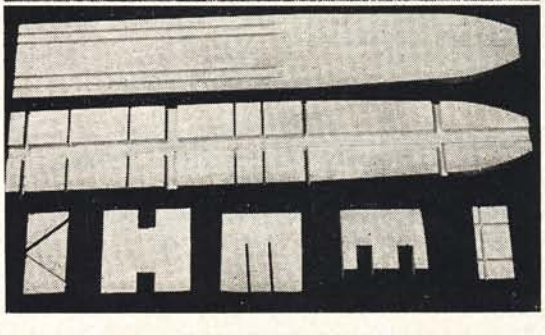
To finish, give three thin coats of sanding sealer, sanding carefully after each, and a final coat of 50/50 dope-thinners. Colour dope on anything but fins is not advised because of the danger of spreading weight towards the extremities.

The model can then be trimmed as described in the accompanying article.

Simple, solid balsa wings, tail and fins plus obeche fuselage boom make a sizeable design with remarkable performance

OVER THE R/C WAVES





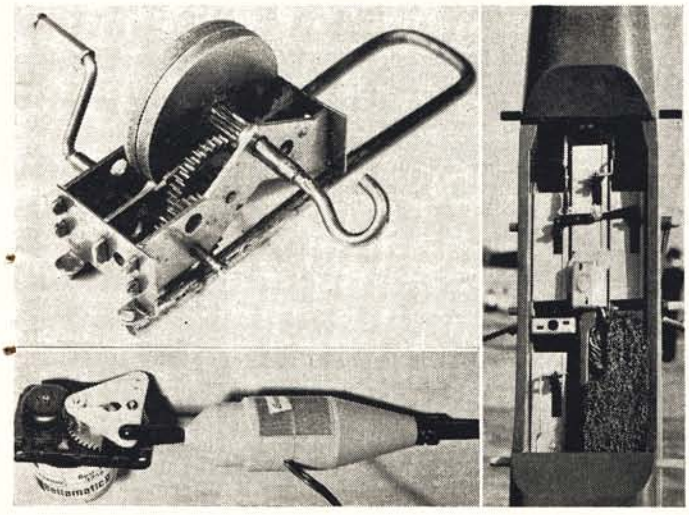
A NEAT IDEA submitted by L. T. Rudd of Luton & D.M.A.C. utilises the flywheel inertia drive from a child's unwanted (?) friction drive toy. As the photograph on page opposite illustrates, the works can be converted with a winding hook and handle plus a supporting loop for a hand grip to make a 15:1 geared winder for actuator rubber motors. Small, neat, and fast in action it has the tremendous advantage of being virtually "free".

Scale models continue to be in the news and the forthcoming National Championships promise to be as bright as ever with new entries in the multi-channel scale event. The *Miles Magister* appears to be a popular choice. Both Walter Neild of Cheadle (see photo) and Dave Platt of London are entering replicas and from what we hear, each has been made with devout attention to scale. The *Chance-Vought Corsair* has always been considered a rather difficult scale subject, having appeared regularly at the American Nationals only to suffer through some misfortune in flight stability. Congratulations are due therefore, to Arthur Lalley from Bexley Heath, Kent, who successfully tested his 8¼ lb. version during April. Arthur has been modelling for less than two years and is fast becoming something of a legend in the London area for his progress in multi-channel control. Apart from the lack of aileron sensitivity which is to be corrected, the Corsair made a stunning 1st flight and we should imagine, looks a very pretty sight in the air. Incidentally Arthur placed first in the West Essex invitational competition on March 28th with his *Mustang* and was also second in a field of well known competitors in open multi.

The old chestnut that radio control could be fitted to a free flight contest glider quite legally within the framework of the rules and used to hold thermals or steer into a thermal prone area has developed a stage further in Poland. Stan Zurad sent us details and photographs of his *Wakefield* equipped with Otarion 0-22 receiver for rudder-only control using the Japanese O.S. "Minitron" lightweight escapement. We have no news of any contest success but the possibilities are obvious, and utilising clever structure there should in fact be very little weight penalty. Zurad's model is in fact a mere 3 grammes in excess of the required minimum total weight of 230 grs.

When the American Model Press reviewed Lou Andrews' new kits the *S-Ray* and *H-Ray* (with similar flying surfaces but shoulder wing and high wing configuration) they made favourable comment on the degree of prefabrication and kit engineering which renders these models particularly easy to make. Having obtained an *H-Ray* kit, we can most certainly confirm that these kits are "different". Suitable for rudder only, intermediate or small multi they utilise a fuselage assembly with cross milled balsa blocks that permit a wide variety of equipment installations

At left, top to bottom; 13 year old S. Caley of Forest Gate, London, took 2nd place with his Cox .09 powered APS "Lumpers" at the West Essex invitation meeting March 28th. Model uses a U.K. receiver and Elmic conquest escapement. Note the drag tab on near side wing for quick field trim. Next is Arthur Lalley and his 8¼ lb. "Corsair" with Merco .61, enlarged to 1/8th scale from Aeromodeller drawings, and uses Orbit 12 with extra channels on aileron trim and Servomite servos. Next, "Miles Magister" by Wally Neild enlarged from Aeromodeller plans to 67 in. span for all up weight of 7 lb. 10 oz. of which 8 oz. is ballast to compensate for the short nose. Radio equipment is F & M with Bonner servos and the power is a Merco 49. The colouring is in the pre-war all trainer yellow scheme. Bottom photograph shows some of the machined components in the H-Ray kit. Vertical bulkhead slots permit a range of positions according to chosen equipment, and all parts lock together securely even without adhesive.



Mr. Rudd's gadget at left made from a child's push along toy is a handy rubber motor winder with flywheel action for 15:1 gearing. Below it is the new Graupner Trim-O-Matic servo arranged to extend or shorten an elevator pushrod for trim. Small in size it is seen linked to a standard Bellamatic Mark 2. The servo uses the Micro T 05 motor geared 141:1 and is designed for relay operation. At right is Basil Murley's (of Bazz Bomb fame) installation of 10 channels in a standard "Tauri". The fuselage complete with Orbit 10 receiver and Merco 49 weighs no less than 5 lb. 3 oz.—almost a "multi Bazz Bomb" so to speak!

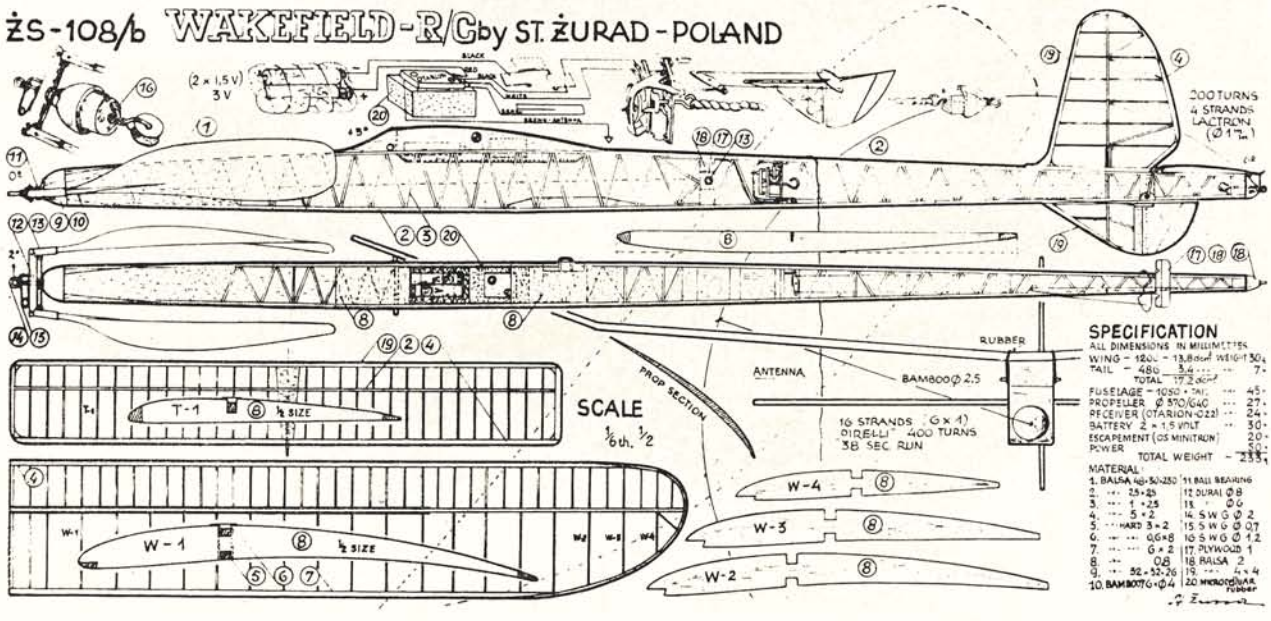
and key the components infallibly. Each is 50 in. and ideal for 1.5 to 2.5 c.c. We understand that they will be imported through Messrs. Ripmax and should prove to be very popular indeed with the sport flyers. A point very much in their favour is that the kits contain a special photo sheet which covers practically every equipment combination that the model could possibly carry, leaving little to the imagination as far as installation is concerned.

As we go to press, advance kits for the *Keilkraft Mini-Super* and *Veron Concord* have arrived; and we have no hesitation in saying that these will make a tremendous impact on the British market for their completeness. Each is provided with wheels, fabricated undercarriage and in the case of the Concord which is strictly multi-channel, with K-links for connecting controls. Structural reports will be made as soon as possible. Meanwhile we can say that having seen prototypes of both designs they are sure to live up to the promise of being specially created to suit the British flying conditions and equipment.

Mention of Veron reminds us that it was a most refreshing thought on Geoff Franklin's part to use a perfectly standard *Robot* kit as a demonstration model for the first of the new Orbit 3+1 proportional sets to arrive in the country. This outfit is so different in its approach that the manufacurers have issued a lengthy explanation of the values of the system. By discontinuing their twin stick analogue proportional outfit (many of which are in most successful use in the UK), Orbit appear to be concentrating on the 3+1 and a new, much more expensive digital system. As Geoff can demonstrate and the handout instructs, the 3+1 offers from a single stick and two trim buttons plus a selector lever practically all the functions needed for multi-channel competition work yet it is light enough with an airborne weight of 17 oz. to fit into 48 in. models. More on this gear is to be published in our companion magazine, *R.C.M. & E.*

Proportional will be well represented in the coming World Championships. British team members have been trying various systems and Cliff Culverwell who leads the South African team will use the Pretoria produced *"Constellation* 7". 2nd and 3rd men are John Wessels who is also from Jo'burg and a *Taurus* flyer; but with *Min-X* reed gear, and Chris Sweatman from Port Elizabeth who is no stranger to British contests and flies a *Decoder* with *Orbit* 12. Of the dozen competitors for team places at the Easter eliminators, three used Con: 7.

The Herborn Model Flying Club in West Germany has sent us some details of their International Radio Control event for the *Queen of the Netherlands* trophy to be held June 25/27th. This will be a large contest attracting entries from many European countries including, it is hoped, the U.S.S.R. Anyone wanting further details should contact the club at Mulhgasse 1, 6348 Herborn/Dillkreis, West Germany.



Model location and recovery

—a 'bring 'em back alive' feature by Martin Dilly

IT MAY BE because of smaller flying fields or longer flights or windier weather, but it seems that model flights these days are ending in awkward places far too often! When this happens the problem is two-fold—finding them and getting them back again safely. A discussion of a few ideas on the subject, some tried, some untried, might therefore be of interest to the hardened free-flight man.

As regards the location part of the problem, there can be two broad approaches to this, the *"before"* and the *"after"*. Briefly, the first consists of various gimmicks on the model to make it easier to find in difficult surroundings, and the second involves schemes to improve the vision of the searcher.

Modifications to the model may be necessary. One of the simplest and most effective of these is the use of large fluorescent panels on the model; this approach is specially effective in conditions of poor visibility for instance when the light is failing after a fly-off. Several years of field trials with a number of "Day-glo" type paints have shown that the most visible and easiest to use is Reeves "Blaze", which is a lurid orange colour that stands out against any surroundings; the bigger areas of this that you can use on the model the better, but the most suitable regions are the wing-tips, fin and above and below pop-up tailplanes. Some people also use panels of shiny metal foil to reflect the sun, but this has fairly obvious disadvantages in this country. It is incredible how many people still produce models finished in blacks and greens and dull yellows and happily fly them in a country that is largely black and green and dull yellow.

A design feature that improves the chances of recovering a model is the breaking fuselage type of D/T used on some rubber models; in tallish grass or corn the popped-up tail or fin is often the only part visible and locates a model otherwise sunk in the vegetation.

The other aids to model location require rather more effort but might well be considered; most can be deployed by the same scheme that operates the dethermaliser and at the same time. One of these that has certainly been used in the United States is the flag-on-a-pole-system; this consists of a light balsa spar held along the fuselage in flight but released by the D/T to spring up vertically above the model. On top of the spar is the largest, brightest flag or disc that the model can carry. The idea is that this projects up out of the scenery and draws attention to the model below.

A similar idea is a long, brightly coloured streamer of tissue, ribbon or possibly recording tape leader as sold by E.M.I., that is released by the D/T to trail behind the model during its descent and drape over the surrounding countryside when the model lands; this would be of more use in wooded country than the flagpole scheme and probably less bother to rig up on an existing model.

A rather less practical idea is the use of smoke-bombs attached to the model; apart from the weight involved and the risk of fire, ideally this system would operate some time after landing, when there would be some chance of searchers being in the vicinity of the conflagration, and a separate or much longer fuse would be needed to provide the required delay. Cost would be quite high and public reaction to odd clouds of smoke bursting out round the countryside might well be poor, so on the whole this one is not recommended except in deserts.

Another possibility is some sort of acoustic system; some children's bicycles have electric buzzers instead of bells, and the insides of one of these might be worth investigating. The structure of the model could be used as a sounding-board to amplify the buzzer's output, and one of the miniature cells of the Mallory type could be used for power, switched by means of a D/T fuse or timer operated mechanism.

A rather more sophisticated version of this is the audio oscillator; this could be quite light, using current transistor techniques, but would need some kind of loudspeaker or vibrator. Using a sensitive directional microphone quite accurate bearings on the model should be obtainable, and possibly filter circuits would be of use as well. This is one for the electronics boys to play with; possibly the R/C members of your club could be interested in the project.

The ultimate model location technique is radio direction-finding; this has been proved to be quite practical, the main difficulties being legal rather than electronic. The model carries a transistorised transmitter (typical weights are under an ounce) and an aerial; the transmitter is either left on continuously or else switched on at the same time as the D/T. The owner then trots off with a suitable receiver with a directional aerial, and homes on to the whine. Dead easy! The main snag, of course, is what frequency to use, the radio control fliers being quite likely to object to models flying around emitting 27 Mc/s; on other frequencies the G.P.O. is likely to do a better detection job than the owner of the model. . . .

The above ideas are all incorporated in the model; however even if you happen to be flying a model without every mod. con. on it all is not yet lost. The best way of not losing a model, short of keeping it in the car, is to keep it is sight; this doesn't mean pounding off across Chobham after it in a 30 knot wind, because the model will win every time and you'll probably get a broken ankle into the bargain.

The trick here is to stay more or less put, making use of any nearby high ground, and watch the model with binoculars or the naked eye until it is on the ground ; then, when you're quite sure just where it is, note any handy landmarks or take a bearing with a marching compass (to be reviewed next month), and set off down the line, checking the bearing from time to time if in any doubt. Theoretically you then find the model at your feet. . . .

Unfortunately, things don't always turn out that way; the model may go out of sight while still airborne. The procedure here is to use the compass to estimate the line of drift: this needs to be done before the model is actually invisible to the naked eye. Take a bearing on the model as it is turning cross-wind, or else take a mean between its bearings while flying upwind and downwind; the former is

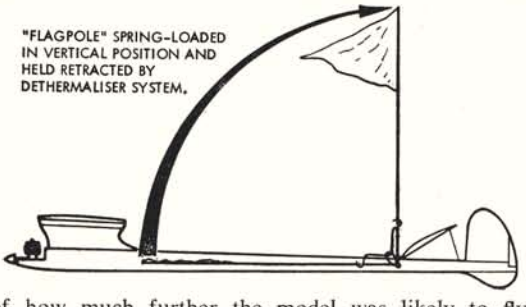
easier, due to a larger area of model being visible when broadside on.

Having established the line of drift, it is necessary to relate this to some fixed landmark lying on the line, either by noting any convenient tall tree or building downwind from you, or else by taking a back-bearing (i.e., a reciprocal of your line of drift) and noting any upwind landmarks on it.

A large scale Ordnance Survey map can be useful in some situations, for instance to relate the estimated position of the model to roads and buildings, or to decide where the line of drift crosses roads. The Map Room at the British Museum has aerial survey photographs of the whole of this country, and these are well worth investigating; the relevant grid references should be quoted when trying to locate a particular photograph.

Whichever method you use, do make absolutely sure that you can identify your selected landmark later; trees in particular appear to change colour and shape rapidly with changes of light and position, so keep referring back to your marker frequently as you go down the line.

The model may be anywhere within the radius of the glide circle either side of the line of drift; how far downwind you look depends on your estimation



of how much further the model was likely to fly after you lost sight of it.

If, on the other hand, you've seen the model land and you find yourself in the right area but with no sign of the model, don't despair. For a start you may have over- or underestimated the range downwind, so go up and down the line, upwind and downwind of the model's estimated position. Use the high ground or even jump up and down to increase your effective height; the best method is to climb to the top of the tallest tree in the vicinity. This way you can see into depressions in the ground and behind bushes and save yourself quite a lot of foot-slogging. There have been times when the model has only been visible from tree-top height, but searchers on the ground have been invisible in the undergrowth; the trick here is to stay up the tree and get the grounded bods to shake bushes to reveal their position so they can be homed on to the model by shouts from above.

As regards a ground-borne search, it may seem an obvious point but it is not very efficient for people to look for a model in tight little bunches or in single-file; man-eating wild animals of the hungry sort are quite rare in this country, so you'll be quite safe spread out in line abreast, and it is much more likely to produce the model. The spacing will have to be varied according to the sort of country being searched.

It is worth bearing in mind that binoculars give a rather compressed impression of the range between distant landmarks. 7 x 50's are a good compromise;

the largish aperture is specially useful during the poor light conditions of late fly-offs, and a higher magnification is difficult to hold steady in a strong wind.

Artificial aids to finding the lost model could do with a little investigation; one quite serious possibility is stilts. These needn't be a vast height and would be ideal in tall grass or possibly even corn, as the flattening effect would be negligible compared with size 11 boots; only a short increase in height would provide a much larger area of visibility.

Another scheme is the use of mirrors; some sort of periscope using a lazy-tongs system would probably be feasible. Rather simpler is a straightforward mirror on a pole; aluminised polyester film (Mylar or Melinex) stretched on a frame would be light and manoeuvrable, and could be made collapsible for convenience, while bamboo poles plugging into fibreglass joiners would provide the necessary height. A variation of this that has been used is a polished car hub-cap mounted on a pole; this makes a quite efficient wide-angle mirror, and can be looked at through binoculars to give a magnified view of the surrounding country.

That just about exhausts the ideas on the location problem, except to stress the importance of good public relations. This means first and foremost avoiding all crop damage; even if you can't see anybody who looks remotely like a farmer, *don't* walk straight through the middle of fields of anything at all like crops, let alone corn. *Do* make a special point of keeping to the edges, and with root crops walk between the rows if you must cross the field. But make it quite obvious that you're not just going in a straight line across anything that is in the way; if you do suddenly meet the owner of the land he'll be much more likely to help someone who appears to respect his crops and hedges. It is applied psychology really.

Next month we'll discuss how to recover the model once it has been located, and there will also be a review of some marching compasses.

Recommended Reading

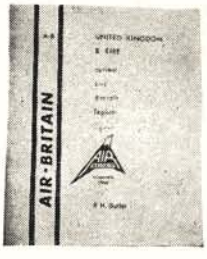
THE aviation presses seem to be in full song with constant flow of absorbing literature to catch the tide of enthusiasm which is on the upswing. Starting with the least expensive and closest to our own hobby interests, **Performance Kits** have produced a 44 page stiff cover 5½ x 8½ in. booklet **"Flying Model Aircraft"** by O. F. W. Fisher retailing at 2/6d. Chapters on simple aerodynamics, sailplanes, rubber and power driven types, control-liners and radio control serve as a good introduction to the hobby plentifully illustrated naturally enough with the kits and accessories distributed by Performance Kits. The last seven pages form a catalogue of products. For 4/- **Foyle's** have produced a really first class 92 page 4½ x 7 in. **"Aeromodelling"** introduction by Vic Smeed which goes much further than the usual standards by including general arrangements for various gliders, rubber driven, free flight, power and control-line models to be made with the aid of dimensioned sketches. Vic's admirable style has the quality of putting over a complicated story in the simplest manner and we have no hesitation in advising all newcomers to purchase this inexpensive introduction.

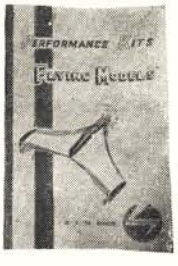
The four faces of "Profiles".

We have mentioned the 2/- **Profile Publications** before in this series and at the risk of repetition once more draw readers' attention to the regular 4 types-a-month which are achieving increasing popularity. Modellers will find the lack of constant scale and cross sections a severe handicap but this is small complaint against a first class publication produced to an excellent standard in colour and quite obviously the result of long labours in research and artistry.

For half-a-crown a new publication from the **Science Museum "The World's First Aeroplane Flights (1903-1908)"** by C. H. Gibbs-Smith published by Her Majesty's Stationery Office measures 5½ x 8½ in. provides 32 pages of informative fact on that little appreciated period of aviation. Many fine photographs are included and a series of tables catalogue all the powered take offs and flights from December 17th, 1903 throughout the ensuing 12 months.

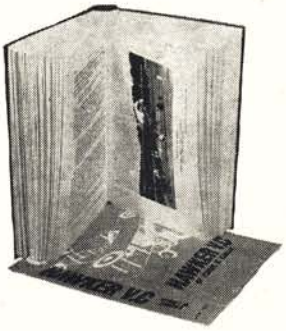
Aviation enthusiasts do not have to be reminded of the **"Air Britain"** organization. Members have just been advised of the latest publication which is P. H. Butler's **"Register of Civil Aircraft in the United Kingdom and Eire".** Measuring 6½ x 8 in. the 68 page book covers every aeroplane flying in the British Isles from G-EBLV, the preserved DH 60 Moth to the very latest Beagle production aircraft G-ATCD. The aircraft are named, with construction number, owner, usual base and previous registration details. In addition there is a complete listing of civil airfields with geographical locations and all for 4/- to A-B members or 7/- to non-members. **Messrs. Putnam & Co. Ltd.** have specialised in aeronautical technical references and their list of titles continues to expand with commendable additions. Two have been released this month. First, was A. J. Jackson's **"Avro Aircraft since 1908".** This is a truly massive tome bringing 470 5½ x 8½ in. pages positively filled with technical facts, magnificent photographs and scale drawings and laid out in the most readable manner. The section on the Avro 504 alone covers what must have been several decades of research, and the very happy choice of illustrations gives a variety of markings sufficient to inspire any scale model maker. Among the various gems to be found are an Anson on floats in the South African Air Force, the Irish Army Corps type 636, the Parasol 661 with Zap flaps and park bench ailerons, the converted Hawker Audax with Panther radial engine, the "Venetian blind" wing Baby, the more modern Avro-Canada disc shape "Avrocar", and the rocket interceptor type 720. Most definitely highly recommended and worth 3 guineas. Peter Lewis' **"The British Fighter since 1912"** is also 63/- and covers 400 pages of the same size. This is not produced as a type by type review but more as a story of progress interspersed with drawings and many rare photographs to illustrate the progress of fighter design from its original inception. With few exceptions (including the remarkable Bristol 52 Bull-





finch) the age of the biplane absorbs rightly enough more than half of the book, and this appears to cut short the space available for more detail on the latest types, including discarded projects. Mr. Lewis has plenty to say of the political whims which have served to cripple fighter development in post-war years and reminds us of the cancellation of the Miles M.52 supersonic project which would have given us such an enormous lead in flight research. The unhappy story of less successful prototypes and flight limitations is emphasised by the author's access to official reports which are quoted extensively and make interesting if unhappy reading for those who endeavour to remain true blue in spite of political philanderings.

From the **Mitre Press,** a biography of **"Hawker VC"** with 253 5½ x 8½ in. pages for 35/-, promises to become a collector's item for those who specialise in World War I. Lanoe Hawker (not to be confused with Harry Hawker after whom the Company was named) was the first fighter pilot to be awarded the Victoria Cross, served with the First Fighter Squadron, No. 24 and used the famous deHavilland 2 pusher fighter to tremendous effect. Written by his brother who is able to convey a most personal story, the book includes a large number of Hawker's diary notes and official reports of reconnaissance flights, etc. Photographs take one into the atmosphere of the early air war period and the descriptions and illustrations of Bertangles aerodrome provide one with a detail that is authentic beyond question and quite a contrast to the fictional works.



AIRCRAFT DESCRIBED No. 142

MESSERSCHMITT Bf 109E

Drawn by J. D. CARRICK
Described by C. W. CAIN

CREATING A CLASSIC FIGHTER—Even if there had not been a German Air Ministry specification issued in 1934 (a year after Hitler came to power) it is highly probable that Professor Dipl.Ing. Willy Messerschmitt would have gone ahead and evolved the classic Bf 109. But the Germans knew that Britain was designing the Hurricane and the Spitfire . . . and round the world designers were in trend towards the monoplane single-seater with retractable undercarriage and seeking speeds a 100 m.p.h. faster than the contemporary biplane interceptors.

Willy Messerschmitt set out to create the smallest practical airframe round the most powerful aero-engines which were then in the development stage. He settled for a slim fuselage, tiny cockpit and compact, blunt wings of minimal area. The tail too, was diminutive and the tailplane was strut-braced and adjustable for take-off and landing. To further assist low-speed handling he incorporated Lachmann leading-edge wing slats and fully-slotted flaps and drooping ailerons. The powerplant, unusually, was given upthrust (see g.a. drawings). The fully retracting main undercarriage was long, to assist take-off—but meant landings had to be more tail down than most pilots of the time would have preferred. As with the Hurricane and Spitfire, the Bf 109 underwent progressive development, exchanging fixed-pitch wooden propeller for early 2-blade variable pitch (U.S. Hamilton licence-built) and ultimately 3-blade v.p. VDM propellers. Armament was too light to begin with and was increased to approximate to that of its chief adversaries, especially after the Bf 109 was "blooded" in Spain during the Civil War (1937-39) and groomed for the big battles to come.

From the first prototype of 1935 to the last of the infinite variety of Bf 109s, the German war industry turned out the fantastic quantity of some 33,000 of these tough little warplanes. They served on every front and with Germany's European allies. But it is the Battle of Britain one-o-nine, the Bf 109E for "Emil" which is perhaps best remembered. Although the Hurricane was more manoeuvrable in turns, the Bf 109E could outclimb and outdive. So while the Hurricanes sought to down the He 111s, the Do 17s, the Ju 87s and Ju 88s they had to be protected from the "Emils" by the faster Spitfires. Yet it is proof both of the bravery of the opposing pilots and the magic of the Bf 109 that quite recently, 25 years after, veterans of the Battle of Britain can still speak in high praise of the product of Willy Messerschmitt. Had the Bf 109 been capable of greater duration who knows how the Battle of Britain might have been altered? As it was, to protect the Luftwaffe day bombing raids with adequate "cover" the "Emils" could not stay to "mix it" for fear of running out of fuel before reaching the safety of advance bases in Northern France. Perhaps, far above the skies of Kent, there still echoes the urgent warnings of "Bandits! Angels-one-five" and "Achtung! Spitfeuer" and the battle cries of "Tallyho!" and their counterpart "Horrido!"

Above right, factory photograph with "Swastika" deleted shows a preserved 109E AJ-YH with splinter camouflage and dappled sides. note early hood. Above, Bf 109V14 (D-1RTT), first prototype of the E series with DB601A engine, two fuselage guns and two wing cannons, first flown in summer 1938. Note unusual colour line under centre. (Messerschmitt A.G. photo.)

From V for Versuchs to E for "Emil"—Ironically, the very first Bf 109, the V1 (Versuchs—experimental) was powered by a British aero-engine, a 695 h.p. Rolls-Royce Kestrel V liquid-cooled 12-cyl. Vee. The Bf 109V1 was first flown in September 1935 and won the German Air Ministry competition in the following month at Travemünde. Its rivals were two Kestrel-powered prototypes, the He 112V of Ernst Heinkel, the Arado Ar 80V, and the Kurt Tank designed Fw 159 which was powered by the still experimental Junkers Jumo 210A-0 of 610 h.p. The He 112 was put into limited production and fought in the Spanish Civil War.

Messerschmitt lost no time in forcing the Bf 109 into large-scale production and in the remarkably short time which elapsed got the fighter into squadron service with JG.2 "Richthofen" Gruppe early 1937. Almost immediately Bf 109Bs with Jumo 210A engines joined the Condor Legion (Staffeln 1 & 2 of J/88). These were joined by Bf 109Cs in 1938 to replace the He 51 biplanes of 3 Staffel of J/88. When the war ended in March '38 the Luftwaffe pilots returned, leaving various equipment. (See later *"Deutsche Museum Bf 109E"*).

Just prior to the outbreak of World War 2 the

(Continued overleaf)

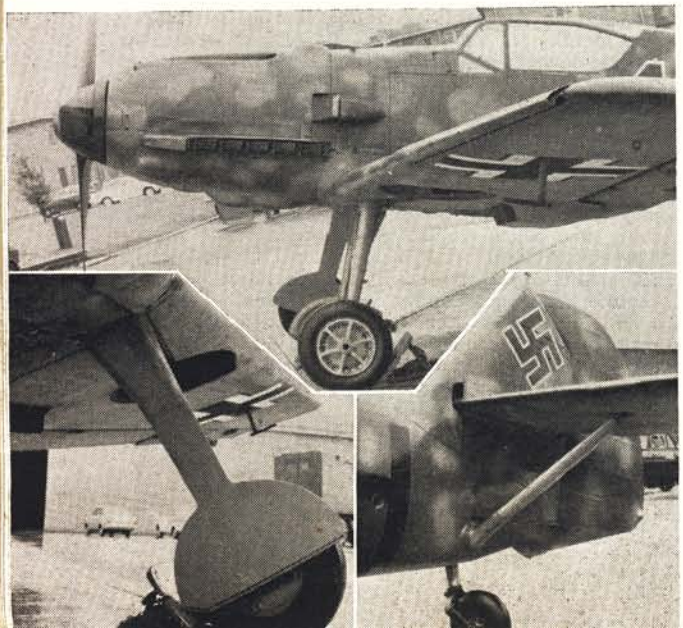
Below, one of many intriguing photos from Karl Ries' series of books shows Major Hannes Trautloft, Commander of JG 54 being strapped into his Bf 109. Note the insignia carrying the 3 Gruppe badges of JG 54 and the later type hood. Left, and bottom left, details of the preserved Bf 109E, the subject of our measurements for Doug. Carrick's drawing on following pages. Preserved at R.A.F. Biggin Hill, it has a much later type canopy and car tyres, but is otherwise reasonably wholesome and truly representative. Slat has been opened purposely in this photo to indicate its position. Armament has been removed.

(*Continued from page* 267)

Luftwaffe had in service some 235 Bf 109Ds and 850 Bf 109Es. After the Polish campaign the Luftwaffe found that just under one-fifth of its battle force had been destroyed or seriously damaged and the need was for replenishment and further build-up. The resultant "Sitzkrieg" or "Phony War" was most welcome. Then on April 9th "Operation Weser" involved an initial 30 "Emils" out of a strike force of 500 bombers and other warplanes and some 500 troop and airborne carriers. First Norway, then Denmark . . . then Holland, Belgium, France and the epic of Dunkirk. In France and the Low Countries the RAF met the Bf 109E in strength. But the Hurricanes were thinly spread and the Spitfires were retained in the U.K. There was a brief respite.

In July 1940 the Emils were seen over south-east England for the first time. The Battle of Britain was about to commence. Unfortunately it would require more space than is available to do complete justice to the Bf 109E either as in-fighting arm of the Luftwaffe or its part in the Battle of Britain. Suffice to say that it also served in the Russian campaigns.

Deutsche Museum "Emil"—Although the personal biography of the "Emil" really started in mid-1938 when the Bf 109V14 (D-IRTT) was first flown, the first pre-production Bf 109E-0s (1,100 h.p. Daimler Benz DB 601A-1) were coming off the assembly line at Augsburg only a few months later and still in '38. Although it is not generally known, Bf 109E-1s were battle tested in the Spanish Civil War because one (WNr.790) must surely be in line for "the longest serving 109" in that it was still flying with the Spanish Air Force as late as 1954. In 1960 this (redesignated SpAF C-4E (serial 6-106) was refurbished by Hispano-Aviacion, Seville and acquired by the Deutsche



Museum, Munich, where it can be seen today. Unfortunately it has been repainted in rather dubious markings of Jagdgeschwader (Wing) JG.26 'Schlageter'. (Schlageter was the name of the first commander of JG.26, ca 1937) and the shiny crosses give it a plastics model look. Pity!

The "Hell-hound" Bf 109*E*-4—Doug Carrick's fine general arrangement drawing pleased the writer because it is recorded in a wartime scrapbook by way of an excellent photograph of the same "pancaked" fighter which appeared in the London "Daily Telegraph" for September 3, 1940. It bears the "S" for "Schlageter" and the red "Hell-hound" (fiend says the dictionary!) but a soldier hides the individual number '10'. The pilot was believed to have been Oberleutnant Eckhardt Roch of 9 Staffel/III Gruppe/JG.26. This "Emil" was later put on public display but its ultimate fate is unknown.

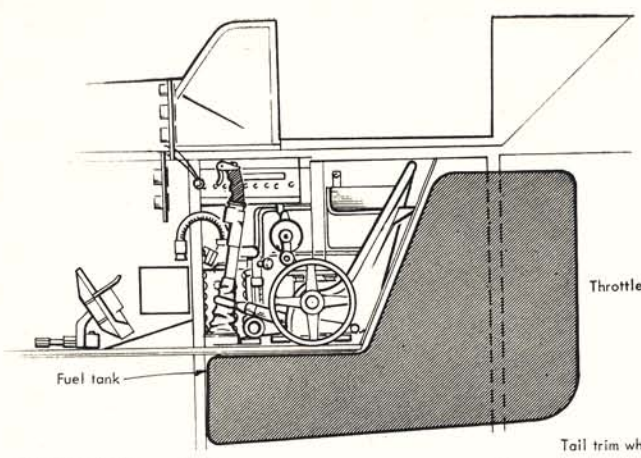
The Biggin Hill Bf 109*E*-4—The RAF Historical Branch maintains a redecorated Bf 109E-4 at Biggin Hill. Apart from the dubious markings "12 + GH" and an indifferent paint scheme, this Bf 109E-4 lacks an authentic canopy (see g.a. for the accurate details) which probably stems from a late production (1944) Bf 109 of the K-series which had a revised "Galland hood" to assist the K-series' pressure cabin. For a time it was at C.F.E. Duxford as RAF serial DG200 and is not to be confused with AE 479 captured by the French in 1940 and shipped to the U.S. in 1942.

Data—(*Messerschmitt Bf* 109*E*-4)—*Span*, 32 ft. 5¾ in.; Length, 28 ft. 8 in.; Height (to prop tip) 12 ft. ½ in.

There are several excellent sources of detailed information which should be examined to get the full flavour of this classic fighter. These include : "Famous Fighters of the Second World War" by William Green (Macdonald). "The Messerschmitt 109*" by Heinz Nowarra (Harleyford). The Official History of the R.A.F. and the series of markings and pictorial books by Karl Ries (Verlag Dieter Hoffman, Germany).*

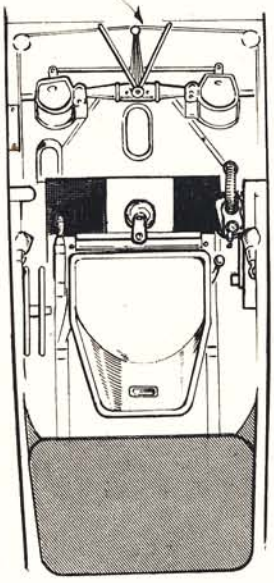
Acknowledgements

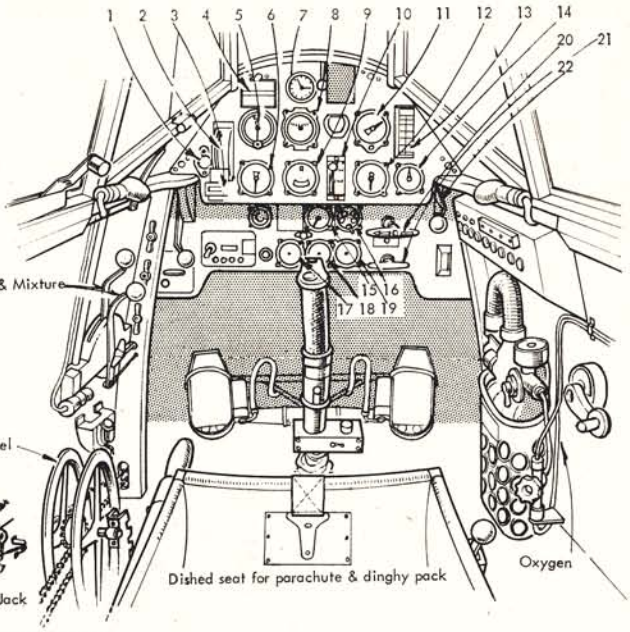
This feature could not have been produced without the fine co-operation of Messrs. Pavel Vancura, Ken McDonough, Roy Cross, Karl Ries, German records library Ministry of Aviation, and the Officer i.c. Historical Branch Aircraft, R.A.F, Biggin Hill, to whom we are indebted.

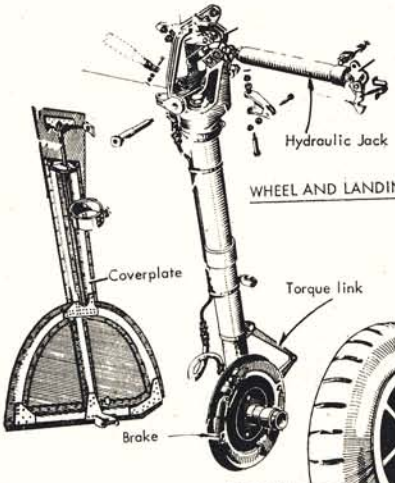


COCKPIT VIEWS SIDE

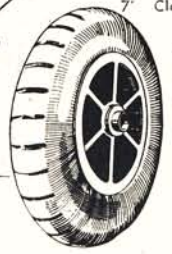
PLAN



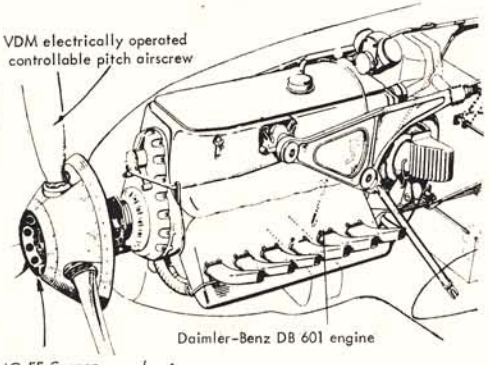


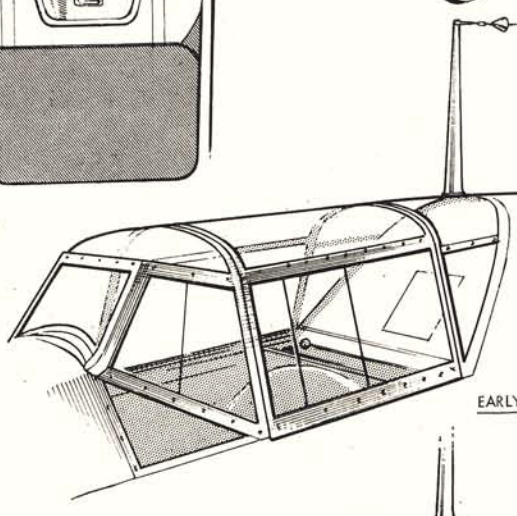


WHEEL AND LANDING GEAR

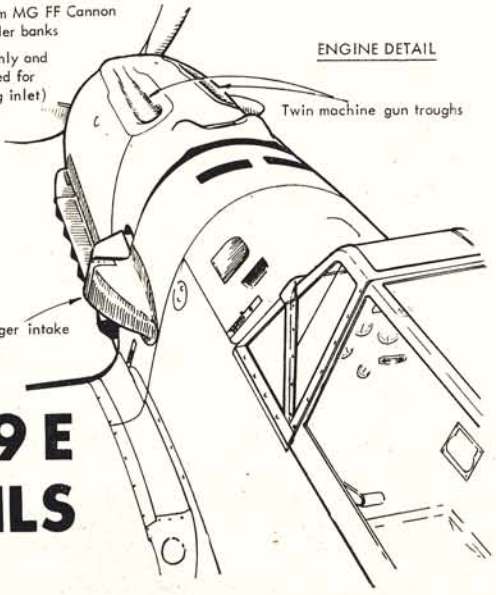


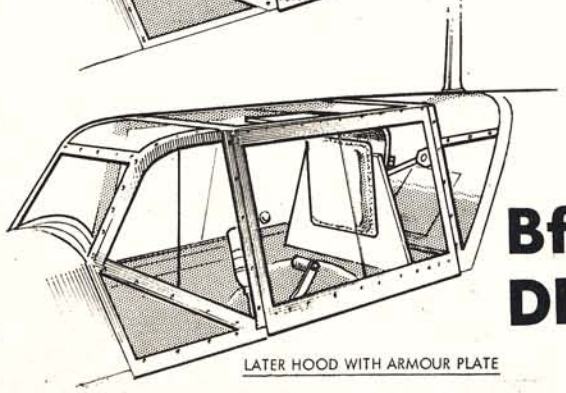
1	Cut off switch	8	Compass	15	Oil Pressure
2	Gun selector	9	Turn & Bank	16	U/C Indicator
3	Heater control	10	Propeller pitch selector	17	Fuel
4	Data Card	11	Boost guage	18	Oil Temp.
5	Altimeter	12	R.P.M.	19	Rad. Temp.
6	Air speed	13	Deviation table	20 & 21	U/C Selectors
7	Clock	14	Rate of Climb	22	Hand pump





EARLY HOOD





LATER HOOD WITH ARMOUR PLATE

Bf 109 E DETAILS

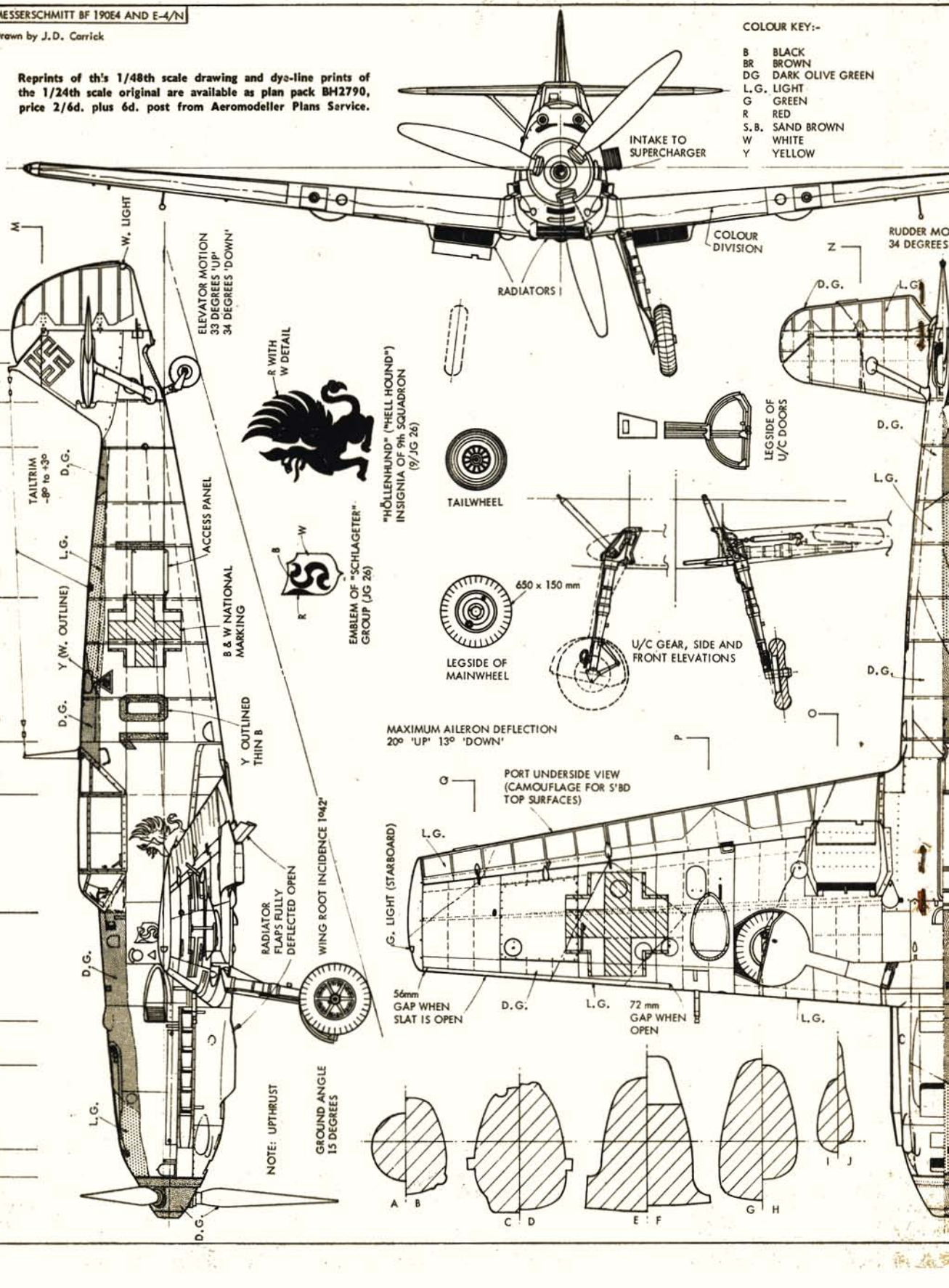
MESSERSCHMITT BF 190E4 AND E-4/N

Drawn by J.D. Carrick

Reprints of th's 1/48th scale drawing and dya-line prints of the 1/24th scale original are available as plan pack BH2790, price 2/6d. plus 6d. post from Aeromodeller Plans Service.

COLOUR KEY:-

B	BLACK
BR	BROWN
DG	DARK OLIVE GREEN
L.G.	LIGHT
G	GREEN
R	RED
S.B.	SAND BROWN
W	WHITE
Y	YELLOW



UPPER AND LOWER INSTRUMENT PANELS
REAR VIEW
RUDDER MOTION 34 DEGREES EACH WAY
L.G.
D.G.
FIXED TRIM TAB
CANOPY HINGED TO STARBOARD
8mm ARMOUR PLATE
PADDED HEADREST
ACCESS TO FUEL FILLER CAP
SPINNER WITH FRONT SECTION REMOVED
STAGGERED 7.92 mm RHEIN METALL MG 17s (STAGGERED LAYOUT COMMON TO ALL 109Es)
TROPICAL FILTER WITH SAND MESH AND FRONT COWL HOOD
ALTERNATIVE SPINNER
STARTER CRANK APERTURE
SUNBLIND INSIDE
ABOVE AND SCRAP VIEWS DEPICT BF E-4/N OF I/JG 27 AS EMPLOYED IN NORTH AFRICA
INSIGNIA OF I./JG 27
Y (B. DETAILS)
MAXIMUM FLAP DEFLECTION 42 DEGREES
FLAP
AILERON
FIXED TRIM TAB
R. LIGHT
SLAT
12 mm GAP WHEN OPEN
18mm GAP WHEN OPEN
20mm MG FF CANNON
INTERNAL RIFLE STOWAGE (TROPICAL VERSION)
W. BAND
RIFLE STOWAGE IN DESERT VERSION (PLAN)
M
N
O
P
Q
K
L
ALL CONTROL SURFACES ARE FABRIC COVERED
FT

Left, fine model of Bristol 123 Fighter among hundreds on display. Above, all yellow Firefly from Svensk Flygtjanst who used it for target towing. It is very well kept and will be repainted.

AEROMODELLER VISITS AN AIR MUSEUM

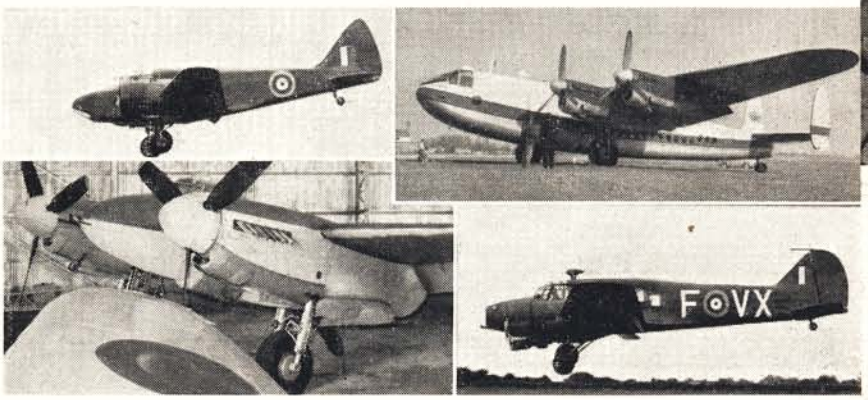
Part 2. "SKYFAME"

FACED with the realisation that unless *someone* was prepared to arrest the devastating loss of historical airframes, Peter M. Thomas conducted virtually a single handed crusade which resulted in creation of *"Skyfame"*.

Otherwise known as the Desmond Commonwealth Flying Memorial, in commemoration of Mr. Thomas' elder brother who lost his life flying a Wellington from Malta in July, 1941, the museum is devoted to the collection of aircraft of the World War 2 period and the maintenance of most exhibits in flying condition. Additionally a display of plastic and carved wood scale models, specially commisioned paintings, photographs, and unorthodox types such as the "Flying Flea" and C.30 Autogiro are on view within the hangar and side buildings. Any visitor to the museum will immediately be impressed by the welcome given by Peter Thomas and his wife Gwladys. They have given all of their capital and moved home from Cardigan in Wales in order to be close to what is now quite obviously their completely absorbing interest. The museum was initiated by the campaign to preserve a Short Sunderland flying boat. After a couple of offers had been made, each of which involved heavy expenditure, the French Admiralty generously presented one of their retired aircraft which is now on permanent view from Whitsun to September inclusive at Pembroke Dock, South Wales, repainted in its original R.A.F. Squadron Markings. From this small (?) beginning came a crusade for preservation of R.A.F. machines otherwise destined for salvage of metal or destruction by fire. Arrangements were made to purchase a Mosquito TA 719 which later took part in the film "633 Squadron".

The Mosquito has subsequently been joined by another and by exploring every possible source, a fascinating collection of types is now gathered at Staverton Airport. The aircraft come from a wide variety of sources and each is destined to be repainted in an accurate and commemorative original colour scheme. One facility offered at "Skyfame" which is unusual among museums is that of being able to walk all round and underneath the machines and in some cases to inspect the cockpits by means of stepladders.

Acquisition of the exhibits is a complete story unto itself, involving constant watchfulness on the aircraft industry, the armed forces and various overseas contractors. Sometimes it is necessary to make immediate offers for machines and Mr. Thomas established the organization to enable prompt purchase.



Fascinating quartet. Airspeed Oxford (ex-Boulton Paul Ltd.), Avro York (ex-Skyways), DeHavilland Mosquito (ex-Royal Air Force) and Avro Anson (ex-Derby Aviation and London School of Flying). Flying views by R. W. Cranham.

Needless to relate, the maintenance of such expensive machinery in flying order is far beyond the means of general income from the museum and so a *Skyfame Supporters Society* has been created with a membership fee of one guinea per annum, offering free access to the museum and free entrance to all the flying displays and general demonstrations. The Society also provides aircrews and maintenance volunteers.

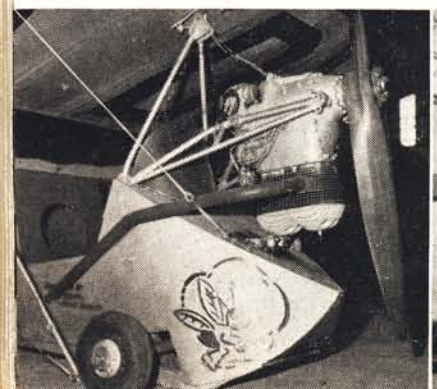
Situated adjacent to the main A40 route between Gloucester and Cheltenham it seems almost a tragedy that local authorities prohibit much in the way of direction signs to draw the attention of the general public to this most worthy effort. Aeromodellers will thoroughly enjoy this collection.

Aircraft on View during our visit were the DH Mosquito TT35, (or B16) G-ASKA Coded HT-D serial RS709, Mosquito PR34 G-ASKC Coded SY-G TA 719 damaged by accident, Avro Anson MK1 GAMDA Coded VX-F serial N4877, Airspeed Oxford Mk. 11 G-ANTW Coded V3388, Avro York MK1 G-AGNV to be painted as 'Ascalon' (Churchill's transport) LV633, Fairey Firefly MK1 G-ASTL to be repainted as Z2032 Flying Flea G-ADXS and Avro built Cierva C30 G-ACVV. Other aircraft promised or anticipated are a Beaufighter in Portugal, Blenheim in Libya, Walrus in Australia and a Sea Fury, there's also a remote possibility of a Halifax.

Address: Skyfame Ltd., Aircraft Museum, Staverton Airport, Cheltenham, Gloucester.

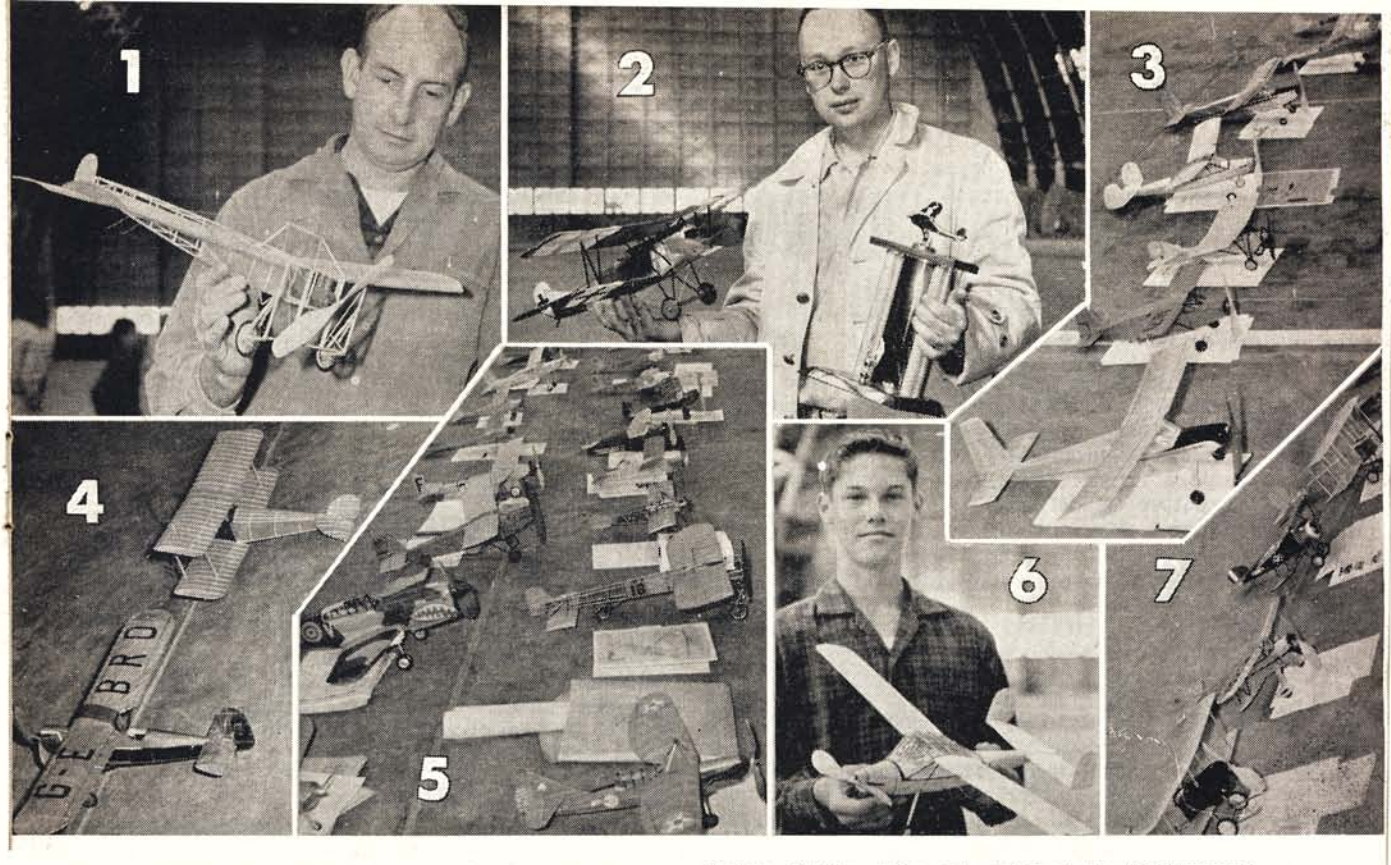
Situation: Hangar by entrance of Staverton Airport, off Bamfurlong Lane which joins the A40 midway between Cheltenham and Gloucester at "The Plough" (Bus stop).

Open: Wednesday-Sunday (inc.) 2 p.m.-6 p.m. *Charges*: Adults 3/-, Children 1/6. Party trips welcome by arrangement.



Below, two out-of-the-ordinary exhibits are Christopher Story's Flying Flea with Scott engine and Guy Baker's C.30 Autogyro which are on loan from the owners for exhibition in the museum.

The Editor is engaged upon compilation of a Directory of preserved aircraft on public exhibit throughout the World and would appreciate news from all quarters of museum and other exhibits. Even what may be most obvious to locals in Timbuktoo will be news to others. Is there an 'oldie' in your town?



FLYING SCALE INDOORS

or — how to avoid modelling's number one hazard by shutting out the wind and the weather!

PHOTOGRAPHS BY DALE WILLOUGHBY

Variety of indoor flying scale models at the "Flightmasters" meeting is evident in photographs above. (1) Harold Osborne took first place in open class monoplane event with this 1909 Cessna Monoplane totalling 154.3 pts. Wings have highly arched section as on original. (2) Tom Stark won the Open biplane class event flying a Cleveland Fokker D-VII kit model collecting a handsome trophy in the process. Junior class monoplanes in (3) show selection of designs, note scale documents ready for the judges' appraisal, line up includes Helio Couriers, Wittman, Buttercup, Heath Parasol, Max Holste MH 152. (4) Widgeon and a Sopwith Tabloid by Kingsley Kau. Latter was covered with .0005 in. condenser paper, and is obviously beautifully constructed. (5) Open class monoplanes come in all shapes and sizes ranging from a P-40 Kittyhawk, Curtiss Robin, Douglas 0.46, Bleriot, Antoinette, Bristol Brownie, Ercoupe to the Pilatus Porter. (6) Junior monoplane winner at one event was an A.P.S. Max Holste made and flown by Dave Maystead. (7) Few of the open class models lined up with scale documents. Tabloid, Waco, Sopwith Camel and B.E.2.

ALTHOUGH INDOOR CONTEST FLYING seems to have lost a lot of its followers in many countries there are growing signs of a revival of the scale branch at club room level in many places. *N.A.A. Flightmasters*, a Californian club centred upon the North American Aircraft Co. and whose sole interest is flying scale, whether it be R/C, F/F or C/L, have organised indoor meetings in a Naval Airship Hangar with a 140 ft. ceiling.

At one event with an outside air temperature of 55 deg. and one of the huge hangar doors jammed about 4 ft. open, there was plenty of unstable air for the unwary. Ideal conditions were created when the sun warmed the hangar roof raising the inside air temperature so that when some small doors were opened artificial thermals were created. Air conditions were observed by watching the drift of the microfilm models some being as much as 500 ft. from launching point though still of course within the hangar. Rules were kept to a minimum with only the wingspan restricted to 30 in. and propeller area unlimited.

The Guillow range of kits have been found to be an ideal basis for this type of contest and the N.A.A. Flightmasters think the popularity of these scale rubber kits in the U.S. helped to swell their contest entries. At the mid-1964 contest 53 official entries competed for numerous trophies. Kingsley Kau's *Westland Widgeon* and *Sopwith Tabloid* won the open class for combined mono and biplane, while Mike Shakocius won junior with his *Max Holste MH* 152 (from Aeromodeller plan *"Threesome"* price 2/6d.) and a *Nieuport* 28. Harold Osborne's 1909 *Cessna* and Harold Warner's 1911 *Bleriot* (which beat the 'minute' with a 66 sec. flight) prove that the oldies are very suitable. They took first two places in 'Mono' while a *Wright Model "L"* won Biplane for Fred Weitzel.

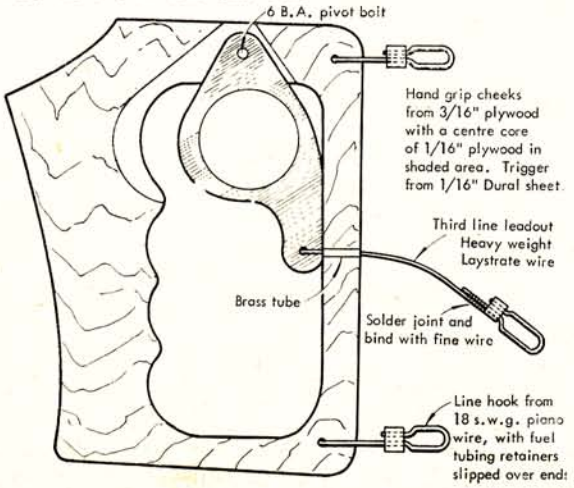
The *Tabloid*, a 1909 *Bleriot* and the *MH* 152 again led a December meeting. Flight time in seconds is added to scale points, the two being fairly equally balanced. Despite a large amount of scale research by some entrants the practical men who have a good balance between performance and scale fidelity always come out on top.

THIRD LINE CONTROL

By D. Chinery

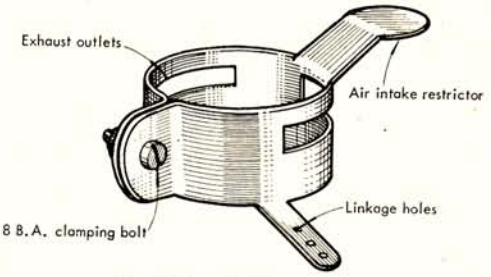
MOST modellers will have seen or read about control line scale and stunt models that have extra controls such as motor speed, flaps, or rudder actuated by means of a third control line. The author's interests have been confined mainly to small stunt models and it did not seem advisable to have a separate third line that had to be pulled during a manoeuvre to obtain engine speed control. Keeping cost and the use of tools to a minimum the system detailed here was devised and has since proved very satisfactory in use. The bellcrank unit is designed to allow equal tension in each control line at all times and so makes for greater safety than when having one line taking more of the load than the others.

For best results when using a control handle with a trigger operated third line, the bellcrank control unit must be capable of equalising the tension in each of the three lines. This is taken care of by mounting the main elevator control bellcrank onto the smaller throttle control crank, which is in turn mounted to the model. Cut the elevator bellcrank from $\frac{1}{16}$ in. dural and drill the holes as shown in drawing. A commercial unit may be used but be sure to modify the holes to the correct centres as these are the best size for the handle shown. For non stunt models the $\frac{5}{8}$ in. dimension control can be reduced to $\frac{1}{2}$ in. but take care that the two pushrods do not foul. Cut the throttle control bellcrank from 1/10 in. dural as this has to withstand the twisting force created by the main elevator bellcrank being mounted off centre. For the main bearing and fixing bolt assembly cut a $\frac{5}{8}$ in. length of $\frac{5}{16}$ in. Whitworth bolt and drill a $\frac{1}{8}$ in. dia. hole through its centre. Saw a $\frac{5}{16}$ in. nut in half and use this as the means of fixing the bearing onto the plywood mounting plate in the model. 6 B.A. steel bolts are used as pivot pins for both the bellcranks, and in the case of the main bearing, pass through the $\frac{1}{8}$ in. dia. hole in the $\frac{5}{16}$ in. dia. bolt.

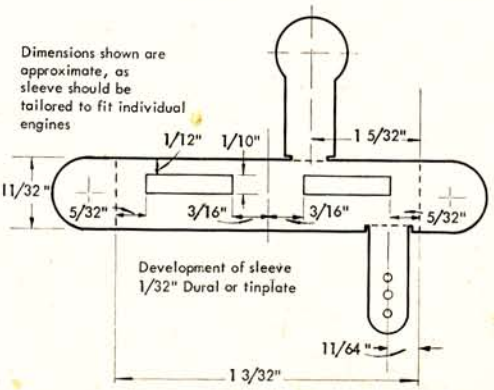


Start the handle construction by cutting out the $\frac{1}{16}$ in. plywood core. Cut this to shape until it is a comfortable fit in your hand and then cut the area away at the top for the trigger movement. Cut the two outer sides from $\frac{3}{16}$ in. plywood, rounding off all corners, etc. Glue the layers of plywood together with the $\frac{1}{16}$ in. plywood in the centre. Make the trigger from $\frac{1}{16}$ in. dural and drill pivot and leadout holes. Drill $\frac{1}{8}$ in. dia. hole in top of handle for trigger pivot and leadout hole in front and bolt trigger into place, checking for a free fit. A length of heavy Laystrate is secured through the trigger hole with a soldered cup washer, the other end passing through the lead out hole in the front and a line connector soldered on. Bend the two 18 s.w.g. line connectors to shape and fit to handle, making sure that the length of the Laystrate centre line is sufficient for the trigger to be fully depressed.

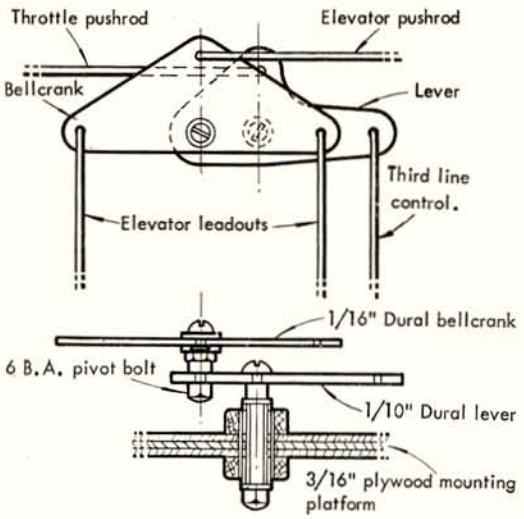
Anyone who has a Merco, O.S., or Cox Medallion can link the pushrod to the throttle provided and they are ready to operate. For those who have a Cox Tee Dee, or Medallion and want a lightweight cheap device such as the author required, one can easily be cut from dural or tin sheet. Its action is very simple and as can be seen from the dimensioned layout and completed view is not hard to make. As the pushrod moves the linkage arm forward the sleeve rotates around the cylinder liner and the exhaust slots turn away from the exhaust port partially blanking them off. After about 30 deg. rotation the choke finger begins to close off the air intake at the same time as restricting the exhaust so obtaining a slow engine speed. The sleeve is cut from .040 in. dural or tin plate using the measurements given as *a guide only* for the Medallion .09. The end of the choke finger should be left oversize and its shape adjusted with the engine running to give a pro-



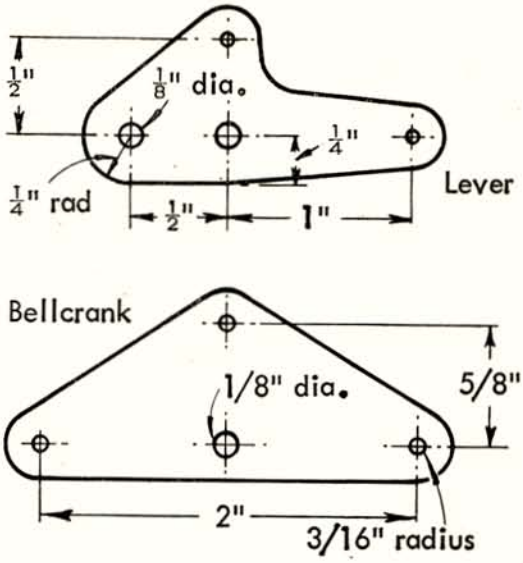
Throttle sleeve for Cox Medallion .049 engine



Bellcrank Control Unit installed in fuselage as described in text



Bellcrank and lever full size.



gressive action. Make the sleeve a tight fit over the liner to start with and then add paper shims between the bolting flanges to allow it to rotate easily whilst still a tight fit over the cylinder liner and exhaust ports.

When the system is assembled in the model, bend the pushrods to allow a "V" kink for field adjustments in their lengths. The control unit top bellcrank will move approx. ¼ in. sideways in each direction as the third line is operated, so this must be allowed for in the construction of the model. All the control lines must be cut and bound to their exact length, so it helps to have an adjustable link such as a bottle screw as used on model yachts, fixed into one of the leadout lines. No end of gadgets can be operated by this third line and to name but a few, retracting undercarriage, wing flaps, motor speed control coupled with an offset rudder and arrestor hook on the low setting, bomb dropping, etc.

GADGETS

HINTS AND TIPS TO AID YOUR MODELLING

MOST POWER MODELLERS will at some time or another have been caught out with a **blocked up fuel filter** that has collected too much dirt for its own good. Ian Watkins of Shrewsbury found a bicycle pump was the ideal thing for blowing it clean if the dirt was too solid to be moved by blowing with the mouth. If this does not work, soak the filter in paraffin for a while and try again. Of course one must not forget which end is "in" and "out", as small particles that have been left behind will soon find their way to the motor if the filter is installed the wrong way around.

Free flight modellers who drill holes in their fuselages to fit an alloy tube for a **D/T snuffer** will be interested to hear the suggestion by D. J. Adams from Wellington, New Zealand. He uses the electrical isolation rings that can be purchased in most electrical shops and are used on electric fires, etc. They are made from porcelain and are cone shaped with a centre hole that is a tight fit over the D/T fuse and snuffs the fuse out admirably. Being porous they glue on to the model easily and can be attached to a flat sheet side without any cutting about.

Joe Savini from Liverpool gives the following tips for the use of Titanine **fuel proofer,** to ensure that it is absolutely proof against glow plug fuel and easy to apply. Use about one and a half phials of hardener to each jar of proofer and never mix up more than half a jar at a time, adjusting the hardener accordingly of course. Whilst applying the proofer, keep the bottle in a bowl of hot water as the heat stops the proofer setting too quickly. The best surface over which to apply this proofer is Humbrol Enamel "cut down" with dope thinners says Joe.

Many modellers must have had to think hard and quickly when they have done a job with **Araldite** and they have an excess mix left over that really should not be wasted. M. Thomas of Bolton uses his to make free modelling pins by simply pushing the pin head into the Araldite and giving the pin a twirl, setting it aside to dry. The head is hard and globular.

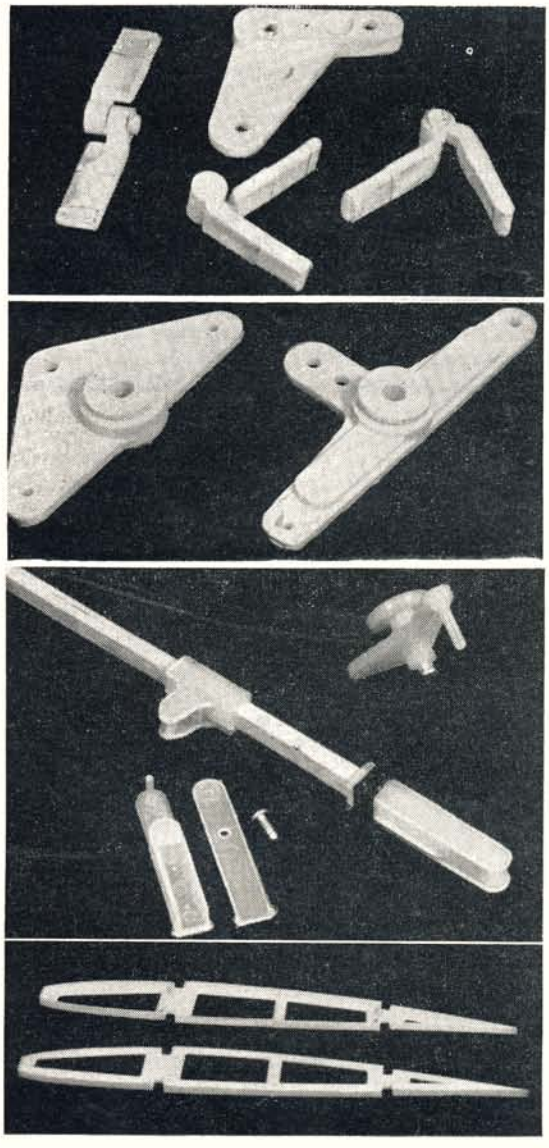
Many methods of **curing warps** in wing structures have been suggested in the past but not many modellers will be aware of the hot water bottle (yes, bed type) system. Michael Hollebon of Goole was very wary of putting the wings of his "A.P.S. Pal Joey" R/C model near an electric fire so he filled a hot water bottle with boiling water and placed it on the wings. When the wing was warm, gentle pressure was applied to the warped area and the hot water bottle removed. After the wing had cooled down the warp did not return and Pal Joey returned to the happy stage of being flyable once more.

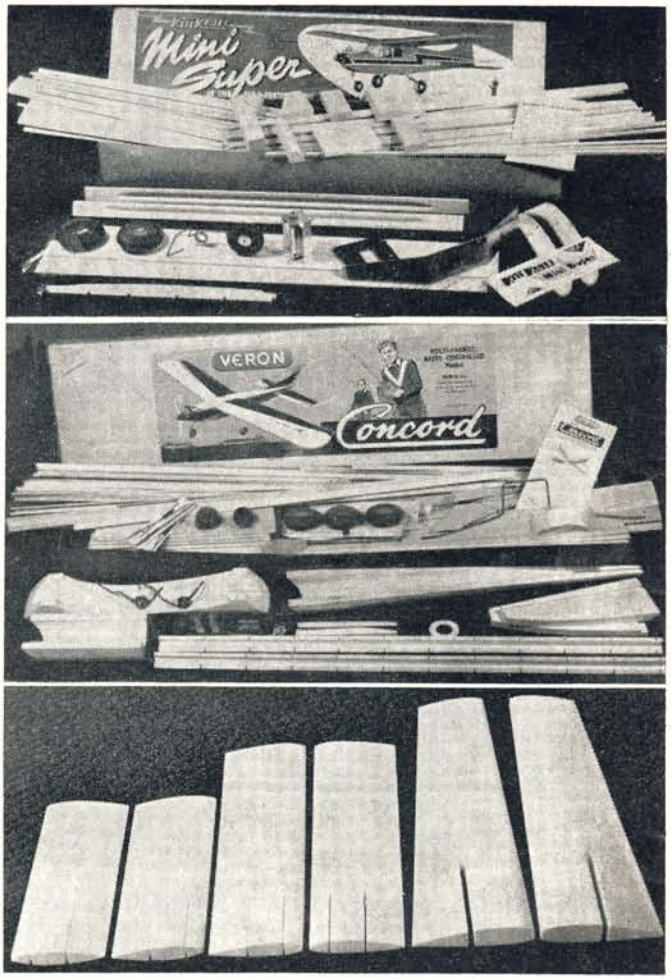
Running in **pressure feed type motors** usually needs a special tank and lots of good air tight plumbing. Pete Muller from London finds that by restricting the air intake with a piece of bandage held over the opening by an elastic band the engine will run quite happily at reduced r.p.m. on suction feed. This has worked on both K & B and O.S. engines and the power loss is acceptable since full power is not needed at this stage.

Trade Notes

MODELLING IS BECOMING more and more affected by plastics and this month's collection of review items emphasises the way in which plastic components come into many classes of aeromodelling. Naturally we start with the traditional plastic scale models of the month.

Monogram's 1/48th "Lockheed Lightning P-38" must certainly mark a new phase in plastic kit development, representing as it does, the first truly fully convertible model with all parts required for different variants supplied by the manufacturer. Any one of five different machines can be built, *viz.*, P-38M Night Fighter (our own particular choice), F-5B photo reconnaissance version, Pathfinder, P38L fighter bomber and the P-38 J fighter bomber.





Top left, the "Snowline" nylon mouldings from Christchurch, New Zealand. Range includes specially strengthened bellcrank, individual hinges and various horns which have application for Radio Control or Control Line use. Distinctly original and fulfilling an ideal purpose in own design models they are to be recommended. Bottom pair of photos illustrate the Williams Bros.' fittings for Radio Control pushrods and at bottom, the high impact plastic moulded 10 in. chord wing ribs. Photographs above show at top, contents of Keilkraft's latest kit the "Mini Super" an exceptionally complete kit which one multi flyer has already said "makes one want to go back to single channel". Such comment is well deserved. We venture to predict tremendous popularity. Centre is Veron's long awaited "Concord" with superb fuselage and leading edge prefabrication. Complete with accessories it promises to be another great favourite. Three sets of wings in expanded polystyrene are by H. J. Ives of Yeovil. Note slots to accept root spars. Balsa sheet covering is advised to make a very simple Radio Control model wing.

Beautifully produced instruction sheet gives good quality drawings of all possible versions and full detail necessary for accurate colour work—these have to be seen to be believed. Definitely not a beginner's model, construction for the night fighter version involves removal of upper wing half centre-section to take the radar cockpit. Other jobs such as fitting of hinged armament panel and folding cockpit lid are also best attempted by an expert.

In all respects this is an elite among kits. Monogram, always noted for quality of moulding and accuracy, have really excelled themselves; the transfer sheet (sufficient for five different models, remember) is a work of art in itself. A 'leg' moulded on to the port fin helps to keep the completed model upright with all three wheels of its 'trike' gear on the ground. Obviously, for scale reasons and in the interests of realism, lead added to the nose of the model at an earlier stage would have removed the need for this unsightly fourth leg. But this is our only grumble. Parts go together smoothly and accurately and clear moulded parts such as cockpit canopy and 'glass' panels for radar and photographic versions of the machine are second to none. A beautifully 'engineered' kit in every sense of the word. Imported by **A. A. Hales Ltd.**, the retail price is 27/6d.

Enterprise in New Zealand where no doubt a shortage of imported items created the demand is shown by **Snowline Industries Ltd.**, of Christchurch who are producing a range of model components moulded in ICI glass filled nylon which has been specially selected for its tough, impact and wear resistant nature. The accessories include control surface horns, suitable for R/C and some very neat hinges which can be employed for all movable control surfaces. Bellcranks for either control line or radio applications as well as a range of wheels from $\frac{1}{2}$ in. to 2 in. diameters are available and trade enquiries invited. We shall be pleased to forward the address to interested parties.

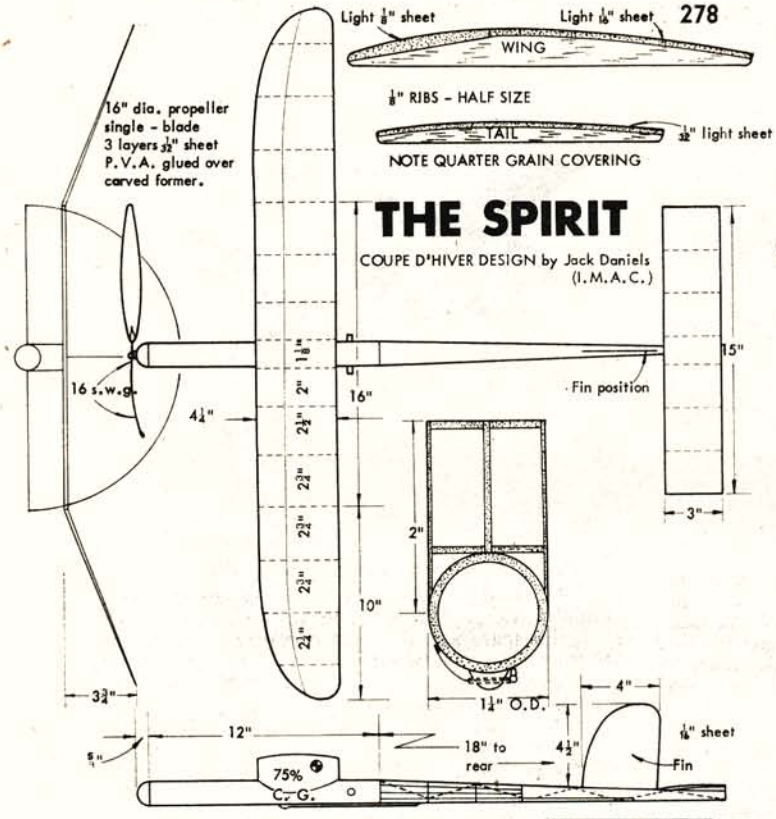
We have had on test for some time the range of injection moulded plastic accessories put out by **Williams Brothers** in the U.S.A. and confirm both the utility and cleverness of these fittings. As the photograph on the page opposite illustrates the push rod fittings are designed to go over $\frac{3}{16}$ in. square balsa rods and are held in place by small self-tapping screws, the end pieces form a detachable link and generously safe proportions and mid-way along the rod (if this scheme is used on ailerons) one can set a special servo pin pick-up. These fittings sell for 6/- a set, and we find it surprising that they have not been more widely adopted.

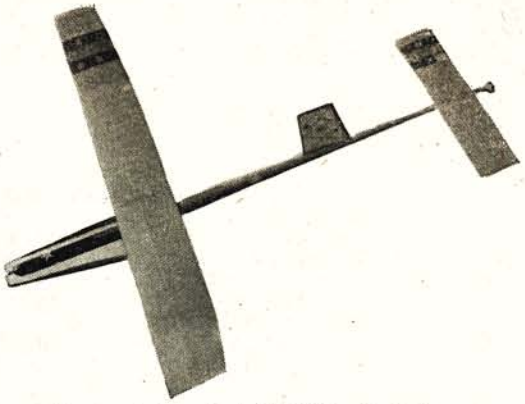
Another most successful Williams Bros. fitting is the nylon Bellcrank at 5/- which is used for combining ailerons and rudder.

When they introduced the "Duck Hawk" kit for a 54 in. span pylon racer, Williams Bros. created a new style of kit with large quantities of high impact plastic moulding which extended from the nose shells and engine mounts to the turtle back, formers and even the wing ribs. These plastic wing ribs of 10 in. chord are sold separately in boxes of 20 to airfoil Section N.A.C.A. 2412 at $3.98 in the U.S.A. Slotted for $\frac{3}{16}$ in. spars and made in opposite hand mouldings, the ribs must be attached with contact cement. They speed assembly and have proven to be very tough in use.

A form of complete rib elimination is the system of cutting expanded Polystyrene wing cores. Slabs of EP are available through builders merchants and a number of modellers have written to tell us how they have cut the material with a hot wire as described in the Aeromodeller Annual. **H. J. Ives** of Yeovil offers the service of providing wing cores for aircraft such as the Taurus, Tauri, Gee String and Pylon Duster and others with popular designs to follow. Prices average 25/- each plus 4/- post and packing and spar slots are cut for introduction of dihedral keepers. Each despatch is accompanied by assembly instructions advising the use of P.V.A. adhesive and including a diagram of how to apply leading edges and balsa sheet surfacing.

Photographs at left and top right illustrate the detail of Monogram's kit for the "Lockheed Lightning P-38" which we have made in this instance as the Night Fighter 2 seat version. Note open cockpit and nose bay with internal armament plus radome under nose. Altogether a remarkable kit. At right translucent polythene bottle with wide neck and top plus carrying handle. Contains gallon of "Glofuel" by H. J. Nicholls & Son Ltd., selling at 22/6 complete. Bulk buying is economic but it should be remembered that the fuel is a standard "sport" mix without any special additives.





This elegant design is L. Giolitto's winner of the Italian International Contest held on February 7th and in which it achieved a perfect score of 360 seconds. Note the extra long tail moment and the forward fin position.

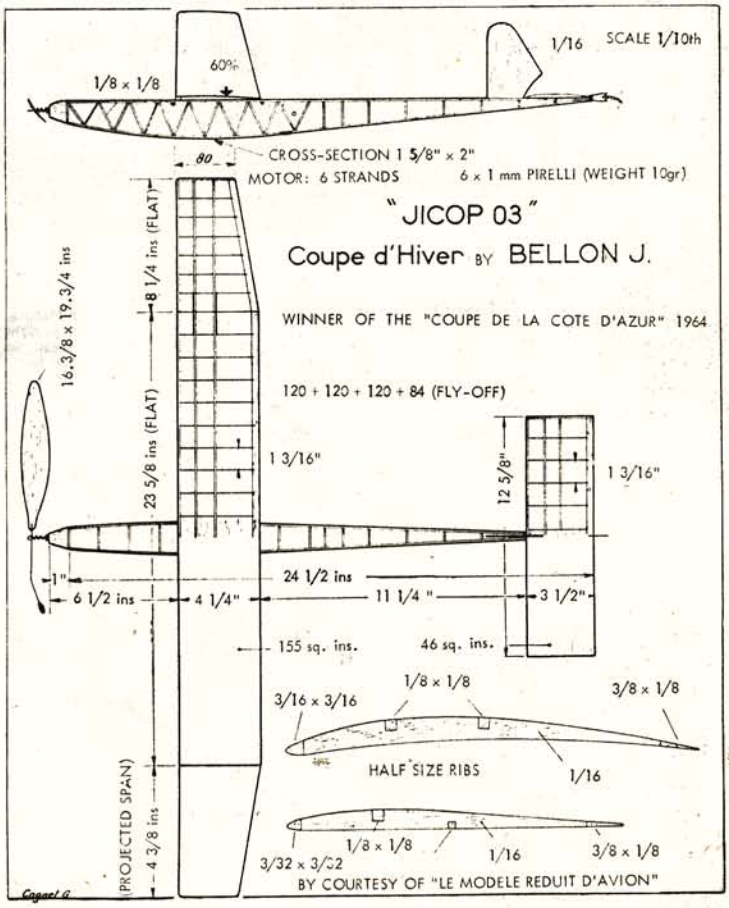
"The Spirit"

Jack Daniels of Illinois M.A.C. has produced a design of refreshing interest in the "Spirit" which should attract European modellers as much as it has fellow C.H. flyers in the U.S.A. Note that the streamlined tubular fuselage is stringered for the rear section, that the wing tips adopt the absolute lift concept originated by Don Foote and that the airfoils are of the Austrian Jedelsky type with solid sheet structure. Here is a model which should by rights stand up to windy conditions and has by contest performance proved a good match for other more ordinary types.

Two outstanding Coupe d'Hiver designs

"Jicop 03"

WINNER of the famous French South Coast event last December for Coupe d'Hiver models was this rather conventional design by J. Bellon from Nice. The "average" wing area of just over a square foot compares with the much larger "Pamyscaphe" published last month but readers will otherwise find several items common to both. The type of airfoil, the dihedral, and the overall shape stamp it as typically French. The fuselage is double covered with British Modelspan and the airscrew is carved to thin section from a flexible hardwood. Otherwise the design is quite ordinary in construction. Breaking down the weights into grammes, we have fuselage—21 grammes, wing—24 grammes, tail—7 grammes and airscrew assembly — 26 grammes making a total airframe weight of 88 grammes. In the fly off Bellon defeated Matherat by 20 seconds. The latter was apparently flying a model only suited to absolutely calm air conditions.



Understanding MAIL ORDER

A VERY high proportion of our readers depend to some extent upon the Mail Order supply houses which utilise our advertising columns. Since we are selective in acceptance of new clients, being in part responsible for their services, the following letter disturbed our confidence to the extent that it was circulated to every Mail Order house mentioned in AEROMODELLER and RADIO CONTROL MODELS & ELECTRONICS.

Complaint

". . . I have for the past eight years been obliged to order through your advertisements and it is not until recently that I have found someone who is prepared to offer a real service for the money they are so ready to take. It would only bore you if I were to relate the long list of three months deliveries, no replies to enquiries and complete ignoring of letters, to say nothing of wrong items sent, trade labels all over packets and goods carelessly valued, both of which invite customs duty, sometimes excessive. Suffice it to say that* ALL *the Mail Order modellers I know here are heartily sick and tired of the blasé, incompetent attitude of most Mail Order firms in the U.K.*

"Letters have been written on the subject before and negative replies have been received, which solve none of our problems and it seems to me that you have a certain responsibility in the matter, since you allow these people to advertise in your columns.

My contention is this, I pay cash with order every time, I therefore do not expect to have to wait a month or more for the goods to be posted and then six weeks for them to arrive by sea, if I send money for Air Mail postage. Consider this: If I walk into a shop in U.K. and ask for an item and then pay for it, do I come back a month later having waited for it to be wrapped up? Your opinion on why I should have to wait by post, then would intrigue me greatly.

"Mail Order modelling is BIG, *only consider the number of firms who do it, therefore make a reappraisal of your position in this matter and take it upon yourselves to insist that your advertisers offer a service and to me that means nothing less than return of post delivery. . . ."*
B.F.P.O. 53. N. G. I. PRINGLE.

Replies and comments were solicited.

To our disappointment, the response indicates that to date only five Mail Order advertisers consider the complaint worthy of comment.

Mail Order Comments

From Harrogate Radio Co., "Speaking for myself I am very pleased with my Mail Order Clients feelings towards us as many of my clients have bothered to write and tell me how they feel. I am sure Mr. Pringle must have something in what he tells us but in many cases I wonder how many firms have the trouble we do with orders that are not readable. The perfect Mail Order client is the one who always uses BLOCK LETTERS with his address and his NAME and not leave us to try and read his signature at the end of the letter, also who does this *every* time. Also, abbreviations are used far too much which means we have to look up postal addresses to make sure. For instance there is a Higham in five counties.

"As for overseas clients we have always given prompt service, even small orders of 1/6d. value to be sent Air Mail, these may not pay profits but if one is interested in the Mail Order as we are, then the satisfaction of helping is very rewarding, I challenge anyone to write in, giving their opinions of Mail Order Service obtained. I have enclosed a few letters which make me sure of my position. *But* for letters like these I would have *given up* Mail Order some time ago.
Harrogate. E. R. ROGERS.
(A large collection of complimentary letters expressing satisfaction was attached—ED.)

From G. W. Jones Bros. Co. Ltd., "We receive numerous letters of commendation from our Mail Order customers, many of whom have been dealing with us regularly for years, and a lot of letters begin with 'Thank you for the prompt despatch of my last order, and excellent packing'. This also applies to our overseas customers.

"Sometimes a customer might read about certain goods before they are actually produced, but these items never appear in our advertisements before the goods have arrived.

"With reference to Mr. Pringle's remarks about Air Mail Postage, it sometimes happens that the customer does not realize how expensive this can be, and if the additional expense is out of all proportion to the value of the goods, we send the parcel by surface mail."
Chiswick, E.4. A. W. JONES.

From F. A. & F. Allen Ltd., "Whilst we can only speak for ourselves, it would seem that, if Mr. Pringle's comments are correct, then there is much to be desired. However, from our point of view, we would state quite categorically that the items advertised through the medium of your magazines are in stock and, if ordered by post, are despatched within 24 hours. There are occasions when items are out of stock by the Manufacturer, in which cases there could possibly be a delay in the completion of the order, but in every such case, the delays are notified to the customers concerned.

"It would seem, therefore, in view of the number of overseas and home customers that we are fulfilling a service to the modeller, which is more than appreciated.

"In conclusion, it would seem that we can satisfy most of the people some of the time but not all of the people all of the time."
Poynton, Cheshire. F. ALLEN.

From Oakfield Rado Ltd., ". . . Chapter and verse could be written on this subject, and I feel that only firms conversant with the very complicated overseas postal arrangement should compete in this market. One of the best services 'small packet' Air Mail, is little used, and not known about in many Post Offices, let alone by the trade. . . .

"To your writer I would reply:

1. Delays are usually awaiting some article out of stock, normally sent by return in this country, but with costs so high by Air, double despatch is impossible.
2. It is an offence to under-value goods, or to falsify the true sender.
3. 'Blasé incompetent' firms (*sic*) do not stay in business for long.
4. Overseas Mail Order modelling is SMALL due to the inability of most British firms to understand that the World is only as far away as the nearest Head Post Office.
5. Firms should be able to quote, and accept payment in currency to suit the buyer . . . the idea that only Sterling is 'Good' money is outmoded."

Hazel Grove. J. BLEAKLEY.
(Complimentary letters in English, Italian enclosed.—ED.)

From Henry J. Nicholls & Son Ltd., "Mr. Pringle complains specifically of 'three months deliveries, no replies to enquiries, and complete ignoring of letters, to say nothing of wrong items sent'. Having had eighteen years experience in the Mail Order business, I am convinced that no organization offering this kind of service would remain viable for long.

"Mr. Pringle also complains of 'trade labels all over packets and goods carelessly valued'. This would seem to indicate a desire on his part to have goods sent to him in a manner that is contrary to the regulations

Continued on page 281

*Mr. Pringle referred to Ed. Johnson.

STREAMER-EATER

F.A.I. SPECIFICATION COMBAT DESIGN FROM NORWAY BY ANDREAS YTREOY

NORWEGIAN COMBAT RULES are now standardised as the F.A.I. 2.5 c.c. class regulations, and this model has been specifically designed and developed to suit the rules through several models to its final form as presented here. A.P.S. *Peacemaker* style swept back wing tips were found to give a definite improvement to its flying characteristics, mainly in the form of much smoother manoeuvres at high speed, the high speed being mainly due to the small wing area.

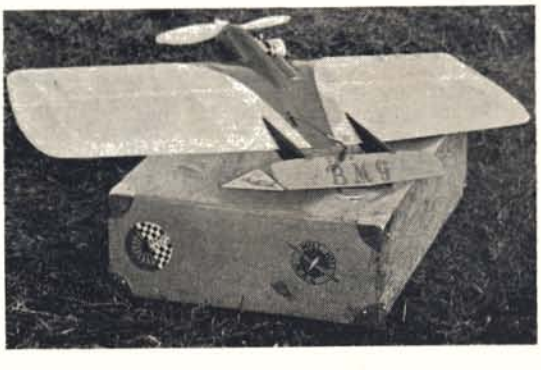
Although an easy model to fly, it is after all a contest combat model and a quick action elevator is employed to get those snappy manoeuvres that are so often called for in this class of flying. This is an all moving tailplane pivoted on the leading edge and attached to the wings by strong booms. Some trouble was found in getting strong enough booms but this was overcome by using the balsa/plywood/balsa sandwich shown on the plan. Also the trailing edge was enlarged for greater strength and a spruce bracing strip added.

Several *Streamer Eaters* have been constructed by the author and his friends and flown with minor alterations and improvements to test new ideas, and in the course of this flying. *Streamer Eater* won first and second places at the Norwegian team trials for the Nordic countries control line championships.

Construction is simple in most respects and should not present any problems to the tyro or experienced builder. Commence with the tailplane booms by cutting out the $\frac{1}{8}$ in. balsa and plywood parts and cementing them together. When dry sand to a smooth section and drill bearing hole for 18 s.w.g. pivot wire.

Designer's toolbox is used as a take-off patch to comply with the F.A.I. regulations. Model rests across the corners and leaps almost vertically into the air when released. Box is decorated with British Club transfers.

Next make the elevator up by cutting the spruce L.E. to shape and pressing the 18 s.w.g. pivots into place with the sandwich booms attached. When set cement the $\frac{1}{4}$ in. hard balsa T.E. section of the tailplane on and carve to a streamlined section. Cover booms and elevator with nylon and set to one side until the rest of the model is constructed. Wing construction should be started by cementing the laminated L.E. together and cementing the spruce bracing strip to the T.E. Whilst these are drying cut wing ribs to shape and the $\frac{1}{8}$ in. sheet gussets noting the grain direction on plan. Cut engine bearers to shape and hardwood spacing block, when sure of the good fits that are needed here, nail and glue together. Cut the rear fuselage from $\frac{1}{8}$ in. sheet and glue to engine bearer assembly. When the fuselage is dry cut the small slots for the leading edge, top and bottom spar and solid section trailing edge. Shape the wing tips from $\frac{3}{16}$ in. sheet and Araldite the $\frac{1}{2}$ oz. tip weight in place on the outboard one. Commence the assembly by sliding the leading edge through the fuselage and the two main spars. Place all the ribs in position, line up as truely as possible and cement the two tip ribs into position. When set cement the rest of the ribs in position and add the trailing edge. Now cut the plywood bellcrank platforms to shape and install in the centre section with the bellcrank. Note that the pushrod should be fixed to the bellcrank as well as the leadout wires. Cut the tank from tinplate and make up to the pattern shown installing this in the outboard side of the centre section. Add the wing tips and centre section sheeting, then all the sheet gussets. Crack the mainspars at the tips and trim them down until they blend into the tip. Carve the $\frac{1}{2}$ in. sheet nose fairing to shape and cement to the bearers and forward centre section sheeting. This completes the wing construction with the exception of the final sanding and cleaning up and checking of controls to make sure that nothing is binding up or fouling. It will be noticed that we have not fixed the elevator booms and elevator in position yet, this is quite correct as they are added after the model is



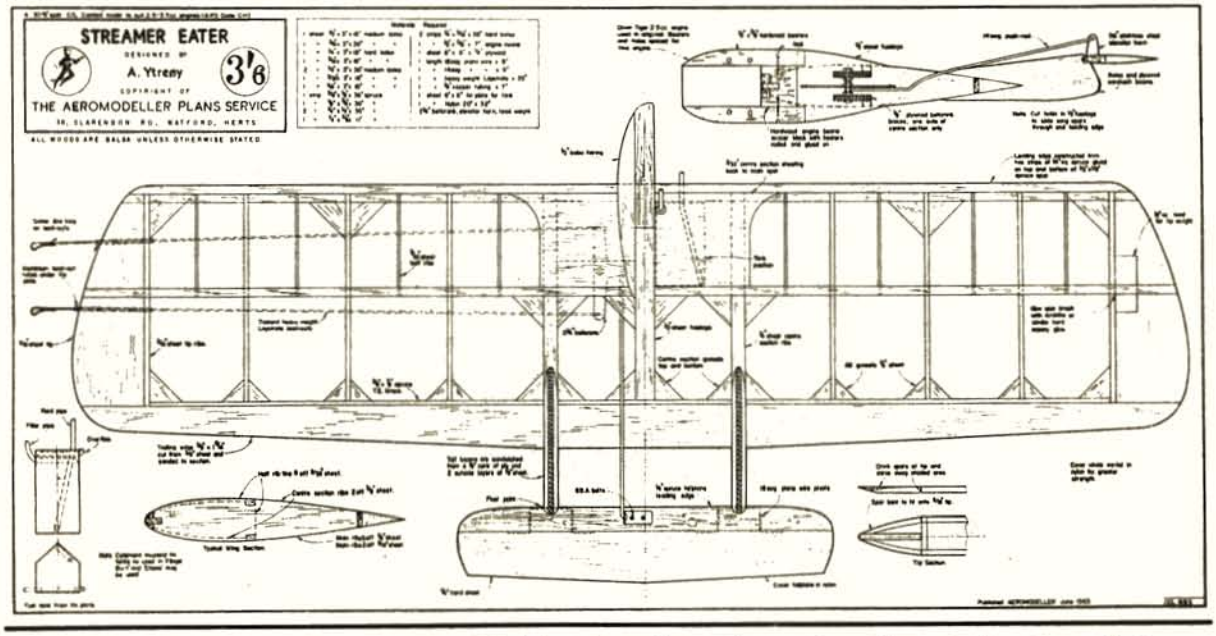
covered and dope applied to strengthen the structure.

Cover the model in two pieces of nylon, wrapping it around the leading edge of each wing half and butt jointing at the centre. When dry cover the nose section and trim all the rough edges off. Apply three coats of full strength clear dope and cement the elevator and booms into position.

Give the booms three coats of clear dope and when dry bend the end of the pushrod to shape and solder through the elevator horn. Solder the control line loops drill engine mounting bolt holes and apply the colour scheme of your choice not forgetting the fuel proofer of course.

With an Oliver Tiger the author's originals fly at over 90 m.p.h. this of course depending on the state of your engine, the author using a re-worked version to obtain these speeds — and don't forget that SILENCER!

Full size copies of this 1/5th scale reproduction are available price 4/- including post from Aeromodeller Plans Service. Quote Plan No. CL 883.



Understanding MAIL ORDER

[*Cont. from page 279*]

governing the export of goods by post, to which every bona fide exporter is bound to adhere by law.

"Our records show that we received one order from Mr. Pringle. This was on March 10th for an Elmic escapement, which was despatched to him the same day by Forces Air Mail as requested. We received a further letter from Mr. Pringle on March 29th stating that it had not reached him and we replied again by return, stating that it had actually been despatched on the 10th and asking him to let us know if it did not arrive so that we could send a replacement. Not having heard we assume that it eventually reached him. But it is hardly reasonable to hold us responsible for delays in the Post over which we have no control.

"Lastly Mr. Pringle claims that Mail Order Houses use your advertising columns to solicit orders that they are not in a position to fulfil. This has always been a problem. Advertising material has to be prepared ten weeks in advance. Inevitably items get advertised for which stocks are inadequate to meet the demand, but these are happily in a minority.

"Mr. Pringle states that 'Mail Order business is BIG'. Let me assure him that its bigness is only relevant to the size of the headaches it causes. Compared with selling goods over the counter it is definitely unprofitable. The overheads involved are high, and the correspondence and paper work alone absorbs half of the gross profit.

"Despite its comparative unprofitability we maintain our Mail Order service for specific reasons. Our many friends overseas rely on us because they cannot be served in any other way. Many Mail Order customers in the provinces make a trip to London two or three times a year, and without the postal contact between trips, these customers would be lost. Regular customers living a few miles away expect to be able to phone up at any time and get some hard-to-obtain item sent to them by return of post. This is all part of an overall service.

"Mr. Pringle must surely have been unfortunate if his experience really justifies his expressed opinions."

Holloway, N.7. H. J. NICHOLLS.

Our Own Experience

Aeromodeller Plans Service makes an average of 120 despatches daily. Orders are cleared within 48 hours and go to every country in the world where aeromodelling is practised. The only delays we experience are due to matters beyond our control, i.e., bookbinding, reprints, castings. There is one other source of delay which affects European customers. It is not appreciated that the International Money Order system is a misnomer in that it is standard for most European countries but not for the United Kingdom. Whereas in Europe one can order goods and remit identification, address and cash by I.M.O., in the U.K. the recipient only has the clue of a town name and must therefore identify the order and address by separate notification from the sender. It is therefore ESSENTIAL for all customers in countries such as Austria, Belgium, France, Germany, Italy, Netherlands, Spain, etc., to write an order to the company at the same time as arranging the I.M.O. Otherwise, we at A.P.S. must await arrival of a complaint before we know *who* has asked for *what!*

● *A further reply has since been received from 'Radio Models', and Messrs. 'Southern Radio Controls' have telephoned a comment.*

NOISE ANNOYS

ARE the recently introduced silencers or ("mufflers") sufficient to meet the S.M.A.E. requirement that "from the 1st of January, 1965 all internal combustion engines in use in model aircraft must be fitted with a silencer"?

Without an established decibel level maximum the decision to accept or reject any form of noise reduction device on the model flying field rests unhappily on the shoulders of the Contest Director.

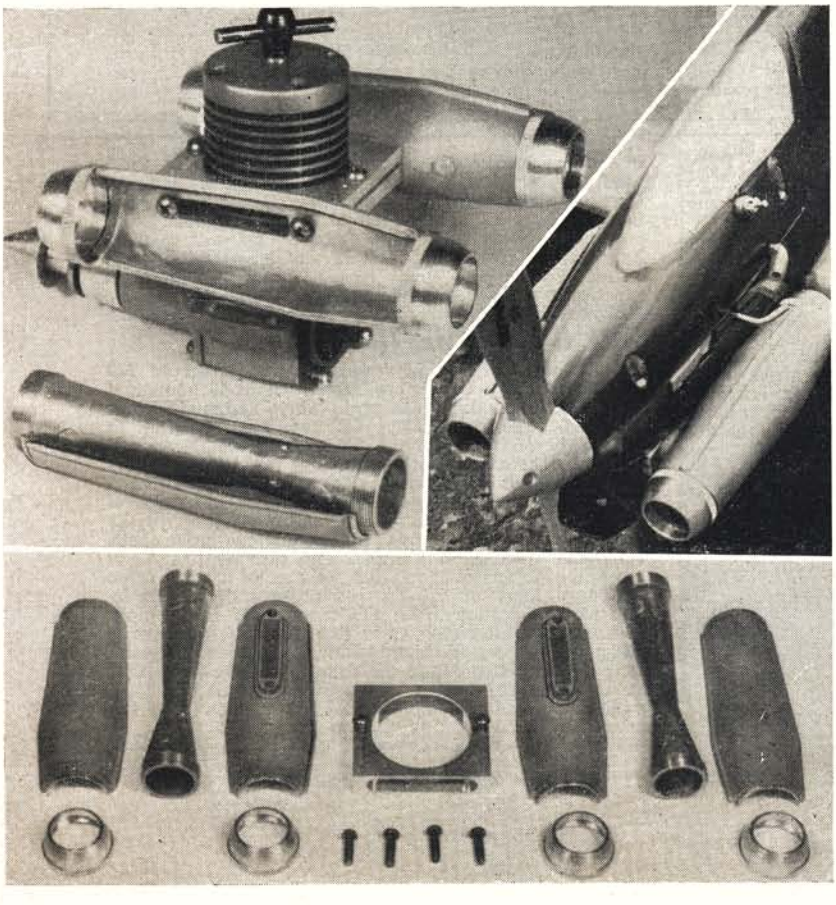
In our view, the broad application of a tangible rule like this was the correct approach. Stricter legislation would have involved far too many technicalities in the establishment of testing standards, and purchase of equipment which is not only costly but also demands very specialised skill in operation. As the owners of a noise meter, we can state with experience that decibel readings fluctuate enormously according to local conditions which involve background noise, wind strength and physical reflection, among other variables.

Not that we wish to repress opinions of the opposite view—indeed our columns have carried letters of objection. One of the most experienced aeromodellers who raised the plea for the "freedom of the individual" from the very start of this silencer wrangle was F./Lt. Noel Falconer. Yet now, we have from Noel, photographs and details of his "silenced" Super Tigre .60 and McCoy engines.

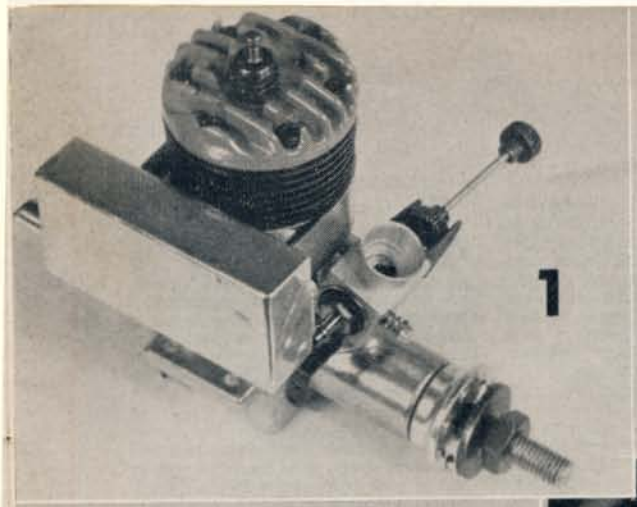
To quote from his correspondence on the "D.A.C." ST.60 silencer "Assessment, and I promise you it's not rosy-hued : Mainly good average in starting (priming hole ideally placed), silencing (to about an equivalent .19RC level, as good as any but quite inadequate for proper silencing), power an *honest, flying* 10-15 per cent drop—it still hauls my 8-pound 'Candy' straight up. Note of the exhaust—no difference." So Noel has the satisfaction of both attempting to comply with the rule and also retaining a powerful noise! The ST.60 fitted with the same silencer *does* in our experience have a noise reduction. Perhaps Noel is stretching his imagination a trifle! However, to further quote his letter, "Handling—superb beyond belief. I set up my idle within a minute of the first start, it will run very slow indeed, and on an ideal flying idle it has no trouble with loading up or anything else, it takes slam opening and closings in its stride, response is immediate, and also—the only time I've found this—the response is very closely related to the throttle position not like the usual way you have 90 per cent of your throttling on the first ¼ throttle opening". This improvement in control is by no means exceptional. The advantage of the developed silencer to the aeromodeller is inestimable and the introduction of the first seriously developed unit with features to improve engine efficiency should considerably influence future trends.

We refer to the "Eta" unit which designer Ken Bedford refers to as a "Muffler". A description of the function of the venturi and the exhaust extraction methods were given in March, 1965 *"Noise Annoys"* but the construction details are worthy of second description.

An extruded manifold slips over the cylinder head and bolts to the crankcase lugs on the Eta Mk. III. Jet pod-like "Mufflers" which serve the purpose of being expansion chambers, exhaust extractors and silencers are mounted either singly —using a blanking plate or, as twin units. (Who's for a scale Caravelle, or BAC-111?) Cast in two halves with a threaded central venturi core, the unit is held together by screwed ends. If extra silencing is required, wire wool packing can be used between the Venturi and outer casings. Single side installation costs £1 18s. 10d. or twin installation for full Eta 15 efficiency £3 4s. 3d. The Eta .29 also utilises a single unit bolted onto the existing exhaust stack, (now has lugs cast into it), costing £1 7s. 0d. All parts are available separately. Tested in staffman John Franklin's own design F.A.I. team racer, with a German "Glasflügel" glass fibre 7 x 8 propeller on an Eta .15 III the following figures were



Looking like two jet pods the Eta muffler at left involves 11 parts for a double-sided Eta 15 installation. Note the extraction venturi in outer shell with end caps resting on inner shell. Sides of model have to be trimmed away to fit curve of silencer as shown in staff model. At right 1, shows McCoy 35 R/C with brass box type 308 silencer fitted. Needs changes for R/C version. 2, two sizes of 308 silencer to fit A.M. diesel range, very robust but crude fitting method. 3, close-up of 308 McCoy silencer shows brass fixing strap and reinforced area drilled for exhaust outlet. 4, Tim Gray's home-made silencer fitted to Eta 15 by A. Allebone in combat model, works best in airstream not behind as shown. 5, another Gray silencer fitted to a P.A.W. 19 and made from an "Outdoor Girl" lipstick case also fitted in a combat model by Tim Gray. 6, Webra silencer fitted with extension tube by M. Eames, to obtain peak performance. 7, K. Lindsey's home-made Super Tigre G20 speed silencer fits inside model fuselage. 8, new A.M. silencer in two sizes to fit all their diesels, only weighs ¼ oz., made from pressings. 9, close-up of Gray silver soldered silencer with turned collector ring and lipstick case expansion chamber. 10, experimental D.A.C. silencer with Super Tigre exhaust controller in place. 11, Australian Burford silencer in sizes to fit all their range of engines, modifiable to fit other makes.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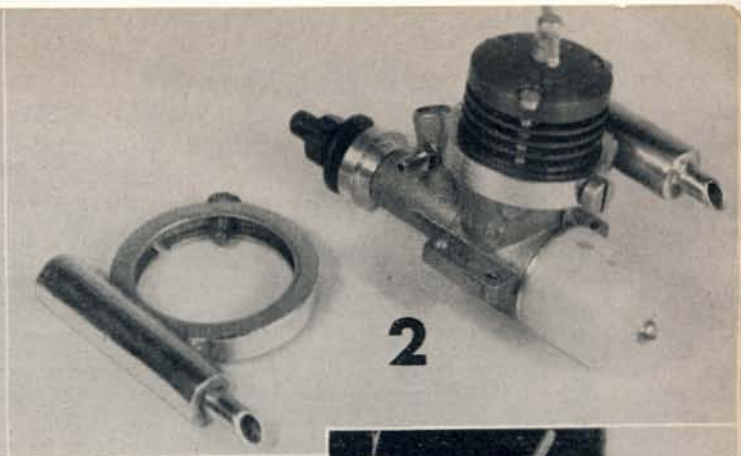
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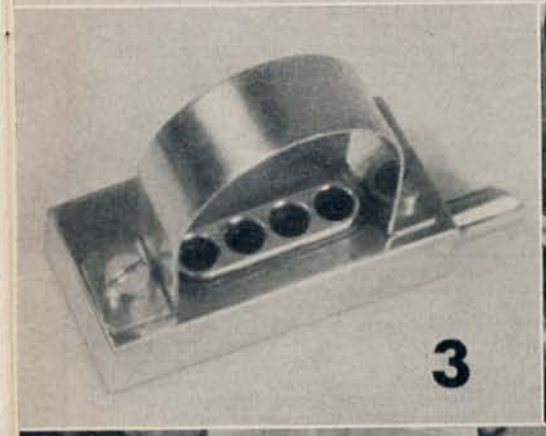
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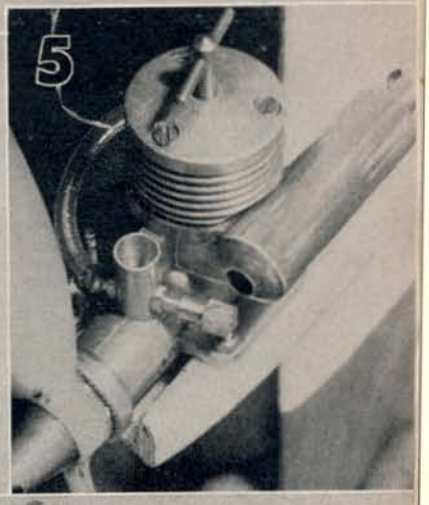
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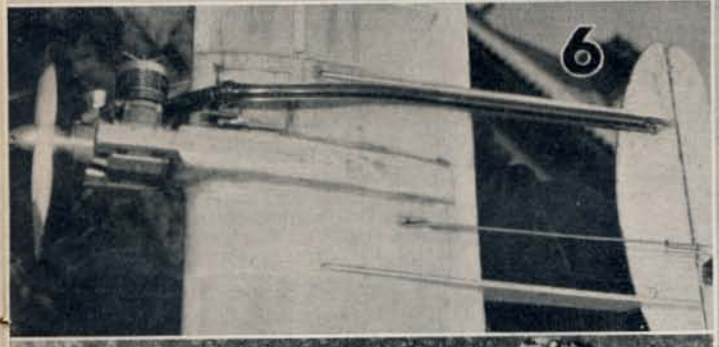
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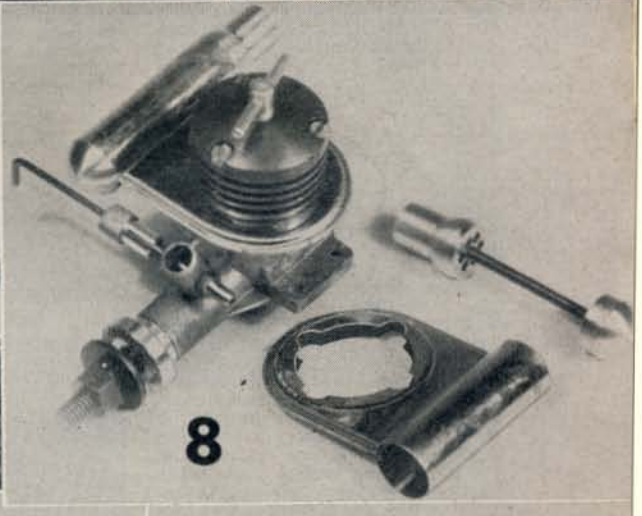
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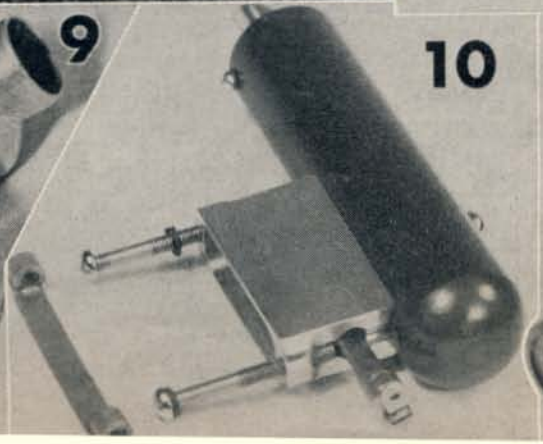

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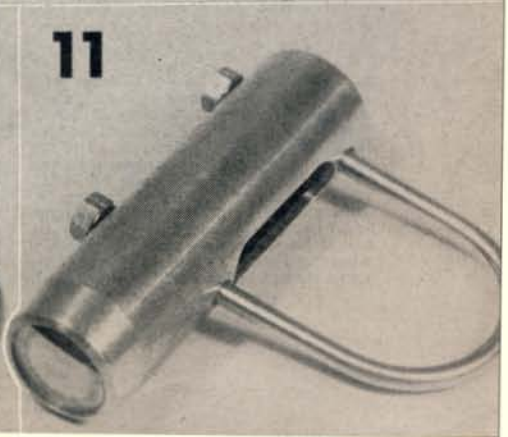


obtained: Std. Eta with open jet needle valve, 56 laps at 92 m.p.h. Backplate bored to ¼ in. I.D. and open jet needle valve, 101.2 m.p.h. for 34 laps. dB readings were taken with a background noise level of 41 dB and recorded as follows: 15 foot distance, static model—84 dB, 50 foot static—74 dB and 70 foot airborne 78 dB. Being used to silencers the Mk. III still sounded rather loud, but when the units were removed the blast of noise convinced us otherwise. Laps were increased by approximately 30 per cent with speed down 1-2 m.p.h. Extra weight is a mere 3 grammes over 2 ounces.

The "A-M" silencer has now arrived in two versions to fit AM 10 & 15 and AM 25 & 35. This is very neat, lightweight (¼ once complete!), with a minimum number of parts and yet robust construction. The manifold and expansion chamber are stamped and bent from .011 in. tinplate sheet with folded edges to form one unit. This is completed by a solid turned alloy streamlined frontpiece that is a plug-in fit to the expansion chamber and tied to the rear outlet alloy turning by a 1½ in. long 6 B.A. bolt. The cylinder head has to be removed and the silencer slipped over the liner. When the head is replaced, it clamps down on the manifold for location. By virtue of the radial exhaust and removable silencer ends a choice of three positions, i.e., either side, or across the back of the motor is available for the AM 25 & 35 or four positions, two of them at angles across the rear, on the 10 & 15. A little ingenuity could adapt this unit to fit many other motors and it is well worth its low 11/10d. price tag.

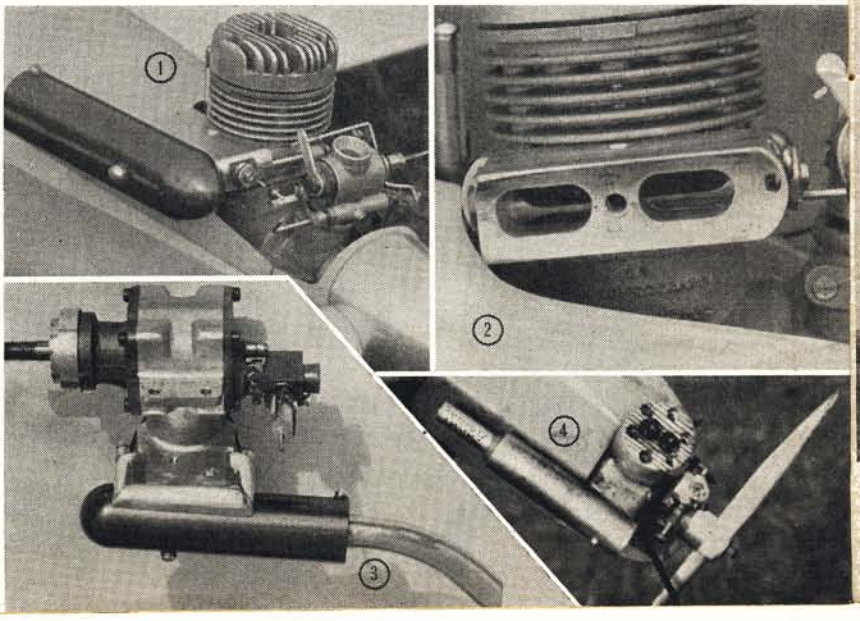
Latest additions to the range of "308" silencers are two to fit the A.M. range of diesels at 30/- each, and one for the McCoy .35 for 32/6d. The A.M. version is available in two sizes and consists of a turned brass collector ring that is cut away on one side with a tubular brass expansion chamber silver soldered in place, silencing is reportedly good and power loss tolerable. Fixing is implemented by means of a grub screw that screws through the collector ring and binds on the cylinder liner exhaust ports. This seems crude and could lead to liner distortion if over tightened by heavy hands. The A.M. 10 & 15 version is ¾ oz. and the 25, 35 size weighs 1 oz. The McCoy .35 silencer (2 oz.) is unusual in that it is the first commercial square box expansion chamber we have seen. The box is made from brass shim with a strenthening insert around the exhaust inlet area. Attachment is by means of a brass strap passing around the crankcase. Smaller than most, it has to be filed slightly to fit the R/C version as it does not clear the exhaust chopper, bearing, in the exhaust stack.

"Burford" engines from Australia distributed in G.B. by Performance Kits have produced silencers in finished numbers for some years and latest versions fit their 15, 19, 29, and 35 engines. A tough and robust unit and small in overall dimensions, it has a solid front and fairly small expansion chamber with a turned alloy restrictor at the rear. This is a double flanged turning, similar in shape to a model wheel hub, but with two flats cut on the circumference opposing each other. Fixing is by means of a strong wire hoop that passes around the crankcase and bolts through the silencer. Price in G.B. is £1 for all sizes.

Still in the experimental stage, but interesting to the multi channel radio controllers "D.A.C." are developing a variable restriction manifold. It fits in the same manner as others in the *Spinaflo* range and uses the waisted rotary brass bar from the Super Tigre unit. This is primarily intended for the S.T. range but could be used on many other makes if trials prove successful. Noel Falconer who has tested one of these units reports good to average starting with the priming hole ideally placed in the manifold between the rotating bar and the exhaust port. D.A.C. made a McCoy .60 silencer special, for Noel Falconer to allow a *fully cowled engine and silencer.* The engine mounting plate is canted through 20-30 degrees, as with the silencer offset this gives equal overhang each side of the mounting position centre line, so enabling a neat cowled installation to be used when the motor is mounted in the inverted position.

The "Gee Dee Pike" silencer first reviewed some months ago has now undergone some slight alterations, the most important being the use of an aluminium adaptor block extended another ¼ in. and including a priming hole. Reason why some of the earlier models came loose was due to shrinkage of the adaptor, it has now been changed to aluminium to minimise this. Exhaust outlet holes in the valve plate have now been enlarged and also the outlet pipe. A nimonic steel spring replaced that previously used and the power loss is now decreased with the overall weight reduced.

Some of the most simple and effective home made silencers we have seen are those of the Luton clubsters. They are all made using manifolds produced by Tim Gray. Tim is the son of Peter Gray who contributes to our "Aircraft Described" series. They all have a common expansion chamber shell and this is an "Outdoor Girl" lipstick case (the largest available). Tim machines the manifold to fit P.A.W. Webra, Eta and Oliver engines then silver solders the silencer. They are the extraction type with a centre tube running through the sealed silencer on a similar principle to the Eta and P. A. Moore creations. M. Eames of Luton has a "Webra" Manifold on a Webra Mach II in a twin boom combat model. It was found that by attaching a length of neoprene tubing to the outlet end and running it back along the tailboom it could be trimmed for maximum performance, in fact a tuned exhaust length. Another notable home made silencer was seen at the first S.M.A.E. centralised control line meeting. This came from Kevin Lindsey and was fitted *inside* a speed model on a Super Tigre G.15. The ST exhaust stack had been turned off and a hand filed manifold fitted that directed the exhaust round to the back of the motor. This was connected to an eliptical section expansion chamber with wire wool packing inside it.



1, Noel Falconer's ST-60 in "Candy" with experimental exhaust control D.A.C. silencer using ST parts. 2, Close-up of D.A.C. manifold shows the ST rotating, waisted brass restrictor bar in place, linked to the throttle. 3, Noel's off centre mounting silencer for a McCoy .60 made by D.A.C. to special order, for ease of cowling. 4, Twin plugged head seen on Paul Rogers' latest multi R/C model is reported to give a 400 r.p.m. increase when used with a silencer. Simple expansion chamber has sound absorption holes drilled in the outlet.

N.W. Area Easter Meeting

R.A.F. Ternhill

TALKING POINT of the two day Easter Meeting run by the North Western Area of the S.M.A.E. must surely be the weather, and was it foul—with 35 to 45 m.p.h. winds gusting up to 50 m.p.h. at times! Rain poured down, as well as a few hail storms and odd snow flurries to add to the agonies.

Control line was hard hit by the weather—or was it silencers? The few models that were flying well all sported silencers but some seemed far from silenced and a few disqualifications took place. Combat took the whole two days and most of the models seemed to be A.P.S. "Flingle Bunts", and "Razor Blades", Stoo Holland the winner had to fly against his O/D model in three rounds. The final between B. Bumstead and S. Holland, club-mates of course, was a classic affair with several cuts and plenty of fancy flying.

Place and Haworth were using an Enya 15D with an Enya silencer in their F.A.I. T/Racer that did cut the noise down considerably, but also the speed. In their first heat it snowed then came a slight lull followed by a heavy hail storm, not exactly the best of conditions. Fastest heat went to Franklin/Ives from Wanstead with their Eta powered racer seen in "Noise Annoys", time was 5:01.5 doing 34 laps to a tank. Nixon/Ellis from Hinckly had a neat glass fibre silencer built into their model and came third in the final. Winners Turner/Davy were also using an Eta and silencer. ½A team racing was fortunately flown in the lee of some large hangars as was class B giving much smoother air conditions. The ½A final was uneventful except for a few angry words between the first and second place teams over a collision that resolved itself. Class B was won by Yates/Hampson from Leigh with a home made silencer fitted to their Eta 29 for a time of 8:13.5. Second place Lauri from Novocastria used a D.A.C. Spinaflow silencer on his Eta 29 with the innards removed.

Free style R/C attracted 15 entries and B. Denial from Doncaster took first place. At the prize-giving there was much laughter when he was presented with his prize—an electric razor, see February '65 "Aeromodeller" cover and you will realise why. Multi R/C was well supported and some models were at times, in sudden gusts flying backwards in relation to the ground, so strong were the winds. Ed. Johnson took first place flying a hybrid consisting of a glass fibre "Taurus" fuselage, "Orion" wings, and "Taurus" tailplane. His Merco 61 was fitted with a Pike silencer and Bonner Digimite proportional R/C gear was used. Ed. won an "Enterprise Navigator" kit for his efforts!

In Open Rubber G. Tideswell made 9:00 with a single blader in one of the few calm moments of the day which included a 4:15. J. O'D was flying a hybrid using coup de hiver wings and tail and a larger fuselage. Dave White was unfortunate to only place fourth when a well meaning retriever crushed the fuselage of his model. Dave Wiseman had to reconstruct his wing tip due to the elements and just came first in ½A Power. J. O.'D. had his model loop and clear the ground by a few feet but to no avail. Pete Manville made a perfect score and this takes some doing in those conditions. Close on his heels came Dusty Miller who won the event three years ago, and in third place Joe Savini with his "Faital" design. Combined F.A.I. was closely fought and H. Tubbs' consistant flying gave him first place. Savini flew remarkably well in the conditions but was unfortunate to miss his first round flight by seconds. (The event was run in 5 rounds of one hour.) Many wings broke in Open Glider and the winner, K. Smith, was using a small model, about A/I size.

Results :— **Open Glider** (99 entries) : 1, D. Coffin (Southampton), 4:37 ; 2, K. Smith (Croydon), 3:47 ; 3, D. Wiseman (York), 2:59. **Open Rubber** (48 entries) : 1, G. Tideswell (Baildon), 9:00 ; 2, J. O'Donnell (Whitefield), 8:47 ; 3, H. Tubbs (Baildon), 7:15. **Open Power** (56 entries) : 1, P. Manville (Bournemouth), 9:00 ; 2, D. Miller (Cambridge), 7:19 ; 3, S. Savini Wallasey), 6:31. **½A Power** (24 entries) : 1, D. Wiseman (York), 5:52 ; 2, G. Head (Lee Bees), 5:47; 3, M. Brown (Maidenhead), 5:02. **Tailless** (12 entries) : 1, J. Pool (York), 1:32 ; 2, G. Tideswell (Basildon), 0.59. **Combined F.A.I.** (54 entries) : 1, H. Tubbs (Baildon), 6:32 ; 2, S. Savini (Wallasey), 6:16 ; 3, D. Coffin (Southampton), 3:47. **½A Team Racing** (30 entries) : 1, Turner/Nixon (Wharfedale), 0:00 ; 2, Dell/Balch (Feltham), 0:00 ; 3, Neal (Hatfield), 0:00. **F.A.I. Team Racing** (34 entries) : 1, Turner/Davy (Wharfedale), 11:12 ; 2, Franklin/Ives (Wanstead), 11:37 ; 3, Nixon/Ellis (Hinckly), 13:40. **B Team Racing** (15 entries) : 1, Yates/Hampson (Leigh), 8:13.5 ; 2, Lauri (Novocastria), 9:57.2 ; 3, Skitt/Hardcastle (Wolves), 10:03.2. **Combat** (91 entries) : 1, S. Holland (Northwood) ; 2, B. Bumstead (Northwood) ; 3, J. Downey (Worthing). **C/L Stunt** (17 entries) : 1, H. Dowberkin (Harwich), 1040 ; 2, D. Day (Wolves), 828 ; 3, M. Mayne (Fareham), 632. **C/L Scale** (2 entries) : 1, S. Perry (Wolves), 432 ; 2, A. C. Day (Birmingham), 430.5. **Free Style R/C** (15 entries) : 1, B. Deniel (Doncaster), 102 ; 2, B. Purslow (LARCAS), 92 ; 3, A. Thomas (Sutton Coldfield), 92. **Multi F.A.I. R/C** (17 entries) : 1, E. Johnson (CM), 1529.5; 2, B. Purslow (LARCAS), 1400.

Some idea of the wind strength can be gained from heading picture illustrating the direction sock lifting past the horizontal position. At left Brian Turner (Wharfedale) warms up his winning "Aquarius" ½A team racer before the final; 30 in. span, Oliver powered and light blue finish. Flew very well in the hands of pilot Les Davy from Wharfedale.

Roger Hargreaves at right made 3rd in F.A.I. multi R/C with "Taurus" powered by a Merco 61 using Gee Dee Pike silencer and Orbit 10 gear in red and white model. Flew well to beat D. Read by 5.5 pts.

Above, 4th place F.A.I. R/C D. Read with De Bolt "Interceptor", Merco 61 and silencer, Wt., 6¼ lb. Left, Joe Savini launches his Faital in 2nd round of comb. FAI.

CLUB & CONTEST NEWS

What better evidence of Sqdn. Ldr. Drinkell's (OC RAF Ouston) enthusiasm for the hobby than this group of his junior clubsters with their variety of models?

Club Strength

Within the first month of the new membership scheme of one-date (April 1st) renewal for the S.M.A.E. Ltd., Club registration amounted to a total of 170 qualified applications. A recognised club is one with 5 persons, at least one of which must be a full member. This regulation (actually an amendment of the Constitution) which has rarely been enforced in the past has been relaxed to permit the sport flying club the benefit of S.M.A.E. Affiliation.

Whereas, in the somewhat free and easy arrangements of previous years, a club might well have had 10 members paying their S.M.A.E. fees and as many as another 100 within the framework of the club, the 1965 regulations are that in the Society's view the club consists **only** of the S.M.A.E. fee-paying members. This leads to many changes. In Scotland, **Scotmac** will be the S.M.A.E. free flight club and a new club, the **East Renfrewshire Aeromodellers** will cater for Control Line. These same modellers will **also** belong to the SAA affiliated Glasgow clubs. Elsewhere the S.M.A.E. portion of club membership has been separated for convenience.

Not exactly a happy state of affairs, this use of 'clubs of convenience' tends to undermine the prestige of the S.M.A.E. and reduces the Junior potential.

Use of R.A.F. airfields, insurance, contest organization and the fellowship of experienced modellers are indisputable advantages of S.M.A.E. membership. It seems sad that some areas' efforts have been directed towards **minimising** club affiliation strength at a time when the S.M.A.E. could benefit best by an upsurge of support.

Neath (Wales) Rally

First rally of the year in Wales was notable for the lack of clubs sending entries. Individuals were plentiful but mainly from Rhondda and Bristol & West. Unlimited free flight turned into a glider only battle with a two minute max. set due to the conditions. Many had towing troubles in the strong wind and no triple max.'s were scored. J. Bailey won with 4:44 (he has **also** won the Pilcher Trophy and S.M.A.E. F.A.I. Rubber events as well as 3rd in F.A.I. Power so far this year) the second and third men being within the next ten secs. Combat was restricted by lack of entries, and this proved to be an Aeromodeller Plans Service clean up. K. Selby won flying a "Wolverine" that had an undercarriage, and an Eta for the power plant. Chuck glider was very popular and S. Thomas emerged the winner with own design model at his first competition.

New Merseyside Club

Liverpool and Collegiate M.A.S. are an all control line club with special interests in combat, stunt and team racing. They have a reportedly excellent flying ground and several displays lined up for sports days. Interested locals should contact Peter Baker, 11 Greenbank Drive, Liverpool, 17, for further details.

Whit Sunday R. C. Meeting

Bletchley Buckaneers' Whitsun R/C meeting, for those who are not travelling to Newcastle, is now expanded to "all-comers" as detailed in Contest Calendar.

Efficient silencers **must** be used and the free style will have two obligatory manoeuvres. Two flight lines are to be in operation, one at either end of the runway. Fred Bearton, who gave the B.B.'s a lecture on silencers as reported last month, has now carried out some field tests with strange results being apparent. Worst engine was a Fox 35 with a home-made silencer that **increased** the noise reading. Taking this as 100 per cent the next in line were two K & B 45's with Merco silencers at 39.7 per cent and the best was a Super Tigre 45 with a modified Merco silencer at only 5 per cent. dB figures were Fox 35 82, K & B 45-78 and Super Tigre 45-69, obtained at a 25 ft. distance from the engine.

Baguley Wins in Rain

Jim Baguley (Hayes) won the K.M.A.A. with a fly off time of 2:18 after a false start time of 3:00. The time keeper's watch went wrong, and Jim had to lend him his own (not special of course). Both times were made whilst it was raining! Jim **had** to keep the K.M.A.A. in the club as Ray Wotton won it last year.

Croydon & D.M.A.C. Open Gala

Held at Chobham on April 25th, with weather cloudy and a light breeze blowing, thermal activity was abundant throughout the day. The Gala attracted quite a large entry in rubber and glider though, possibly due to the problem of silencers, there were few power contestants. No re-entry was allowed. Surprisingly enough only one person managed a full score in the power and glider event, George Fuller making a rare appearance to win power and Paul Newell taking glider. The weather obviously suited the rubber flyers as no less than nine people reached the fly-off, which was held in near perfect conditions; as can be seen from the flight times. It was a very closely fought affair, with Digby Woods of St. Albans narrowly beating Fred Boxall by 17 seconds for first place.

Incidentally, twin brother Reg Boxall has been taken seriously ill with thrombosis of the leg and is now recovering slowly in Chichester Hospital, however he will not be flying for some time.

Results :— **Rubber :** 1, D. Woods (St. Albans), 17:42 ; 2, F. Boxall (Brighton), Wooten (Hayes), 8:57. **Power :** 1, G. **Glider :** 1, P. Newell (Surbiton), 9:00 ; 2, M. Coombes (E. Grinstead), 8:58 , 3, Mrs. 17:25 ; 3, J. Allen (Brighton), 17:20. Fuller (St. Albans), 9:00 ; 2, B. Cooper (N. Heights), 8:31 ; 3, G. Head (Lee Bees), 8:04.

Silencers Demonstrated

Following many complaints of noise at their flying site, Wanstead Warhawks were asked by the Epping Forestry Commission to demonstrate the effectiveness of silencers when fitted to radio control and control line models. In all about 14 local officials were present and seemed fairly impressed with the results. Wanstead club are now awaiting to hear the official view as to the fate of their flying field and many others in East London. In the modelling field mode's galore are being produced including a scale "Grumman Gufhawk" for a Merco 49 by Pete Ball with fully detailed cockpit and sliding canopy. U/C is fully sprung and it now awaits the Nationals. Many other scale projects have been completed but the most ambitious is that of Dave Platt who has a beautiful 1/6th scale "Miles Magister" for Multi R/C, and a silenced Merco 61 inside the cowling. Ternhill, Easter Meeting was a blow out for them with only two members staying for both days. The Club are very pleased to announce that Henry J. Nicholls has accepted the position as Club Hon. President and that new members include Eta engine man Ken Bedford, who is seen pitting team racers quite often these days.

(*Turn to page* 288)

Basil Murley ("Nova" — Intermediate) Dave Platt ("Fleetwing" —Multi) and "Stoo" Holland ("Peacemaker" — C/L). The "noise and silence" demonstrators for Epping Forest, see above.

Lindbergh's
'Spirit of St Louis'
Now a Frog Trail Blazer kit 3'6

Lindbergh, the Flying Fool, left New York in his overladen plane 20th May 1926 to fly solo across the Atlantic. Others had tried for the $2500 prize and all failed. Some had lost their lives, too.

For two days the entire world waited anxiously for news, and finally Lindbergh touched down at Le Bourget in Paris . . . as the first man in history to fly the Atlantic solo!

The Spirit of St Louis was a modified RYAN M2. A super-inspected 223 b.h.p. Wright J-50 Whirlwind and a duralumin Standard Steel Co. propeller were provided. The 36-ft M-2 wing was enlarged to 46 feet, with the same Clark Y wing ribs, but for efficiency the spacing was reduced to 11 inches, leading edge wrapped with ply, and airfoil shaped balsa blocks used to fair the tips. The ailerons were reduced by 1/5 from the M-2 size to avoid wing stress, and became diminutive tabs by comparison, though quite effective for lateral control. With the larger wing and need for internal fuel tankage plus a large tank in the fuselage around the centre of gravity, the tail unit had to be shifted back 2 ft. and nose length extended 18 in. to compensate. Another major requirement was for an extra 2' 9" undercarriage track with bungee cord suspension on long travel legs to take the terrific load.

The fuselage was welded steel, the wings wood, with steel tube brace struts. Fuel tanks were tailored of "Ternplate". Fuselage was lined with balsam wool around the cockpit.

Wing struts were covered with balsa fairings, and all strut component joints sealed with beaten aluminium covers. Most important of all was the blending of the Ryan spinner into the square frame of the main fuselage with machine-turned polished cowlplates . . . possible only by placing the pilot aft. Also bulk fuel tankage had to be near the c.g. Lindbergh preferred being aft of the weight mass, anyway, in case of a crash, and an emergency periscope was devised.

Frog have brought the 'Spirit of St. Louis' to life in their new Trail Blazer series. Kit includes superb scale models of Lindbergh and ground crew. In the shops now, only 3/6d.

FROG®

See the whole exciting range in the 1965 Frog Catalogue, available from your nearest model shop: only 4d.

FROG CONSTRUCTION KITS—CREATED FROM MANUFACTURERS BLUEPRINTS

Combined S.M.A.E. and Club Contest Calendar

May 23rd *S.M.A.E. Control Line Team Trials,* Criterium of Aces, R.A.F. Hemswell, Lincoln. F.A.I. Team Race, Speed, Stunt, Combat. No silencers required. (*NB Criterium of Aces will be at Liege, Belgium, 27-29 August.*)

June 6th & 7th *British National Championships.* R.A.F. Ouston, 12 miles west of Newcastle-upon-Tyne, just off B6318 road. June 6th—Thurston Cup (Open Glider), Women's Cup (Open R/G/P.), S.M.A.E. Trophy (Multi R/C), Knokke Trophy (C/L Scale), Gold Trophy (C/L Stunt), Davies A Trophy (A T/R), Combat heats, Handicap Speed and Scale Radio. June 7th—Model Aircraft Trophy (Open Rubber), Sir John Shelly (Open Power), R.A.F.M.A.A. Trophy (½A T/R), Scale Radio (Judging), Scale C/L (Judging), Combat finals, and Speed.

June 6th *Buckaneers M.C. Free Style R/C Contest.* Podington Airfield, Nr. Wellingborough, Northants. Multi channel and super-hets only. Details and entry forms from: D. Giles, "Derron", Station Road, Bow Brickhill, Bletchley, Bucks.

June 13th *Uxbridge D.M.A.C. Control Line Rally.* Hayes C/L Circuit, Charville Lane, Hayes, Middx. S.M.A.E. combat, B Rat-Race on 56 foot lines. Pre-entry by June 7th, 2/6d., to: R. G. Shelvey, 5A Station Parade, Denham, Uxbridge, Middx.

June 20th *Finchley and D.M.A.C. Control Line Gala.* Glebe Lands, Summers Lane, Finchley, London, N.12. Class A and B Combat, Senior and Junior Stunt, Pre-entry, 2/6d., to: K. D. Lesser, 20 Squire Lane, Finchley, N.3, or field entry if places are available on the day.

Rallies Additional to Previous S.M.A.E. and Club Contest Calendar

(*See Feb., Mar., Apr., May issues*)

July 11th *Clywd Slope Soaring Meeting.* West Slopes of Moel-Ffamau, Nr. Mold. Open A2 and Junior, R/C Single Surface, R/C Multi. Pre-entry for R/C by 1.7.65 to: C. R. Filtness, 26 Raymond Street, Chester. 2/- Snr. 1/- Jnr.

July 18th *Esher Intermediate R/C Rally.* Woburn Abbey. Details from and entry to: W. R. Oberg, 109 Longewood Avenue, Tolworth, Surbiton, Surrey.

July 25th *Bristol M.A.C. Radio Control Rally.* R.A.F. Hullavington, Wiltshire. Multi, Scale, Intermediate, i.e. 6 or less channels. Two flight lines, three flights each. Intermediate based on nominated time and spot landing.

Sept. 5th *Northern Heights Gala.* R.A.F. Halton, Bucks.

Sept. 26th *Northern Area Vintage Contest.* R.A.F. Topcliffe, Yorks, Nr. Thirsk. Pre-Jan. 1951; 3-3 min. flights. Entrant must prove vintage of model. R.O.G. 15 sec. run. If motor is DESIGNED PRE-51, 25 sec. run. 164' Glider Line.

October 3rd *South Coast Radio Rally.* Golden Cross, off A22 London-Eastbourne Road, between Uckfield and Polegate. Details from: Area Secretary, 52 Dover Road, Polegate, Sussex.

Oct. 17th *Tony Pannett Memorial Trophy.* R.A.F. Topcliffe, York, Nr. Thirsk. Open Power 3 x 3.

December 26th *Woking D.M.A.C F/F Gala.* Chobham Common. Open R/G/P, Coupe D'Hiver, Chuck Glider. Starts 10 a.m.

NO KIDDING AT KIDDERMINSTER

In its first 18 months Kidderminster M.A.C. membership has risen to 50. A local flying site is leased from a nearby manufacturer and this provides an excellent surface for all types of flying. Radio control is the main interest and they recently enjoyed a visit from the L.A.R.C.S. (Leicester Area Radio Control Society), who thrilled them with their radio prowess. Tom Jolly is keeping the C/L boys moving and a good entry should be at the Nationals. They are very keen to promote contest flying in their area and would like to hear from local clubs.

CLASSIFIED ADVERTISEMENTS

PRESS DATE for July issue, 1965, May 24th, 1965.

ADVERTISEMENT RATES :
Private **Minimum 18 words 6/- and 4d. per extra word.**
Trade **Minimum 18 words 12/- and 8d. per extra word.**

Box Numbers to count as six words when costing.

Box replies to be sent care of Advertisement Departmnt, Model Aeronautical Press Ltd., 38 Clarendon Road, Watford. Copy received after first post on May 24th, 1965, will be held over until the next issue, unless cancelled in writing before 20th of following month.

FOR SALE

SELLING UP : AM.15, D.C. Bantam, 2 Jetex motors, fuel, etc., Celspray; all perfect. 110 Model Aircraft and Aeromodellers, 3 Aeromodeller Annuals, plans, props, tanks, etc. Any reasonable offers for lot; will separate if necessary. Malcolm English 38 Blackpool Road, Preston Lancs.

COX SPECIAL, near new, 70/- o.n.o. Heaps of models, cheap. S.A.E. list. Baguley, 29 Adelphi Crescent, Hayes, Middx.

WEBRA MACH II, slightly modified, very fast, £5. Also Frog Viper, perfect condition, £2/5/-. M. Jacobs 124 Middleton Road Gorleston, Norfolk.

E.D. SUPERFURY 1.49 c.c. diesel, superb condition, 17,000 r.p.m., boxed, accs., 60/-. Francis, 57 Lucerne Walk, Shotgate, Wickford, Essex.

SEND S.A.E. for list of "Aeromodeller" and "M.A." Some years complete. Offers. R. G. Harris, 30 Mornington Road, Loughton, Essex.

RUBBER CONTEST: Hard-carved high efficiency airscrews, noseblock, ballrace and pick-up, £1. Pirelli; 1959 Jap tissue—all colours. Amor, 6 Inglemire Lane, Cottingham, East Yorkshire.

VECO 19, £2; Enya 19, £2; AM 35, £2 (requires running-in); or £5 lot, assorted accessories. W. W. Mitchell, 23 Prior Road, Forfar, Angus.

SELLING UP: Mono-line, U-Reelys, engines, radio, new kits, accessories (offers quickly—wife compels). S.A.E. Box No. 748.

DEAC 500 Charger in case with meter, £2. UK Rx., £2. Musclemite servos, new, £2. Sleyride motors, 2-6 v. for servos new, £1. Relays, Carpenters, 24 v., 5/-. Siemens HS. 3.7K, 1K, 10/-. REP, ED 5K 5/-. Box No. 747.

BUY BRAND NEW EQUIPMENT at two-thirds the price: R.C.S. Guidance Sytem Mk. II £10; three-quarter built Robot, 25/-; ½A team race pans (polished), 8/6d. Various engines, 15/- to £3. 9 Knightsbridge Court, Sloane Street, London, S.W.1. Tel.: BELgravia 1770.

VECO 35, 98/6d.; AM 35, 50/-; AM 10, 30/-; E.D. Bee, 20/-; Tee Dee 020, 30/-; T/Hopper, 30/-. C. Buncher, Kentisbeare, Devon.

R.C.S. Sports 10 Transmitter and Receiver. Latest type (not high power) Tx. in older type case. Latest 'Slimline' Rx. Also 8 channel transistorised Servomite pack and Musclemite. Any reasonable offer. C. Baker, 27 Heathside Road, Woking, Surrey.

MICRODYNE 1 S/C Receiver, cost £11, sell £6. Greenouff, 5 Waterloo Road, Salisbury.

SUPER 60, built, unflown, nylon covered, red and blue, Musclemite throttle rudder and elevator control, Deac, R.C.S. 6 channel transistorised Receiver and Transmitter, Enya 35 II engine, not run. Offers over £50. "Woodcote", Tubney, Nr. Abingdon.

O.S. MAX 35 Mk. 1, never been run, 70/- o.n.o. McGregor carrier wave Rx., Tx., 80/- o.n.o. Weir, 56 Queen's Road Ashford, Kent

FINISHED SMOG HOG, no engine, fitted servos, only needs wiring, E.D. Everest Six Tx., Rx., £25. "Aeromodellers" from 1941; many other mags., engines, etc. S.A.E. Norris, 15 Grange View, Eastwood, Nottingham.

COMPLETE SET of volumes "Aircraft of Fighting Powers 1939-45". Unmarked. Offers: J. Wickham, 28 Cherryfield Ave., Crumlin, Dublin 12.

D.C. SABRE, 10/-; AM 25, 20/-; E.D. 1.46, 20/-. S.A.E. to Snelling, 14 Brook Lane, Kidbrooke, London, S.E.3.

RARE PETROL ENGINE K6 V.G.C., little used since new. Best offer. S.A.E. for replies. Griffiths, 8 Factory Row, Seend, Melksham, Wiltshire.

A.P.S. SPITFIRE, very good condition; Veco '35', nylon covered. Offers. O'Neill, 3 Birchwood Rd., Corringham, Essex. Tel.: Stanford-le-Hope 2915.

FOR SALE: 'Aeromodellers' (26), 'Model Aircraft' (15), 'Flying Review' (42), 'Air Pictorial' (66). Any offers? Will sell in separate batches if preferred. Apply: 45 Rock Road, Solihull, Warwicks.

ETA 29 Mk. 5 with Fred Rising butterfly throttle, 65/-; Frog 2.49 BB modified, 45/-; AM 35, 35/-; AM 10, 20/-; all excellent. King, 19 Manor Way, Higham Ferrers, Northants.

G21 Mod., £5; Fox 15XX Fact. mod., £3; KB 19, £3; Frog 249 BB, £2; TD09, £3; Mod. Jubilee chromed liner, £5; 2 mod. Jubilee, £3 ea.; Dynajet, £10; 2 Monoline handles, £1 ea.; Monoline units, 6A, £1 ea.; 1B, £1; 1C used, 15/-; ½A, £1; Tornado Plasticotes 6 x 9, 6 x 10, 3/6. ea.; Revup 5¾ x 8, 3/6d. ea.; Cox 09 throttle, £3; pans, spinners. Bird, 133 Engadine Street, London, S.W.18.

SALE: Berkeley kit 54 in. span, Waco cabin duro cowl, 3 in. Dubro airwheels, 12 x 6 prop. nylon, cement, cost over £12, first £5 secures. Parr, 78 Upper Milehouse Lane, Newcastle, Staffs.

SELLING UP: Cox TD 049, 09, both new, 55/-, 65/-. OS 15, 40/-. Bargain, each accessories. Pike, 32 Fleet Road, Benfleet, Essex.

FROG 2.5, YIN YAN 2.5, RASANT II 2.5, Drabant 2.5, ED 3.46, Amco 3.5 diesel and glow, Oliver 2.5, OS 15, 25/- each. Spitfire 1 c.c., Alag 1 c.c., E.D. Bee, E.D. Cadet, Frog 100 vintage), 20/- each Elfin .5, Frog .5, Wen Mac 049, OK 020, 7/6d. each. Bound volumes 'Air Trails', 'Model Airplane News', 'Flying Models', 'Aeromodellers, 'Model Aircraft', 1943 to date, 32/6d. each. C. Read, 15 Union Street, Newport Pagnell, Bucks.

WANTED

ENGINES: Good, used European or British engines in running condition, complete with tank, n.v., etc. Will consider trade for U.S. engines. State condition and price including prepaid postage. Every reply answered. W. R. Shirley, 255 Chippewa Road, Pontiac, Michigan 48053, U.S.A.

OHLSSON 23 (sideport) petrol, Frog 175 petrol. State condition, price. Willcocks, 24 Gleneagles Gardens, Bishopbriggs, Glasgow.

DE BOLT "Custom" biplane. Fully or partly built. New or used. Not too heavy. Write details and price to: 47 Downham Road, Ely, Cambs.

ORBIT or F & M 10 relayless transistorised superhet Tx. and Rx. Details and price to: Robinson, 32 Cairn Cres., Cambusdoon, Alloway, Ayr.

GOOD TWIN-CYLINDER petrol engine, preferably Craftsman, flat-twin. Also have several petrol engines (singles) for exchanges. Box 749.

SITUATIONS VACANT

GOOD SPARE TIME PAY for skilled modeller, help develop models of new type flying machine. London/South England. Box No. 746.

BOOKS

OBTAIN your 'Aircraft Profiles' from: C. J. Pidler, 40 St. Mildred's Road, Ramsgate, Kent—details and aviation lists free.

AMERICAN MAGAZINES. Year's subscription 'Model Airplane News', 46/6d.; 'American Modeller', 35/6d.; 'Air Progress', 39/6d. Full catalogue free. Willen Ltd. (Dept. 1), 61a Broadway, London, E.15.

RARE BOOKS. 'History of Model Aircraft', C. E. Bowen; 'Indoor Flying Models' and 'Rubber Motors', R. H. Warring; 'Aeromodeller Annuals', complete set 1948-65. Excellent condition, offers plus postage. Amor, 6 Inglemire Lane, Cottingham, East Yorks.

'AEROMODELLER' BACK ISSUE MART. Vast stocks of back issues held in stock. Beaumont, 11 Bath Street, London, E.C.1.

TRADE

RADIOMODELS, Regent Road, Hanley, Stoke-on-Trent: Radios, Engines, H.P. 10 per cent deposit. Single Channel with Compound Actuator, £13/5/-. S.A.E. lists.

ROSSI 60, 10 c.c., chromed, £17; Rossi 60 (chromed) R/C, £19/10-; Rossi 60 STD, £13/10/-; Speed pan for 2.5 c.c. with spinner, £1; 5 c.c. pan, £1/5/-; 2.5 c.c. team race pan, 13/-; 4 grades glow plugs, 4/- each; Vulcan jet, £12; 6 x 8, 6 x 9, 6 x 10 speed props., 3/-; 7 x 8, 7 x 9, 7 x 10, 3/2d.; 9 x 11, 12, 13, 4/-. Rossi, Via Pace 13, Brescia, Italy.

TATONE TIMERS—D.T.'s Standard or ½A Fuel Shut-offs. Price now 37/6d. post free from Dave Posner, 61b Canfield Gardens, London, N.W.6.

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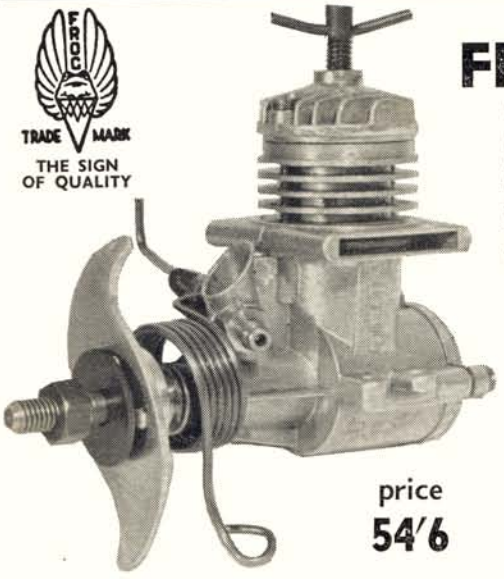

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FROG '80' Mk. III DIESEL . . .

Latest version of this superb and deservedly popular sports diesel has been improved in detail design and now gives a better-than-ever performance. Equally at home for control line or free flight—and, of course, baby R/C models—the '80' offers dependable power and extra long life.

- **FOOLPROOF SPRING STARTER**
- **TWIN EXHAUST STACKS (Easy to fit a silencer !)**
- **ANGLED NEEDLE VALVE**
- **COMPRESSION SCREW LOCK**
- **SPEED RANGE 3-15,000 R.P.M.**
- **EXCEPTIONAL EASY STARTING**

SPECIFICATION

Displacement: .79 c.c. (.048 cu. in.)
Bore: .400"
Stroke: .392"
Mounting dimensions: (Beam) $1\frac{1}{4}$" × $\frac{7}{16}$"
Height: $2\frac{1}{2}$"
Length: $2\frac{1}{2}$"
Crankcase width: $\frac{11}{16}$"
Weight: 1.9 ounces
Cylinder: leaded steel
Crankshaft: hardened steel
Piston: Meehanite
Contra-Piston: Meehanite
Con. rod: Alloy forging
Crankcase: Light alloy pressure die casting
Main bearing: Bronze

Matches free flight models 30-44" span (30-36" span for R/C); control line models 12-30" span.

OTHER MODELS IN THE FROG RANGE

EVERY "FROG" ENGINE GIVES YOU :

- ★ **DEPENDABLE, DEAD-EASY STARTING !**
- ★ **SMOOTH, FLEXIBLE PERFORMANCE !**
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- ★ **OUTSTANDING LIFE AND DURABILITY !**
- ★ **AN ENGINE THAT STAYS ON TUNE !**

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Guarantee

Every FROG ENGINE is fully guaranteed to be free from any mechanical or material defect and is precision manufactured to the highest degree of British engineering skill and craftsmanship. Spares and servicing facilities are also readily available, if required.

Manufactured and Distributed by

A.A.HALES LTD
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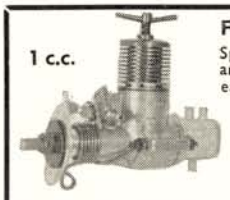
1 c.c.

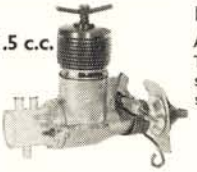


FROG "100" Mark III 57/-

Specially developed for sports models and an ideal 'beginner's' engine because of its easy starting and consistent performance. Handling is now made even easier with the spring and cam starter fitted as standard.

Capacity: .99 c.c. (.060 cu. in.)
Bore: .416"
Stroke: .460"
Weight: 3 oz.
Front rotary induction. Plastic tank fitted as standard.

1.5 c.c.



FROG "150" Mark III 59/6

A superb high-performance diesel for ½A Team Racing, the smaller stunt model, or sports or contest free flight. Now fitted with spring starter—and performance uprated !

Capacity: 1.49 c.c. (.060 cu. in.)
Bore: .500"
Stroke: .460"
Weight: 3 oz. (3½ oz. with tank)
Power: approx. .15 bhp at 15,500 rpm

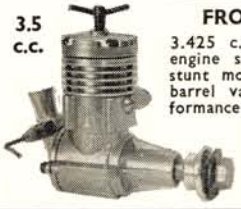
2.5 c.c.

FROG "249 BB" 79/6

A true competition engine designed for top performance and featuring twin ball races, high speed rotary (crankshaft) induction and special cylinder porting. Robust design ensures great strength and extremely consistent performance.

Capacity: 2.494 c.c. (.152 cu. in.)
Bore: .581"
Stroke: .574"
Weight: 6½ oz.
Power: Approx. 0.3 bhp at 15,500 rpm
Angled needle valve.

3.5 c.c.



FROG "349 BB" 87/6

3.425 c.c. capacity (.209 cu. in.) ball race engine specially suited for Combat or larger stunt models. Original design of rear-mounted barrel valve induction for really smooth performance with a large size diesel.

FROG "349 BB" R/C . . . 105/-

Special radio control version fitted with exhaust muffler and barrel-throttle for fully flexible speed control. 7¼ oz.

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