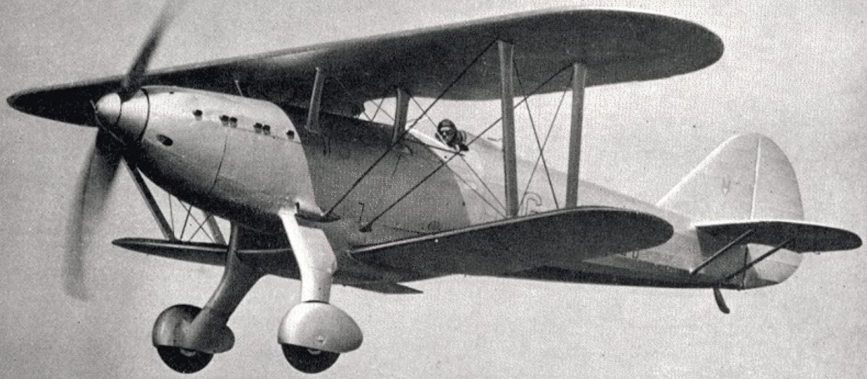
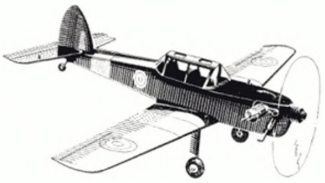
AERO MODELLER

APRIL 1956



FAIREY FANTOME FEATURE

1/6



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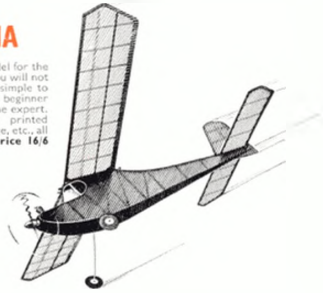

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The world's smallest production diesel. .15 c.c. now available at a greatly reduced price due to improved methods of manufacture. Perfect for miniature flying scale and free flight models it now costs only **£3.19.8**

DART 0·5cc 0·3 cu. in.

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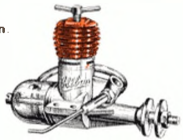

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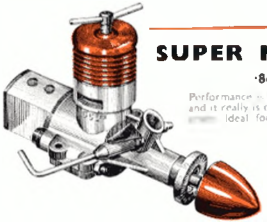

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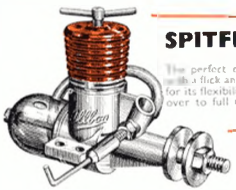

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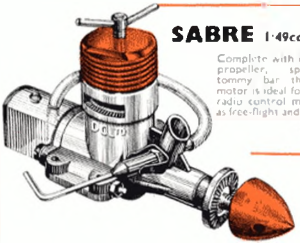

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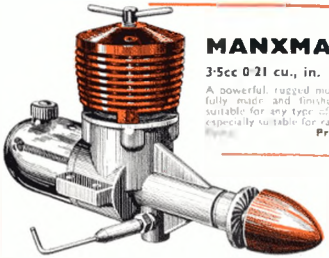

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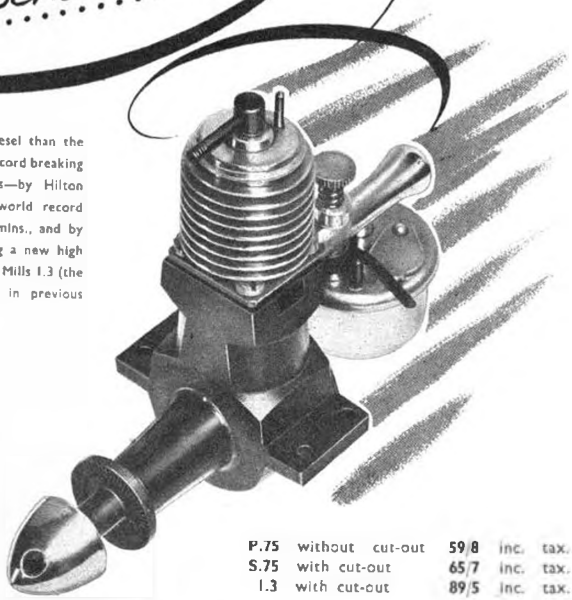

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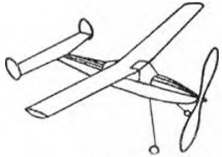

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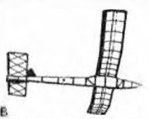

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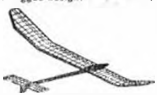
34" Sailplane. Very light. Rugged design. **8/3** (+ 1/8 P.T.)



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64" A/2 Sailplane. Winner in 1954 All-Britain Rally. 1954 S.M.A.E. Cup; 1955 Southern Counties Rally. **16/3** (+ 3/3 P.T.)

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38" Low-Wing Cabin Model for 5-1 c.c. diesels Pre-cut and printed parts and coloured Modelspan, etc. Plan shows fixings for 8 engines. Absolutely complete.

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A Modern-delta Glider with phenomenal performance. Kit absolutely complete.

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13½" Jetex. 2nd in 1955 S.M.A.E. Jetex Cup and Scottish Rally. **3/3** (+ 8d. P.T.)

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24" Beginner's Glider. **4/1** (+ 10d P.T.)

It is with deepest regret that we announce the sudden death of our Founder, Mr. Arthur Mullett, who succumbed to a heart attack on February 25th last. His passing at the early age of 47 will, we know, be regretted by all.

The personal service that Mr. Mullett gave to customers in all parts of the world will be continued under the able management of Mr. Ray Spence who has served with the business in all its departments for many years.

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ALLBON SUPER MERLIN	**47/– + 8/–**
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Frog .5 c.c.	38/9 + 6/3
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E.D. Baby .46 c.c.	46/– + 9/11
Mills 0.75 c.c. with c/o	55/– + 11/–
Mills 0.75 c.c.	50/– + 10/–
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Chump 20" C/L	10/7 + 2/2
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D.C.

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"Covers the world of Aeromodelling"

VOLUME XXI
NUMBER 243
APRIL 1956

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

★

Special features

★

Regular features

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5 weeks O.O.S.!

WITH OUR TIMER well and truly stuck and the Editor suffering from advanced D.T. trouble, we have been borne aloft these recent weeks on the thermal bubble of a printing dispute which temporarily suspended the publication of the majority of magazines printed in the London area. We know from correspondence and telephone calls received at the Editorial Offices that readers and our friends in the Trade, stop watches in hand, have been anxiously awaiting AEROMODELLER'S return to earth, and do sincerely regret the inconvenience and disappointment suffered by readers and advertisers alike.

From our viewpoint it is a great relief to return to terra firma once again, for nothing is more frustrating than producing a phantom AEROMODELLER, no pun on this month's cover being intended!

With our feet once again under the editorial desk instead of reclining despondently on its cement stained surface, we resume publication of this April issue approximately 5 weeks behind the normal date, and trust that the wholesome aeromodelling fare offered between these covers will satisfy the appetite of hungry enthusiasts. The editorial menu is, as always, sufficiently varied to cater for extremes in modelling diets, including the second of our "Famous Biplanes", featuring that beautiful aeroplane the Fairey "Fantome", a first class scale model of the Sopwith "Swallow"; a twin engined free flight canard the "Pteranodon" for those who like something a little different; a most informative survey of radio control flying in the U.S.A. by Claude McCullough, Chairman of the A.M.A. Contest Board; two articles for contest fliers, one on Slope Soaring, a truly fascinating branch of glider flying, the other entitled "Control that Climb" for those prop. flickers who wish to emulate the feats of Buskell and Gaster. All the regular features such as "Engine Analysis", "World News", "Model News" etc., are back in strength as can be seen from the list of contents.

Now to the future!—with the normal publication date for the May issue already but a memory we shall, by the sterling efforts of our printers and staff, produce that number by the 9th May. The June issue will follow on the 30th May, the the July issue on the 18th of June and by the August number we hope to be back on our normal date of July 15th.

Come what may we felt it our duty to produce the full quota of AEROMODELLERs in 1956 and ask the indulgence of readers until we can once again reach normal working.

On the Cover . . .

Classic picture of a classic aeroplane. Picture by that virtuoso of the camera, Charles E. Brown. Aeroplane, by the Fairey Aviation Company known as the "Fantome" and later the "Feroce". One of the prettiest biplanes ever produced, it is a fitting subject for the second of our "Famous Biplanes" feature in this issue.

"*Model Aviation*", official journal of the A.M.A. in the U.S.A. contains a report on the F.A.I. meeting which we quote verbatim:

I.M.A.C. MEETING REPORT

Paris, December 1955 *as reported by Mr. A. F. Houlberg, President of the F.A.I. International Model Aircraft Committee.*

Organisation of World Championships

It was decided that the question of holding the four championships together was dependent on a National Aero Club being willing to stage such an event. Any National Aero Club applying for permission to organise such an event is to submit full details of a plan of organisation. The final decision is to be made by the I.M.A.C. and will be dependent on whether the holding countries wish to organise their own championships. In short, most countries wish to retain their right of conducting the contest in their own country if they win a championship.

The F.A.I. Sporting Calendar for World Championships for 1956 is, therefore: (*Published in our February issue and omitted to save space.—Ed.*)

Items Raised by Belgium

A vote was first taken to ascertain if the Committee was of the opinion that a change in the formulae was desired in 1957. Belgium raised this point in particular because of the results of the Championships last year in Germany. The vote had the following results.

Gliders: No change.

Wakefield: Eight to two votes against increase in the maximum flight time. Eight to two against increasing the number of contest flights. Nine to nothing against increasing the total weight of the model. Six to one for revising the rules for 1957.

A lengthy discussion then took place on the question, which resulted in the following voting:

Reduction of rubber to 50 grams—five for. Reduction of rubber to 60 grams—two for. No change—one for.

The rubber weight will therefore be reduced to 50 grams for 1957.

Power: Six to four votes for change.

A discussion took place on the question of increasing the power loading to 300 or 400 grams per cubic centimeter of displacement. When put to a vote, there were five votes for and three against 400 grams. The voting was the result of the majority feeling that if any change was made, it should be an appreciable change or else the Committee would find itself in exactly the same position again by the end of 1957.

The President pointed out that these were drastic alterations and that the meeting could wither pass them then and there or refer them back to the National Aero Clubs for ratification.

The Committee considered that as each delegate held a mandate from his National Aero Club, the Committee was authorised to make a final decision. When put to vote, six were for making a spot decision and two against.

The power loading for 1957 will, therefore, be 400 grams per cubic centimetre (or double the present power loading).

Championship Jury

It was agreed that it was the prerogative of an organising National Aero Club to appoint a Jury or Stewards Committee. It is preferable that two of the three members

Heard at the HANGAR DOORS

A sad loss

It is with sincere regret that we report the sudden passing away on the 25th February of Mr. Arthur Henry Mullett, energetic principal of the Brighton model business that is probably even better known overseas than at home. Coronary thrombosis was the cause of death, and the end came with dramatic suddenness in the matter of a very few hours.

Arthur Mullett was barely 47 years of age, and he will be sorely missed in the trade. Originally dealing in musical instruments, he started his model shop in the post war years, and in a remarkably short space of time had built the business up to one of world-wide fame. Service was the standard on which this success was achieved, and particular attention was paid to the requirements of those keen overseas modellers who cannot walk around the corner to a model shop and make their selections.

A keen model boat man, he was always ready to compete or assist at regattas, but devoted much of his time in recent years to his other hobby of fishing.

Mr. Mullett leaves a widow and three children, to whom we extend our deepest sympathies. We learn that the business will continue under the able managership of Ray Spence, who was Arthur's right hand man for many years.

Those rules

Mail continues to arrive from faraway places, providing yet more comment on the 1957 rule changes. One opinion we value is that of the most unbiased, and certainly the world's greatest all-round flier, Emil Fresl of Yugoslavia. Emil would like to see a 300 gm/cc. rule, *or* reduction of power run to 10 secs.

be of a nationality other than that of the organising nation, and preferably chosen from among members of the International Model Aircraft Committee.

Official Languages

It was confirmed that the official languages were French and English, and that the rules of all international contests were to be in these two languages. The text of the rules is to be sent to the F.A.I. Bureau for a check and approval of the translation to avoid misunderstandings.

R.O.G. Requirement

It was agreed by six votes to two to abolish the rise off ground requirement for 1957. This does not affect the requirement that hydroplanes must take off from water or the requirement that control line models take off the ground.

Sporting Code Annex B

After a detailed discussion, it was agreed that it was advisable for the whole of Annex B of the present Sporting Code to be incorporated in the Rules when the Code is reprinted in 1957. This applies to such points as requiring competitors to provide templates of lifting surfaces, requiring competitors to vacate the starting position immediately after a flight, forbidding metal propellers, allowing only the competitor and one assistant at the take-off area, etc.

Great Britain proposed that persons forming a team in an international contest should all be nationals of the country entering the team. In view of the complications arising in connection with colonies and dependencies and the fact that this involved other committees, it was agreed to place this on the agenda for the next General Conference.

The above report is the first *detailed* account of what took place at the F.A.I. meeting (although it does not state who voted for what) and indicates that it was far from the cut and dried affair that some delegates would have their National Bodies believe. All of which emphasises that an F.A.I. delegate carries a heavy responsibility, not only at the meeting itself, but also in presenting on his return a fully detailed account to the people who sent him. A lot of British heads would have been less hot about the rule changes had they seen the above report, which brings us to the 64 dollar question: Why should British modellers have to glean their information from overseas sources when the S.M.A.E. could very easily have issued the above report and cleared the air?

Charles R. Wood, who is Vice President of District XI of the A.M.A. and hails from Seattle has written at length; he generally agrees with the new rules, but he says he is far more perturbed at the splitting up of the World Championships into three separate meetings. This view is also expressed by "*Flypaper*" one of America's enthusiastic model magazines which says the decision "appears to be a rather selfish attitude on the part of these countries in taking this stand. The U.S.A. for the past two years has strived to combine the three largest events and this was finally accomplished in 1955. Now things have back slid." Mr. Wood also mentioned that he doubted whether the U.S.A. will be able to send teams owing to the high travel cost, and has suggested to the A.M.A. that they declare their own U.S. Champion in each of the World Championship Classes.

International contests

Our old friend Juste van Hattum invites British enthusiasts to the International Flying Wing Contest organised by the Royal Netherlands Aero Club which will take place on June 8-11 in Holland. Full details and the venue will be communicated to National Aero Clubs in the near future and interested modellers should note that entries must be submitted through the S.M.A.E.

Contests embrace both gliders and power models and this year the wing loading has been reduced to 8 grammes per square decimetre, i.e. 2.621 ounces per square foot.

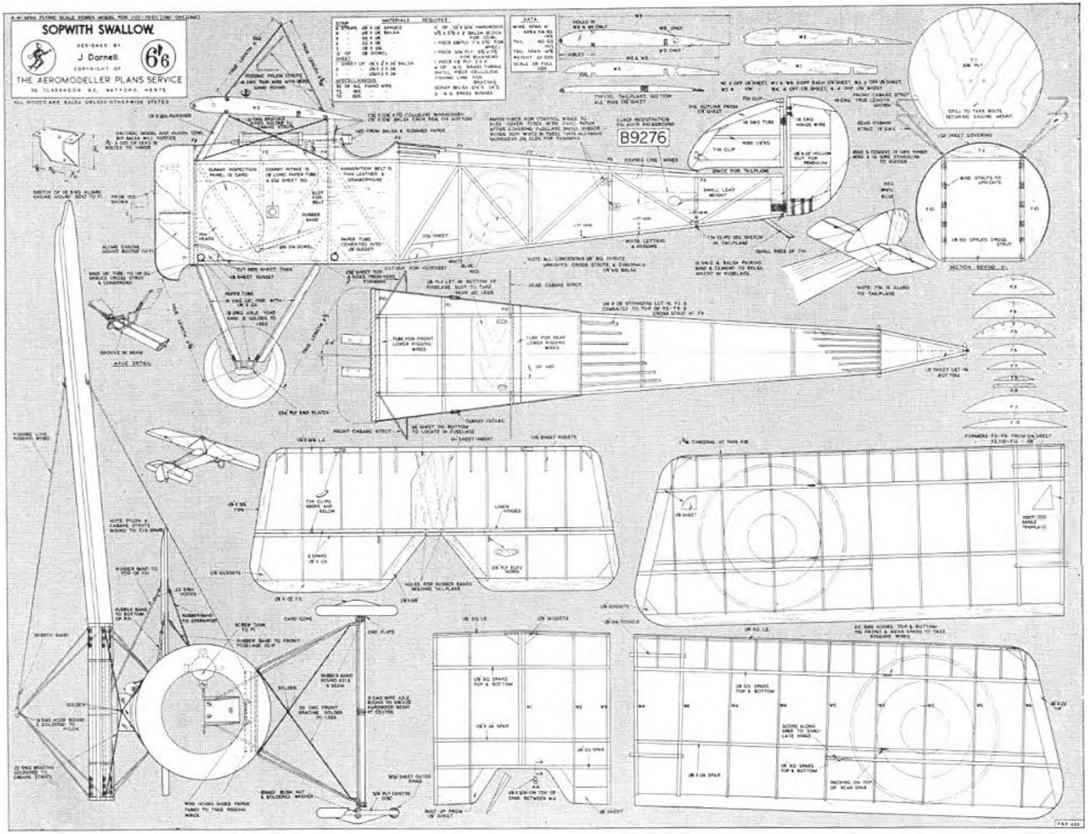
Also of interest to aeromodellers who wish to combine aeromodelling with a continental holiday is the Monaco Hydromodels event for both rubber-driven and powered waterplanes organised by the Aero Club de Monaco on the 5th and 6th May, 1956. Aeromodellers who are also motoring enthusiasts should take special note that the famous "Grand Prix de Monaco" takes place the following weekend. Again entries must be submitted via the S.M.A.E. to whom an official invitation has been sent.

Gliding holidays

Quite a number of our readers spent a most enjoyable holiday last year at one or other of the Gliding Clubs that run special Holiday Gliding Courses. Fees range from 12 gns. to 18 gns. per week according to Club and season, which includes full board and accomodation, flying membership, tuition, lectures, insurance, and other outdoor activities. There is no doubt that this is the ideal type of holiday for modellers who like the outdoors and who wish to carry their aviation activities a stage further than modelling. For those in the North the Yorkshire Gliding Club offer facilities at Sutton Bank; in the West the Bristol Gliding Club operate at Lulsgate; and in the South the Surrey Gliding Club will look after you at Lasham. Full details can be obtained direct from the clubs whose advertisements will be found elsewhere in this issue.

British Nationals

Lack of an AEROMODELLER has prevented us passing on the unfortunate news regarding the British Nationals which were scheduled for the Whitsun Holiday period, i.e. 20th and 21st May. Waterbeach, that haven of modellers, was the intended flying site but we understand that the R.A.F. have been forced to withdraw this offer owing to the aerodrome going fully operational. Last minute efforts by the S.M.A.E. to find an alternative 'drome have produced R.A.F. aerodrome Hemswell in Lincolnshire which is approximately 10 miles N.W. of Gainsborough, so will all "Nats" enthusiasts make special note of this change as it is a tidy step from Waterbeach to Hemswell!



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SOPWITH SWALLOW

A monoplane joins our flying scale range of one-eighth size '14-'18 fighters from the board of—

JOHN DARNELL

THIS RELATIVELY little-known Sopwith parasol monoplane makes a perfect free-flight scale model and completes the APS range of ⅛th-size '14-'18 fighters that came from the Kingston factory. Already firmly established as favourites in plans service are the *Pup*, *Camel* and *Triplane* so why not add this snappy flier to your collection? It suits any of the 1.5 c.c. diesels, will trundle around with a 1 c.c. and really tear up the air on 2 c.c. or more.

The Swallow (real one) began life under another name as the Scooter and appeared as the Sopwith Monoplane No.1 in 1918. It had a 130 h.p. Clerget rotary engine and was based on a Camel fuselage with the swept wing surfaces placed very low over the normal gun position. As such, it was an ambitious project and in the guise of civil registration G-EACZ was a fine aerobatic and racing mount for Harry Hawker. The Swallow was Monoplane No. 2, having a higher centre-section to clear the armament, greater span and larger ailerons: but in spite of persistent trials, it showed no great advantage over the Camel and was of course, too late in 1919 for active service. Registered B 9276, the sole Swallow had a 110 h.p. Le Rhone engine.

John Darnell's model has simple structure, is a veteran flier, and can take either radial engine mounting direct on the ply bulkhead F.1., or have a beam mounted engine on the alloy bracket detailed. The pendulum-controlled rudder is a fine stability aid, and the shock absorbing undercarriage is both realistic and practical. Like the full size, the axle is retained in position with rubber band binding which allows initial bumps to be taken by the flexible axle, while in the event of a resounding thwack on terra firma, the whole u/c pivots and rear legs stress a rubber band as they slide into the fuselage and give up to 2½ in. of total wheel travel!

Begin with the fuselage, making up the basic box structure using spruce longerons, extra weight of which is negligible and strength value inestimable, then add the surrounding formers stringers etc. Do not apply the nose sheeting until after the cabane struts, undercarriage tube and rigging tubes are bound in place and the u/c fitted complete with shock rubber to dowel. Note that the axle assembly is completely separate and need not be made until last. With the u/c in place, and 22 swg cross braces soldered to prevent sideway just as they did on the full-size, pre-cement the nose faces to take F.1. and after fixing this important bulkhead, apply the nose sheet.

Now turn to the wing, which should by rights be flat: but needs the dihedral indicated to make the model auto-stable in flight. To get this dihedral angle, all we need to do is to adjust the rigging cord on final assembly and to set the root rib of each wing panel at the angle provided by the template shown. The wing then can be made in one flat unit, with un-cemented dry butt joints where the spars and trailing edges pass from panel to c/section, leaving the leading edge to keep the wing in one piece and angling the root ribs leaving a "Vee" gap. Part the wing panels by cutting through the l.e. and then fit the locator dowels so that the correct dihedral is obtained. Pin together and bind the c/section to the cabane struts using the frontal aspect of the whole wing as a guide to lateral line-up and the wingsweep in plan view to check the other way. Leave to dry, after liberally cementing all binding, then add the upper rigging pylon braces.

Tail unit, sundry rigging hooks and scale fittings (don't forget the pilot!) are self explanatory from the drawing, and we are left with the cowl and colouring to complete. On the John Darnell original, the cowl was beaten from a sheet of 20 swg aluminium, over a hardwood former: but a laminated balsa one would suffice. In any case, up to 1½ ounces of ballast will have to go into this short nose to get the centre of gravity forward.

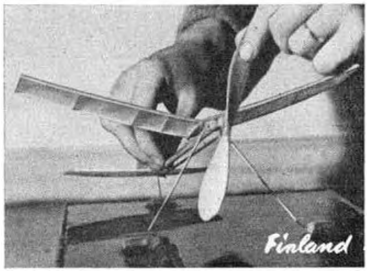
This model really glides, so the initial trim is soon found by altering the tailplane angle for a long flat descent. Try her on low power with a 9 x 4 prop., gradually working up the revs each flight and you will soon be the envy of the '14-'18 fans who will rejoice in the realistic flight pattern.

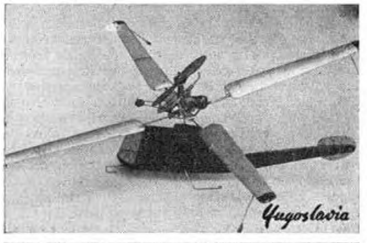
WORLD NEWS

A NATIONWIDE eliminating contest to be held at 24 specified flying sites on May 26/27 will constitute the first leg for selection of the **U.S.A.** international teams, followed by semi-finals 3 or 4 weeks later which take place in only four places in that vast country. One has to be a keen and hardened traveller to want to gain a place in the U.S. teams: but the advanced planning will make this years' selection more satisfactory than before.

Recent cricket news from **Pakistan** included the Lahore meeting between the Pakistan and M.C.C. teams, and it will probably come as a shock to cricket diehards that regular control-line displays were given on the ground by the Lahore club. The lads normally fly at the famous race-course and quite a number of models have been lost in the thermals which abound there since the simple fitting of a d/t is a complication they prefer to do without! The 6th All-Pakistan meeting was held at Lahore early in the New Year: but attendance was less than one-quarter of normal, solely due to the restriction of imports and complete lack of aeromodelling supplies. Mohammad Junaid, secretary of the Lahore Club would like to learn of any timber that would act as a balsa substitute and is available in his country—we would gladly pass on any suggestions; but at the same time point out that balsa is not the *only* modelling medium. Many countries maintain a high standard of flying using nothing but "hardwoods", Spruce, Birch and Obeche being Scandinavian favourites, and Pine, Cypress and Paulownia in wide use in Japan.

From the heat of Asia to freezing winter in **Finland** where they certainly breed them tough,—and keen. Force 5 winds and a temperature of minus 17 degrees Centigrade were not enough to deter the stalwarts who risked frostbite to fly on the ice for the 10th Finnish Winter Contests. Control tent had a fire: but others cut chunks of frozen snow to make igloo walls for protection against the arctic conditions. Even so, the time of 3 : 14 was amassed by R. Hyvarinen to win A/1, and 3 : 40 by H. Spring for A/2, (see below).





Left, top to bottom: Lahore group shows some of the lads who flew in the Pakistan Championships. In a display at M.C.C. v. Pakistan cricket match, one model had a battle with an eagle in front of 45,000 crowd. Next: Makara is the name of the Finnish hit model for indoor aerobatics—takes off from a small knoll! Helicopter is by Vladimir Novto, following study of AEROMODELLER articles. Uses an Allyn Dart and said to be fine for beginners. Bottom is Arturo Dias Rojo, a leading Mexican flier and his Torp 15 contest model

Below: Contrast from Northern Wintry climes, the hardy Finns, H. Spring at left with his winning A/2 and Timo keeper E. Ojala at right, both somewhat iced up!!

Model that is sweeping up many high places in California is the VTO Rammod design by Ron St. Jean as above. Right: is a ducted fan scale model that takes off. Bill Paxton's Douglas B66 has a fuselage duct for rear mounted engine, with scale pod jets as dummies. Below, the Villanovense Football Club of Vila Nova De Gaia is also keen on aeromodelling as will be seen by this picture of them with their one-design collection of gliders.

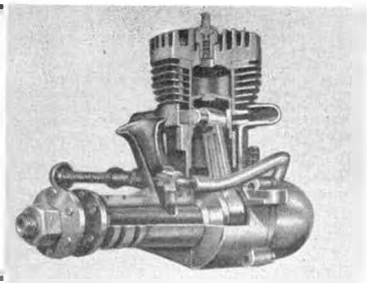
Last month we scratched the surface of the Scandinavian classifications for types of models, and now we have the full set which were originally introduced by Mr. Poppius of the Finnish Aeronautical Association. Gliders are "A" types as we already know, being A/1, A/2 and A/3 according to size, with A/4 for Slope Soarers, A/5 for Automatic Steering and A/6 for R/C. Indoor classes are B/1, 2 and 3. Rubber outdoor, C1, 2, 3 (Wakefield) and C/4 for Seaplanes, with the big size as C/5. Power models are "D" types, beginning with D/1 for International Power, D/2 and D/3 (Seaplanes), D/4 (R/C) and D/5.

Our Plans Service customers tell us it was worth the long trip to **Australian** Nats., Archerfield Aerodrome, 8 miles from Brisbane, Queensland. A lot of models drifted out of the field to land in a swamp which was hardly convenient, and a group of enthusiasts worked hard to rescue Russ Morrison's *Steiss Miss* (O.S. engine) which left its mark in power. Star of the last day was Max Newnham's 14 lb. scale C/L Viscount with four 5 c.c. engines. Flown on 70 ft. lines, we are told that it took 2,000 hrs to build, and pulls so much on the lines that it takes two people to lean back on the handle! As ever, the power scramble was a marathon and the R.O.G. requirement in grass wrecked some chances. Winner was an incredibly battered *Veron Cardinal* with faithful Mills and among devices used to keep noses into wind for the "as-many-flights-as-you-can-make-in-hour" in which total duration counts, were permanently open trailing parachutes.

Above right: Gliding scene in Holland could have been taken anywhere but for that characteristic Dutch application of novelty in the tail unit design. The scale Hawker Tempest is to class A team racing spec: but flown more for sport by designer R. S. Hosey of Otaki. Engine is an E.D. Racer. Below left and right Pfalz DIII and Me 109f are novel contrasts in German Warplanes. Built by F/Sgt. Robert of R.A.F. Seletar, they are both free-flight, with pendulum rudders, and have Elfun Dart power. Transfers were made by the AEROMODELLER gummed label method

Know Your Engine

CONTINUING OUR NEW FEATURE WITH EMPHASIS ON PORTS AND TIMING OF MODEL ENGINES



Japanese OS-29 engine cutaway shows internal structure of a type as sketched second from left in Fig. 9.

Concentration on compression ignition design where cylinder stresses are much higher and consequently stronger cylinders are required, has led British and most Continental manufacturers to employ quite rugged steel cylinders (sometimes referred to as cylinder liners) with separate finned jackets combining—or together with a separate—head. The common form of such cylinders is plain, with a flange at the exhaust position and external surfaces threaded above the flange if the cylinder jacket is screwed on, and below the flange if the cylinder is fitted by screwing into the crankcase—or merely plain in bolted up assemblies, or where the cylinder is located by the jacket screwing into the crankcase.

Exhaust ports in such cases are then cut into the thicker flange section, their effective width (and area) being the resulting opening on the inside of the cylinder. From being quite large, *i.e.*, approaching 360 degrees circumferential porting, there is now something of a trend to reduce the port width. Simply opening up the exhaust ports sideways does not necessarily benefit scavenging and the actual size of these ports is no real criterion at all as to high speed performance. Some very high speed engines in fact have quite small exhaust port areas, although frequently in such cases it is to be found that the opening time has been advanced to something like 110 degrees past top dead centre. Timing, of course, is governed by the depth of the ports (and determined by the position of the flange). On a design where scavenging appears to be incomplete, enlarging the ports upwards is more likely to give better results than enlarging them sideways. The respective merits of slots as opposed to a ring of holes is debatable, the latter providing "progressive" opening, but more gas friction.

By-pass or transfer porting on such cylinders is often largely decided by production requirements. Where a free gas passage is provided between the bottom of the cylinder and the surrounding crankcase unit (*i.e.*, the cylinder bedding down on the flange), it is only necessary to cut the by-pass ports through the cylinder wall. This must be done below the flange and if the cut is made perpendicular to the cylinder (slots or drilled holes) the difference in timing between exhaust and transfer is governed by the distance between the top of the exhaust port(s) and the bottom of the flange. The same practice can be followed when the cylinder is screwed into the crankcase by milling by-pass passages down the threaded bottom portion of the cylinder. *See Fig. 9.*

If the flange is thick and the stroke of the engine short, this frequently implies a restricted transfer opening time and the higher the bore/stroke ratio the more significant this feature becomes. The result is that at the higher speeds there may be insufficient transfer time for a full charge of mixture to be transferred to the head, with appreciable reduction in power. The engine may run quite well at high speeds, and may even have quite a high peak r.p.m., but its torque output will tend to fall off fairly rapidly as the speed is pushed up and the brake horse power developed will be only moderate as a consequence.

With this type of transfer porting it is nearly always necessary to overlap the geometry of the exhaust and transfer ports for sustained high speed performance, such as by angling the transfer ports cut through the cylinder walls so that they emerge on the side with the top above the level of the bottom of the exhaust ports; or by forming passages to a similar level on the side of the bore (which is a much more difficult machining operation) and so on. The main trouble is in achieving this without unduly weakening the cylinder. One cannot cut into the flange area, either from the outside or the inside, without weakening it. This, in fact, is a point in favour of employing minimum size exhaust ports so that

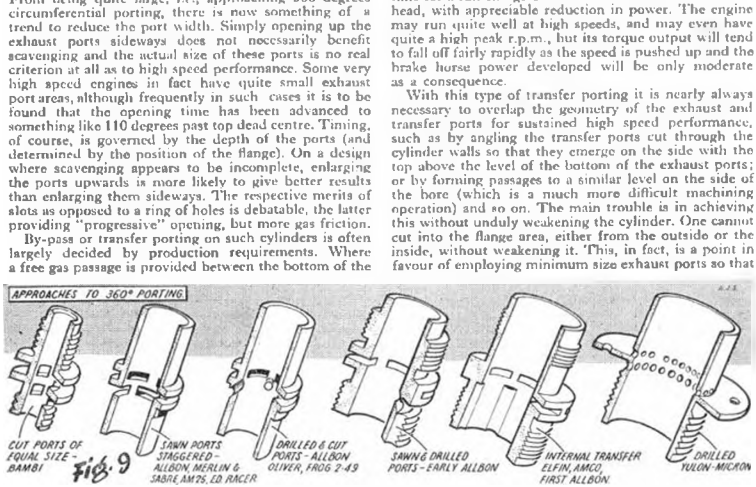


Fig. 9

more metal is available in the walls for forming the transfer passages to a greater height. But restricted exhaust port areas will be equally effective in reducing peak performance by preventing proper scavenging although the size of the transfer ports is far more significant, as regards perofrmance.

The shape of the transfer passages themselves is also a matter of some significance for peak performance and satisfactory high speed running (satisfactory in the sense that a good torque output is maintained at high speed; speed, with little or no usable torque is of little practical value). Hence again an engine cannot be judged on its "maximum speed". Letting the mixture find its own way, as it were, from crankcase to the top of the cylinder is satisfactory up to a point, but refinements to the sub-port are producing a restriction, and an increase in gas velocity will normally improve starting and peak performance. Increasing transfer passage area can only be useful up to a point. After that it can be harmful since the mixture may tend to expand into these areas and slow up after leaving the crankcase unless the area is progressively decreased, bottom to top. Starting characteristics then deteriorate and a similar loss of performance may be experienced as that due to insufficient transfer timing. Individual "tuning" techniques frequently refer to polishing the inside of the transfer passages with a view to reducing gas friction and hence minimising any tendency for the flow to slow up, but this, in general, has very little effect if the transfer passage is already of adequate size.

The timing for glow-ignition engines is different from that of compression-ignition (diesel) types—generally arrived to give optimum timing at very high r.p.m., hence tending to exaggerate the transfer period. (*Fig* 8)

Thus the performance of an individual engine fitted with alternative "diesel" and "glow" heads is usually quite different. There may be exceptions to the rule, but in general the torque output as a diesel is markedly better than with glow ignition, although with the latter higher r.p.m. figures may be obtained.

All engines with "high speed"-timing, too, are quite prone to blowback when turned over by hand—a feature which often makes it difficult to draw the fuel line full of fuel by finger choking. (The secret here is to remove the finger when the piston reaches top dead centre and so cut off the blowback effect.) Partial plugging of the induction tube (*e.g.*, with interchangeable venturi inserts), or even special valves on the intake (*e.g.*, the new McCoy .049) are features sometimes adopted by manufacturers to promote better starting characteristics on engines tuned for high speed running. The point to bear in mind is that for starting high speed engines the faster the propeller is flicked over the better. Quite a number of such engines will not smooth out and run satisfactorily on their own below about 8,000 r.p.m. and so they can hardly be expected to start merely by pushing the propeller over.

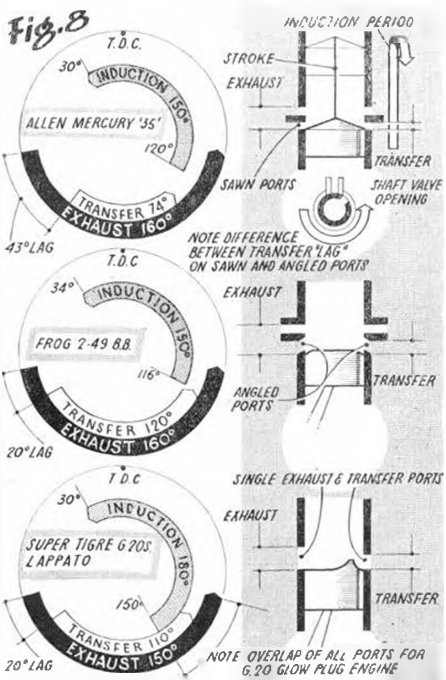
Quite a number of engines, too, have the unfortunate trick of backfiring when being started and then running quite happily in the reverse direction. The side port engine with its perfectly symmetrical timing should run equally well in either direction, although the internal geometry may be arranged to favour the normal direction of rotation. The reed valve engine, although the timing is asymmetric, will adjust this asymmetry to either direction of rotation and will again run equally well either way. But the same characteristic is often present with rotary valve engines, particularly when being started with small propellers. Quite often this feature is associated with restricted transfer timing, making the mixture a little late in getting to the top of the cylinder. There is not much one can do about it with a particular engine, except to be prepared for it to happen and avoid starting with the engine over-compressed, which is the condition most favourable to backfiring. Also the sharper the flick-over in the right direction the better.

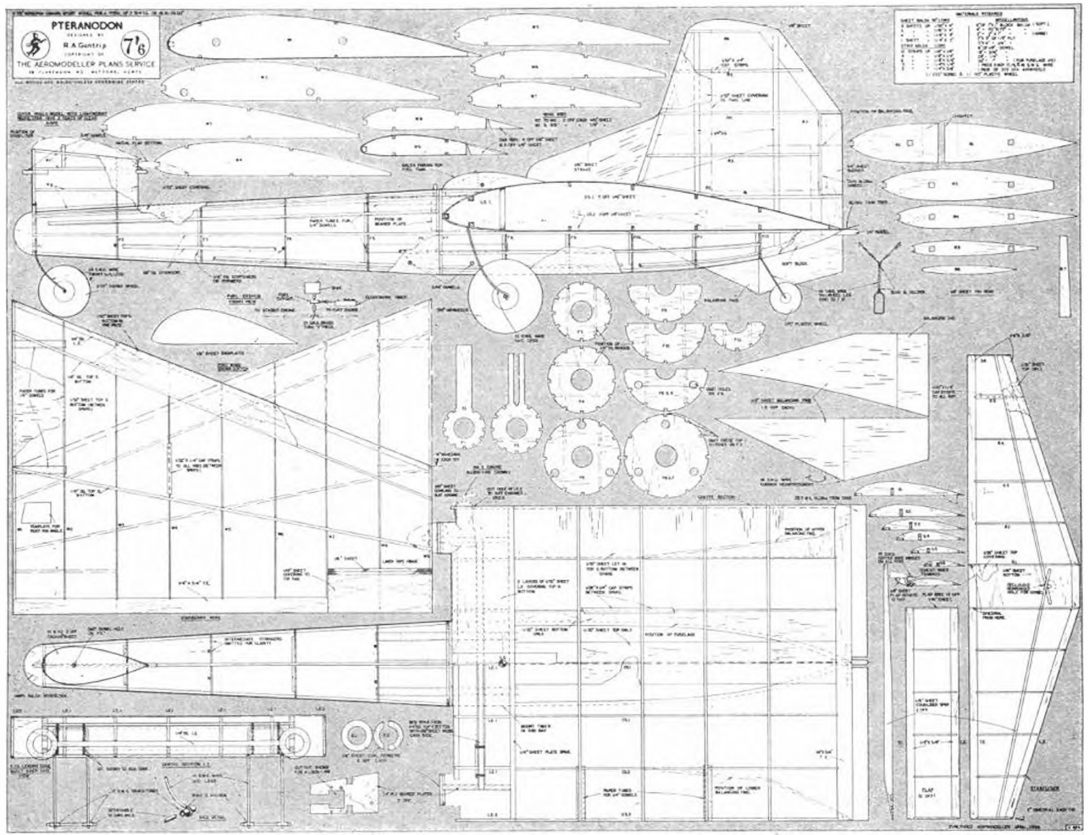
It should be emphasised, in fact, that without the proper tools and equipment, and the necessary skill, the average user will probably do more harm than good in attempting to modify the timing of a standard commercial engine. Most British and Continental engines have hardened cylinders to start with, which necessitates either grinding of the ports or softening of the cylinder line and re-hardening after working. This would also mean a new piston would have to be lapped in to fit. Also most crankshafts (including American engines) are hardened and will probably be ruined if softened as exact tempering is important.

But for the man with the necessary skill, reworking an engine in search of that little extra in performance can often be an attractive, and interesting, proposition. The mass-produced commercial engine is, after all, a compromise between design for performance and design for production, with particular emphasis on good starting characteristics in the more popular ranges.

Next Month

What all engine fans want to know will be answered by a summary on how Fred Carter tunes his engines —including a test report on the World Record holding 5 c.c. Carter Special.





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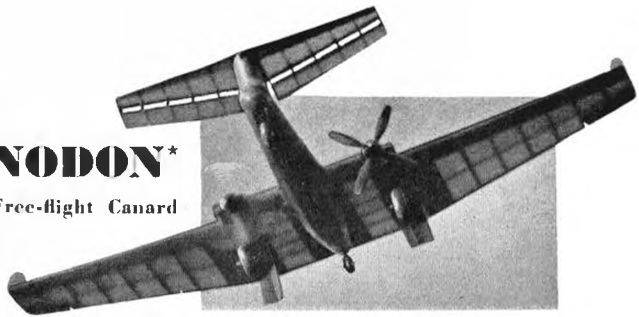
R. A. Guntrip's

PTERANODON*

A 55-inch span Free-flight Canard for a total motor capacity of 2·4cc.



DO YOU WANT a free-flight twin with no vices; that flies equally as well on one engine as it does on two; that can use engines of different capacities; that does not need simultaneous engine cut-outs; that is an ideal radio subject for radio control; that packs into a box only 22 in. x 17½ in. x 15 in.; and which certainly is different? Then "Pteranodon" is the model you have been looking for!

The designer, needless to say, is a canard enthusiast, which accounts for the unusual back-end-first appearance. He has flown the prototype over a period of nearly two years and found it a thoroughly reliable sport model that can be taken out in any weather with complete confidence.

It first took the editorial eye at the 1955 Northern Heights Gala where its stability and flying performance were impressive.

Construction of the fuselage is slightly out of the normal run, but not at all difficult, and is fully detailed in the building instructions supplied with the plans. People using wheels other than those specified should adjust the length of the undercarriage legs to give adequate ground clearance for take-off and the following hints by Mr. Guntrip on trimming and multi-engine starting procedure will be of interest to all.

Trimming

Set all tabs at zero to their parent flying surfaces and obtain satisfactory glide in still air. Adjust the angle of glide by means of the flaps on the front main-plane and lock in position with cement. Do *not* use the tabs at the rear of the centre section. Rolling or yawing should be corrected by one wing tip tab and the tab on the centre fin. Again cement the adjusted tabs in their new positions, and do not use the balancing fin tabs for trimming the glide.

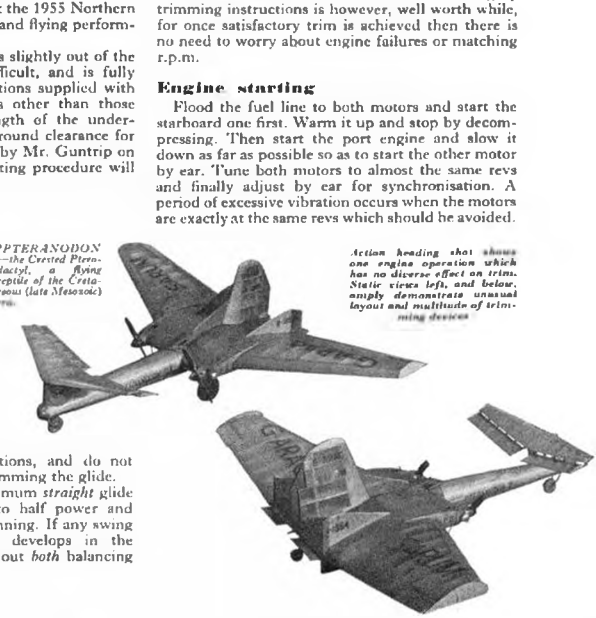
Having now obtained the optimum *straight* glide run the starboard engine up to half power and launch with that engine only running. If any swing away from the off-set thrust develops in the ensuing power flight then turn out *both* balancing tabs by the *same amount*. Work up to full power on No. 1 engine and then fly with No. 2 only. If any appreciable swing develops with this engine, adjust the port tab and balance this for glide by the tab on the centre fin. Now fly the model on both engines, trimming for turn with the remaining wing tab. If it seems reluctant to climb under full power deflect the wash out tabs at the rear of the centre section, but do not overdo this, as if a steep attitude is induced the drag from the front plane will make the climb worse than it was before. Finally cement the two balancing tabs in position. (Phew! Did you say TRIMMING Ed.?)

Careful attention to these somewhat lengthy trimming instructions is however, well worth while, for once satisfactory trim is achieved then there is no need to worry about engine failures or matching r.p.m.

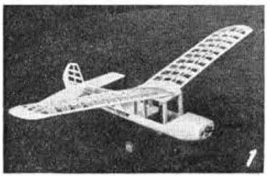
Engine starting

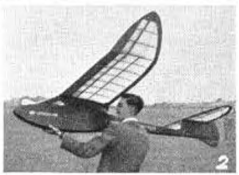
Flood the fuel line to both motors and start the starboard one first. Warm it up and stop by decompressing. Then start the port engine and slow it down as far as possible so as to start the other motor by ear. Tune both motors to almost the same revs and finally adjust by ear for synchronisation. A period of excessive vibration occurs when the motors are exactly at the same revs which should be avoided.

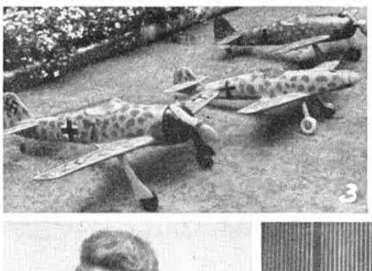
**PTERANODON—the Crested Pteradactyl, a flying reptile of the Cretaceous (late Mesozoic) era.*



Action heading shot shows one engine operation which has no diverse effect on trim. Static views left, and below, amply demonstrate unusual layout and multitude of trimming devices







Model News

MODELLERS WITH a flair for photography will forgive us for reproducing yet another picture of the ever popular APS Douglas Invader when they see our Model of the Month. Titled "Dawn Patrol" this silhouette shot is the work of professional photographer Jon Wooldridge of Liskeard in Cornwall, and as a sample of table-top indoor photography we rate it very highly. D. S. George of the same Cornish town built the Invader for a pair of Elfin 1.49's and not content with just making the bare model, wrote to the Douglas Company for interior details. A photo they kindly supplied enabled Mr. George to complete the cockpit detail, and as a novel tip, he passes on the information that matt black photo print wrapping paper makes most realistic cockpit lining material.

Number **1** picture is a nice constructional view of 18 year old R. H. Ingham's six-foot span radio control design for the Elfin 2.49. Now covered in nylon and ready for installation of a home-built AEROMODELLER receiver, it would appear that Mr. Ingham has an eye to radio accessibility with that huge cabin which has since been fitted with realistic detail. To the right is Neil Kinnaird of Leicester in **2**, with that most huge of all the big gliders in the APS range, the Leprechaun.

D. Whitehead of Londonderry, N. Ireland likes to build scale control-liners of about 20 in. span for the E.D. Bee and similar capacity diesels. To do this, he takes the 1/48th scale APS drawings and enlarges it 24 times, the result being seen in **3**. The Focke-Wolf 190 A-4 works out at 22 in. and the Messerschmitt Me 109 G-16 at 20 in. which allows liberal use of sheet for the construction and in no time at all, one could build up a fleet of WWII fighters. Why not a Thunderbolt, Spitfire, Hurricane, or Mustang in the same series?

One might well think that the diminutive Chilton DW-1a in picture **4** was another C/L model as above: but no—this is free-flight! Young L. Hughes of the Urmston and District M.A.C. made it for an Allbon Dart, and the little tapered wings are only 22½in. span. All-up weight is a scant 8¼ ounces, so when the test flights do eventually take place (weather has been holding them up), builder Hughes can

expect some fast flying. Colouring is authentic glossy black and white.

Larger in all respects is the magnificent Fairchild 24 Argus in **5** which is the work of Nottingham Forester, A. W. Brown. Made to one-sixth scale (2 in. to 1 ft.) it is actually a twice-size version of the APS rubber driven model. Colour is silver, with red leading edge trim and lettering plus a royal blue upper fuselage. Initial flight tests of this 3¼ lb. beauty have shown it to be a fine flier with a long tail-up take off run and steady circling climb. Power is an Amco 3.5.

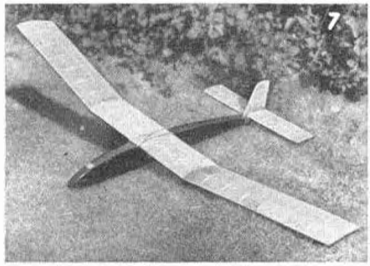
Over to the other column of pics, and Number **6** shows us an old favourite of the 47-49 contest seasons, now re-vamped with considerably more power in the form of an Oliver Tiger. We refer of course, to the Banshee, an American design noted for its extreme dihedral angles, tapered tips and fine stability. When it was most popular, the glowplug engine and 2.5 c.c. contest diesel had yet to appear, so Banshee's were operated with fairly high loading, having to carry ignition coil and batteries. It would be interesting to see how Jack Arden's model in this pic compares with the modern contest power model, he placed 7th in the recent N. Western Area Winter Rally at Tern Hill.

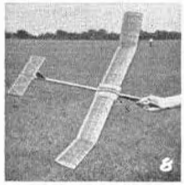
One of the prize winners at our 1955 "Golden Wings" final contest was M. D. Simmons of Newport, Shropshire, and one of his trophies was a Kodak Folding Camera. It is particularly fitting that the first picture he took with the new camera should be of his "Golden Wings" glider, and though its against all the rules of good model photography (in **7**) to use the grass lawn and garden as a background, we think its a fine effort. Details of the 1957 "Golden Wings" Contest will be announced to all "GW" Club members shortly.

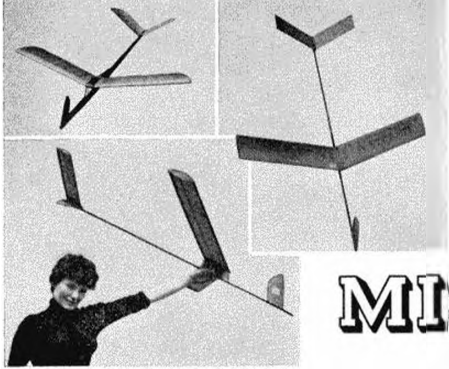
Another pair of A/1 gliders from our own locality of Watford are in **8** and **9**. At left, in photo 8 is M. Long's 40 in. span model with simple hardwood boom fuselage and flat plate tailplane. It was built in just two evenings and placed 6th in the Watford "¼A/2" event with a total of 3:30 for three flights in steady rain. At right, Martin Bridge's 4th A/1 was second in the same contest with a total of 4 : 36, 11 seconds behind winner John Trinder. The times are typical and if readers could see the hazardous surroundings of the Watford flying ground, they would soon appreciate why the "small field" model, like the A/1 is so popular.

Our last, in No. **10** is one that comes from a long way off, in Bridgetown, Barbados, British West Indies. Built from an American Berkeley kit by L. R. Alleyne, this North American Mustang has full cockpit detail, sliding canopy, engine speed control (ETA 29) and even a sprung tailwheel. The authentic colouring is for the Californian National Guard.

Now that the Invader (Model of the Month), Catalina, Mosquito and Huge Handley Page 42 Hannibal Airliner are firmly established favourites among the scale control-line fraternity, it is becoming increasingly evident that they have also sparked off a new trend of enthusiasm for flying with more than one engine in a model. So much so, that for *next month*, Model News will be entirely devoted to scale control-line multi-engined models, presenting no less than sixteen different types and also embracing a fine article on do's and don'ts of how to go about making your own scale multi. There will also be a description of one of the most magnificent scale models it has been our pleasure to examine—complete with APS drawing. It is Capt. Milani's accurate (inside and outside) Dornier Do. 215 to the same scale as the favourite Mosquito– and what a magnificent pair they make!







Add variety to your modelling by flying hand-launch gliders from the local hill — wind is welcome, if you build a special design for SLOPE SOARING like this simple 42 inch span

MISTRAL

By Peter Valentine

IF YOU LAUNCH a conventional glider into wind from a suitable hill, the chances are that you will be disappointed with the result. For in nine cases out of ten, the model will hang into wind for just a few seconds, then begin to turn back into the hillside for an abrupt landing.

Perhaps that is the reason why this interesting phase of aeromodelling appears to have such a limited following—initial tests with a normal model discouraging further efforts—and we hope that "Mistral 6", presented opposite, will induce more enthusiasm.

The Slope Soarer must be specially designed for its purpose. It has to be fairly robust to withstand hard contact with the ground, it needs some sort of device incorporated in its design to give it weathercock stability, and it should be convenient in size. "Mistral", and its preceding development models, built and designed by Peter Valentine, work on the forward fin theory, with long tail and nose moments and somewhat unique planforms for the wing and tailplane. It has quite a successful record with a number of long flights at the Welsh Clywd slope, and being of A/1 size, it is neither expensive, nor difficult to make.

First, a word on the various methods of approach that can be made to slope flying. The Swiss, who have long experience at the game, favour a forward CLA (Centre of Lateral Area), in other words, small fin (if any) and deep keel to the nose. In this country, quite an opposite method is adopted, in that extra area is added to the fin, or rearward CLA employed. Both systems are satisfactory to a point, but neither is perfect.

After a long series of experiments with the "Mistral" series, built as half-scale A/2 models, Peter Valentine discovered that if the CLA was brought forwards and upwards, and placed on a lengthy moment arm from the centre of gravity, then it was possible to have a model that scarcely ever turned its nose out of wind. Too large a nose fin caused the model to sway from side to side, too small, and it is obviously ineffective. The position of the fin should be so that the CLA should be on, or a little above the centre of lift, thus a fairly tall fin is required.

All of these features are incorporated in "Mistral 6" and though this particular latest version of the series has not had the full flying tests as given to earlier marks, it is presented as a good basis on which the interested modeller can experiment and draw his own conclusions.

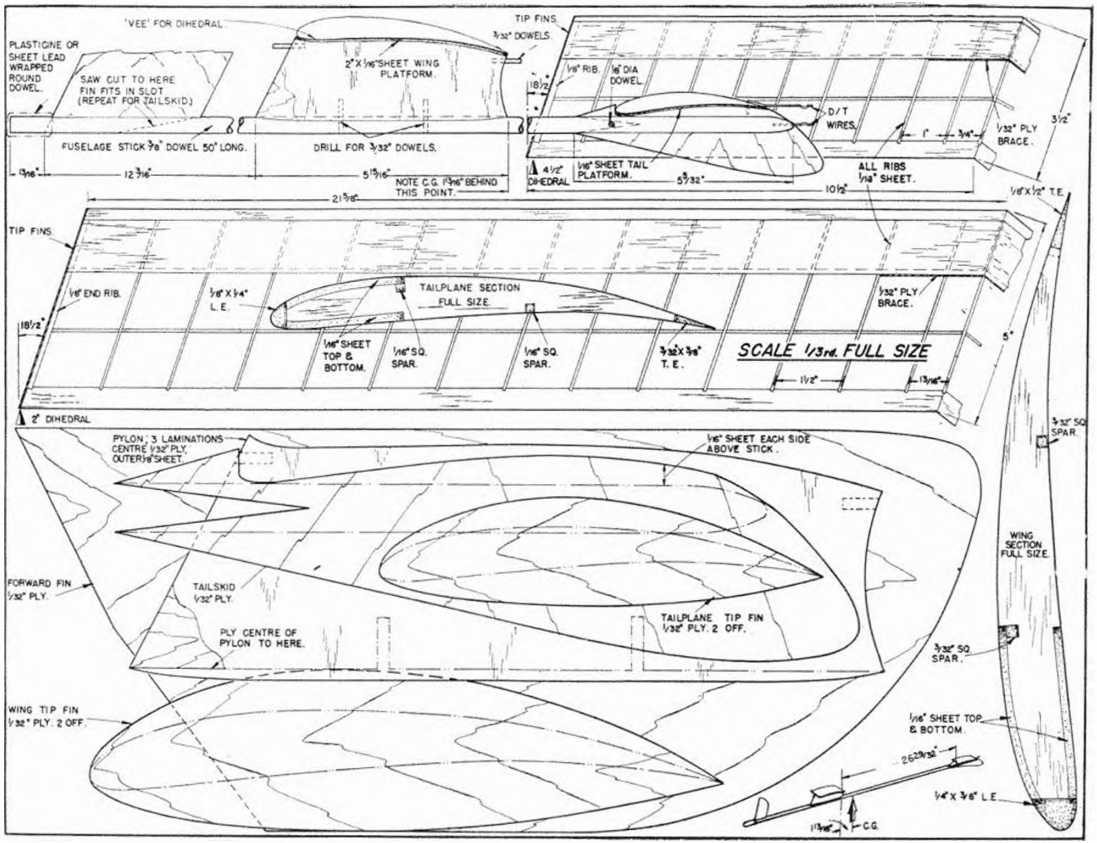
Don't be confused by the drawing! All the principle components are there full-size if you sort them out, and one-third scale views of the wing and tailplane halves enable you to sketch them out full-size for assembly on the building board. You'll need the following:—

50 in. straight hardwood dowel, ¼ in. diameter.
Two sheets medium grade 1/16th balsa for ribs, etc.
One sheet 1/16 in. ply 6 in x 12 in. for fins, etc.
Short lengths, 1/32 in. dowel; piano wire; ¼ in. balsa sheet.
Two each, 1/16 in. and 1/32 in. square strips for spars.
One each, ¼ in. x ¼ in., ¼ in. x ⅛ in., 1/32 in. x ⅛ in., ¼ in. x ¼ in. L.E.'s and T.E.'s.
Tissue, Cement, Dope and Plasticine.

Start with the draughtmanship by enlarging the flying surfaces three times plan size, using the vital dimensions quoted. All ribs are set at an angle of 18½ degrees to the trailing edge, and are spaced evenly at 1¼ in. distances on the wing, 1 in. on the tail, with the exception of the closer placed centre section ribs. Build by setting the leading and trailing edges at the angle shown on the rib section, and cementing all ribs in place. Add upper spars, lift from the board, add lower spars, and the respective wing and tail panels are joined at the dihedral angles which give 4¼ in. rise at each tail tip, and 2 in. at each wing tip. Bent 1/16 in. ply braces along the rear faces of the upper spars will hold the angle, then apply sheet covering around the leading edges, and finally sandpaper and shape to the desired section. The tip fins are applied after covering.

The "fuselage", such as it is, consists of a length of ¼ in. dowel, marked off to the given dimensions and slotted for the forward and rear fins. Start at

Earlier Mistrals, Mk. 3 and 5 are seen at top, with young lady holding the author's Mk. 6 prototype. All have the swept surfaces large tail dihedral and nose fin design characteristics which add up to weathercock stability for best slope soaring


'VEE' FOR DIHEDRAL
PLASTIGINE OR SHEET LEAD WRAPPED ROUND DOWEL.
SAW CUT TO HERE FIN FITS IN SLOT (REPEAT FOR TAILSKID)
2" X 1/16" SHEET WING PLATFORM.
TIP FINS.
3/32" DOWELS.
1/16" RIB.
1/8" DIA DOWEL.
18 1/2"
D/T WIRES.
1"
3/4"
1/32" PLY BRACE.
3 1/2"
FUSELAGE STICK 3/8" DOWEL 50" LONG.
DRILL FOR 3/32" DOWELS.
4 1/2" DIHEDRAL
1/16" SHEET TAIL PLATFORM.
5 9/32"
ALL RIBS 1/16" SHEET.
10 1/2"
1/16" X 1/2" T.E.
13/16"
12 3/16"
5 15/16"
NOTE C.G. 1 3/16" BEHIND THIS POINT.
21 5/8"
TIP FINS.
1/16" END RIB.
18 1/2"
1/16" X 3/4" L.E.
TAILPLANE SECTION FULL SIZE.
1/16" SHEET TOP & BOTTOM.
1/16" SQ. SPAR.
1/16" SQ. SPAR.
3/32" X 3/8" T.E.
1/32" PLY BRACE.
SCALE 1/3rd. FULL SIZE
1 1/2"
13/16"
5"
2° DIHEDRAL
PYLON: 3 LAMINATIONS CENTRE 1/32" PLY OUTER 1/16" SHEET.
1/16" SHEET EACH SIDE ABOVE STICK.
3/32" SQ. SPAR.
WING SECTION FULL SIZE.
FORWARD FIN 1/32" PLY.
TAILSKID 1/32" PLY.
PLY CENTRE OF PYLON TO HERE.
TAILPLANE TIP FIN 1/32" PLY. 2 OFF.
3/32" SQ. SPAR.
WING TIP FIN 1/32" PLY. 2 OFF.
1/16" SHEET TOP & BOTTOM.
26 2/3rds"
1/4" X 3/8" L.E.
11 3/16"
C.G.

RAF GEN

How much do you know about the Royal Air Force?

RANK, TITLES & CAP BADGES

by Bruce Fergusson

UNTIL THE 27th August, 1919, when the new R.A.F. rank titles had been selected by the Air Council, Military titles had been retained. Now it was that stars and crowns and gold rank lace yielded to the plain braid so familiar today to denote rank.

Much time and thought had been given to the matter of rank titles for the new Service. Names like "Reeve", "Banarette", and "Ardian" (this last being compounded from two Gaelic words, "Ard" meaning "Chief" and "Eun" meaning "Bird") were considered and rejected. Even today there is a school of thought which urges the simplification of the unwieldy rank titles!

It is interesting to read the remarks made by Senior Officers of the other Services about the R.A.F. at this time. Regarding the Gorget Patch, Major General W. F. Cleeve, C.B., R.A., Commandant of the Royal Military Academy said in March, 1918 ". . . the new Air Service is to do away with tabs—there are so many coloured tabs in the Service (Army) now that this new Service is going to have no distinction at all. HOW LONG THEY WILL BE ABLE TO GET ON WITHOUT THEM I DO NOT KNOW, BUT YOU WILL FIND THAT IT WILL PROBABLY COME INTO THE SERVICE BEFORE LONG . . ." Needless to say tabs have never been a part of R.A.F. uniforms and the Service has got on well without them!

The familiar Cap Badge for Group Captains down to Pilot Officers is almost the only badge which has been worn, apart from the Warrant Officers and the Airmen's badges, without change since the formation of the Service. This badge has been disrespectfully likened to a bunch of bananas! Today, however, the familiar Tudor Crown is being replaced by the St. Edward's Crown, which is popularly called the Queen's Crown.

From the formation of the R.A.F., both men and women members of the Service have worn the same badges and buttons which, when compared with the other Women's Services, is quite unique.

Next month we shall consider whether the basic badge of the R.A.F. is an EAGLE or an ALBATROSS! It's an old chestnut and a great after-dinner argument!

Slope Soaring (contd.)

the nose and work back. At 1¾ in. we have the nose fin leading edge, where it comes through the slot to the bottom surface, then another 12⅞ in. back for the pylon leading edge to get the wing position.

If the tail end of the fuselage is slotted as indicated by the dotted lines on the rear fin (tailskid) drawing, we also have the tail position, and the distance between the wing trailing edge and the tailplane leading edge should be in the region of 26⅜ in. Note that the pylon for the wing is a ply of ¼ in. balsa, either side of the centre core, and that ⅛ in. outer faces are used to support the tail platform. After making up the fuselage, complete with platforms set to take the dihedral angles, give the whole a coat of sanding sealer and rub down ready for a coat of colour decoration.

Final balance should be at a point 1¾ in. aft of the wing trailing edge, and this will be achieved by adding a small amount of plasticine on the nose. Note that there is no provision for a towhook, and the "Mistral" is most definitely *not* advised for anything other than slope soaring.

A good choice of launching site is just as important as the model design and the prime factor of importance, is that one should pick a slope where the wind is blowing at or up the hillside and not around it. "Mistral" will keep its nose into wind, but there will be nothing to stop it drifting back into the slope if the wind direction veers around the edge of a spur. The ideal is a "bowl" facing directly into wind, where the airflow is forced upwards and over the ridge without spilling at the sides. In these conditions, flights of more than five minutes hovering and weaving in the constant slope wind, are quite easy to attain, and give a satisfaction which makes the effort of climbing the hill more than worthwhile!

Other approaches to weathervane action are the rocking tailplane as described in December '55 Gadget Review, and use of tip fins and adjustable alloy nose plate, as seen at right, and below. Launching his rocking tail model is F. McNulty of Leeds M.F.C., and below is Dave Painter of Henley with a forward area special, actually used for towline

April, 1956

Second in our new series of stage-by-stage 1/48th scale solid model articles on **FAMOUS BIPLANES** *is the elegant 1935 fighter . . .*

FAIREY FANTÔME

by G. A. G. COX

ONE OF THE most elegant biplanes ever built, the "Fantôme" displayed not only beauty of line, but also an excellent performance as a fighting machine; at the time of its appearance in 1935, this aeroplane was the fastest multi-gun fighter in the world. The "Fantôme" was built to compete in a fighter competition organised by the Belgian government. After an impressive demonstration at Brussels however, it failed to pull out of a terminal-velocity dive and was destroyed, supposedly because the pilot "blacked-out", for no structural failure was discovered.

Development continued at the Belgian factory of the Fairey company, and a new machine emerged, externally identical, but now named "Feroce". Two of this type were supplied to Russia, and one to the British Air Ministry.

The "Feroce" was of all-metal construction with fabric covering on wings, tail and rear fuselage. Power was supplied by a 925 h.p. Hispano-Suiza liquid-cooled engine, between the cylinder banks of which an Oerlikon 20 mm. cannon could be fired through the airscrew hub. Two .303 machine guns were located in the fuselage and another two in the lower wings.

The maximum speed was 270 m.p.h. at 13,000 ft., the ceiling, 36,000 ft., and the duration two hours at 217 m.p.h.

Both machines were doped silver grey all over. The "Fantome's" registration letters, G-ADIF, were in black outline. The "Feroce" supplied to Air Ministry bore the serial number L7045.

The Model

The "Fantome" with its in-line engine and clean lines is a suitable subject for the less-experienced modeller. It is for this reason that the basic processes are explained in detail. Illustrated stages are marked with an asterisk*.

1*. Turn the nose button from hardwood. (If no lathe is available a wheelbrace held in a vice will do the job. A file should be used in place of the turning chisel.)

2. Trace the outline of the fuselage onto paper, adding the shape of the cockpit interior, the location of the nose button (6), and the rudder tenons (13), but excluding spinner and headrest.

3. Pinprick all these lines onto two $\frac{1}{4}$ in. thick pieces of balsa reversing the paper the second time to give a left and a right side.

4. With a fine fretsaw, and taking care to keep the blade perfectly upright, saw round the outlines, keeping just outside the pin holes.

5.* Trim the edges level with the pin holes with a knife or chisel, checking for "squareness". The fuselage halves now have approximately $\frac{1}{32}$ in. spare all round (i.e., the thickness of a pin hole) which will be removed when glasspapering.

6*. Cut out semi-circular recesses for the nose button.

7. Join the halves together temporarily with two spots of cement. Add the nose button.

8. Trace the plan view onto the fuselage and cut to shape.

9. Make fuselage cross-section templates from stout card.

10*. Carve chamfers on all corners, working on port and starboard sides simultaneously, comparing widths of chamfers to ensure that both sides are the same; and proceeding as stages 1, 2, 3, show. Constantly check cross-sections with templates.

11. When nearly the correct shape, the fuselage should be finished with No. 1 then "Flour" grade glasspaper. Throughout stages 10 and 11 great care should be taken to leave the front edge of the nose button untouched, the object of which is to preserve a perfect circle to match the spinner.

12*. Separate the fuselage halves, make a deep incision along the front edge of the cockpit cavity and work towards it with a gouge. Sand, fill the grain with sanding sealer, and dope grey. Cutting from rear of the seat position makes the gouging easier, as bulkhead can be added later, rear of seat.

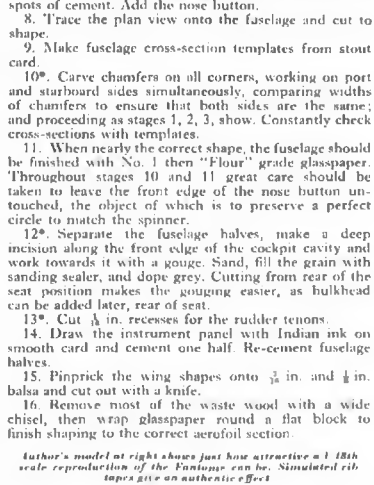
13*. Cut $\frac{1}{8}$ in. recesses for the rudder tenons.

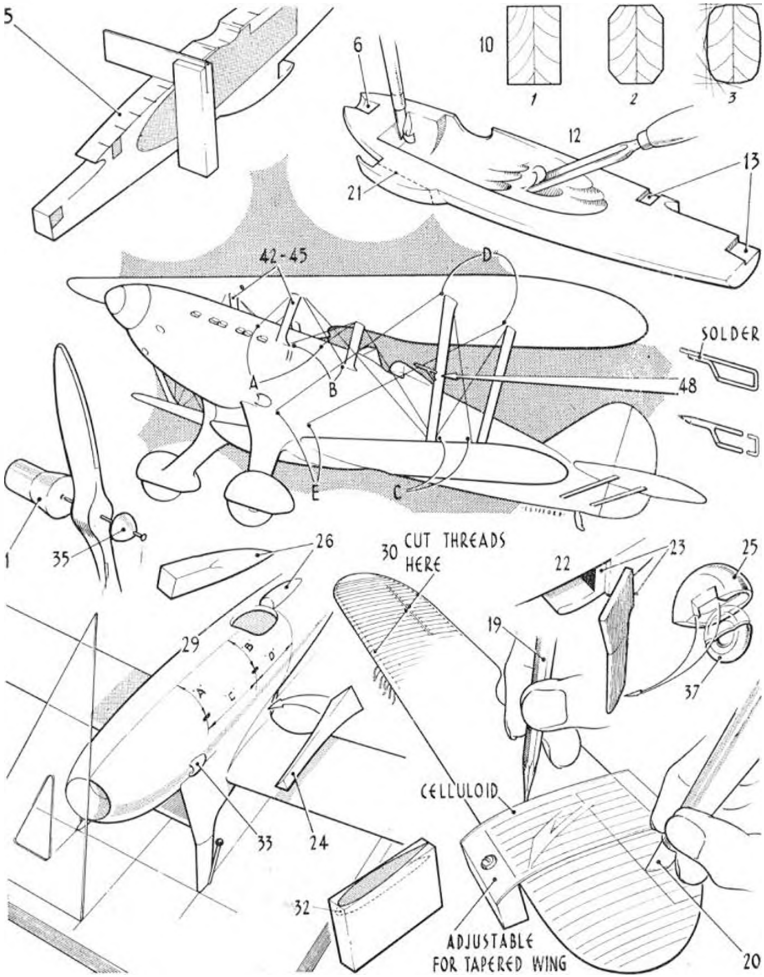
14. Draw the instrument panel with Indian ink on smooth card and cement one half. Re-cement fuselage halves.

15. Pinprick the wing shapes onto $\frac{3}{16}$ in. and $\frac{1}{8}$ in. balsa and cut out with a knife.

16. Remove most of the waste wood with a wide chisel, then wrap glasspaper round a flat block to finish shaping to the correct aerofoil section.

Author's model at right shows just how attractive a 1/48th scale reproduction of the Fantome can be. Simulated rib tapes give an authentic effect




5
6
10
1
2
3
12
13
21
42-45
D
SOLDER
A
B
48
E
C
1
35
26
30
CUT THREADS HERE
22
23
25
19
29
37
CELLULOID
33
24
32
ADJUSTABLE FOR TAPERED WING
20

17. Score along the root lines of the lower wing and crack to give dihedral. Cement the cracks and support the wing tips with scrap ¾ in. balsa until dry.

18. Give the wings three or four coats of sanding sealer, rubbing down with very fine glasspaper when each coat is quite dry.

19*. With a strip of paper, transfer the rib spacing onto the wings and draw the ribs using a 6B (very soft) pencil. (It is well worthwhile making the simple celluloid ruling gadget shown for this operation.)

20. Score the ailerons with a knife.

21*. Split the radiator with a sharp knife where indicated and carve recesses for the lower wing. Cement the wing in place, checking that the trailing edge is at right-angles to the centre-line of the fuselage. Replace lower half of the radiator housing.

22. Give the front surface of the radiator a final smoothing and dope matt black.

23*. Cut u/c legs from mm. ply and sand the front edges round. Remove part of the radiator as shown, to accommodate the legs, and glue them in. Note the method of achieving correct alignment.

24*. Make balsa wing fillets. Wrap glasspaper round ¼ in. dowel to smooth them after gluing in place. All small fillets around the radiator may be made with glue.

25*. Cut the wheel spats from ⅛ in. sheet and cement to a scrap piece while carving and sanding. Make recesses for u/c legs and glue in place. Fillet with glue.

26*. Carve the headrest and attach to the fuselage.

23. Seal the grain of all bare surfaces. (See 18).

28. Make the tail surfaces from ⅛ in. sheet in the same way as the wings. Seal the grain and add to the model.

29*. The centre-section struts are best made from bamboo. Each one should be ⅛ in. too long. Locate the strut holes by checking measurements A, B, C, D. Pierce holes with a large needle and insert struts ¼ in. into fuselage. Viewed from the front, the struts should be splayed out ⅛in. too much so that they will spring into their holes in the wing.

30*. Coat 40 in. lengths of No. 30 sewing cotton with cement to smooth down loose fibres. Wind round wings, following rib lines, then rapidly apply a coat of a/sealer, working chordwise. When dry, run a very sharp blade along a straight-edge to remove unwanted thread which stands out too much around the leading edge.

31. Cut strut holes in wings with a pointed blade.

32*. Make the upper wing fairings from ¼ in. sheet and seal the grain before parting-off. Cement to wing.

33*. Produce air inlets in the same way as the headrest and if ambitious, hollow with folded glasspaper.

34. Pierce m/gun holes in nose with a darning needle, groove gun-troughs.

35*. Turn the spinner from hardwood. (Drill hole before rounding and parting-off.) Carve propeller from balsa or hardwood and glue spinner on.

36. Make up a dope mixture of 66% silver, 33% grey, and apply to the entire model except the underside of the lower wing. If the grain sealing has been done thoroughly, no more than two coats should be necessary.

37*. Carefully make ⅛ in. recesses in the spats to take the wheels. Turn one wheel, dope blue/black and cut in half as shown. Glue in position.

38. Build a seat from balsa and card, fit a celluloid windscreen.

39. File wire to an elliptical section, dope black and insert 1 in. lengths to represent exhausts.

40. Score all cowling lines with a sharp blade. Mark cowling fasteners and screws by pinpricking.

41. Hold the upper wing temporarily in place on the centre section struts with a rubber band and make interplane struts from bamboo to fit. Dope them silver/grey.

42. Cut notches in the tops of all c/section struts. Pierce needle holes at A and B, and right through the wing at C.

43. Coat light grey No. 40 cotton with cement. Apply a spot of glue to holes A, push the end of a 3 in. length of cotton into each, cross-over, and glue into the notches in the struts. Trim-off the surplus.

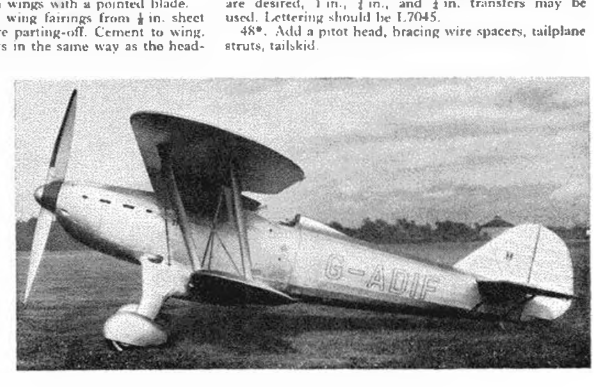
44. Glue 9 in. lengths of thread into holes B, and into each hole D, a 6 in. and a 3 in. length.

45. Now, the critical stage in rigging. Glue the tops of the c/section struts, pass over them threads B, hold the wings on with a rubber band, pull the threads tight. Cross over the *short* threads D, and push through holes C. Apply glue to all strut holes and pop the interplane struts in place, remembering to pass under the *front* strut *both* threads B. Pull these threads tight and trim. Likewise, tighten and trim the short threads D. Finally pierce holes at E, and in them glue the long threads D.

46. Smooth over the holes in the undersides of the lower wings and give a coat of dope.

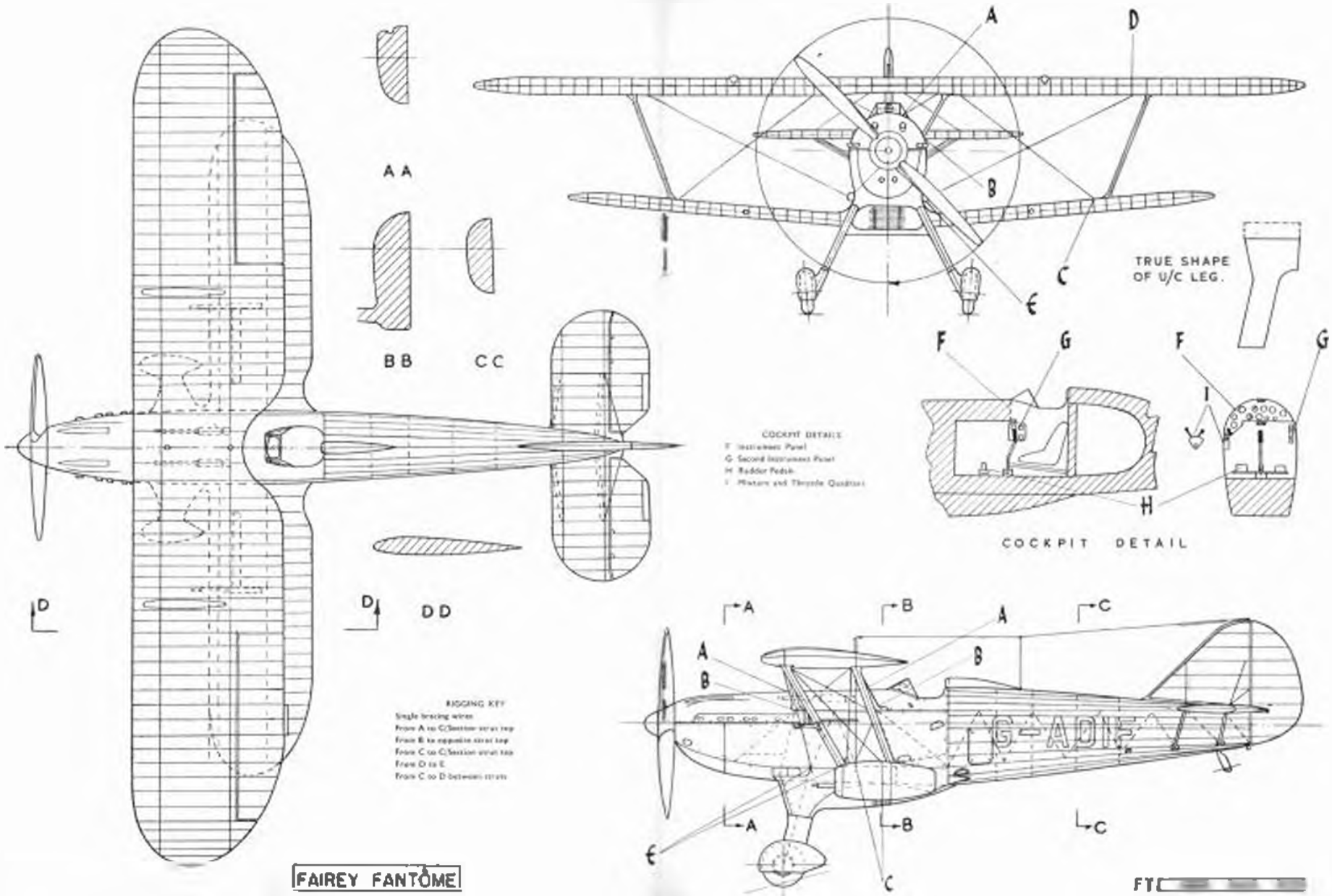
47. Use Indian ink for all lettering, with registration being G-ADIF in hollow outline lettering. If roundels are desired, 1 in., ¾ in., and ½ in. transfers may be used. Lettering should be L.7045.

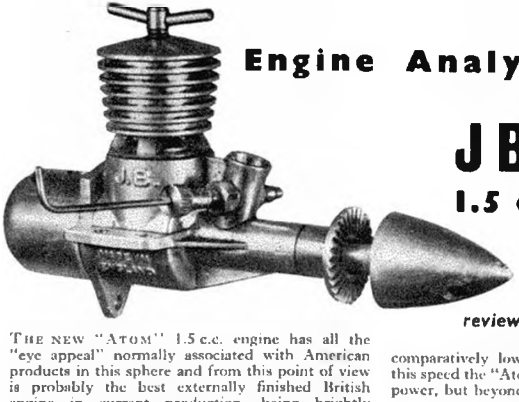
48*. Add a pitot head, bracing wire spacers, tailplane struts, tailskid.



Side elevation of the full-size displays its elegance of line and also the neat outline type civilian registration of the prototype. Control - line enthusiasts would also find this a fine subject for sport flying or aerobatics, although the protruding cylinder head would be an unavoidable eyesore. Note small Fairey trademark on the fin—as found on all Fairey Co. advertisements.

This photo, and top right, p. 193, reproduced by courtesy of Fairey Aviation Company Ltd.


A
D
B
C
E
AA
BB
CC
DD
TRUE SHAPE OF U/C LEG.
F
G
H
I
COCKPIT DETAILS
F Instrument Panel
G Second Instrument Panel
H Rudder Pedals
I Mixture and Throttle Quadrant
COCKPIT DETAIL
RIGGING KEY
Single bracing wires
From A to C/Section strut top
From B to opposite strut top
From C to C/Section strut foot
From D to E
From C to D between struts
G-ADNF
FAIREY FANTOME
FT



Engine Analysis No. 20

J.B. ATOM

1.5 cc diesel

reviewed by **R. H. WARRING**

THE NEW "ATOM" 1.5 c.c. engine has all the "eye appeal" normally associated with American products in this sphere and from this point of view is probably the best externally finished British engine in current production, being brightly polished all over. It has all the hallmarks of a good design, robust construction, easy-to-reach controls and a nice long crankshaft bearing, but lacks the performance to go with it. The manufacturers have insisted on close working tolerances all round with a view to eliminating any criticism that there is any compression leak past the piston—a point by which the inexperienced invariably judge a new engine when it is first put into their hands. This, of course, is also a fallacy—and the manufacturers know it, But, as they point out, the customers expect it.

The result is that all the "Atoms" as manufactured are rather "tight". Employing both a hardened cylinder and piston, running wear on these two components is very small and so a normal running-in time will have little or no effect on tightness. As a result, internal friction remains high at high speeds and so the engine will not develop its full power until, perhaps, tens of hours of running. And if the initial tightness is a little too much, you have an engine which just will not keep running fast with a small propeller, or will only turn it over at a quite moderate speed and then "hunt".

The first of the two engines we tried, showed all the symptoms of excessive tightness, getting very hot and being reluctant to run consistently on small propellers. The second was much better and could be started and run straight away on a 6 x 4 Frog nylon propeller, although its speed initially was only in the region of 13,000 r.p.m. Both engines were given a quite protracted running-in period, but the first engine continued to overheat and consistently failed to come up to anything like the performance of the other.

The second engine was used as the subject of the power tests still, we would say, exhibiting signs of excessive tightness or excessive internal friction, since torque began to fall off rapidly quite early and peak power was realised at the comparatively low speed of 10,700 r.p.m. Up to this speed the "Atom" gives good average "1.5 c.c." power, but beyond it the power just falls right off.

Just how much of this lost power could be recovered by more and more running in is problematical. The test engine had the equivalent of some four hours running time before the measured runs were made. It seems fair to the manufacturers to say that the peak performance would probably have been somewhat higher with a lot more running time, but equally fair from the customers' point of view, that long running-in times are not desirable and also that some of the production "Atoms" will probably be even stiffer and so even worse off in this respect.

On the face of it, therefore, in stressing the importance of maintaining a good compression seal and endeavouring to obtain maximum working life for the piston and cylinder with hardened components, top performance is sacrificed and there is a distinct possibility that there will be considerable difference in the performance of individual engines. Used as a low speed engine for sports flying, the "Atom" is delightful to handle, easy starting, consistent running and as powerful as any other engine in its class. Try it on small propellers and it is quite a different story, until it is well and truly run in, although the same good starting characteristics are retained throughout the speed range.

Run-in at high speeds

Running in at a moderate speed will do no good at all. Unless the engine is particularly stiff, start right in with a 6 by 4 plastic propeller. If necessary, fit a flywheel for cord starting (the extra weight will help in any case, as the more flywheel effect the better to smooth out the running). Then get it running and keep it running until it will maintain consistent revs. on a 6 by 4. Mercury No. 8 is very satisfactory for this stage or a straight three-part mixture of paraffin oil and ether. When loose enough, J.B. fuel or Mercury R-D will give those few extra r.p.m. on smaller propellers. Any excessive heating of the crankshaft bearing during

this period can be alleviated by pouring oil or fuel over the outside of the bearing. The engine can be considered free enough for installation in a model when it will consistently run through a tank full of fuel on a 6 by 4 nylon or 6 by 3 wooden propeller.

Construction-wise the "Atom" is extremely robust and well fitted. The hardened steel cylinder has four large exhaust ports, quite late opening and not fully uncovered by the piston. The bottom section of these ports then gives sub-piston induction at the top of the stroke. Four transfer ports are cut on the outside of the cylinder, drilled upwards at an angle to open very shortly after the opening of the exhaust. The bottom of the cylinder is slightly relieved, but the main bore is substantially parallel.

The bottom of the cylinder is threaded 32 t.p.i., $\frac{3}{4}$ in. diameter and screws into the crankcase casting. These threads are well cut and the cylinder fit is really tight, without the use of gaskets. The top of the cylinder above the exhaust port ring is also threaded 32 t.p.i., $\frac{7}{8}$ in. diameter, onto which screws the dural cylinder jacket.

Composite piston

The piston is of the built up type, the piston itself being of special cast iron, heat-treated to harden. The gudgeon pin is retained in a dural plug which screws into the inside of the piston, clearance on these threads being fairly generous to allow for the differential expansion of the two materials.

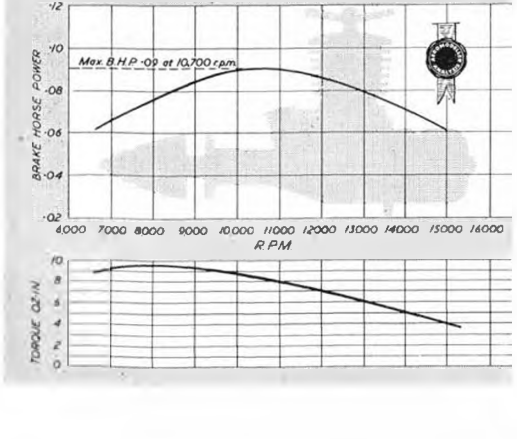
A large gudgeon pin is used, with generous play on the little end. The connecting rod is hardened steel. On one of the engines examined, the con. rod play was not symmetrical, with the result that the rod itself was effectively "angled", producing noticeable wear on the crankshaft pin. After some 4-5 hours running, this pin had, in fact, developed a definite "waist" and the wear rate would probably increase more rapidly once the hardened "skin" was worn through. This feature is, we understand, now receiving particular attention from the manufacturers.

PROPELLER—R.P.M. FIGURES	
Propeller	r.p.m.
8 x 8 (Stant)	5,200
8 x 8 TR (Stant)	7,100
8 x 5 Frog nylon	8,600
8 x 4 (Stant)	9,000
7 x 4 (Stant)	9,500
6 x 4 (Stant)	12,000
6 x 5 (Stant)	11,400
6 x 4 Frog nylon	14,000
9 x 4 (Stant)	6,800

J-B "Atomic" fuel.

The hardened crankshaft is $\frac{5}{16}$ in. diameter (the common average for 1.5 c.c. engines) but with an effective bearing length of $1\frac{1}{4}$ in. (about $\frac{5}{8}$ in. more than average). The specific advantages of a long shaft bearing are better support and lighter loading. The crank pin is $\frac{1}{4}$ in. diameter and the crank web is generously cut away for balance. With a reasonably light piston the "Atom" is, in fact, substantially free from vibration at all speeds.

The crankshaft runs in a plain bearing, reamed and honed and with a very nice finish. Again the fit is tight and one of the two engines showed marked signs of local overheating at two spots, as evidenced by brown discolouration on the shaft. The propeller end of the shaft is tapped 2 BA and fitted with a substantial spinner nut. The prop. driver is of dural with a deeply knurled face for



SPECIFICATION

Displacement: 1.472 c.c. (.09 cu. in.)
Bore: .5365 in.
Stroke: .397 in.
Bore/Stroke ratio: 1.35
Bare weight: $3\frac{1}{4}$ ounces (including 1 oz. tank)
Max. B.H.P.: .09 at 10,700 r.p.m.
Max. torque: 9.7 ounce-inches at 8,000 r.p.m.
Power/weight ratio: .029 B.H.P. per ounce
Power rating: .06 B.H.P. per c.c.

MATERIAL SPECIFICATION

Cylinder: Hardened steel
Piston: Hardened cast iron
Contra-piston: Hardened steel
Connecting rod: Hardened steel
Crankshaft: Hardened steel
Crankcase casting: Light alloy
Spraybar assy.: Brass, 4 B.A.
Cylinder jacket: Dural
Tank: Dural
Spinner nut: Dural

Manufacturers:

I. E. Ballard and Co. Ltd., 12A Fell Road, Croydon.
Retail price 58s.
(including purchase tax).

Engine Analysis (contd.)

grip, seemingly a little rough, but most effective in function. The boss is ¼ in. diameter and the driver is the normal friction fit on the tapered portion of the shaft.

Radial and beam mounting

The crankcase casting is provided with both lugs for beam mounting and a flange for radial mounting. Hole spacing for the former is, in our estimation, too close to the crankcase itself to allow of sufficient bearer width after drilling the holes for the mounting bolts. The advantage of the radial mounting is also offset somewhat by the fact that the back cover projects beyond the face of the mount and so the bulkhead would have to be cut out to receive this.

Summarising, a nice looking engine and very well made—perhaps too well made, in that the manufacturers have reduced working tolerances to extremes to pander to the demand for "good compression" and a main bearing free from play. As a result, internal friction is high and tends to become excessive at high speeds. Hence peak power is developed early and is inevitably rather low. It would undoubtedly perform very much better at 10,000 r.p.m. up with much looser fits all round.

The choice of a hardened piston with a hardened cylinder is a debatable virtue in this case. The manufacturers have done it to ensure long life—an unhardened cast iron piston tending to crumble in time. Similarly with the hardened steel con. rod, but our feeling here is that the latter choice may defeat its own object in the end by aggravating wear on the gudgeon pin and crankshaft pin. We cannot see the "Atom" claiming any "performance" records, but we can see it giving a long and useful life with sports models, used with generous propeller sizes.

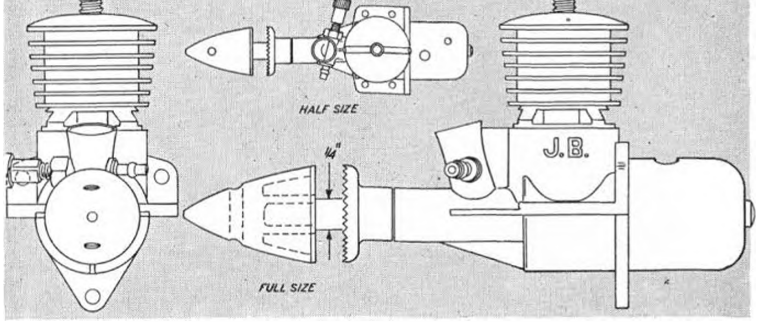
What's the answer?

George turned up at the local ground with a beautiful 30 in. span stunt model last week which we all expected to "go through the book". Proportions were conventional, and it was light enough, but it would do little more than the average "sports" design. After George, our stunt Champ, Norman had a go and all he succeeded in doing was getting it inverted and then pulling it into the deck. "Just didn't seem to have any lift", said Norman, and yet we all agreed that it would fly "straight and level" like any other stunter. What's the answer?

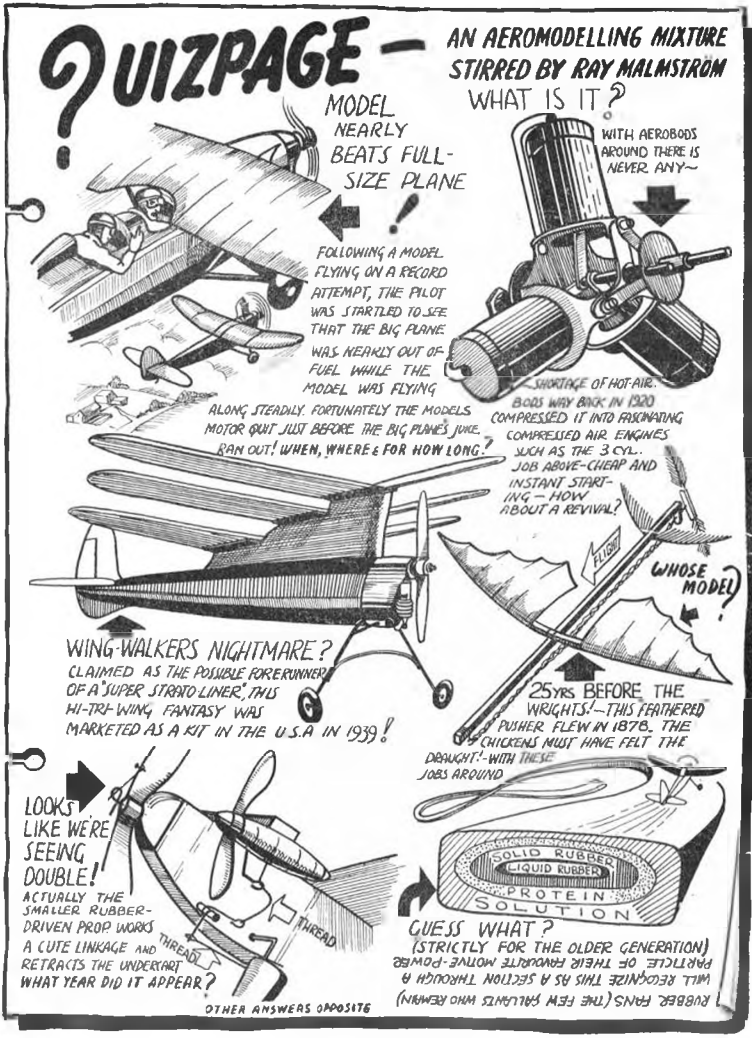
What would YOU do in a case like this? Think a moment, then twist the page for the solution to the problem which is printed below.

ANSWER—If the proportions are normal, control plane properly positioned, not too far forward and balance not too far forward, then probably the wing section was too thin. Many of the early stunt designs had thin symmetrical sections and were quite satisfactory. Then somebody tried a 15% symmetrical section and it made all the difference. Thick sections (15-18%) tilts are commonplace on stunt designs. Thin sections may seem to have less drag but it does not follow that you gain in performance!

QUIZPAGE ANSWERS: The long range model was the "Miss Philadelphia". She flew for two hours 35 minutes 39 seconds, in the U.S.A. during 1934. Feathered pusher is Pennell's famous "Aerophane". Auxiliary rubber driven prop for undercarriage retraction was a 1941 idea.

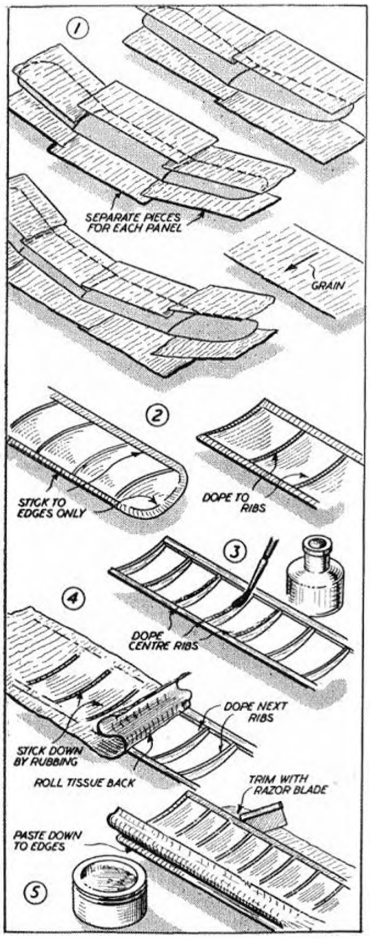


QUIZPAGE — AN AEROMODELLING MIXTURE STIRRED BY RAY MALMSTROM



Aeromodelling STEP-by-STEP

COVERING FLYING SURFACES



LIGHTWEIGHT TISSUE is used for covering all rubber models wings, gliders up to about 250-300 sq. in. area, and small power models. Larger models generally need a stronger covering, such as heavyweight tissue, silk or nylon. The procedure with tissue covering is essentially the same, irrespective of "weight". Silk and nylon require rather different technique.

With all tissue covering the first basic rule is—separate pieces of tissue cut out oversize for each surface of each wing panel. It is impossible to cover satisfactorily past dihedral joints, however shallow the angle involved. So first cut out the separate tissue panels required, making them at least an inch wider than the actual wing chord and at least two inches longer than the respective panels. If the tissue you are using has any definite grain it it, the grain should always run *chordwise*. If the covering is split later the split will not tend to run along the whole length of the wing. (**1**).

In covering upper surfaces, the tissue is stuck down *only* around the outline of the wing frame. The same with the undersurfaces if the ribs are flat bottomed. If the ribs have undercamber, then the tissue must be stuck down to each rib to conform to this undercamber (**2**).

When covering a wing with undercamber it is best to cover the undersurface first. The next three stages describe how this is done. If the wing is flat bottomed, skip to (**7**) and carry on from there, remembering that both under surface and top surface are covered in the same way. It does not matter which you do first.

About the best adhesive for sticking tissue to balsa framework is white photographic paste. However, this is *not* suitable for sticking down to undercambered ribs as it tends to pull away when the tissue is tautened. Use *thick* model dope for this job, applying to three or four ribs in the centre of the wing panel (**3**), laying the tissue in place smoothly and sticking down to the doped edges of the ribs by rubbing over with a finger (**4**). Then roll the tissue back to expose the undoped ribs, apply dope to three or four more and proceed, in the same manner, along the whole length of the wing. Go over each rib again just to make sure that the tissue is stuck down properly along the whole length of each rib. Leave for a few minutes to let the dope set before getting on with the next stage of the job.

This consists of rolling back the tissue carefully from the leading edge, trailing edge and tip, in turn, applying paste to these edges and smoothing the tissue down in place. Then trim off excess tissue with a *sharp* razor blade (**5**). If the blade tends to "drag" as it will after a while, dip it into water, shake dry and try again. One other tip; after trimming off the covering flush with the edge, rub round with a finger coated with paste to make sure that the edge is well secured.

To cover a flat-bottomed wing, or the top surface of an undercambered wing, start by pasting over the middle portion of the wing edge (**6**). Lay the tissue in place and pull evenly in place (**7**) .Roll back until you are just pulling off part of the pasted down section, paste the next two bays, or along to the end of the frame, and again smooth the tissue down and pull taut (**8**).

You do not have to pull the covering *tight*. It is far more important to get it on free from *wrinkles*. Tiny wrinkles will often pull out after water-spraying. Normal slackness will *always* pull out. But large wrinkles will never completely disappear. Wrinkles are particularly likely to appear near the edges where the tissue is pasted down and radiating from the ends, i.e., the end rib and the tip. It needs practice and nothing else to be able to produce good covering, and even the experts can make mistakes at times. The things to avoid

are, trying to work too rapidly—trying to cover too much of a wing with one application of paste – starting with badly creased tissue in the first place—and excessive straining of the tissue trying to pull it in place.

One part you will always find difficult to pull out without leaving wrinkles, is the upper covering on the top (9). If you use the new "Wet Strength" tissue, however, you can apply it damp, when you will find it relatively easy to work and pull to shape over even the most difficult of tip shapes. This type of paper is not greatly weakened when it is wet, but is softened to the extent that it can in effect, be "moulded" to compound curves.

With care and experience you can work ordinary tissues round the tip to eliminate all wrinkles, but in the end this probably takes longer than the alternative methods shown. For example, starting from the trailing edge and working as far as possible around the tip without wrinkling, slit the tissue over the centre of the end rib carefully and paste down with an overlap (10). This gives you freedom to draw out the remaining wrinkles in the front portion of the tip covering. Alternatively, paste the covering down to the end rib and trim off with this wib. Then simply cover the tip with a separate piece of tissue which is carefully laid in place as smoothly as possible, pulled taut all round the rubbed down in proper contact with the pasted edges (11).

The joints between adjacent panels of covering are often untidy. Again it needs practice to make a neat job. Where there are several panels to be overlapped and joined as in the polyhedral wing shown in (8 centre), cover the flat centre section first. Trim off flush with the ribs at the dihedral break. Now take each piece of tip covering, in turn, and without sticking down, trim to an exact fit along the line of this tip for both upper surface panels. This will mean trimming the edge to a curved shape. Having got this right you can then paste down to the first two bays adjacent to the dihedral joint and *start* with a perfect lap joint, working out towards the tip. In the case of the lower polyhedral wing where the centre panels themselves have a dihedral break, then probably the easiest way of getting a neat covering job is to cover the right wing tip first and then work *along* the end of the wing, finishing up with the left wing tip.

When trimming off excess tissue, some people advise leaving an $\frac{1}{8}$th or $\frac{1}{4}$-inch strip extra, which is then pasted around the leading or trailing edge, or tip. It possibly makes a beater job, but is not really necessary, even when using coloured tissues. The doubling up of the tissue layers will show and unless the surplus edge is trimmed *exactly* parallel, may look untidy.

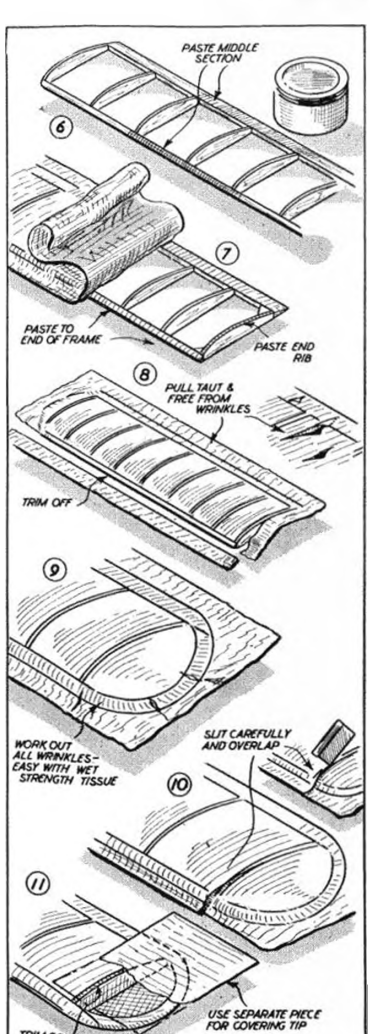
Here are some further tips regarding tissue covering. If the tissue you are using is badly creased, iron it out flat and smooth again with a fairly warm iron (but be sure not to iron in any wrinkles).

Modelspan can be used right away after ironing, but Japanese tissue should be left at least overnight, hung up, to absorb moisture. If Japanese is used directly after ironing, it will be reluctant to tauten up when water-sprayed.

Modelspan tissues need more coats of dope than Jap. tissues to seal up all the pores in the tissue.

If wrinkles are left in the covering after water-spraying and allowing to dry again, try dabbing a little more water on the area concerned. This should pull out a bit more of the wrinkle, but will seldom remove it all.

Avoid handling undoped tissue after water-spraying. You can easily "fingerprint" the covering and strain the tissue fibres. Such "bumps" as you produce in the covering in this manner can be pulled out by water-spraying, if you have not broken the fibres.

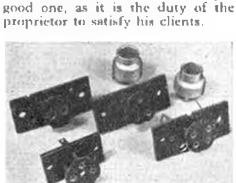


Trade Notes

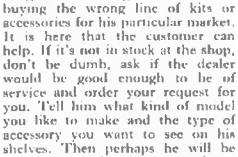
Mercury spinners with Nylon tips give most secure fitting. Also below is Mercury plastic 6½ in. prop for rubber drive. Right, is Italian die-cast speed pan for Super Tigre in light alloy, with spinner

WHAT MAKES a good model shop? We are frequently asked that question, and surely the simple answer is that the shop should give satisfaction to the customer, and profit to the proprietor. Unfortunately, the first clause is not always fulfilled. The man who buys the stock for the shop is the one who determines the trend of the trade, and if he is not a practising aeromodeller, there is the constant danger of making a mistake in buying the wrong line of kits or accessories for his particular market. It is here that the customer can help. If it's not in stock at the shop, don't be dumb, ask if the dealer would be good enough to be of service and order your request for you. Tell him what kind of model you like to make and the type of accessory you want to see on his shelves. Then perhaps he will be able to judge his future purchases on the basis of customer demand instead of having to guesstimate according to his own, often unwise, opinion. One wholesaler recently went to a lot of trouble to locate real Japanese silk of pre-war grade, and absolutely perfect for model use. Yet he tells us that a good many model shops will not carry this desirable material because *they* say there is no demand. That there is a demand (albeit limited) is an unquestionable fact as our own heavy correspondence indicates. The dealer takes it upon himself to say that there is no demand, simply because he does not appreciate the value of the material in question, or has no experience or knowledge of how good it is. Expensive? Not when one considers it is only 80% up on 1938 cost and is now loaded with heavy duties, import costs etc.

We quote just this one example to illustrate our point—that it is as much the responsibility of the customer to make his model shop a good one, as it is the duty of the proprietor to satisfy his clients.



Above: 2, 3 and 4 pin sockets for radio control connections and Right: single or double circuit slide switches and potentiometer distributed by Ripmax. Left: the New Zealand Velojets in their new acorn shape, showing internal spring for pellet loading. Below: Twin-tube set of Araldite will stick anything to anything. Sells for 6/- and economic



Among the new kits out this month and on our review bench is the latest **Contest Kits** production, a smart 27 in. model called the **Cranwell.** For an inclusive price of 7*s.* 6d., we get enough to make this nice cabin design, complete right to the 3-piece ultra-simple but very effective prop., wheels, bushes, cement and colour tissue. All you need to make it fly is tissue paste, clear dope and four yards of ¼ in. flat rubber. Cranwell comes with a nice clearly-drawn plan and instruction leaflet which go to make it a fine introductory model for the beginner, or sport flyer for the experienced. The prototype put up the creditable performance of a total of 10 minutes 45 seconds duration in the course of an hour's scramble, and if you think that's easy—try it yourself with a 27 in. rubber job!

New style **Velojet** the solid fuel rocket units marketed from New Zealand by **Bettair** of Box 250, New Plymouth, are the screw barrel versions shown in the photo. These have knurled bands around the exterior to aid dismantling, are extremely light, varying from ¾ ounce for the 50 size (11/-) to 1 ounce for the 200 unit (27*s.* 6d.). The units come boxed with a supply of fuel, mounting bracket and full instructions. "Flight-Extenda" barrels are available for all sizes at 5/- each.

A unique feature of these New Zealand jets is that the safety spring is a single affair, incorporated in the mounting arrangement. That it works satisfactorily is proven by the following it has in the Antipodes, and our own test units passed several static running checks without fault.

Want to stick metal to wood, or metal to metal without solder or brazing? We might have been wishing aloud when we spotted **Araldite** in its 6/- two-tube pack at Messrs. **Ripmax.** A trial test with two pieces of faced mild steel adhered together convinced us that here at last is one medium that *can* really stick metal to metal. The steel pieces are still together "as one" and subsequent engine bearer bulkhead joints show Araldite to be the answer to many of our modelling problems. Sold in most enterprising

model shops, it comes in a flat blue and white pack with full instructions. Same blue and white colour code is followed by the two tubes, one of which contains the resin, the other, a hardener. The two items are intermixed just before making the joint (it lasts for 3-5 hours) and a smear put upon each of the two faces to be joined. The joint must then be bound or clamped, and in 12 hours at normal room temperature, it should be set. In three days, it is absolutely as firm as Gibraltar and if need be, the process can be hastened by heating on a radiator or in an oven.

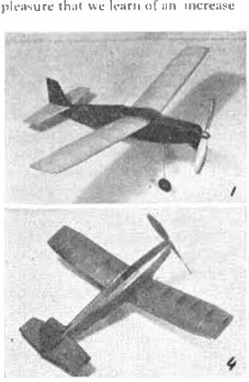
Another difficult—even "impossible" task is that of soldering aluminium, and there are many cases where this would be desirable, yet impossible to join by any other method such as riveting or Araldite joints as above. For example, edge to edge joints on a cowl. Recently announced to the Aircraft Industry, was a revolutionary new soft soldering process developed by **Tiltman Langley Ltd.**, of Redhill Aerodrome Surrey. This consists of a tool, plus ½ pound of corrosion resisting alumn solder, for £1 10s. 0d. carriage paid ex-works. The jobs to be soldered are heated to 250°C. and brushed with the special glass bristles which induces the alumn solder "tinning" to flow and make the bond. Like Araldite, this process is used on full-size aircraft and more than meets our requirements in joint strength.

Followers of U.S. modelling activity will be regular subscribers to our contemporary American Model Magazines, and it is with pleasure that we learn of an increase in the circulation rate of **"Flying Models"**. Up till January '56 a bi-monthly publication, "F.M." will now be monthly and yet still have the same interesting content. In fact we are promised more than before. British subscription rate is now 29s. 6d. per annum, through the usual agencies. (See classifieds).

The rapid introduction of plastic kits, mainly for model cars and galleons, has caused a minor trade boom in some parts. First indication of home production of plastic aircraft line came with a visit to the local Woolworths. There we noted an excellent representation of the Spitfire, bagged in a polythene packet, and moulded in blue plastic. The price is very low 2/-. These kits, manufactured by **Airfix**, are now distributed through the model trade and we are told that the Spit will soon be followed by a Gloster Gladiator, which should be a most popular subject.

There's great activity in the Holloway Road area, namely, Henry J. Nicholls and **Mercury Models.** A flush of new kits are well on the way, and the five little rubber jobs in the **Starflite** series will form a neat squadron of 18 in. genuine fliers, weighing an ounce all-up. Designs are named after stars, and are Alpha, Mars, Perseus, Saturn and Sirius, covering the full range of possible wing positions and including a smart biplane. Price for each is 4s. 9d. and this includes the specially moulded plastic prop., preformed undercarriage, wheels and rubber. Only extra's required are cement and dope. These kits have been produced with one main object in mind—that they should not be a disappointment either in the construction or flying, to the beginner builder. Plans are positively self explanatory with copious stage-by-stage assembly sketches and after a sparkling display in the AERO-MODELLER back garden (it's a big one) with Henry J. and the staff busting motors trying to see which could fly farthest,—we can give every assurance that the Starflites are wizard little fliers, each as good as the others, and all capable of covering 100 yards per flip.

On the control-line side, Mercury venture into a new field with a scale **North American Mustang** (bubble hood version) which is to be as nearly completely pre-fabbed as modern kitting methods allow. Tailored around an AM 25 diesel, the 23 in. model has a shaped and sectioned solid balsa wing, belly radiator shaped, fuselage top block shaped—in fact all the "hard" work is done for the builder to minimise assembly time down to an evening. In spite of the all-balsa construction which involves a thick wing, the weight is less than 20 ounces and performance as a sport or combat model for non-aerobatic jousts is most lively. Price will be circa 35/-., to be announced later. Farther ahead in the Mercury programme is another surefire design from delta man Laurie Ellis in the shape of the **"Agressor"** (yes—only one "g"). This is a double-delta for pint-fivers with a span of 39 in. and a two sheet set of assembly drawings that include no less than 56 separate building sketches. Watch the advts. for delivery date and price announcement—should be less than 30/-.



The new Mercury range of small rubber models 1. Saturn, 2. Mars, 3. Perseus, 4. Alpha and 5. Sirius. A neat squadron of genuine fliers. In centre is the pre-fabbed Mustang G/L model for the AM 25 and similar engines.

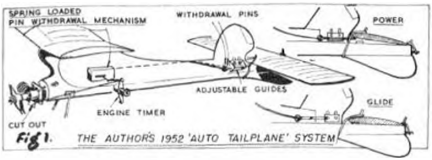
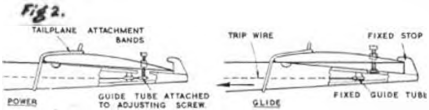


Fig 1. THE AUTHOR'S 1952 'AUTO TAILPLANE' SYSTEM

THE MAJOR problem of flying a high powered contest power model is principally one of trimming it against the effect of excess wing lift during the climb. That this state of affairs should be so is primarily due to the need for the model to have a reasonable glide at the end of the motor run. With the wings, tailplane and C.G. in a fixed relationship to one another, there is an immediate "nose-up" tendency when applying high power, and the looping effect is a logical and accepted resultant.

Most common method of achieving parity between these conflicting extremes is to use turn and roll in a spiral climb, this being easily achieved with the pylon layout; another method is to counteract the excess wing lift by means of a nose-down force such as downthrust.

Fig 2.



AUTO TAILPLANE SYSTEM

These methods do however, represent a waste of power in the case of a fast spiralling model, and excessive drag in a model with a large downthrust angle. A far better system, having a similar stabilising effect to downthrust, is to increase the tailplane lift for the duration of the motor run, either by using an engine-timer operated elevator, or a moveable tailplane. Using either of these, there is no apparent limit to the power which can be handled in a model and the trimming is greatly simplified. The engine can fully perform its desired function, while the tailplane fulfils its primary purpose of stabilising the model.

Considering how stereotyped contest power models have become, it is therefore to be hoped that the following systems will provide some food for thought.

Fig. 1 illustrates a variable incidence tailplane system fitted to a modified

Control that

JIM WALDRON REVEALS HIS METHOD

"Contender" in 1952, power being an Amco 3.5 diesel, and model weight 14¼ ozs. While under power, the tailplane leading edge rested on two pins, these being withdrawn by a spring-loaded mechanism which was tripped by the engine timer, the tailplane was then pulled down into the glide position by the fixing bands. There were disadvantages to this sytem. The high "pull-off" loads required to withdraw the pins due to the tension of the bands, this requiring a powerful and rather heavy operating mechanism with a pull of over 2 lbs.! Adjustment of the pin guides was also not easy to perform with accuracy.

A much better system is illustrated in *Fig.* 2. In this, the tailplane pivots about the leading edge and is retained in the power position by a tripwire from the timer, this passing through a fixed guide in the fuselage to an adjustable guide under the tailplane trailing edge. In operation, the leading edge retaining bands pull the trailing edge up to a fixed stop and one advantage is, that only the engine timer is necessary to pull the trip wire while an obvious disadvantage is that tipping the tailplane for D/T operation is not possible.

The "Auto-Elevator" systems illustrated in *Figs.* 3 and 4, do not suffer from the above disadvantages, and that shown in *Fig.* 3 is the author's personal preference.

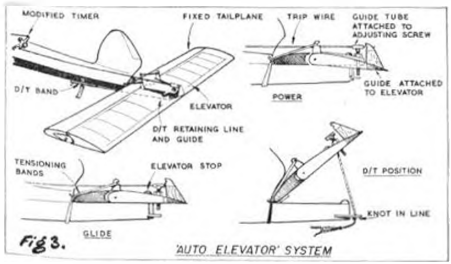


Fig 3. 'AUTO ELEVATOR' SYSTEM

In the former, the tailplane leading edge torsion box, together with a fixed centre section, is attached to the fuselage in the normal way, except for a modified D/T band/retaining line attachment at the rear. The remaining elevator portion is tensioned upwards against fixed stops by bands, and retained in a lower "power" position by the trip wire, as before. Glide packing is inserted under the fixed portion, and for power adjustment, the guide tube with its attached adjusting screw is lowered—increments of ¼ turn or more, this in turn depressing the elevator when the trip wire is in position—the

second elvator system is much more simple in construction and can in fact be a modification to an existing tailplane; weight is however, greater than in the other type due to the sheet elevator.

General requirements

It is not suggested that these systems are the only ones available, but they do represent flight proven methods, all giving the desired effect.

climb with V.I.T.*

OF HANDLING HIGH POWER

Should anyone wish to experiment with his own system, the following points are offered as having been found desirable in practice.

1. Simplicity.
2. Accuracy of adjustment, i.e., by screw if possible (*see Fig.* 5).
3. Low weight.

Other points to be considered are:—

4. Inability to "trip" the system accidentally without cutting the engine.
5. Freedom from "self-operation" due to engine vibration.
6. Rigidity of tailplane mounting.

6 B.A. Pitch	7 B.A. Pitch	8 B.A. Pitch
0.53 mm.	0.48 m.m.	0.43 mm.

Fig. 5. Illustrating the fine adjustment obtainable by screw thread. (Pitch—one full turn).

Trimming

Fast turn and roll is not necessary with these systems, but a straight climb is equally undesirable, as although quite good in calm conditions it tends to be rather risky in windy weather.

The usual tendency is for any slight turn initiated by turbulence to become "nose down", the reasons being illustrated in *Fig.* 6.

Gust effect on straight climb

Firstly, by deflecting the model from its climb the gust invariably induces a banked attitude, often combined with a reduction in climb angle. If the deflection is not considerable and the model's lateral recovery power good, then it will merely assume this change in direction and continue climbing as before, but if the recovery is slow, a turn will develop and flying speed increase. When in this banked, circular flightpath the effective incidence of the lifting tailplane will be greater than previously and with the increased speed, give excessive lift, this forcing the nose down, the result can well be imagined!

* Variable Incidence Tailplane

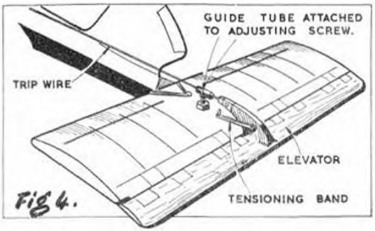


Fig 4.

It can therefore be seen that using a straight climb with high power is rather like flying "on a knife edge"!

There is no need to be pessimistic though, the answer is to use the elevator to all but cure the looping and complete the cure by applying a slight (but positive) turn *combined with* roll, as shown in *Fig.* 7.

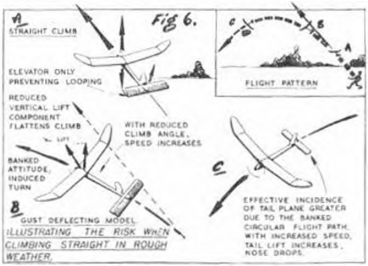


Fig 6.

Turn has the effect of reducing the vertical lift component, while the roll applied by increasing the incidence of the inside wing tip is necessary to prevent it dropping excessively.

In effect then, the model is guided into a spiral climb with the increased tip incidence providing a safety factor, should flying speed increase, when its own lift will also increase.

However, this steep, slow turning and rolling climb is much more efficient than the fast turning spiral which would be necessary *without* the extra lift provided by the variable incidence tailplane.

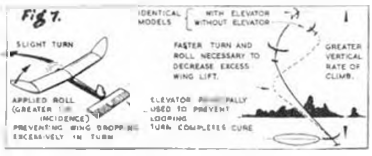
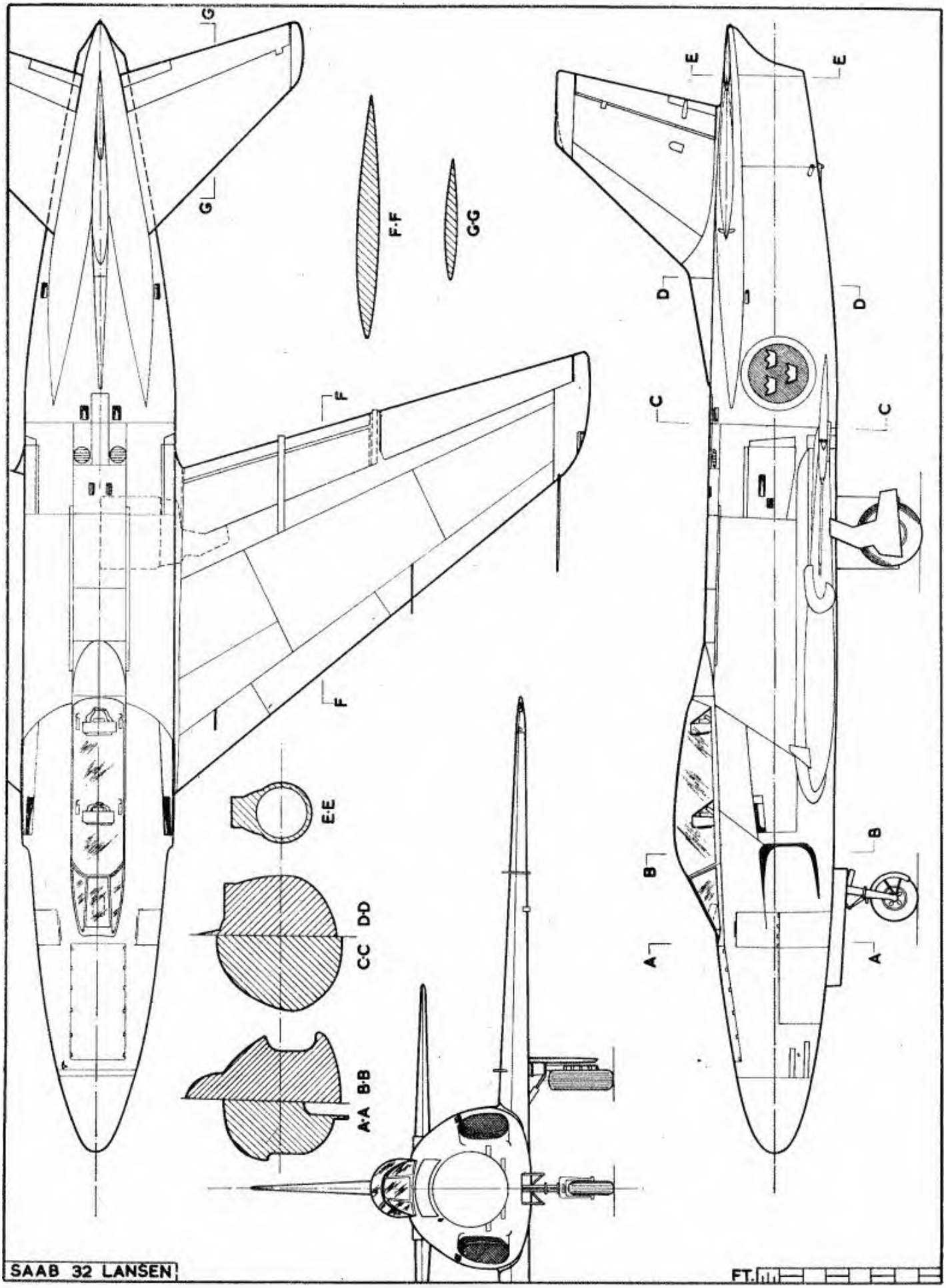


Fig 7.



SAAB 32 LANSEN

FT.

"T" TYPE 1/72nd SCALE REPRINTS OF THIS DRAWING AND "A" TYPE 1/48th SCALE DYELINE PRINTS ARE AVAILABLE FROM A.P.S. PRICE 6d AND 1/- RESPECTIVELY

AEROPLANES IN OUTLINE

NUMBER 44

BY J. R. ENOCH

SAAB 32 LANSEN

Comparison between the two prototypes shows salient external differences between early and production Lansens. Square tip denotes latest version. Below, in first SAAB 32, showing hinged hood and only one seat fitted

SINCE THE end of the last war, Sweden has proved that she possesses all that is necessary to design and build aeroplanes of specific types, just when they are required, equal to those of similar function which are in service with the Air Forces of other nations Of these aircraft, the SAAB-32 Lansen (Lance) is an outstanding example.

Designed to fulfil the requirements of the Royal Swedish Air Board, the specification called for a two-seat attack aircraft primarily intended for use against ground and sea targets, but capable of development in Fighter and Reconnaissance roles. Work on the design of the Lansen commenced in December, 1948, after preliminary design study for an enlarged twin engined version of the SAAB J-29 had been abandoned two months earlier.

It was originally intended that the Lansen should be powered with the Swedish—STAL Dovern, 7,000 lb. thrust turbo-jet, but due to delays in the development of the Dovern, it was decided to use the Rolls Royce Avon Turbo-jet. The Avon specified, RA. 7R, is being built under licence in Sweden by the Svenska Flygmotor A.B. and, known as the RM 5, provides 7,500 lbs. thrust (10,000 lb. approx. with afterburner in operation). Though the four prototypes were powered with British-built Avons, production aircraft will be provided with the RM.5.

Designated A.32, the first prototype Lansen made its first flight on 3rd November, 1953, with B.R. Olow, the Company's Chief Test Pilot at the controls.

Of conventional layout, the Lansen embodies many aerodynamic and structural refinements, the latter in particular, affording the utilisation of highly efficient mass production methods for airframe construction and assembly.

The fuselage, of all metal stressed skin structure, is essentially that of a sleek, high performance aircraft, and has a large well streamlined di-electric nose cap, within which is contained an elaborate electronic fire control system and comprehensive navigation aids. Underneath this equipment are mounted, two each side of the forward retracting nosewheel unit, the four 20 mm. Swedish Hispano Cannon, which form the aircraft's main armament. The Cockpit, flanked by the very efficient flush engine air intakes, is pressurised and air conditioned, with SAAB ejector seats in tandem for the Pilot and Navigator. The one-piece canopy, which has suppressed aerials in the top, is hinged at its port side. Fuselage air brakes are provided, and from a point forward of the tailplane, the entire rear fuselage can be removed to expose the power unit for servicing. The thin variable incidence swept tailplane which has hydroboosters of SAAB design, and the fin and rudder, are faired into the fuselage with large fairings, designed to effect maximum airflow efficiency around the rear fuselage.

Of thin, laminar flow section, the wing was originally fitted with leading edge slats over the outer "half span", but after initial flight tests the slots were replaced with fixed fences as shown on the photographs. With an aspect ratio of 4.5, and swept at 35 degrees at 25% chord, the wing has large area Fowler-type flaps which confer excellent short take-off and landing chracteristics. In common with the elevators, the ailerons are hydraulically power-boosted. The leading edge of wing, tail surfaces and air intakes are thermally de-iced. The wing unit is assembled in one piece prior to assembly to the fuselage. Main units of the undercarriage, fitted with Dunlop wheels and "Maxaret" brakes, retract inwards into the centre section.

In addition to the fixed armament, a combination of bombs and rockets can be carried, provision is also made for a ventral fuselage fuel tank to be fitted as required. It is likely that necessary consideration has been given with regard to carriage of Guided missiles.

With maximum speed acknowledged to be more than 700 m.p.h., the Lansen possesses excellent performance characteristics. It has been stated that on numerous occasions speeds in excess of Mach 1, have been attained. The first flight during which supersonic speed was attained was 25th October, 1953. Specific details of performance are restricted, but the ceiling is estimated to be approx. 50,000 ft. at the stated maximum all-up weight of over 22,000 lbs. Empty weight is 15,500 lb. approx.

The Lansen, can be rapidly converted to dual control to permit pilot familiarisation and amongst scheduled developments of the basic A.32 are the J.32 Supersonic two-seat all weather fighter, and the S.32 Photo Reconnaissance version.

Current trend in U.S. is to match paint job between car and radio model. Here the author's "Wagon" matches red and black Plymouth Hardtop

COMMENT FROM

A Review of Radio Control

ALONG WITH the leaps-and-bounds growth of radio control flying in the U.S. has come an inevitable situation; an increasingly lengthy queue of modellers waiting for their turn in the air. This is not a phenomenon common to big meets such as the Nationals, where a rotation of some 50 aspirants necessitated sweating the line for eight hours, but a feature even of evening test flying sessions and the popular R-C picnic outings.

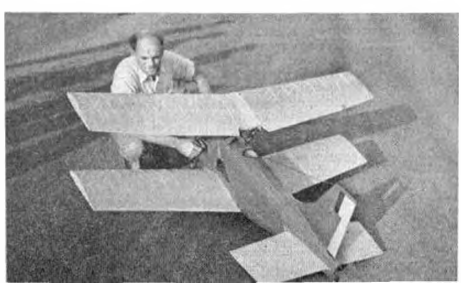
It is with this situation in mind that the first items of equipment packed up are a couple of comfortable folding canvas camp chairs which provide a grandstand seat for observing the planes and techniques of other R-Cers.

For several years the small ship was popular both for sport and competition, but now the trend is toward bigger planes. In some cases, particularly in multi-channel this has been dictated by the necessity of carrying a large pay-load, but even in rudder only and sport flying jobs, where a minimum of equipment is required, size is going up. Consensus is that a good big ship will beat a good little one and results seem to bear this out.

Small planes tend to be bouncy and jerky under control. They seem more affected by gusty wind conditions and seldom penetrate well. Successful take-off percentages favour the big craft. Best of all is the ability of larger sizes to carry ample batteries and a receiver (and relays!) with better than marginal performance. In the long run reliability will be found far more important than portability.

Under A.M.A. rules competition flying has been divided into Rudder Only and Multi-Channel classes. The major consideration in setting up the Rudder only rules was to establish levelling conditions favouring the entry of beginning fliers in contests and that this aim has been fulfilled was demonstrated throughly by Ed Friend in winning this event at the 1955 Nationals. Only a few months into his first year of R C work and with his first plane (a big Live-Wire Cruiser) he topped expert fliers of considerable fame and experience.

This big Bipe with light wing loading is shown with builder Jim Reed who hails from Washington D.C.



However, it is becoming very evident that there is a rather large jump from Rudder Only to Multi-Channel with an intermediate group of planes and fliers caught in the gap between. Rare indeed is the modeller who does not develop a yen for additional controls after successful rudder only experience. But when faced with the prospect of competing against a 5 or 6 channel audio tone rig, the flier of a simplified multiple control is more apt to disconnect his extras and fly Rudder Only; though not in a happy frame of mind. It is fairly certain that a third event allowing any combination of controls that may be operated over a single channel will soon be in operation, providing a logical path of development for advancing to full multi-channel work.

Even for sport flying the addition of a simple motor control provides an array of interesting possibilities. A touch-and-go landing contest has to be tried to be appreciated and nothing can give more thrills at a fly-for-fun gathering with less chance of crack-up or serious plane damage.

The slow motor speed should be adjusted low enough that the plane will lose altitude but not so low as that all power headway is lost. After trying many different approach patterns a simple downwind leg (in low speed) parallel to the runway, followed by a gentle angle turn into the wind seems best. Beware of some of the stunts I have seen attempted, such as spiralling down a ship that refuses to lose altitude in low motor and hoping it will hit the tarmac headed in the proper direction!

Many fliers attempt touch-and-go's as would a full size job, allowing the plane to touch before switching to high power. Considering the limitations of model landing gears meeting tar strips or small rocks, this tactic will more often result in "touch and no-go". The response of the airplane to high power has a certain amount of delay, so the speed change should be made before it touches down. Dependent upon the individual case this may still be three feet in the air; so gauging the timing that as the model settles on to the runway, the motor has returned to full speed and the ship is beginning to accelerate. The whole procedure is a great practice manoeuvre for depth perception, airplane response and pilot co-ordination.

Along the same lines, if your rudder control will pull a little extra, a steerable tailwheel can be a help in company with the motor control for taxiing out, turning into the wind, etc. Howard Bonner has used a steerable tail wheel on a Rudder Bug size ship operated by the standard compound rudder escapement and of course any servo type of drive can handle the job easily. Experience would seem to indicate the inadvisability of attempting to use the tailwheel for guiding during the take-off run (unless you want to do your stunt pattern on the ground), it being a better plan to have the I. G. far enough back that the tailwheel lifts off rapidly, the rudder then being used for steering. Also I believe that a high ground angle is preferable to a low one, to

THE FLYING LINE

activity in the U.S.A. as seen by

CLAUD McCULLOUGH

Chairman A.M.A. Contest Board

facilitate getting up on the main gear quickly.

While the positioning of the two-wheel landing gear about 10 to 15 per cent. of the chord back from the leading edge of the wing gives wonderfully successful take-off characteristics (as Alex Schneider and the S.F. Mustangs so often demonstrate) with a light or medium wing loading ship, it is not a cure-all. On a very heavy loading or fast symmetrical winger something more is necessary.

My own answer to the problem was found in the application of the truck type landing gear pictured on "Wagon". This four-wheel gear is used on army liaison and agricultural crop dusting planes for rough field and cross-wind work. An adaptation of it can be used on the axle of any present landing gear (*below*).

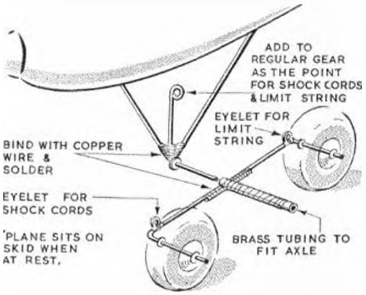
With the normal two-wheel gear on one heavy R/C model, I was lucky to make one successful take-off in five attempts. Upon installation of the trucks the percentage increased to near perfection—in the trial session, 14 consecutive take-offs. Harold DeBolt and others have subsequently used this type with good results.

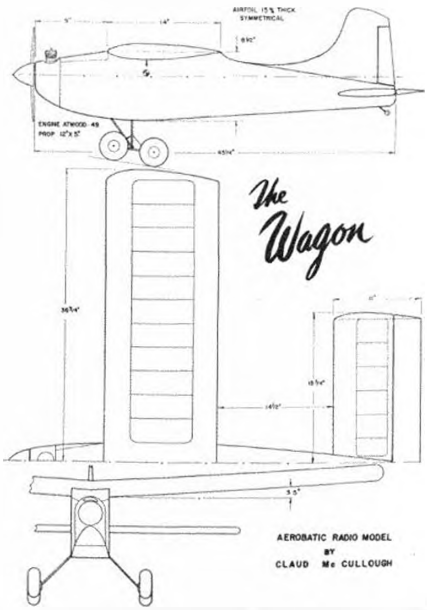
For competition flying a wheel brake is a good point producer (and sport) in performing the so-called proto-type take-off—coming to a stop after taxi-ing 50 feet and then taking off. All kinds of gimicks have been tried but it is best to stay away from complicated arrangements such as drum brakes. A simple catch on one main wheel with a wire engaging it for a stop is sufficient, operating from the elevator servo in full down position. Some fliers brake the tail wheel, requiring less linkage, but given to sliding along and refusing to stop.

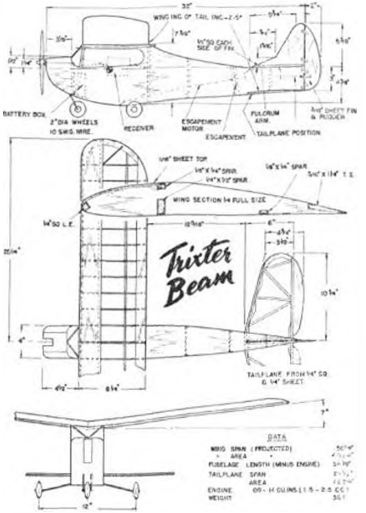
One neat trick is to have a trike gear with the main wheels located very close to the C.G., so positioned that in low speed and neutral elevator the ship will taxi on the tail skid. When the elevator is put into full down the tail will raise and the nose wheel, which has been "frictionized" enough so that it will not rotate when taxi-ing in low speed, contacts the ground and stops the plane. When standing on the nose gear the angle of the ship is nose down and upon switching the motor to high speed and neutralizing the elevator, take-off run commences with the nose wheel clear of the ground.

Three speed motor controls are becoming more popular and offer several advantages. The high speed gives prompt take-off, quick climb to altitude and ample stunt capacity. The intermediate speed is adjusted to maintain altitude and is used throughout the precision pattern maneouvers. In slow speed the plane will lose altitude and approach for touch-and-go and spot landings.

Photo above is a typical club "picnic" this one featuring the Los Angeles "Larks". Shot shows only a proportion of the gathering and might well be compared with the average national contest in this country







With either a two or three speed motor control there is no excuse for having an underpowered airplane—it is much better to use a high power loading and put the motor control to use.

The subject of whether to use a self-neutralizing or trimmable servo on the elevator has been good for some hot arguments. When audio tone control first became popular, following the lead of Ed Rockwood's original set-up, most fliers used self-neutralizing servos. Harold DeBolt with Frank Schmidt's reed equipment, attracted considerable following when he began doing spectacular work, including outside loops, with a trimmable servo.

This is a positional deal, in which beeps of "up" or "down" allow leaving the elevator in any position—very handy for fine corrections and down trim for wind penetrating power. The rub is that with no centering position, after every manoeuver a "hunt and peck" procedure must be followed to get back to neutral. In the hands of a very expert flier good results can be obtained But many modellers, particularly with the strain of performing under the watchful eyes of judges, cannot cope with this set-up and sooner or later, when close to the ground, things get disastrously out of phase.

The self-neutralizing servo which returns to neutral as soon as the "up" or "down" tone is released provides automatic safety for even the most nervous operator and because of this, has once again come into top favour. Practically speaking you are limited with this equipment to full up and full down. The only way you can have intermediate positions is by pulsing and on an elevator this generally gives sloppy and unsatisfactory results, with the plane bobbing and "hunting". A ship with enough elevator movement, for example, to outside loop in the full down position is impossible to power dive smoothly.

My own answer, which has been highly satisfactory, is a combination of the two—a servo providing self neutralizing "up" and trimmable "down". This is easily obtained by disconnecting the down neutralizing switch on any common self-neutralizing servo. First advantage is that groping for a neutral position is eliminated—any time centering is desired the servo is released in the "up" segment, making safe such near-ground manoeuvers as hauling off on take-off and flaring out the glide during landing.

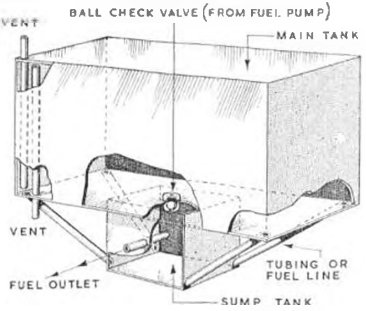
The neutral position is adjusted as a "climbing" neutral for gaining altitude and making gentle, nose-high turns. For penetrating the wind or making steep turns and spiral dives, short beeps of "down" are applied. Further application of down trim will give shallow dives, vertical dives and finally outside loops, returning to neutral by sending "up" tone long enough to drive the servo into the "up" half of the control segment. When a conventional two speed motor control is used with this type elevator operation, the "low" is adjusted to maintain altitude in the automatic neutral position; down trim of the elevator being used for losing altitude.

Another variation which has found adherents is a self-neutralizing type with a 5 or 10 degree segment in in the centre left trimmable for flight corrections. Effectively you have two neutral positions when rerurning from up you have a "descending" neutral and release from down ends up in a "climbing" neutral. However the same considerations apply as with a full-self neutralizing variety when dives and outside loops are attempted.

For doing the more conventional stunts such as inside loops, dives, etc., fairly small moveable elevator area will suffice—20% of the total stab area seems ample and many make do with less. But for advanced manoeuvering—outside loops and the like, larger areas are mandatory, 30% and 40% movable is not uncommon.

A thick stabilizer section has been favoured as an aid to turn recovery characteristics. However this has a tendency to blanket the action of the elevator and require relatively large movements to get results. Current California theory holds that for manoeuvering ability the stab should be as thin as is structurally practical and my experience agrees. (*To be continued.*)

Typical stunt tank design sent by Claud McCullough. When upside down valve closes retaining fuel in sump. Due to position of fuel outlet feed is positive through all stunts. Corner feeds from main tank give prompt refill of sump when ship returns anywhere near level



CLUB NEWS

IT IS AMAZING what can happen during the course of a short month—which amounts to the delay incurred by the recent printing dispute. From Arctic conditions we have passed into the first signs of Spring. Carnage Day is already history, and the contest calendar is rapidly filling up with announced rally dates. So it looks like becoming a very busy season, but not one that is likely to pass smoothly from the administration point of view. Already the S.M.A.E. have had a major setback in not having R.A.F. Station Waterbeach for the Nationals, but it is hoped that in R.A.F. Hemswell one Society will have secured a good alternative site.

Catching up with club news there seems little doubt as I view the pile of reports on my desk, that the North Western Area is the place where most aeromodelling activity takes place in these Isles. I wonder, could this be due to availability of flying sites in that quarter?

London

Sensible approach to the ever-present secretarial problem is solved in NORTH-ERN HEIGHTS M.F.C. by appointment of two Hon. Secs., namely, Malcolm Young and Jimmy Widgery. The club has now adopted a standard A2 design and it is hoped that this will stand the members in good stead throughout the coming season. Radio interest is spreading fast and is the main N.H. activity. Six members now have models in operation and a radio boffin by the name of Ernest Jones is inspiring the boys to get on to multi-channel reed sets.

Arthur Evans, winner of the scale event at last year's Nationals is again building a flashy line for the event, this time an Arado subject. He has also experimented with a dummy "twin" using the flexible drive system for the second prop., on a D.H.10. Ben Bryant has a D.H.9. Hummingbird powered by a home-built flat twin diesel and fitted with R/C, whilst Geoff Goldsmith is another R/C enthusiast with a 7 ft. "Orange Box" powered by a D.T.34 engine flown Junior petrol engine. These enterprising names belong to the BROMLEY M.A.C. who are much encouraged by the end of Biggin Hill aerodrome. Don McIntyre is building a twin engined double delta Canard. Bet he'll be wild when he sees "Pteranodon" in this issue!

A Boxing Day scramble held by SLOUGH M.A.C. was blown out by rough weather, but better conditions came with a novel 20-mile rat race for stunt control-liners, which sounds like a nice way of passing the time at any club C/L meeting. There is a definite trend from F/F to C/L due to the lack of a suitable flying field, and as an encourager club members can learn to stunt using club models for a weekly subscription of 2s. 6d.

Aeromodelling is having a boost due to the Air Training Corps and the HENDON Squadron are particularly fortunate in that their model aircraft club is able to use the R.A.F. aerodrome with its large area of grass and tarmac. Flying meetings take place every Sunday afternoon and if you are keen, live in the North West London area, and want a flying field, I suggest you join up and get into blue.

The Flying Eye model published in the February issue apparently caught the attention of the FULHAM M.A.C. and has resulted in a variation with the name of *The Bloodshot Eye*. This is another club with a major interest in C/L and is ready for the season with "dozens" of stunt and combat jobs.

From ENFIELD AND DISTRICT M.A.C. we have the finalised date of July 15th for their rally at the Enfield playing fields on the Gt. Cambridge Road, and contests will be as before covering combat, team racing, and handicap speed. For further information on the rally write to R. J. Tuthill, 29 Birkbeck Road, Enfield.

Epsom Downs on Bill White Cup day was not exactly a welcome prospect though the meeting had a large entry

Another popular C/L rally is that at DARTFORD which was to have been held on May 27th, but is now definitely scheduled for 3rd June at Central Park, by courtesy of the Council. Incidentally, combat here allows for engines up to 5 c.c. For further details write to J. W. Ager, 109 Heath Lane, Dartford. Lack of an Aeromodeller to announce the date led many to believe that the club affair on March 25th was the annual rally, but we gather the organisation welcomed the visitors, and Sid McGoun opened the season with a rousing fast win in team race II for WEST ESSEX.

Club reports should be submitted to the Editor not later than the 15th of each month. They should be factual and informative, and will appear in the issue published exactly one month after the above press date e.g. reports received in January appear in March issue, published February, 15th.

A particularly fine club magazine is the "Swissenach", issued quarterly by the SIDCUP A.S., and runs to twelve foolscap pages including plans for a combat model and details of German model equipment neatly sketched. Club secretaries would be wise to get in touch with P.R.O. M. Templeman, 71b Sidcup Road, S.E.9 to see what can be done with limited finances and availability of a good duplicator. Eddie Cosh, Managing Editor of "Model Aircraft" recently became President of this progressive club, and I applaud their efforts on behalf of the 8th Sidcup (Handicapped) Scout Group which raised £14 through an exhibition of 300 models, of which 150 were aircraft.

Another heart warming fact arises in the MILL HILL AND DISTRICT M.A.C. report where I am pleased to record that the club invited S.M.A.E. General Secretary D. A. Gordon as guest of honour. (First time he has been invited to a club dinner in ten years without having to pay for his own ticket.) Annual Championship cup was won by Allan Blunt and among the new trophies for 1956 is a Junior Championship cup.

The junior question has been to the fore in the ST. ALBANS M.A.C. and it has been decided to circulate a questionnaire to their junior members in an effort to sift out the hangers-on. Can one have *too* many juniors Ken Brookes has been active among the film libraries and the club's winter film shows have been lengthy affairs, starting at 7.30 and concluding at midnight, the subjects mainly concerned with motor racing!

New club in the area is that at BOREHAM WOOD, with a regular meeting place at the local Community Centre on alternate Thursdays. Main interest are team racing and F/F.

Southern

One of the main events at the WEST HANTS A.A. open rally to be held at R.A.F. Station Andover on 8th July will be the R/C Glider Trophy and the Team Race Trophy. The latter will be awarded to the *club* scoring the highest number of points in the contest, with individual prizes as well. These trophies have been kindly presented by the Signals Research and Development Establishment, Christchurch. All the usual F/F and other C/L events will support these main contests which are open to all, and the aerodrome is within easy rail journey from London. So make it a date.

SALISBURY AND DISTRICT M.F.S. will be having their sixth exhibition at the Market House, Salisbury, on Whitsun and entries are invited from all model makers in the district to compete for prizes which have been donated by the model trade. The exhibition embraces a wide range of hobbies, models ranging from a 14 ft. Enterprise dinghy to steam locomotives.

There is a proposition that the FARNBOROUGH M.A.C. should change to the London Area, doubtless for the convenience of Area-organised events, and I learn that the juniors have been doing so well in club contests that the extra five seconds handicap allowance on motor runs is to be discontinued!

Members of the SOUTHAMPTON M.A.C. are building the *Airspeed Trail* as a try-out for the new F.A.I. power ruling, and have also been engaged in keen chuck glider activities. The Area has recently arranged a decentralised chuck glider contest with best three of five flights to count and junior member Robert Barron placed eighth. Since the junior age limit was reduced to twelve years there has been a flush of new members.

BOURNEMOUTH won the Area Challenge Bowl for 1956, thanks to J. Manville maintaining a steady average of 2 : 14 in power and 2 : 16 in glider.

South Eastern

The sad loss of the club president, Arthur Mullett, was deeply felt by the BRIGHTON DISTRICT M.A.C., especially following so close after Arthur's election as continuing President for the coming year. Last year's power team member Alan Mussell is now a thorough all-rounder with A2s and Wakefields in his stable, and he also has a sexaplane ready for the better weather. Ian Lucas, having broken his very aged and trustworthy PAA at last year's Nationals, is now engaged on a new one, also a new F.A.I. power model I wonder if they will have inter-changeable parts?

SPRINGPARK M.A.C. at West Wycombe is now approaching its fourth anniversary and although hard hit by the National Service Act, membership is now 19 including one lady member.

With so many fully trained aerodynamicists among their members, the SOUTHERN CROSS A.C. is particularly fortunate in having no trouble finding lecturers for their regular weekly Saturday sessions. For example, Grahame Gate, Fred Smith, Keith Donald, and Ray Delves are on the club list to give talks on glider, rubber and

For your Diary — Events inviting your entry

June 3rd
Dartford C/L Rally—Dartford Central Park—all classes.

June 17th
Chester Slope Soaring—Clwyd —5 glider classes inc.: R/C.

June 24th
Midland and Area Rally—R.A.F. Wellesbourne—f/f, T/R, Combat.

July 8th
West Hants Rally R.A.F. Andover—f/f, R/C, Glider, T/R.
Stockport Express Rally—Woodford—f/f, T/R, Combat, Scale.

July 15th
Enfield C/L Rally Enfield playing fields—all classes.

August 26th
S. Midland Area Rally—Cranfield—f/f, T/R, R/C, Combat.

August 25 26th
PAA Scottish Festival—RNAS Abbotsinch—f/f, PAA, T/R.

September 16th
All-Britain Rally—Radlett.

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power models, all of which should be most interesting in view of their extensive contest experience and knowledge of the full-size.

Scale enthusiast — in fact Maestro of scale models—H. J. Towner, has an exhibition in hand at Bobby's Ltd., Eastbourne, which will be supported by the **EASTBOURNE M.F.C.** some time this month (April). Ron Moss has a B17E Flying Fort, complete awaiting installation of four E.D. Racer diesels, and a nice flat piece of terra firma for trials. Any fete organizers who might like demonstrations should get in touch with the club secretary at 13 Bradford Street, Eastbourne.

South Midland

HIGH WYCOMBE M.A.C. announce a Control Line Rally to be held on Sunday, May 6th (umbrellas provided!), when Combat, Handicap Speed, and both A and B Team Race classes will be run. Venue will be the Kings Mead Recreation ground, and further enquiries should be addressed to Mr. Smith, 23 Roundwood Road, High Wycombe, Bucks.

Following the donation of a brand new trophy to the **COWLEY (Middx.) M.F.C.** an all-in contest has been arranged whereby members fly rubber, glider or power models, juniors receive a 50% bonus on their times, max. for seniors of 3 mins. and for juniors 2 mins. Should be interesting. Flying takes place on Hounslow Heath on most Sundays; a club building room 20 x 20 ft is in use at Hillingdon Heath; and, most important, meetings are held *above* the saloon bar at the Fox Inn, High Street, Cowley every Monday evening at 7.30 p.m. Prospective members are always welcome.

LUTON AND DISTRICT M.A.S. have produced a very full contest programme, including an A/1 glider comp. on May 13th. Coaches have been booked for all the major rallies, and we look out for the new 100 m.p.h. team racers produced by younger members Mitchell and Dudley. R/C is showing a new burst of activity.

NORTHAMPTON M.A.C. report a welcome increase in membership during 1955, due mainly to a reduction of junior fees. Mr. Castle has had to resign secretarial duties for business reasons, his place being taken over by F.E. (Big Scale Stuff) Smith. At winter indoor meeting the club Engine Starting competition was won by N. Parry, who got his Oliver Tiger Cub going three times with an average of 4.3 secs. for each.

East Anglian

The hardy and keen flyers in this Area met for the Annual Winter Rally on New Year's Day at Debden and although the weather was atrocious there were 50 enthusiasts present, with an individual win by N. Willis of **ANGLIA,** followed by Mick King of **THAMESIDE.** Mick King was also successful in winning the Glider trophy at the Winter Gala on Epsom Downs. For a view of the weather refer to the heading photograph. Cryptic note in the Area News Sheet is an S.O.S. for anyone finding the Joan Hooper results in their "Contest Kit" to please send these with due urgency to the Competition Secretary!!

There is a new club at **DUNMOW,** where the famous "Flitch" is awarded each year. It is a wonder they did not decide to call themselves the "Flitchers". All will be envious of the fact that they have the use of an less than two disused aerodromes.

Publication of a photograph of a club group in the local newspaper has boosted membership of the **NORWICH M.A.C.,** where the main activity has been team racing, with regular monthly contests. Three keen members have also given talks at two Y.M.C.A. centres which aroused a great deal of interest.

At **IPSWICH** the club has 11 members, including one who has just returned from Singapore and has yet to recover from the shock he got when he discovered the alarming prices of modelling materials in England. Maybe he should have stocked himself up with Japanese kits and engines before he came home!

Midland

Friday, 13th January, was a field day for the **MONKSPATH M.A.C.,** the occasion being a concours event that brought trophies to junior B. Lindon with an exceptionally well finished *Mercury Magna,* and senior K. Williams with a *Mäle Gemini.* P.J.C. Richards from R.A.F. Honiley adjudicated on some 30 entries.

Practical steps to cope with the airfield crop problem have been taken by the **LEICESTER M.A.C.,** who have instituted a camp requiring the highest duration whilst still landing within the aerodrome. Should call for a nice judgement of lift and wind drift—plus the family ranged along the hedges in order to beat back the straying machines!

No interest members of the **HEANOR AND DISTRICT M.A.S.** in all aspects of the hobby a system of league points has been instituted, incorporating impromptu challenge matches as well as official contests. Mid-week flying fixtures are popular, and meeting with some success judging by the number of C/L fans building free-flight models.

Announcement of the new F.A.I. power rules met with initial indignation, then resignation by the **WOLVES M.A.C.** members. Encouragement for the juniors has been given by a building and flying contest, the testpiece being an A/1 glider, cash prizes given from club funds. A. Broomer placed top of the surprisingly good results and I hope to hear more of him in future. The club has now joined Wolverhampton Youth Service Council and among other benefits is now entitled to free use of a Council hall for one night per week.

From **SOUTH BIRMINGHAM M.F.C.** I learn that they opened the season with a contest for the design of a new club badge and transfer, so it seems the famous Red Devil's head is to disappear, as Roy Jones' entry was acknowledged to be simple and elegant and has every possibility of being adopted for the new club transfer.

Biggest recent boost for club membership was the appearance of Phil Dash and Allan Peach with their models on Commercial Television. In spite of the distraction of film star Hazel Court the show went over very well and it is hoped that it justified a whole series of aeromodelling programmes in the future.

A flying camp this coming summer is planned by the **BELPER AND DISTRICT M.A. AND E.C.** and it is hoped that a publicity campaign in the near future will bring in more senior members. Their R/C project has been shelved until extensive repairs have been executed on the club's *Thunder King.* Who put his foot through it?

Biggest news for the Midland Area is the announcement of the **Open Rally** to be held on June 24th at R.A.F. Station, Wellesbourne, Nr. Stratford-on-Avon. Cash prizes for the first three places at £3, £2 and £1 will be awarded in all contests, plus other prizes down to fifth place in free-flight. Entries in the S.M.A.E. decentralised contests for the same day can be flown on a combined event basis and further details can be obtained on request from L. Harding, 28 Hangleton Drive, Sparkbrook, Birmingham 11.

Western

The **BRISTOL ACES M.A.C.** has been busy with indoor R.T.P. flying, including team racers and autogyros, while hectic building activity has been centered on tailless gliders and A/1 types. It would seem that the Bristolians are by no means in a rut.

At **CHELTENHAM** the club has purchased a secondhand Adana printing machine and has since turned out reams of pamphlets, tickets, club cards, letter heads, etc., and if the sample sent to us came from this machine the standard is most acceptable. If any club in that Area wants its printing done at a reasonable charge application should be made to the club secretary at 3 Elm Close, Prestbury.

I learn that a member of the **HAMNSTER AND DISTRICT M.A.C.** has already produced a New Rule 1957 power model, the fuselage of which may also be used as a cricket bat! A contest has been arranged with the **BRIDPORT** club and at the recent precision flying contest P. Arridge came top flying a *Pirate.*

South Western

Pop Baudet and his son took the first three places in the **EXMOUTH AND DISTRICT M.A.C.** rubber contest, and D. Lappett first place in the glider. Next main interest is to be I.c.e. Day Rule 1957 power model, the *A.P.S. Pangeboy.* It was decided that this would be the principle design used in the club contests.

Northern

Some very wise do's and dont's regarding tactful procedure at Rufforth, Baildon, and other places are included in the Northern Area News Sheet, another noteworthy publication which includes detailed drawings and building instructions of Ken Rutter's open rubber model, the *Panther*—other area secretaries please note.

LEEDS M.F.C. have been somewhat shocked by the new F.A.I. rules and there is talk of heavyweight *Green's* from Bryan Eggleston and Frank McNaulty. At **HALIFAX M.A.C.** Wakefield exponent Alan Nobbs has aroused considerable interest in his circular section all-balsa fuselage details of which are to be included in the May or June issue, while at **BRADFORD** the club's Annual Dinner proved to be a riotous affair at Silvio Lanfranchi's restaurant, with guests Bob Copland, Ken Young, and Bob Gosling to enjoy a lighthearted address by the Proprietor and his admirable collection of films of Continental models and fair sex activities.

Incidentally, at the Annual General Meetings of the Leeds and Bradford clubs it was decided not to combine resources for team events, and it was said that Croydon may now heave a sigh of relief.

An enthusiastic club at **HYMERS COLLEGE,** Cottingham, have a Phantom complete with Elfin 1.49 which the club bought out of funds and is available for any of the members to learn how to fly C/L.

North Western

Three pertinent pointers are given in the Area News Sheet to ensure good behaviour

at R.A.F. Station, Tern Hill, and are: (1) that all litter must be cleared; (2) that cameras are not allowed; and (3) recovery is not permitted by car or motor-cycle. Perhaps item (2) has something to do with the announcement that Mr. Whalley of Cheadle lost his camera at the last Tern Hill meeting.

The Area winter rally held on February 12th at Tern Hill was not exactly favoured by the weather as will be seen by the 58 sec. flight from a full line length by J. O'Donnell's *"Thataway"* A/2 which no longer has the forward fin. Garth Evans of **CHEADLE** won the glider event, thanks to the wrubbity advantage of his 12-ft. span *Conquest*. J. O'D. was first again in Wakefield with his straight dihedralled version of *Monotony*, and in spite of the conditions power was up to a very high standard, G. Smith of **WHITEFIELD** M.A.C. winning with a total of 7 : 32.

Besides J. O'D.'s win in rubber at the Area Winter Rally, Mike Allen of Whitefield M.A.C. won both the team race and combat events. Last year's power team member J. Parrott won the club power trophy with 8 : 48 out of a possible maximum of 9 : 00, flying one of his *Monroe* series which he used at Wiesbaden. After a lot of perseverance the Whitefield boys have now got their old flying field back again and are in the happy position of having two sites at their disposal.

A change of title follows the taking over of the *Daily Despatch* by the *Stockport Express* and will mean that the meeting at the A. V. Roe Ltd. aerodrome at Woodford will be known as the *Stockport Express* Rally, with proposed date of July 8th.

Another important date in the Area of interest to modellers throughout the country is the Slope Soaring Rally at Clwyd, North Wales, organised by the **CHESTER** club to take place on June 17th. Classes will be open glider, junior open glider, A/2, R/C and tailless.

Date for rally to be organised by the **HUDDERSFIELD D.M.A.C.** is not to be announced, their most recent activity being the Concours d'Elegence Contest where A. Bradley was top senior with his Hawker *Hurricane* and D. Heywood top junior with his *Stunt Queen*.

Second annual exhibition of the **ENGLISH ELECTRIC M.A.C.** attracted 45 models, and a repeat exhibition is to be staged in July at the Company's Social and Sports Association sports day, together with a C/L demonstration. At a recent inter-club contest with **BLACKPOOL**, F.E. won the power individual and glider team events, and Blackpool the overall team contest.

Although their own winter rally was blown out, members of **ASHTON M.A.C.** went along to the Area rally and Vince Jackson placed third in power and fourth in glider.

New club in the area is that at **BRAMHALL** in Cheshire and anyone interested is advised to get in touch with the secretary at "Chipstead", Bramley Road, Bramhall.

MERSEYSIDE M.A.C. has great expectations for a bash at the long-established British motorplane record by Arthur Searl who is said to have one of the most radical designs of its type ever seen.

WALLASEY M.A.C. members all went along to the Area rally and Peter Nicholson returned with second place in power duration, whilst the club team race entries were second and third, The **WIGAN** boys also gained a place with J. Wilkie coming third in Wakefield. One nameless member who happened to be the only flyer to find thermal at Tern Hill released his model saying, "I don't need a dethermaliser, I'm only trimming"—famous last words!

Club nights are held twice weekly on Tuesdays and Thursdays by the **ROCHDALE AND DISTRICT M.F.C.** and a series of lectures and discussions is planned for all aspects of aeromodelling right through the season. The club also offers its services to provide control-line demonstrations at any public function and current interest is rated at 65 per cent. C/L, 35 per cent. F/F. Several twin engined models are in evidence including a 5-ft. *Bristol Blenheim* and no less than three A.P.S. *Invaders*, one of which is scaled up to 1¼ size. There is also a North American Savage, and a B17 *Flying Fortress* well on the way for four E.D. 3.46s.

Speaking at the Annual Dinner and Prize-giving of the **CHESTER** M.F.C. visitor J. B Hannay, secretary of the Wallasey Club proposed the toast to Chester and challenged his hosts to a competition—an opportunity which was quickly taken up and is shortly to take place.

R. Wilson of the **HYDE M.A.C.** is very busily engaged with a 10-ft. span model—R/C of course—with which he hopes to establish a distance record by flying across the moors using three transmitters.

There is a new club at **PRENTON**, Nr. Tranmere, Birkenhead, with 14 members and a main interest in C/L combat. Local enthusiasts are invited to contact the secretary at 24 Walker Street, Prenton, Nr. Tranmere.

North Eastern

Club Championship of the **TYNEMOUTH M.A.C.** for rubber and power went to Ron Pollard, glider to R. Bowser. After presentation of these prizes the club had a pleasant film show which included a film on aeromodelling and the *Comet*.

Achievement by the **WEST HARTLEPOOL AND DISTRICT M.A.C.** is that they have flown a 5 c.c. team racers indoors and in complete darkness (must have been a power cut). They wonder if any other model boys have had the same experience?

Open invitation from **THORNABY PATHFINDERS M.F.C.** is for any model club in the British Isles or on the Continent to contact the secretary at 54 George Street, Thornaby, for a postal match. The club has plenty of experience with inter-club events, having been challenged and challenging Seaham, Southbank, Stockton and West Hartlepools, over the past few seasons Although the lads survived the local influenza epidemic they are rapidly going down with 1957 F.A.I. virus.

Six team racers have been built over the winter months by **SOUTH SHIELDS** members, including one with an Italian Super Tigre glowplug motor.

New club is that at **BURNOPFIELD**, Newcastle-upon-Tyne, with a membership of 15 and regular meetings on Wednesday nights at the local cricket pavilion Main activities are small team racers, F/F, power, and glider. Local enthusiasts are invited to contact the secretary at 33 Cedar Crescent, Leazes, Burnopfield

Scotland

The **STRANRAER AND D.M.A.C.** has been formed to re-unite several old hands at the game who were once members of various other clubs in the South West of Scotland. By giving weekly flying displays, the membership has steadily grown and on March 25th they held open house for S.W. clubs with glider and power competitions. Hope they had the fine weather we enjoyed in the south. **MONTROSE M.A.C.** had a set-back when they lost their clubroom recently; but undismayed, and like true Scots fra' the Burns country, they intend to build their very own place right on the precincts of the aerodrome That's the spirit!! **BUCKSBURN A.C.** had a revival and is engaged in a recruiting drive among the inhabitants of Aberdeen and district. Secretary Roy Yule welcomes enthusiasts at 499 Gt. North Road, Woodside, **Aberdeen.**

FORFAR and **KIRRIEMUIR** have combined to form one club, and the **ARBROATH** boys had a contest for juniors, getting ten entries. Best constructed model was a *Mercury Trel* by 14 year old D. Porteous. Contest programme for the

COMING EVENTS—Next Month

April 22nd
WESTON CUP: 2nd Wake Elims. } Area
ASTRAL TROPHY: 2nd Power Elims. }

May 6th
HAMLEY TROPHY: Open Power (De-cent).
Wycombe C/L Rally—King's Mead Rec—all classes.

May 20th
THRUSTON CUP: Glider.
DAVIES TROPHY: Team Race "A" } British
SHORT CUP: 2.5 c.c. PAA load } Nationals
GOLD TROPHY: C/L Stunt.
SMAE TROPHY: R/C

May 21st
SIR JOHN SHELLEY CUP: Power } Hemswell,
MODEL AIRCRAFT TROPHY: Rubber } Lincs.
DAVIES TROPHY: Team Race "B"
BOWDEN TROPHY: Precision Power
SUPER SCALE TROPHY: Scale ff
TAPLIN TROPHY: R/C
LADY SHELLEY CUP: Tailless.

ANGUS AND DISTRICT Aeromodelling League provides for one event a month till August at H.M.S. Condor—and d'you know, I think these Scots have got their flying fields better organised than we poor Sassenachs!

Big announcement from Festival Contest secretary, Bill Meechan tells me that the PAA "do" will be at R.N.A.S. Station Abbotsinch this year, on 25/26th August. Near Glasgow, this is a little more convenient than Heathfield. Fine gesture in the **KIRKCALDY M.A.C.** is that winners of clubs events get 50% of the entry fees collected, and the other half go to the S.M.A.E. International team fund. I wish more clubs had the same kind of "go"—particularly those who have greater interest in getting their members into the team selection trials.

Indoor team racing to F.A.I. rules took place at the famous Kelvin Hall (is this why it needs repairs to the roof?) in a competition attached to the Schoolboys' Exhibition. 2 Kirkcaldy teams entered, one retiring when the shortened 30 ft. lines were crankahafted and the other set up best time of the day; but did not beat the **GLASGOW BARNSTORMERS** record of 5 miles in 4 minutes. Models fly one at a time against the clock.

Wales

CARDIFF M.A.C. are distinctly high aspect ratio team racer conscious and are busily engaged on a production line of butterfly tailed club designs, for engines of all types from the plain bearing AM 25 to the esteemed Oliver Tiger.

Ireland

A model club was formed at **LIMERICK** last September with 25 members to start the ball rolling with enthusiasm for all free-flight, control-line and radio classes. Contests are planned, a field and clubhouse hoped for in future, and we trust the blueys will be sending their next report in true rhyming style expected of this famous county.

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Due to extreme pressure of space, this month's long list of new Secretarial addresses has been held over.

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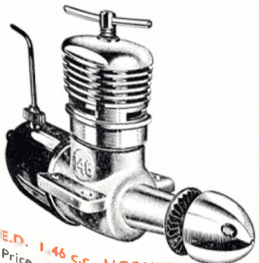

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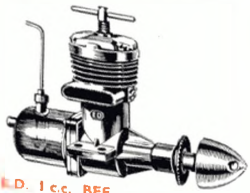

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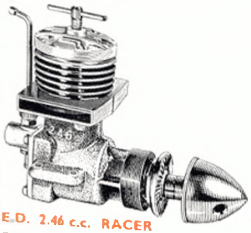

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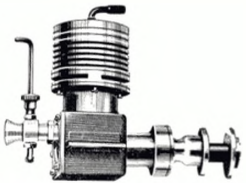

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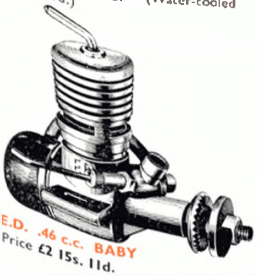

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