AERO MODELLER

AUGUST 1952

IN THIS ISSUE ● A SCALE AUSTIN WHIPPET ● E.D. BEE CONTEST MODEL "PUSSYFOOT" ● "PRESTO" CLASS B TEAM RACER ● FULL SIZED PLANS OF "SKYROCKET" 1951 JETEX CONTEST WINNER ● SPECIAL ARTICLE ON PROPELLERS ● ALL THE REGULAR FEATURES

1'6

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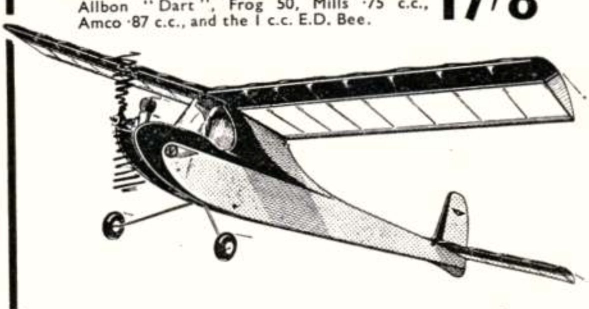
DATA:—Span, 37 ins.; length, 27 ins.; area 188 sq. ins.; height, less engine, 6/7 oz. Suitable for small diesel or glowplug motors, up to and including 1 c.c., such as Elfin ·5 c.c., Allbon "Dart", Frog 50, Mills ·75 c.c., Amco ·87 c.c., and the 1 c.c. E.D. Bee.

17/8



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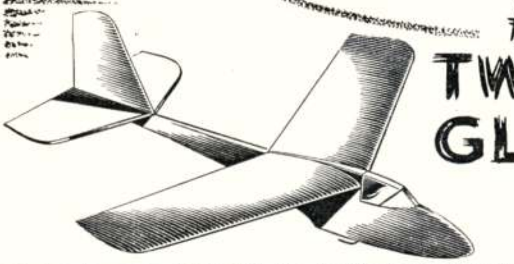

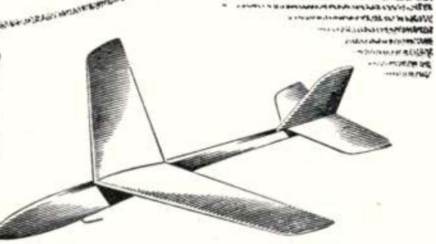

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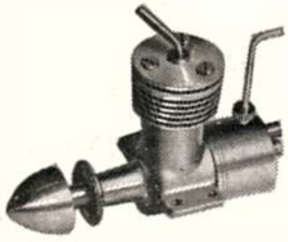

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AERO MODELLER

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Contents

Editorial and Advertisement Offices:
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AS anticipated, the response to Col. Bowden's challenge as published in our July issue has been swift and sure, with honours at present about equally divided between his supporters and opponents.

A noticeable feature of much of the correspondence received is that many people take up the cudgels and berate the opposition without a proper knowledge of the facts that they use in argument. A typical example is that put forward by "A.K.C." of South Croydon, a self-confessed "oldtimer" who has "been building and flying model aeroplanes for over twenty years". After some very reasonable discursions into the realms of realistic-versus-functional models, he negatives his whole argument by the statement that "all competitions should be open to *all* modellers upon payment of a nominal entry fee, and should not be confined to entries from the *closed shop of the S.M.A.E. and affiliated clubs* ! ! (The italics are not ours.) Anyone at all familiar with National rules, etc., will know that all S.M.A.E. contests are open to anyone who cares to enter, though naturally Society members are encouraged by a smaller entry fee than that charged to non-members.

From a Scottish reader comes some rather pithy comments interspersed with sound suggestions that come very near the truth. He states that "*large semi-scale models were in vogue in the three or four years immediately after the War, but in recent seasons seem to have lost their popularity. The last semi-scale contest I attended was a flop, with only one out of an entry of four models able to R.O.G. and make a short flight without disqualification. This was no fault of the models—the trouble was their owners!* They had subconsciously lost interest in that type of model. *Perhaps the reason was the spectacular line-up of scale models at a Concours just across the tarmac. My belief is that the type who used to build semi-scales has become a Scale or even a Radio Control enthusiast.*"

However, the letter we liked best comes from a successful contest man of our close acquaintance who states :—

"*I am a very average clubman, and keen but largely unsuccessful contest flier. Having flown in some 25 competitions in the last 12 months I am fairly hardened to bad luck, and the vagaries of wind and weather, but the vicious system of points deductions proposed by Col. Bowden for his 'stability' contest appals me.*

This type of contest is by fate condemned to be flown in a full gale, when a sudden gust on landing will deprive the unfortunate competitor of all marks! Frankly, if the prospect daunts types like myself, what attraction will it offer to the normally non-contest flier? No, by very definition, it is not possible to design a contest to please the non-contest flier. He usually likes to have a nice quiet fly with others of his ilk—and why not.

Regarding stability and reliability, I must agree with Col. Bowden and would strongly advise young modellers taking up contest flying to concentrate on these features. Leave those 5 minute Wakefields, 9 foot long A/2's and rocket-like power jobs to the 'expert of experts'. Believe me, to put up a regular 2 to 3 minutes per contest flight is a lot more satisfying than to be constantly left with a pile of wreckage."

From our regular role as the onlooker, we peer regularly to both sides of the fence, but it seems to us that it is a case of "East is East, and never the twain shall compete". With the Bowden Trophy appearing again in the 1953 calendar of National Contests, we reserve further comment until we can judge the degree of support such a "precision" class of contest will attract following so much put into print. To the Colonel, we can only submit that his supporters are vociferous if not competitive, and more power to his elbow.

Cover Picture . . . .

From faraway Sungei Besi, Selangor, Malaya, comes this close-up view that might well have been taken on any model flying field in the world. A. N. Gregson is tuning up the Mills 1·3 diesel, whilst Mrs. W. V. Symes casts an appreciative eye.

Engine Analysis

Bobbie Burns spoke no truer words than "The best laid schemes o' mice and men aft gang agley" For "gang agley" last month's Engine Analysis did, thanks to the sudden indisposition of our contributor Ron Warring. We are happy to say that Ron has now completely recovered from what was a painful and infectious illness, and readers will find a most detailed test of the new Frog 50 on page 484.

Wakefield News

News of Wakefield Eliminators in other countries gives a forecast of keen participation at this year's event. Canadian and New Zealand teams have already been announced in our columns, and from Australia we learn that W. Reeve, S. Gray, E. Gregory, A. King, L. Hopkins and A. Lim Joon have sent their models direct to Sweden. Seems to be a hitch somewhere in the Aussies' arrangements however, for your Editor has taken charge of a consignment of models that arrived at London Airport last month following a cable from the M.A.A. of Australia that *three* models were coming.

This consignment arrived almost at the same time as the New Zealand crate containing six Wakefields and four A/2's which, by arrangement, the AEROMODELLER staff is taking under its wing and ensuring their safe arrival at the Contests. (The box incidentally is a masterpiece, and far too large to go into the Editorial car. The journey from Heath Row to Watford with said crate perched on top of the roof was a bit dicey!)

Each of these Empire teams are bound to rely on the proxy flying system, second best though this may be. This is readily recognised as a severe handicap, for it means that unless some first class proxy work is put in by the nominated men, there remains little chance of an Empire country playing host in the future.

A logical solution is perhaps revealed in the F.A.I. Report published on page 496, where co-operation of the full-size industry, Air Lines and the Services is shown to be lacking in many ways. If only some arrangement could be made to sponsor air passage for all competing teams to International events, then the first move would be made to providing a regular reserve of enthusiastic recruits for the aviation industry, which is currently complaining of a severe shortage of man-power. We look to the day when member airlines of the I.A.T.A. can get together and provide the means for a meeting that will be truly International.

European teams attending in person at Norcopping will include the Italians Cellini, Faiola, Kannenworff, Lustrati, Pelegi and Piccini, all of whom placed highest in the May 11th eliminators at Pisa. Some of these names will be familiar to many of our readers, and in view of their high placing in previous Finals, strong competition from that quarter must be recognised.

To date we know of only two American team members, but both these are very well known to us. Ed Lidgard (the fire-extinguisher wielder of the 1949 Contest) has found time to fly into a team place as well as do much of the Organising Committee work—a just reward for some hard going.

The second is that well-known, and well liked modeller, Jimmy Tangney, who took the Eastern Eliminators by storm. When Jim arrived back in the States he settled in Newport, R.I., and thus competed in the Eastern section of the State-wide contests. Using basically the same plane we are familiar with here, Jim's times were 4 : 07.5, 5 : 00

***ROYAL INTEREST.** Sir Miles Thomas, Chairman of B.O.A.C. explains to Her Majesty the Queen and H.R.H. the Duke of Edinburgh, the intricacies of a magnificent model Comet which was on display at the British Industries Fair.*

and 4 : 51.2. As our correspondent says, " Jim seems to have gotten polished up while he was in your country—it was perhaps the finishing touch needed to an already great aeromodeller ". We understand that the American Navy are co-operating by flying Jimmy to Sweden.

Evans in !

Owing to other commitments, A. Albone of Croydon, who placed level with Warring and O'Donnell in the Wakefield Trials, is unable to make the trip to Sweden, and has withdrawn in favour of E. W. (Ted) Evans of Northampton, who placed seventh. Whilst sympathising with Albone, we commend his gesture in relinquishing his place to such a redoubtable warrior as Evans, who will be remembered for his stern tussle with Ellila at Jarmi Jarvi in 1950, and his excellent team managership at the same venue last year.

A. B. C. of Model Aircraft Construction

In announcing our move to Watford we expressed the hope that we should shortly be adding up-to-date model literature to our normal publishing activities. We are proud to announce the publication of the first of this range in the shape of " The A.B.C. of Model Aircraft Construction," from the able pen of that friend to beginners the Rev. F. Callon. By dint of very careful budgetting we have been able to keep the price down to a sum that beginners will not mind paying, and at 5/– we venture to say it represents exceptional value, with ninety-six pages of " gen " to guide the newcomer on the troublefree path to a *flying* hobby!

Older and more experienced readers may very well have learned their aeromodelling from the pages of a book under almost the same title by Editor C. S. Rushbrooke—a book which by the way sold nearly 60,000 copies in its long life. We felt, however, that so much had happened in aeromodelling since that book was written that only a completely new work by a man with his finger on the beginners' pulse would really meet the case. The title expresses so very much the contents that no possible improvement could be found for it.

The conscientious beginner will need little prompting to go forth at once and acquire his copy—with twenty-two chapters of step-by-step instruction it may well be enough to put him amongst his club contest winners this very season. But we would address our remarks more particularly to the more advanced enthusiast who would like to do his own good turn by buying a copy for the useful instruction of a younger brother, a son, or maybe a daughter.

But perhaps the happiest of all to see a beginner's book on the market again, will be the hardworked model shop proprietor who will be able, in a word, to transfer all those buyers of first kits, he has endeavoured so painstakingly to nurse, into customers buying and building ever better models.

Aeromodelling Scholar

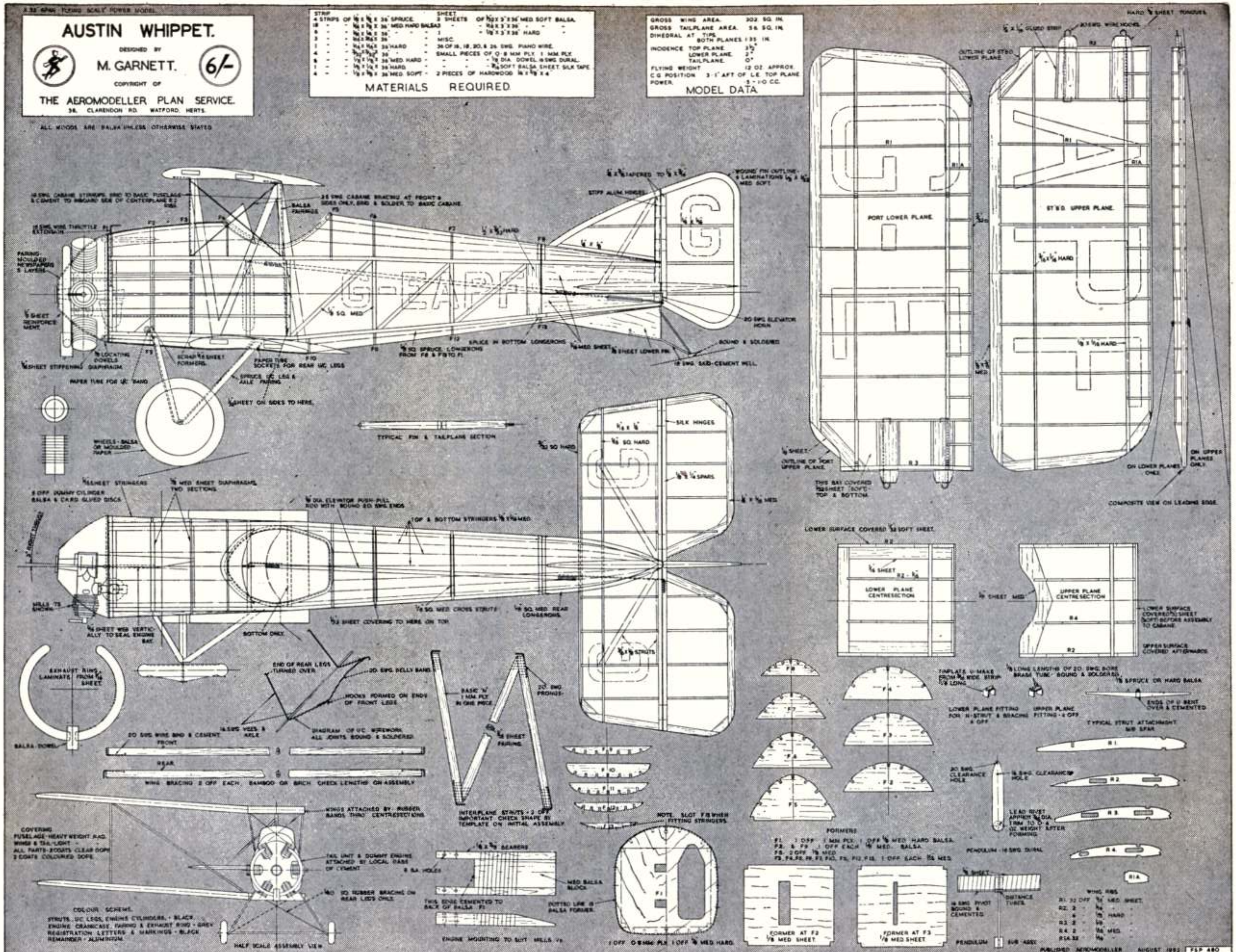
If anyone doubts the use of aeromodelling as a hobby as well as an aid to study of full-size aviation, then let them refer to the photo on this page. Centre-piece of the photograph is Terence W. F. Moore, seen at the Bristol A.C.E.S., aeromodelling section clubroom, and being admired by his clubmates. Mr. Moore is a student apprentice at the Bristol Aeroplane Company and has this year, by dint of hard study, successfully won a " Mitchell Spitfire Memorial Scholarship " for Southampton University. In aeromodelling he is an A/2 fan, and with his " Red Spinner " design, seen in the photo, has several high placings to his credit including first place at the Western Area Winter Rally. Congratulations to this student of aeromodelling and aviation, let us hope that Moore will continue to be able to keep a building board handy through his more intensive work at Southampton.

Sorry, no longer there !

There was a time, when we used to listen to moans and groans from disgruntled clubs with a sympathetic ear, and lend a small measure of commiseration with an occasional " Something will turn up old chap " kind of remark that somehow always did sound as though it was falling on stony ground. For these groans nearly always concerned one misfortune—the loss of the club field.

But now, to our chagrin, and in the famous service slang, we find ourselves no longer " fireproof " or what have you, and in fact the boot is very much on the other foot, for we ourselves are *without* a flying field ! No longer can we doff the editorial gear, pop out of the front door and indulge in uninterupted flying, for now that the editorial offices are removed from Eaton Bray to Watford we have lost our 75 acre backyard. So too, have all the week-end visitors who used to visit the 'Bray for a spot of flying, and some we gather, have turned up this season to find a cow-herd where one they used to aviate.

To all who are not already informed, we would therefore, to save much heartburn and wasted petrol, emphasize that the aerodrome at Eaton Bray is no longer in use as the Sportsdrome, and model flying is definitely not permitted there.



THIS IS A $\frac{1}{5}$ SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 6/- POST FREE FROM THE AEROMODELLER PLANS SERVICE

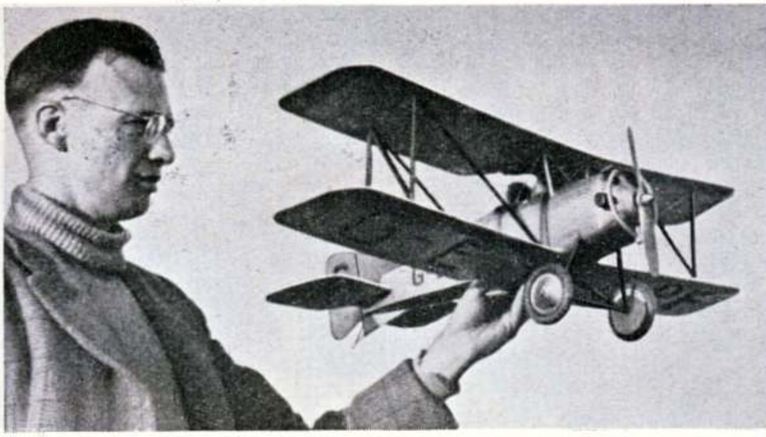
The AUSTIN WHIPPET

A 32 in. Span Flying Scale Model for the Mills ·75 Diesel

BY M. GARNETT

THE Austin Whippet was " discovered " during a search for a prototype biplane suited to the Mills ·75. From the free flight viewpoint, the Whippet had excellent overall proportions, with reasonable dihedral and tail areas, and a simplified bracing system, whilst the diminutive span of the prototype—21 ft. 6 ins.—even in the 1½ inch scale, would produce a compact and robust model of just over 32 inches span. The worst snags seemed to be the engine with its protruding cylinders ready to be removed by finger trouble or by *terra firma*, and the aluminium colour scheme which experience suggested might be difficult.

The late Eddie Riding described the Whippet in the May, 1945, issue of the AEROMODELLER :



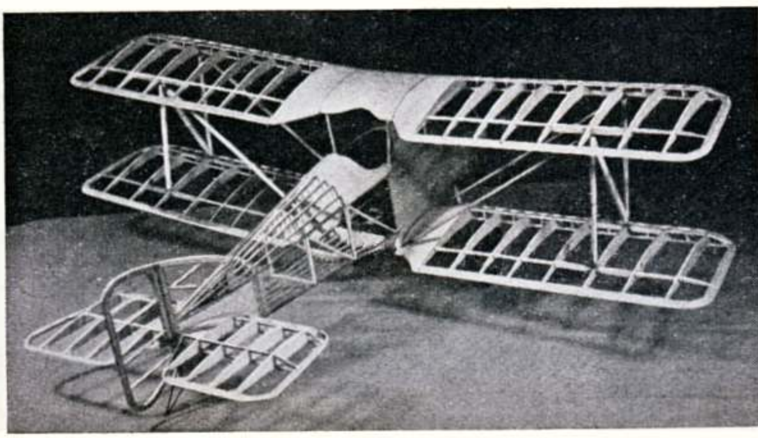
An aircraft fatigue test engineer, designer Garnett should have no qualms over the construction of his dumpy Whippet. This is the later, pendulum 'thin-tail' version, that below is the pendulum rudder, high-lift tail model.

briefly, it was a single-seater light aircraft produced for the private owner by Austin Motors Ltd. in 1919. There was a strong resemblance to the S.E.5A which the firm had been producing, and the design had been adapted to avoid complicated maintenance requirements. The wings folded backwards about a hinge on the rear spars, and rigging difficulties were avoided by the use of streamlined tubular steel struts to brace the upper plane, instead of the usual conglomeration of lift and landing wires. The engine was the 45–50 h.p. six-cylinder Anzani radial, which could be started from the cockpit, and the advertised price of the complete aircraft was £450. Unfortunately the market was not then ripe for a single-seater sports plane, and only three prototypes were built, namely, G–EAGS, G–EAPF, and G–EAUX. PF had quite a long life in the hands of various owners until it went into retirement in 1932, whilst UZ went out to Argentina in 1920 and was still flying in 1928.

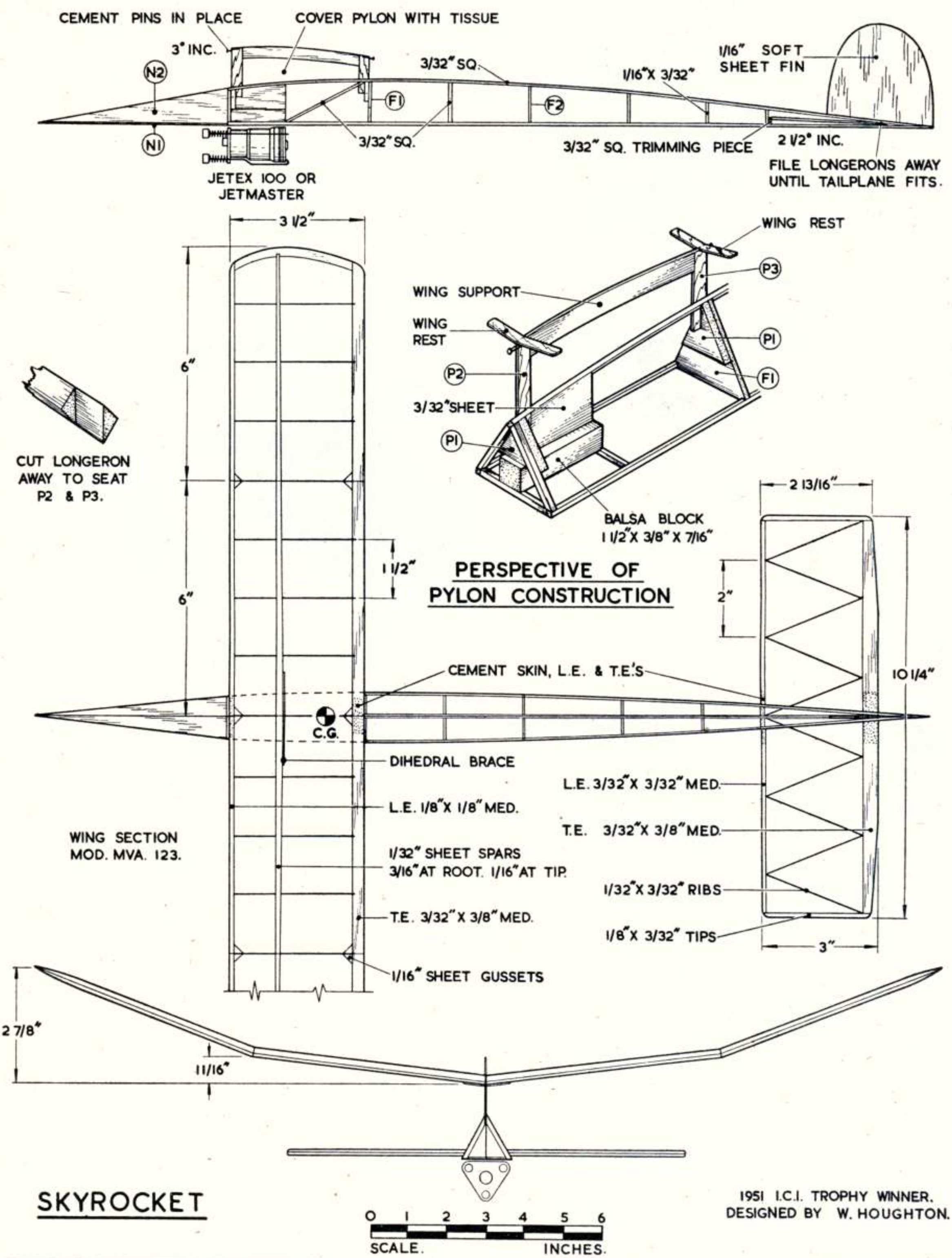
The model has been based on the AEROMODELLER 1/36th scale g.a. and is to scale apart from a slight thickening of the wing section. Engine details have been simplified, and minor details such as wind-driven generator, and aileron connecting rods, have been omitted. The position of internal members has been assumed to be that shown on the A.P.S. drawing, and in the form to be presented here, the model features "knock-backable" wings, and a sprung undercarriage, whilst the whole model dismantles into small components for transport.

Newcomers to free flight scale should have little difficulty in building the model, but they are warned that they might run into trouble during trimming, unless they have previously tried other biplanes. A pendulum rudder and a high lift tailplane were fitted originally, but more consistent results were obtained using the sections shown, and the pendulum operated elevators.

Very detailed building instructions, including excellent advice on trimming and flying the Whippet, have been specially written by the designer and are included as a free leaflet with each full size plan from the Aeromodeller Plans Service. Price 6/– per copy, post free.



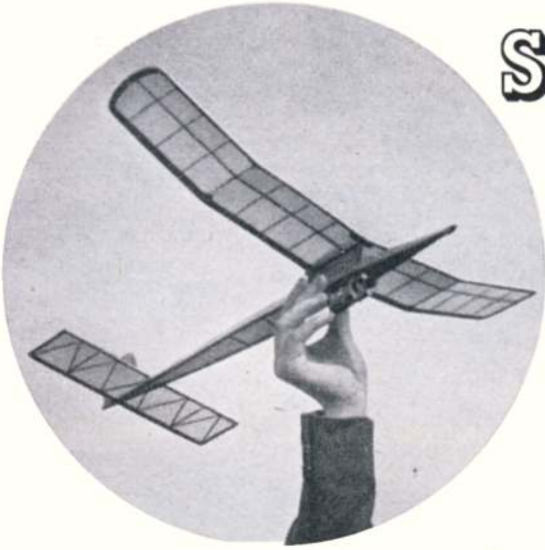
Near-scale structural details are obvious in this view of the prototype model. The thick high-lifting has been replaced with a thinner version incorporating a pendulum elevator. Assembly with internal rubber bands is both neat and crash proof.



SKYROCKET

1951 I.C.I. TROPHY WINNER.
DESIGNED BY W. HOUGHTON.

SKYROCKET



BEST PERFORMING JETEX MODEL OF 1951

By WILLIAM HOUGHTON

Age 23 . . . member Rhyl & Prestatyn M.F.C. . . . keen on H.L. Gliders and all types of models . . . very conveniently a Meteorologist by profession.

WINNER of the magnificent Nobel Challenge Trophy, more popularly known as the I.C.I. Trophy, William Houghton's " Skyrocket " is by no means a thermal-lucky flier. The 1951 International brought the best Jetex fans in Britain to Fairlop and in the absolute calm conditions, this model and modeller from Rhyl in North Wales really ousted the field with superior flying.

His first flight in the contest was 3 : 4 secs. off a single ' 100 ' charge, which indicates how well the designer has applied his long experience of hand-launched gliders to the Jetex powered design. Thin wings and tail with Brasso polished leading and trailing edges, to say nothing of that supersonic nose, all add up to high speed near-vertical climb for a maximum glide ratio.

As a check on performance, the prototype was brought out of hibernation over Easter this year, and on its first whole-charge flight of the day, disappeared into the blue after 9 : 15 secs. ! Which would appear to indicate that a dethermaliser would not be altogether amiss !

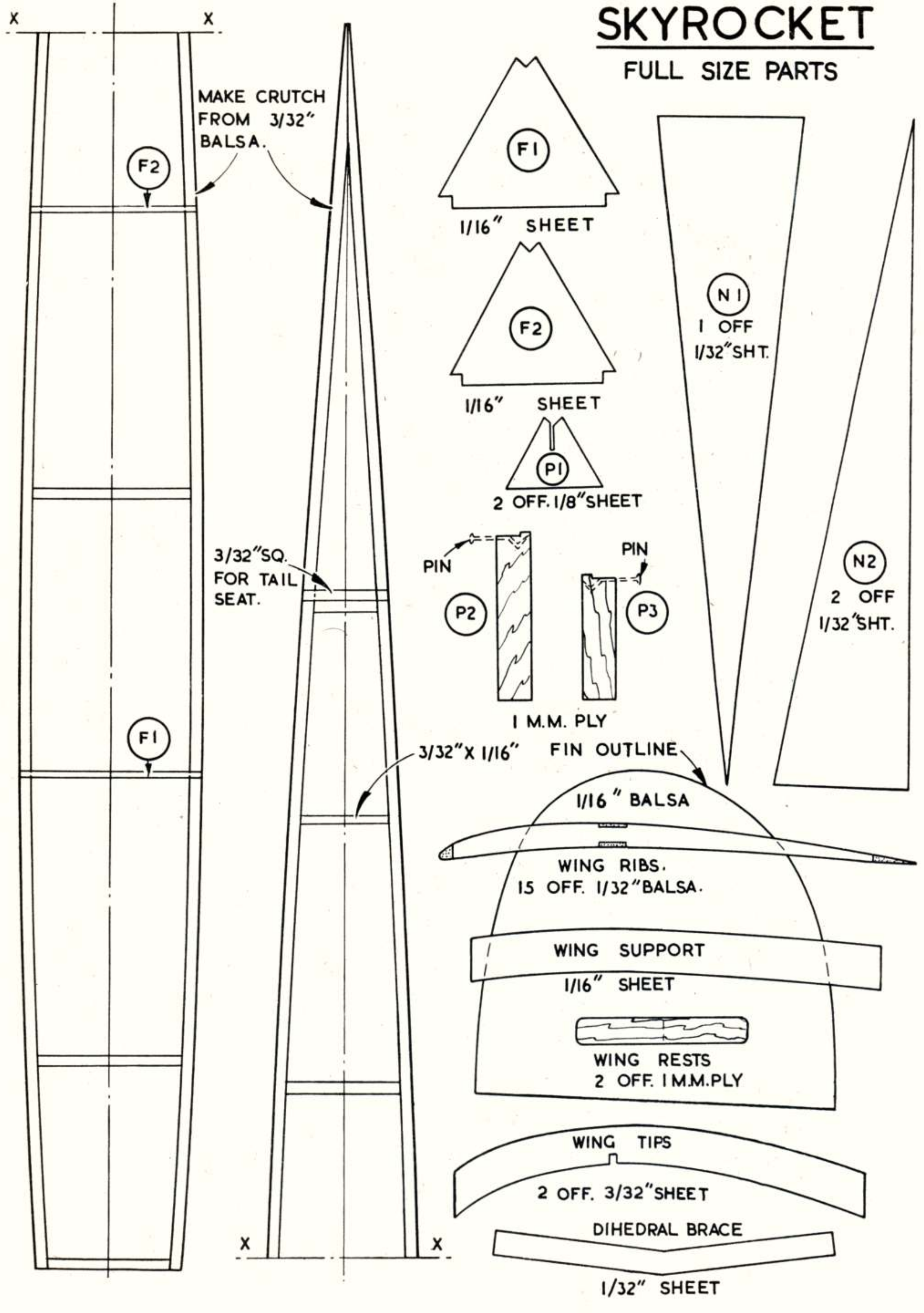
Fuselage is the first item for construction, and start by joining the two halves on the full-size parts sheet. Pin down the base longerons, add F.1, F.2, and assemble parts N.1 and N.2 for the nose portion. Fit the top longeron, add spacers and file away the longeron for P.2 and P.3. Add parts P.1, balsa block and scrap sheet, then insert ply wing mounts and balsa wing support. Cement wing rests firm and square, attaching pins with a secure cement skin. Lift off the board, cover with light tissue and screw on motor clip.

Wing and **Tailplane** are perfectly straightforward, needing no special explanation, while the sheet **Fin** should be given a high gloss finish. All lifting surfaces should be covered with light tissue, carefully applied and doped, followed by a thin coat of fuel proofer. All-up weight, less Jetex unit, ought to be approximately ·75 oz.

Trimming. Warp the last ⅜ in. of fin up to ⅛ in. to the left, and test glide, adding plasticine until the glide is just off the stall. Use a half charge, with cork packing, for first power tests and launch level just as the main power comes in. Use the tail for trim until climb is near vertical and up to 200 feet. Glide is slow and circle large, but this tightens up in a thermal. Calm air average is about 2 : 45 secs. Cement fin trim when satisfactory—now start thinking about that dethermaliser !

SKYROCKET

FULL SIZE PARTS



Pussyfoot

A 46 inch CONTEST WINNER FROM SOUTH AFRICA FOR THE E.D. BEE DIESEL

By Derek du Toit

Aged 19 . . . member Sky Roamers (Cape Town) . . . has tried everything except radio control . . . a keen Sea Rover Scout . . . hopes to visit Europe in '53.

WINNER of both the $\frac{1}{2}$A Senior Duration and Senior Precision events at the '52 S. African Nats, Pussyfoot comes within the giant killer class, for its power unit is the popular E.D. Bee. With light loading for its total of 382 sq. ins. area, and "Civvy Boy" type long moment arm fuselage it should also become a useful competition job for "open" power contests here. Its best flight in the S. African contest was 5 : 21 off a 12·3 seconds engine run . . . readers who are interested can judge for themselves that this ratio of 26 : 1 is no mean figure for only one c.c.

All set to build? Well, pin down the plan and let's start with the **wing** by pinning down the $\frac{1}{16}$ sheet trailing edge and $\frac{1}{8} \times \frac{1}{8}$ L.E. for the centre portions. Note the curvature required in the lower T.E. which can be aided with cement smears across the grain on the inside face. Add ribs and pre-sanded trailing edge top, then the upper spar. Lift off the board to fit lower spar, and attach upper and lower sheeting. Tip portions are of similar construction, except for ribs (cut by "sandwich" method) and trailing edge with webbing, which are of $\frac{1}{32}$nd sheet instead of $\frac{1}{16}$th. All panels are butt joined after pre-cementing.

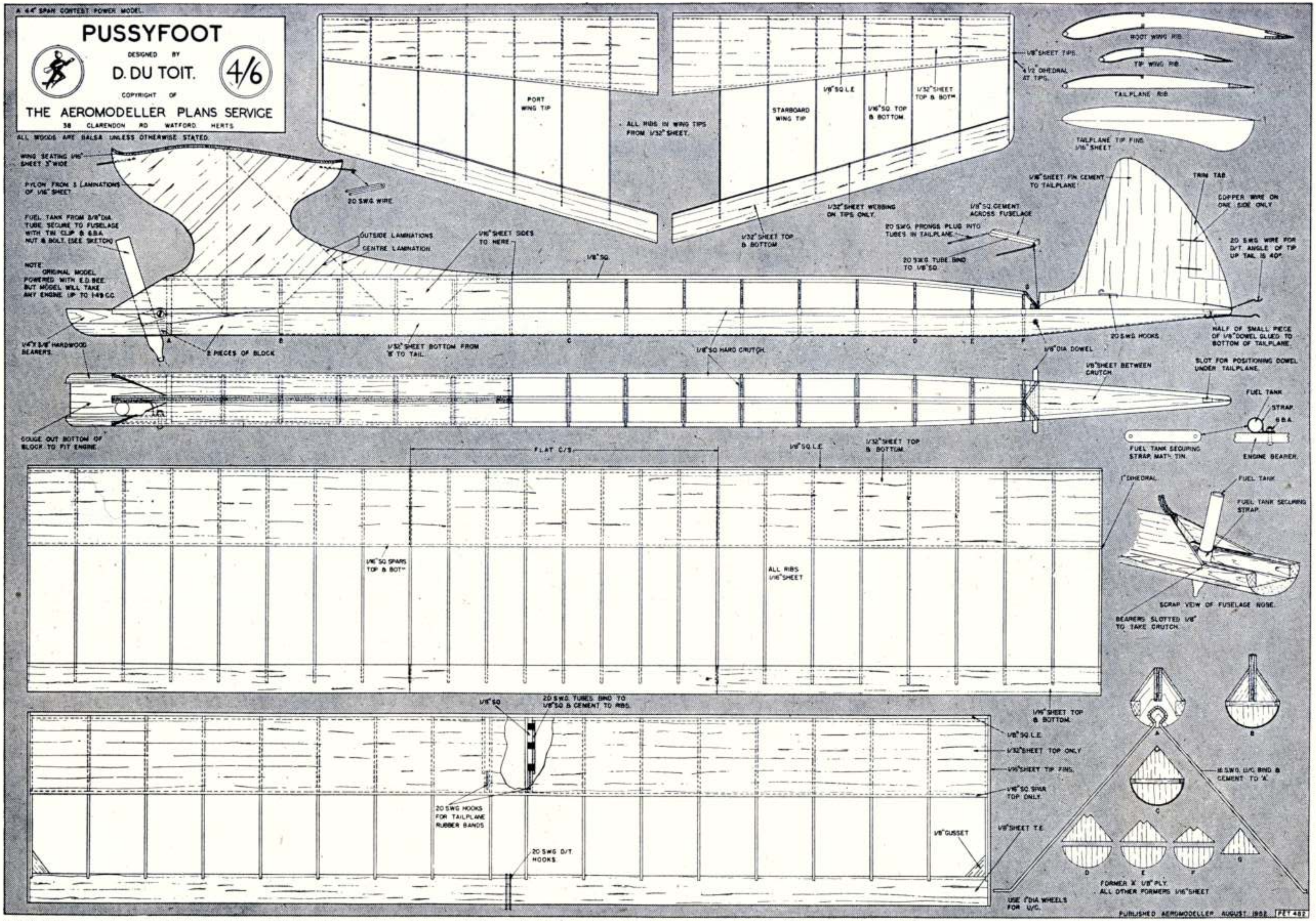
Tailplane construction requires no fancy work and is quite simple, the **fin** is glued in place after covering and doping. Make certain that the aluminium d/t tubes will not be pulled loose.

Fuselage is also conveniently devoid of frills, and is started by laying out the hard $\frac{1}{8}$ sq. crutch and adding the bearers. If you decide to fit anything other than a "Bee", now is the time to make arrangements accordingly. The design should handle any engine from ·75 to 1·5 c.c. Now fit the lower formers while boiling up a length of $\frac{1}{32}$ sheet which is afterwards curved to cover the lower fuselage whilst still pinned down. Made of 16 s.w.g., the undercarriage is sewn on the ply former before sliding onto the bearers, the blocks being fitted on either side.

Construct the pylon separately and allow to set thoroughly before cementing to the fuselage and adding the rest of the sheeting. Odd fillets are cut from scrap, wheels are held on with soldered cup washers, and the whole model covered with light tissue and given two coats of dope.

Even before **trimming** test flights, the left outer panel of the wing should have $\frac{3}{16}$—$\frac{1}{4}$ ins. wash-in. With neutral rudder, a slow left glide should result. Try all power tests on near full revs. with short runs. Four degrees down and two degrees left thrust were used in the original, which is launched at 45 degrees without any side tilt. Prop is an 8 × 4 ins. Use tail incidence so that the job seems to stall but is only $\frac{1}{64}$ in. away from it, and be very careful with that rudder.

You'll find her a real "Pussyfoot" on the glide and easy to handle on power—the only warning point being never, never forget to fit and light the d/t! It has been known to hook a riser at less than ten feet!



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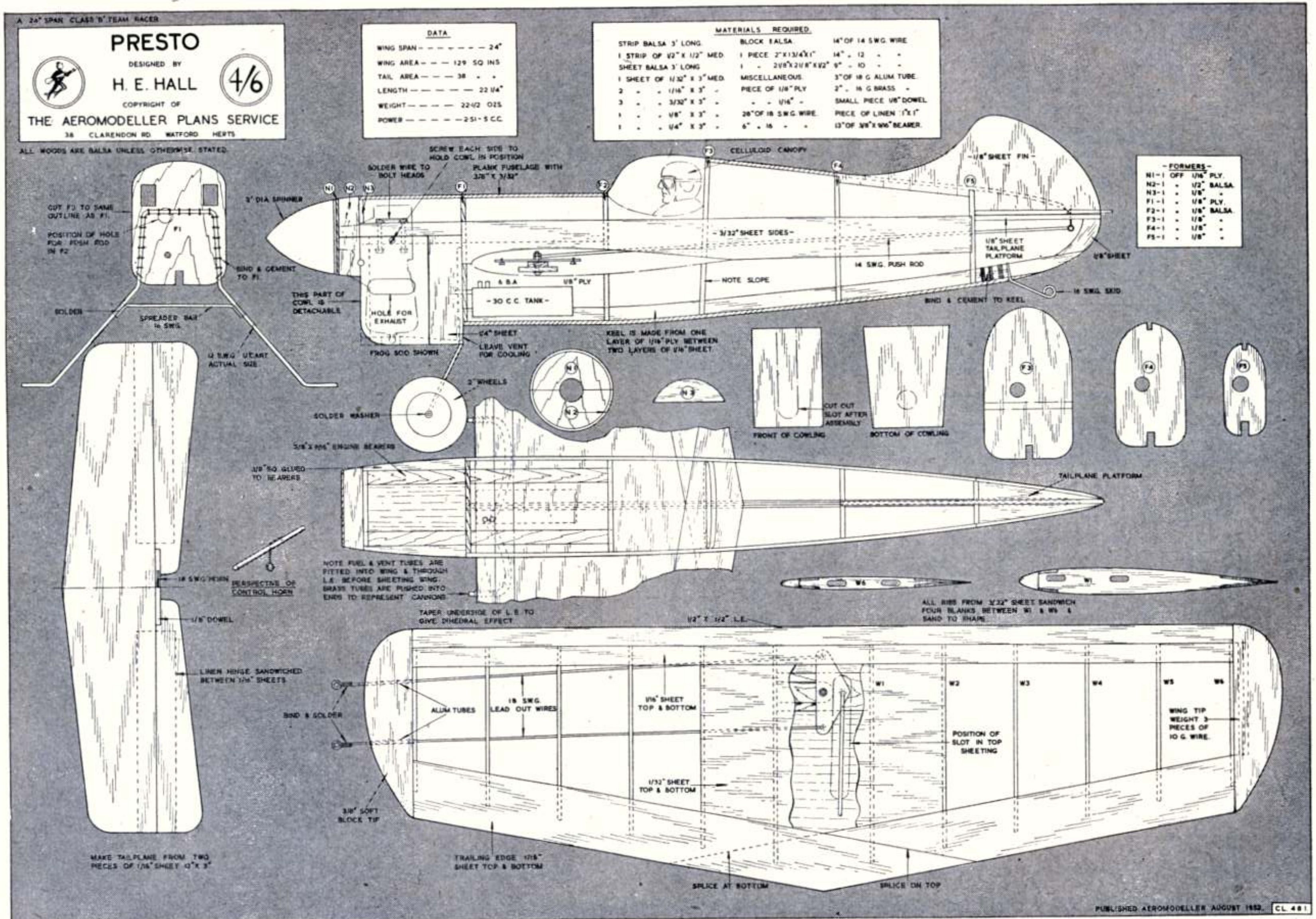
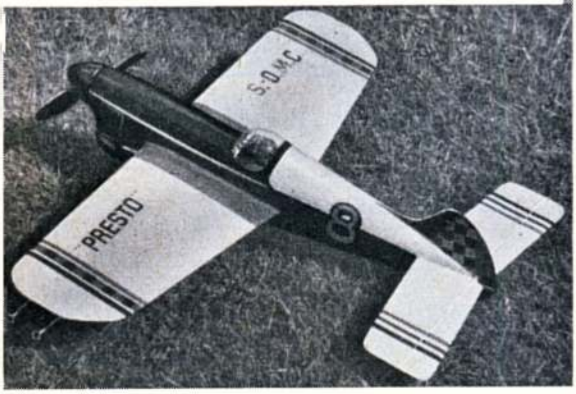


THIS IS A 1/4 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 4/6 POST FREE FROM THE AEROMODELLER PLANS SERVICE

A CLASS B TEAM RACER

PRESTO



BY H. E. HALL

Aged 49 . . member Stourbridge & D.M.C. . . . married, has one son aged 16, also an aero-modeller . . . has been modelling for 7 years . . . other interests are the violin and the local amateur operatic society . . . a professional photographer.

WHETHER for long-range medium speed or high speed medium-range Class B team racing, the Presto is a good-looking speedster to take any 5 c.c. engine. A Frog 500 was used in the original, and following some experimentation with various props, it returned a regular " best " of 73 m.p.h. with good range, using a P.A.W. 8 × 8 propeller.

In musical terms, *Presto* means go as fast as possible, so if the name means anything to a model, Class B team race modellers would be wise to try this design for the next event.

Construction is best started with the **Mainplane** by cutting rib templates of W.1 & 6 in ply and cutting two sets of ribs by the sandwich method from 3/32nd sheet balsa blanks. One set must have holes for the lead-out wires. Shape the leading edge and pin to board so that the taper gives dihedral effect. Add ribs, then upper sheeting and T.E. pieces. Take off board and complete sheeting, add bellcrank mount and assembly, lead-out wires and centre sheeting with the push-rod cleared by a slot. Attach tips, the starboard one containing ballast recessed inside. Sand the whole and put aside whilst making the **Tailplane** assembly from a 1/16 in. sheet sandwich. Actually two 13 × 3 × 1/16 sheets will make the whole tail, with the tapered offcuts for the elevators. Add the horn assembly and cut out the **Fin.**

Bend the undercarriage and bind firmly to $\frac{1}{8}$ in. ply former F.1. Cut out other **Fuselage** formers and drill bearers to suit your engine. Fit bearers through F.1 and F.2, add backbone to these and then fit other formers onto the backbone. Side pieces are next fitted, and after cementing the tail platform, firmly cement the wing and tail in place, connecting the push-rod at the same time. Add fin and tank, leading the vents out to the leading edges as dummy cannon for pressure feed, and bind on the tailskid.

Fix the engine in place and build up the cowl, then plank the entire fuselage, less side pieces, with $\frac{3}{8}$ × 3/32 in. strips. Pilot and canopy can be attached after sanding is completed. The lower cowl, which is detachable and held in place with small wood screws through washers into the bearers, is a simple box structure of $\frac{1}{4}$ in. sheet.

Now cover the entire job with Modelspan, dope and colour to your own fancy, and fuel-proof all over. Weight of the original was 22½ ounces complete and ready to fly; but, of course, the lighter the better is the maxim for speed in racing.

Mrs. Marjorie Hall expresses admiration of her husband's yellow, red and black team racer which is very stylishly decorated. Upper photos display the realistic lines and " swept " tailplane shape. Tank vents project from the leading edge as dummy cannon, also giving pressure feed to the tank.

The INTERNATIONAL

Top: Warring completes winding his all-geodetic slab-sider. Next: M. A. (Mick) King of Belfairs with placing A/2. Above: Laxton of Oundle was 8th with an A.P.S. Revenge. Right: Terrible Trio, Holland, Chesterton and Evans discuss the latter's newest Wakefield.

Above: Wakefield queue—includes Rutter, Dubery and Henry Tubbs, all of Leeds. Below: Eric Lord and fastest climbing model, has table-tennis ball for cross section.

OWING to the difficulty of arranging overnight accommodation for the 200 fliers qualifying for these two important contests, last minute modifications made the 1952 Wakefield and A/2 Trials a one day affair, with both contests run simultaneously. Personally, we feel this was somewhat hard on the competitors, and a number who figured in both classes were hard put to it to do justice in either section.

Fortunately, the day was really kind to the fliers, the overcast sky being helpful to timekeepers and a gentle breeze assisting downwind chasing. It could have done with being a little warmer, and conditions were quite tricky with thermals and downdraughts in equal proportions waiting for the unwary. We noticed many fine flights brought to an unexpectedly early end through a total lack of lift, whilst a few minutes later strong thermals were evident in the same patch of sky.

Maximums were prolific in the first rounds with 29 in the glider section and 15 with Wakefields, and it was soon evident that a hard tussle would ensue for those coveted top placings. The lunch break came at a fortunate time, for it was during this period that the only serious shower made its appearance, and the second and third rounds took place in fine but slightly poorer conditions than obtained in the morning.

Our meanderings round the field showed that by-and-large a great improvement had taken place in model construction, particularly in the Wakefield class. Obviously, the need to build down to the limit means a stricter attention to building technique, and an improved model is almost a certainty. The usual "regulars" were there with some exceptional examples of the modeller's art, but it would be invidious to single out any particular machine or builder for mention. The fairest summary would be to report a great all-round improvement that says much for the stimulus such contests give to the hobby.

Though a number of "toothpick" type gliders were on show, very few Wakefields sported other than medium length fuselages, and the expected quota of "double length American" types were notable for their absence. No one class of machine seemed to predominate, gears, single skeins, folders and featherers all having their fair share of adherents.

In round 2 many more maximums were recorded, but the number of competitors with "Double Max's" to their credit fell to seven in the A/2 and five in the Wakefield. Naturally, all these men were anxiously watched in the final round, and it was here that many came unstuck.

Tension mounted as times were chalked up, and the top places were continuously changing. Many anxious faces were seen around the Comp. Sec's. "box", some registering despair as first one then another "Treble Maximum" was returned. No less than four men secured this honour in the A/2 class, thus supplying the necessary quota for the finals in Austria. Unfortunately the fourth round fly-off became a hashed affair, some chaps being anxious to get away to link up with the rather skimpy Sunday transport. In spite of this, **W. Farrance** made a beautiful flight of 8 : 02 to win the "Aeromodeller" Trophy as top A/2 man.

With the Wakefield boys, tension mounted as first one then another made that last effort to gain a place in the Team. Bob Woodhouse, of Whitefield (1951 Team man) had bad luck on his second take-off, a prop blade shattering but not preventing a maximum

TEAM ELIMINATORS

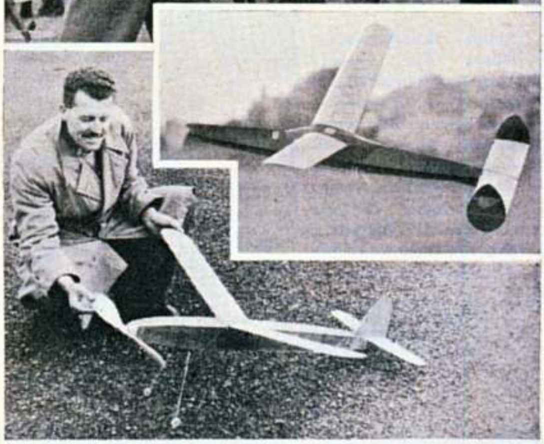
flight. Third time was unlucky however, for this time the too flimsy undercarriage allowed both blades to strike the tarmac, and the model just couldn't take this final blow.

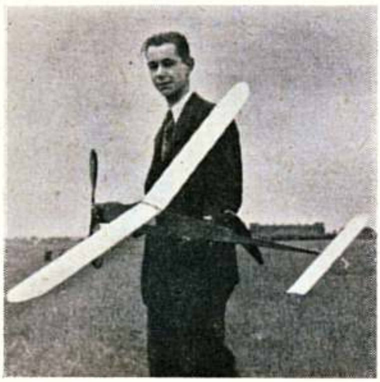
Following a fine maximum on his first flight, **Ted Evans** misjudged his D/T settings in the remaining rounds, and for some time was sitting precariously in 6th place only 23 seconds behind his " pupil " **Tom Dunkley.** Meanwhile, **Ron Warring, Johnny O'Donnell** and **Albone** of Croydon had all tied with a score of 13 : 22, and **R. F. Nicole** of West Middlesex was heading the list with 14 : 20.

Then, sensation to end an exciting day! **John (" Pop ") Royle** of Littleover walked wearily back to the take-off area minus the model lost on his second flight, only to be told that the job had been returned in his absence. With just 15 minutes to go, Royle made a hasty checkover, then wound up for a do-or-die effort. With two maximums on the board, his last effort was watched by practically every modeller on the field, and a fine launch was rewarded by a third five minute flight, to put him at the top of the 1952 contest.

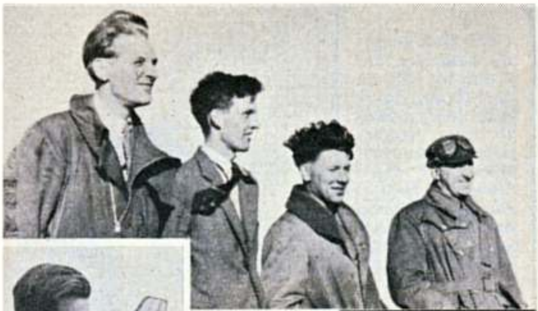
With **Royle Junior** taking a place in the A/2 Team, and **Max Byrd** adding to his Power Team success, it remained for **Mick King** of Belfairs to round out the list of those to represent Great Britain in Sweden and Austria, and if the Trials standards are anything to go by, the International Finals should see a G.B. machine well to the fore, if not the actual winner(s).

Left: Tom Dunkley holds for Ted Evans. Both Northampton members made the team. Right: power leader Peter Buskell and 'Zoron.' Below: Barry Haisman assists Bob Woodhouse for an unlucky third flight. Centre: R. Nicole's interesting model on its way up.





Left: Sandy of Henley with unusual tail position on his 'Dragonfly' design. Right: bottom, Jack North prepares to start his Elfin 1·8. Model is two years old. Right: above, A. G. Albone of Croydon placed in the team with his conventional Wakefield; but has since withdrawn.



Above: The power team, Buskell, Byrd, Monks and North. Left: John ("Pop") Royle anxiously prepares for his third and winning flight. Below: W. Farrance (W. Yorks) winner of the A/2 Trials.

Below: Ray Monks releases his reserve model, of San de Hogan ilk, to make sure of 2nd place, his main model having been locked away in a house! Bottom: Wakefield line-up includes Copland (Northern Heights), Muxlow (Sheffield), and J. Owen of Blackpool.

There should be no misgivings about the selection of the team to go to Switzerland for the International Power Contest in September for in exacting conditions, with wind gusts up to 25 m.p.h., the four leaders proved themselves superior both in flying and recovery of their models.

It was a day for the "old faithfuls," and certainly no event for a newly built job. **Pete Buskell's** winning model, the Zoron, is actually no less than four seasons old with numerous high placings to its credit including a fourth in last year's Sir John Shelley. To total 11m. 50 sec. in conditions where most of the finalists were disappearing O.O.S. at 2m. 30 sec., is no mean effort, and if Zurich's Dubendorf airport is at all windy, then we may expect a high average from the Surbiton chap.

Birmingham's **Ray Monks** would have placed second in the team on only two of his flights, and when he found that the keen householder who had recovered his model had locked same in his pre-fab and gone off to the cinema, Ray might well have rested on his laurels. However, the F.A.I. rules permitted a reserve model and so last year's job was sent off for a commendable flight which shook off the cobwebs and made certain of Monk's position. **Max Byrd** of Loughboro' College (also in the A/2 team) flew consistently to scrape in ahead of Grange's Tony Brooks and a host of others whose times were separated by scant seconds, including fast climbing Norman Marcus who might have been placed higher but for a major repair between second and third flights. Croydon were not to be without a man in the team though, for last year's winner of this same event, **Jack North,** flying what looked like the very same model, made sure of third position by being a clear minute ahead of Byrd.

Johnny Gorham, trimmed "on knife edge" slipped off that edge, Pete Wyatt was upset by motor run, and though flying the fastest climbers of the day, Eric Lord and J. Bickerstaff of Accrington were up and down again far too quickly.

Similarity of the four team models is remarkable, all have side-mounted Elfins, **Buskell** and **North** with 1·8's, **Monks** and **Byrd** with 2·49's, and all are straight pylon jobs with long tail moments and largish tail area. Buskell's and North's have tip dihedral; but others have large proportion shallow angle inner panels on polyhedral wings. They should do well on September 14th, and will be ably guided by **Silvio Lanfranchi,** the appointed team manager.

Below: Max Byrd of Loughboro' College has made a "double" by placing in both Power and the A/2 teams, seen here with his power entry.

South African NATIONALS

By JACK ABBOT

THE fifth post-war S.A. National Championships were held at Cape Town from the 11th to the 14th of April. Unfortunately, this period coincided with the end of the Van Riebeeck Festival, and upset the Organising Committee in a number of ways. Over a hundred modellers moved into Cape Town for the Championships, 42 arriving from Pretoria in an Air Force Dakota, while two resourceful types hitch-hiked the 600-odd miles from Grahamstown, complete with models. The club responsible for the organisation of the Nationals was the Sky Roamers M.A.C., headed by Mr. "Pop" Inglis, and they deserve full marks for the clockwork organisation and for providing accommodation in a city already crammed to the brim. The free flight events were run off at Phesantekraal, an abandoned aerodrome 25 miles out of town, and transport must have been a heavy item on the debit side.

Sailplane and Rubber events were held on Good Friday in perfect weather. Flying was of a fairly high standard, though few modellers have acquired the technique of launching their gliders off a vertical line. Thermals were pretty frequent but not very strong, and no maximum flights (10 mins. in South Africa) were recorded. Jasco "Floaters" were pre-eminent in the Sailplane B Class and took the first four places. H. Faasen won the event with a "Floater" which he had constructed after the end of the A.G.M. the night before and completed the same morning, with a total time of 16 min. 26 sec.

A notable model was B. Shapiro's beautifully built A.P.S. "Leprechaun" which soared away to collect first place in the Junior class with an aggregate of 11 min. 11 sec.

Saturday was devoted to Control-line and the state of the field caused some concern among those intending to use dolly take-off. As usual in the Speed event, entries were few and flying static,

Ken Hopper's F.W. 190 was second in Control-line Flying Scale.

S.A. Wakefield team: Back row, R. Moore, R. Rowe, H. Faason. Front row, D. du Toit, P. Visser. Doc Allen is sixth man.

but Doc Allen and Cliff Culverwell provided an excellent example of easy and consistent engine starting and steady flying. These two were the only entrants to figure in the results and broke records in three classes, Class A being raised to 112·45 m.p.h., Class B to 128·51 m.p.h., and Class D to 140·56 m.p.h. The Class B record was actually broken three times during the day. Most of the models were based on the "Heli-razor" design with only the head of the engine exposed.

The Stunt section was saturated with Veco "Chiefs" and "Squaws" as usual, and this year Gerry Matchett took the Senior honours after the previous champion had pranged. In the Junior Section, the first three places were occupied by Krugersdorp members who have been tops for the last three years. Very noteworthy was the stunting of Bruce Alexander who has only clocked 11 years and spanned just one inch more than the 52-in. "Chief" he was weaving about his head.

On the Sunday the boys repaired out to Phesantekraal for the Free Flight Gas and Jetex. The ½A Class dominated everything again, and a considerable waning of interest in Class C is only too evident. Another noticeable point was that the times for ½A and A were higher than for B and C. (The winner is featured on page 464.)

Monday promised to be an interesting day with the Radio Control being held and so it proved to be. The event was won by Beau Pautz, who had only flown a radio job a couple of times previously, but his performance was excellent and he manfully threw the job into spins and loops. The model was a "Macs Robot," using a mixture of E.C.C. and IVY radio equipment.

The hard luck story of the Nationals was the unfortunate experience of the two bods from R.A.F. Heany, Bulawayo, Al Cowley, and Harry Read, who travelled the 1,400 miles by train, only to have their models not pitch up. Besides sympathy, they earned the undying admiration of everyone by buckling in and timing solidly, without ever taking a break, for the entire four days. It's sportsmen like these that keep the spirit of our hobby burning.

PETER GASSON

Throws a spotlight on various aspects of propellers, including their design, construction, choice of suitable wood, and the somewhat controversial subject of whether to freewheel or fold.

PHOTOGRAPHS BY K. J. JONES

THE interest of all serious modellers is focused just now on Wakefields, and consequently on perhaps the most important component, the propeller. In addition to being important, the propeller is a decidedly controversial topic, the main argument being between the advocates of folding propellers and freewheelers, the two most popular types. So much of this opinion is born of prejudice that it is time the facts were reviewed and the issue elucidated. Regarding the two types on their merits, and carefully weighing the balance of advantage, much more can be found in favour of the folding propeller than the freewheeler, which, while possessing no marked disadvantages, has no overriding virtues.

The only supposed drawback the freewheeling supporters can find against the use of the folder is that the model is under-elevated at the end of the climb due to the blades being still unfolded. Thus they seek to show that the folder puts the model at a disadvantage at the end of the climb because although the glide has almost started, the change in C.G. position through the propeller folding back has not yet occurred. A little careful consideration and perhaps one or two calculations will render this an obvious fallacy. Here is a simple equation which will give the change in C.G. position due to the propeller folding:

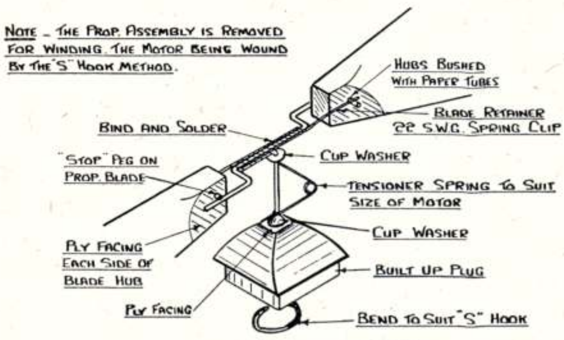
$$\frac{\text{Weight of prop. blades} \times \text{change in C.G. of blades}}{\text{Total model weight}} = X.$$

The result obtained for my Wakefield, using a 22 in. dia. prop. is 0·18 in. This figure is surely too infinitesimal to influence the practical man, and proves that the folder is quite on equal terms with the freewheeler during the climb. Since the glide of a folding propeller model is superior to its freewheeling counterpart, there should now be no doubt about which type to choose. Anyone who still persists in being influenced by the 0·18 in. change in C.G. is met with the fact that any under-elevated tendency is neutralised if the model is trimmed to fly in anti-clockwise circles so that when torque dies off the model is encouraged to fly in a wider circle.

A typical single bladed folder with wire hub assembly. Note the tensioning spring between the shaft and the nose-block.

Balance of Advantage

Among the advantages of the folder is the fact that it practically eliminates all chances of a broken propeller. It also facilitates quick and easy interchangement of blades if found necessary, either when on test or under adverse weather conditions. This is possible by using a spring clip as shown in Fig. 3. A striking disadvantage of the



- FIG 3 -

freewheeler is that it is impossible to achieve quarter grain (which is fully explained later) on both blades, unless they are carved singly and joined together. About the only direction in which the freewheeler scores is flying in gusty weather, when a model is often prone to stall owing to a sudden increase in air velocity and thus an increase in effective forward speed. With a folding propeller model, this stall is likely to take two or three oscillations to damp out. With a freewheeler the prop. acts as a brake and the stall is damped out more readily.

The single-bladed folder entirely eliminates any argument about the C.G. position if the balance arm is attached to the blade. Obviously, as the blade folds back the balance arm compensates by moving forward. The main trouble here is that the balance arm is prone to damage. The only other advantage of the single-blader is that by using a long counter balance arm, the propeller can be made lighter than the double-bladed assembly.

The Feathering Propeller

The feathering propeller, although only a combination of the other two, deserves a mention here. Its principle is to reduce drag by turning the blade edge-on to the airflow when the power runs out. It is a relatively new achievement in the model world and as yet has only found limited support owing to its usually complicated design. Those who have braved its acceptance are mainly experts, willing to spend a great deal of time in its further development. Most designs involve a large number of mechanical parts which should be avoided on contest models on the theory that anything mechanical can go wrong. If it does, the blades may jam, which is likely to cause the model to spin, or go into a vertical dive, when it just revolves round its vertical axis until it reaches terra firma at a considerable velocity. This of course would mean a complete write-off of the fuselage with a normal Wakefield, and a score of about 2 minutes (enough to lose the comp.).

Many regard the feathering propeller as a redundant piece of mechanism. They have found, or at least they claim, that the advantage over a normal freewheeler is negligible. However, it has some advantages. To name a few, it reduces the frontal cross-section very considerably but it is still three to four times that of the folder, and the drag is in a corresponding proportion. It is argued that the frontal side area remains unchanged owing to the blades stopping in the same position. This, surely, is inaccurate: the blades do in fact slowly revolve, owing to the extremely high pitch which most featherers assume when in the gliding position. Thus it would seem that a fairly constant change between a forward fin and a forward stabilizer occurs during the glide which, to a large extent, affects directional stability.

Up till now the average modeller has been wise to leave the feathering propeller to our more experimental brethren who are willing to spend unlimited time on development and extremely accurate building. The design shown in Fig. 7, however, is to the author's knowledge the simplest yet evolved and is within everybody's scope. If the reader is interested in other designs, he sould refer to the September 1950 issue of the AERO-MODELLER for the original device by E. W. Evans. The following are the instructions for constructing the author's design as shown in Fig. 7:—

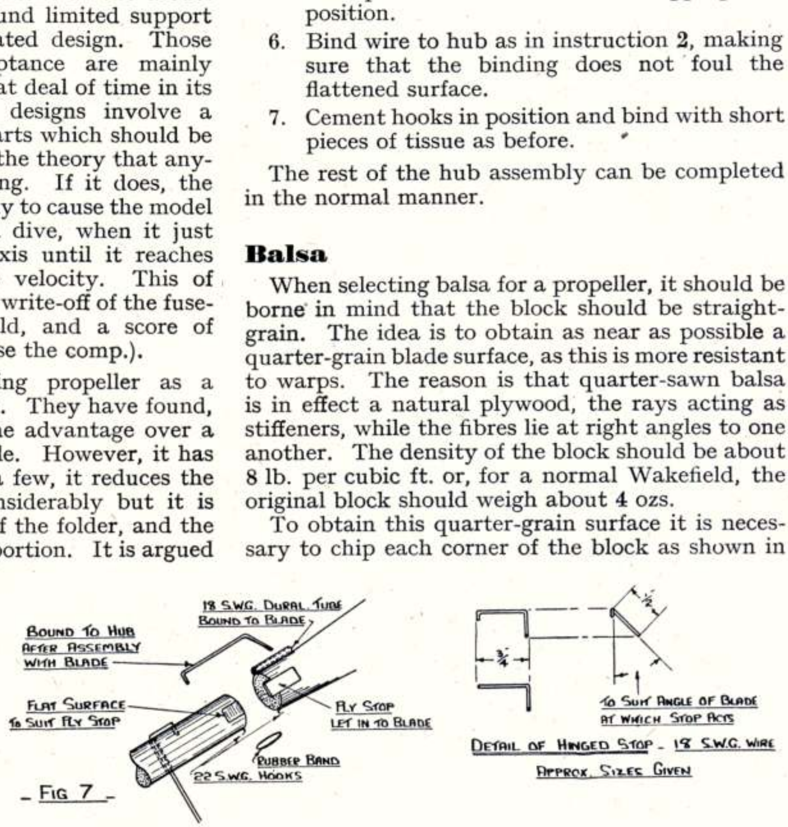
1. The blades and the hub should be carved separately and when sanded smooth are ready for assembly.
2. Cut recess in blade root and cement ply stop in position. File flat surface on hub to suit the stop.
3. Bind Dural tube to front of blade root with several strips of tissue well saturated with balsa cement.
4. Bend stop end of hinge wire and assemble with blade tube.
5. Bend other end of wire to suit angle required and press into hub at the appropriate position.
6. Bind wire to hub as in instruction 2, making sure that the binding does not foul the flattened surface.
7. Cement hooks in position and bind with short pieces of tissue as before.

The rest of the hub assembly can be completed in the normal manner.

Balsa

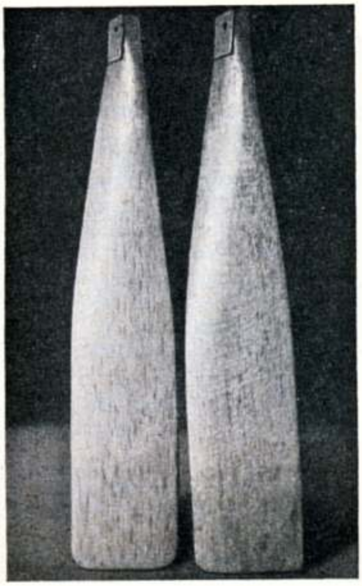
When selecting balsa for a propeller, it should be borne in mind that the block should be straight-grain. The idea is to obtain as near as possible a quarter-grain blade surface, as this is more resistant to warps. The reason is that quarter-sawn balsa is in effect a natural plywood, the rays acting as stiffeners, while the fibres lie at right angles to one another. The density of the block should be about 8 lb. per cubic ft. or, for a normal Wakefield, the original block should weigh about 4 ozs.

To obtain this quarter-grain surface it is necessary to chip each corner of the block as shown in

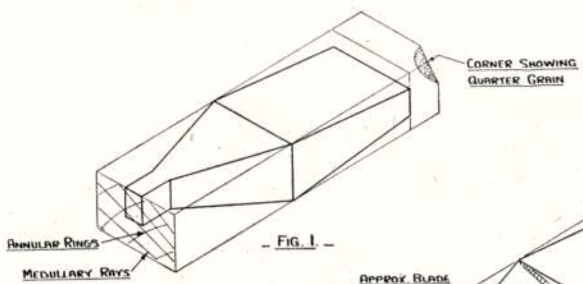


– FIG 7 –

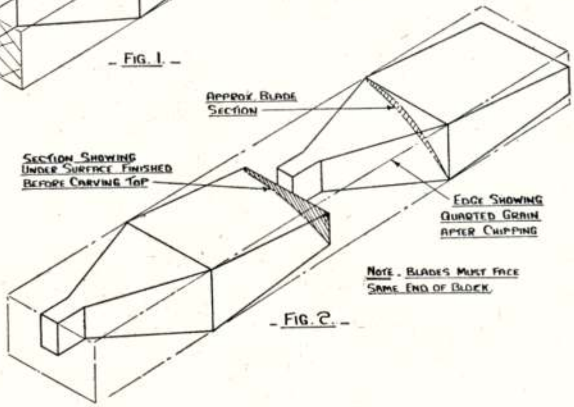
DETAIL OF HINGED STOP – 18 S.W.G. WIRE
APPROX. SIZES GIVEN



These two blades were carved in one as would have been a free-wheeler. Only the right hand blade shows the mottled effect which indicates quarter-grain, a necessary feature if maximum strength and warp resistance is to be obtained.



- FIG. 1. -



- FIG. 2. -

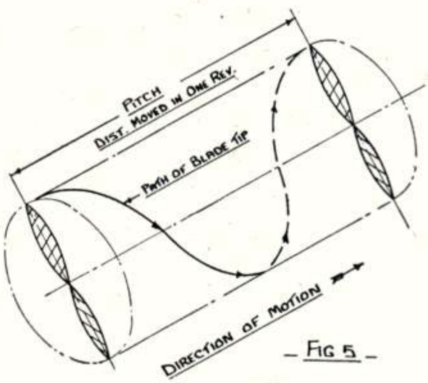
Fig. 1, until the quarter-grain shows. The blank should then be laid out as in Fig. 2. If this procedure is not strictly adhered to it is impossible to obtain quarter-grain on both blades. The maximum thickness of any blade should be about 1/16 in., with 3/32 camber, thickening of course towards the root. As regards finish, some favour tissue covering and some plain banana oil. This is really only a matter of taste : a polished blade can look very attractive, and it also makes the blade waterproof and therefore more resistant to grain swelling and warping.

Blade Design

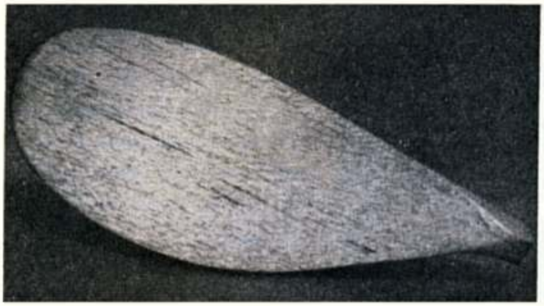
To design a propeller first entails two decisions : (1) prop. diameter, (2) pitch. The diameter of a normal propeller is generally just over one-third of the wing span owing mainly to the excessive torque created by a blade of this size. Pitch, however, is a much more variable figure : for Wakefield work, anything between 20 ins. and 40 ins. is commonly used, the finer pitch being usually employed on a folding propeller model owing to the faster climb. It is felt that a few notes on the design of a helical propeller would perhaps be appreciated by many whose propeller carving is usually more by rule of thumb than by correct design. If the following procedure, which takes less than half an hour, is carried out, a reasonably accurate blade can be marked out. Having decided on the diameter and the pitch, a diagram similar to that shown in Fig. 6 should be drawn to suit the particular propeller required.

The usual scale adopted is 1/2, this giving a more convenient diagram :

1. Draw a line AC equal to the $\frac{\text{circumference}}{2\pi}$ (our scale) which is equal to the radius of prop.
2. Draw a perpendicular line AD whose length is equal to the $\frac{\text{pitch}}{2\pi}$.
3. Mark a point B, three quarters of the radius from A (the intended hub of the prop.) on the line AC.
4. Produce the line AD to a point E to form an angle EBD approximately equal to quarter of angle DBA (pitch angle).
5. Join point E to point C. The angle ACE so formed equals the angle of the blade at the tip.
6. Any convenient points on base AC may then be joined to point E, the angle to the base being the blade angle at that particular point.



- FIG 5 -



This unfinished propeller blank shows the standard of quarter-grain to aim at, but some balsa does not show it so prominently.

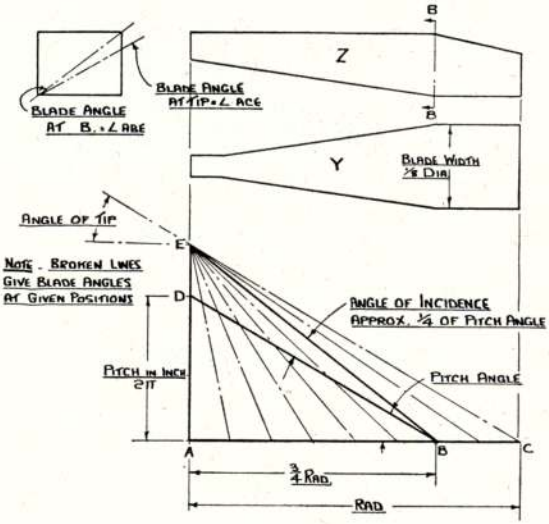


FIG. 6

The next step is the laying out of the actual blank. First the blade width must be obtained, which should equal approximately one-eighth of the diameter. Part Y of Fig. 6 can then be completed. Part Z (the side view of blank) then follows automatically by using the angles obtained to find the thickness at different points along the blade.

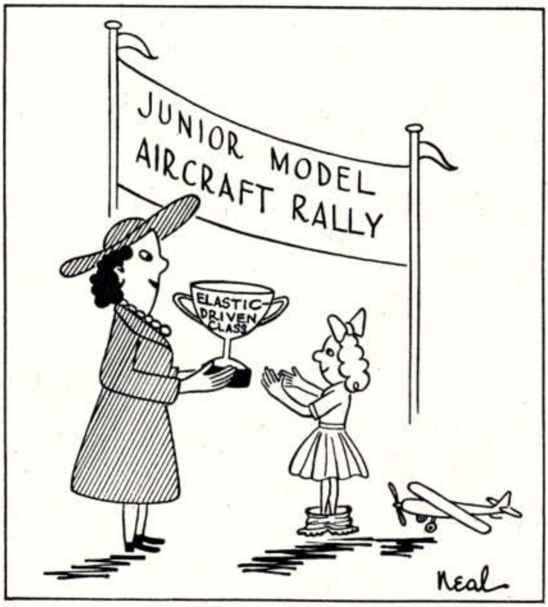
The Hub Assembly

The hub should be of fair size: too small a hub only leads to a rocky fit on the hinge shaft after a little use, and a few knocks. This, however, depends on what type of hinge is used, the hub being smaller in the case of the old-fashioned built-up centre, which has now largely been discarded in favour of the wire hub assembly. These are neater and usually, if well made, lighter than the balsa and ply built-up type, which, in addition, lose their efficiency in wet weather owing to swelling. It is possible to obtain a variable pitch with the wire assembly by using the right gauge wire, although this is very tricky to handle to obtain consistent results. It is hardly necessary to say that all these remarks apply only to the folding propeller.

Many people tend to avoid wire through lack of faith in their soldering, but if the following tips are followed, their unsuccessful attempts at soldering, accompanied by loud and long curses, will become blissful soldering *au parfait*. All wire parts should first be lightly rubbed with emery paper. Parts adjacent to one another to be soldered should then be bound together with fuse wire. If a solder similar to Multicore is used (where a vein of flux runs through the centre of the stick) then no additional flux need be used, which is obviously a great convenience. For this type of work, a small iron will probably be found to be the most convenient. The iron should not be red hot as the solder will just form into small balls and will not adhere to the surface. The ideal and only condition for a satisfactory job is when the solder flows easily into the spaces between the binding. This satisfactory state is obtained when the iron has not started to discolour owing to too much heat. The foregoing remarks apply of course to a gas iron: an electric one should automatically achieve the correct heat.

Conclusion

It is hoped that this article has promoted a better understanding of the whole business of propellers, and the weighty and debatable topic of folders *v.* freewheelers. If it has merely achieved the distinction of causing the expositors of free wheelers to gnash their teeth, the author does not excuse himself.



We publish the following article by C. W. Beasley in the hope that the discussion that will result may eventually lead to a truly international formula for power duration.

"BAMBINO" is Norman Marcus's 1·5 contest model in the photo, a job that would come in category B in this article.

DISCUSSION ON THE F.A.I. POWER FORMULÆ

By F/Lt. C. W. BEASLEY, with a reply by BILL WINTER

THE present system of model selection and classification for the international power competition leaves something to be desired because of the limit of power imposed on the competitors.

There are two different types of motor classification in use today, viz.:

American—Displacement in cubic inches;

European—Displacement in cubic centimetres.

Although it is a simple matter to convert cubic ins. to c.c's. the dividing lines between the classes in one system often fall in the middle of a class in the other. Any International Class must therefore be capable of embracing both with no side having an advantage in respect of capacity or displacement. Taken overall the larger model will defeat the smaller because it is inherently more efficient aerodynamically and can be seen farther away and therefore longer. This applies particularly in windy conditions. The present system is not satisfactory Most of the winners in this class use 2·5 c.c. motors and the largest model possible within the rules. The only motor in the American classification which fits in this class is the ·099 cubic ins. (·62 c.c.) and is outclassed on account of the size of the model it can fly and still give a contest performance.

Now for the type of model. It should obviously give scope for performance, be strong and consistent. The power/weight ratio should be such as to give a reasonable balance between prevention of excess overpowering and yet require skill in trimming for maximum climb. The total area should be such that combined with the weight a reasonable glide performance can be obtained, but floaters should be discouraged. The area should be such as to give a loading well above the F.A.I. Minimum. For these reasons I feel that a model of fixed size, within small limits of course, is the best for our purposes.

The next question is the thorny one of motor sizes. This competition should be stiff but capable of being won by a modeller who has ability but not a very deep pocket. On this score I would rule out ·29 cubic ins. (5 c.c.) and over as the possession of an expensive racing motor will give an advantage.

I suggest then that there are two main courses open to us, using engines in the smaller classes where the displacements are much the same thus :—

Model	Engine Size (Max) c.c.	Total Area (sq. ins.)	Min. Wt. (oz.)	Min. Fus. Cross Section (sq. ins.)
a	3·5	625-650	25	8·5
b	1·75	380-420	14	5·5
c	2·5	525-550	17.5	7

Model A

Both the European 3·5 c.c. and the American ·19 cubic ins. (3·2 c.c.) fit into this class very well, and there are plenty of motors which can be used in this category. Good 2·5 c.c. motors can still give a very good performance in this class as some of them are not so far behind some of the older 3·5's in power output.

Model B

This embraces the 1·5 European and ·099 American (1·62 c.c.). If the upper limit were increased to say 2 c.c. then the ·099 might be giving too much away.

Model C

This is the type already in existence and in this case a fixed weight and area has been selected because inevitably 2·5 c.c. motors are used for top line performance. This class puts the American classification motors at a very great disadvantage and good as some of the ·099 cubic ins. engines are they can't give away nearly 1 c.c. to engines like the Elfin 2·49 or E.D. 2·46. I feel that type (A) would be the most popular on a world-wide scale, followed by type (B). Type (C) I feel is bad for a truly international class; at the moment it is only a European class. One may ask " Why change the existing rules; why not extend the motor size to 3·5 c.c.? " The answer is once again that the models would finish up using 3·5 c.c. motors and for the sake of simplicity of processing a single size has been suggested.

I don't see why we should have so many combinations in this International Power Class as it just complicates things. For a world championship we have the Wakefield for rubber powered models and the A/2 for gliders. Both are fixed and have led to considerable improvements in performance. Why not do it for the most modern type of competition model ?

Whilst I'm on the subject of International Power I should like to make some suggestions as to the length of motor run. Standardise at 20 seconds with R.O.G. No hand launch permitted unless the weather is bad, then the decision must be made early, not after the first half dozen models have been written off. In an International event the contestants should be proficient and experienced enough to R.O.G. in all but the foulest weather.

Rule as to Engine Run

Because of the time lag both in the cessation of sound reaching the timekeeper and his reaction lag to this I suggest the following penalties :—

(a) For the 1st second or part of a second excess run 10 secs. deduction from total time.

(b) For the 2nd and 3rd seconds or part excess run 20 secs. per second excess be deducted from the total duration.

(c) Excess motor run of more than 3 seconds involves disqualification from that round.

To illustrate the above :—

Motor Run (Secs.)	Deduction
20·2	10
21	10
22	30
23	50

Disqualification

Those would really put people on their toes and erratic timing devices e.g. graduated tubes, coils of neoprene would be out.

One final suggestion, make the maximum flight times 6 minutes instead of 5. In the event of a tie, fly off still observing the 6 minute rule. It would be interesting to see how often a model would turn in a maximum.

I expect plenty of criticism and argument. If you do not agree say so, but make your criticism constructive and bring forth some reasoned proposals. We have to start somewhere and sometime so it might as well be here and now.

. . . Over to Bill Winter

FIRST let me say that I checked through on a couple of mythical designs and believe that Beasley's comments on areas, etc., are in line with our own practice.

Secondly, he reaches the core of the problem in his discussion of powerplants. We have a gap between ·09's and ·19's and I more than once cited this to manufacturers, but there has never been a demand in the U.S. for the in-between powerplants, simply because of the way the rules evolved. It is important therefore that we should not be ruled out unless we took to importing such displaçement engines from England and elsewhere.

The other alternative is the difficulty of our selling American modellers on the International event, using in-between displacements (for us) and thus gaining the support of our builders. Certainly, all of us want to see all countries participate and on an equal basis.

There can be no question that simmering down classifications to one single class, as in the Wakefield, is necessary if gas as an international event is to be as clearly recognized and supported as is the Wakefield. The more the complications are studied, team, shipment, etc., the more obvious they become.

We are following a trend towards smaller engines because in postwar years enormous increases in power for displacement have made any plane above the ·19 superfluous, although we still have two larger classes. The fact is that the K. & B. ·19 is as powerful as the old K. & B. ·29 and most B and C class interchanges were done with ·29 and ·32 variations of the same motor. My personal opinion is that the ·19 is certainly adequate.

It seems to all of us at MODEL AIRPLANE NEWS that the one-class idea with a top of approximately ·19 is an extremely wise choice, calculated to ensure quick success of the event on a level with the Wakefield.

I am not sure that it is necessary to mention areas and weights, for, analysed from a practical flying point of view, they actually seem unnecessary. The weights mentioned would seem only to assure that the builder makes an airplane that does not fall apart for the power used—much less would be a detriment, especially in a wind. However, 25 ounces is a nice round number and would work no hardships for ·19 engines. Further it is up to us to adapt ourselves to majority opinion on such matters, insofar as conforming does not create unfair handicaps. Similarly is it necessary to specify a section of 8·5 square inches on a ·19 job ?

Many a builder comes undone now for having too slim a fuselage which permits drastic, if unrealised adjustment changes through twisting, etc. But there again, if cross sections and loadings must be put in the rules we would have no real trouble conforming with them for they are reasonably close to the machines we build automatically.

Other points, such as over-run penalties, while clever and well thought out, actually are things requiring a great deal of debate, modellers being what they are. Some, for example, might argue that several seconds over-run reached a thermal that would not otherwise have been encountered and perhaps the results were worth the penalty. Perhaps this is one rule that would evolve in the second year of competition, not the first.

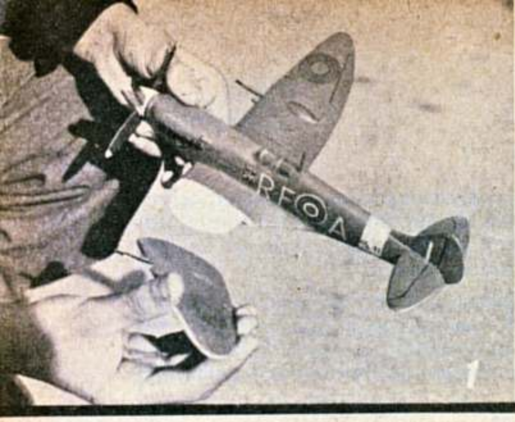
Cordially, BILL WINTER.

Readers might well refer now to p. 497.

Model of

MODEL NEWS

SELECTED ITEMS BY FLIAR PHIL



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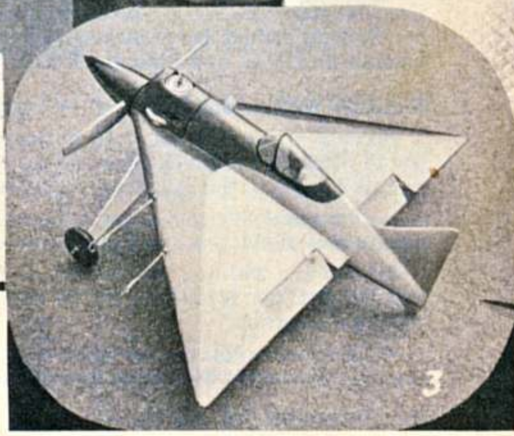
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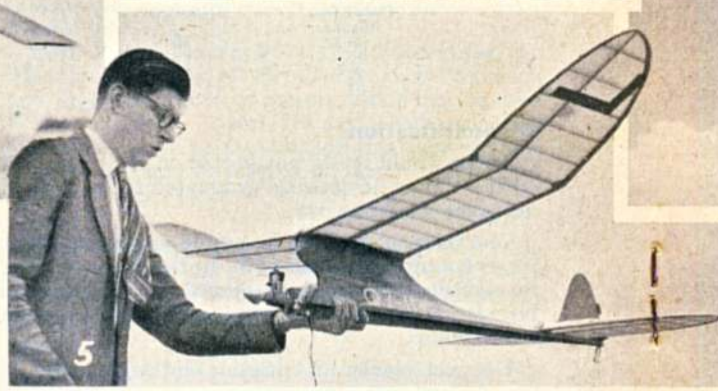
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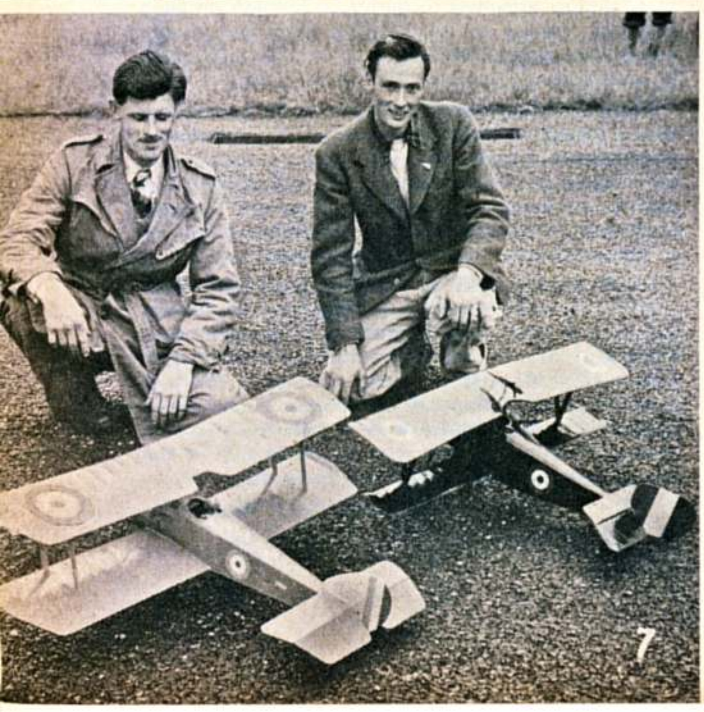
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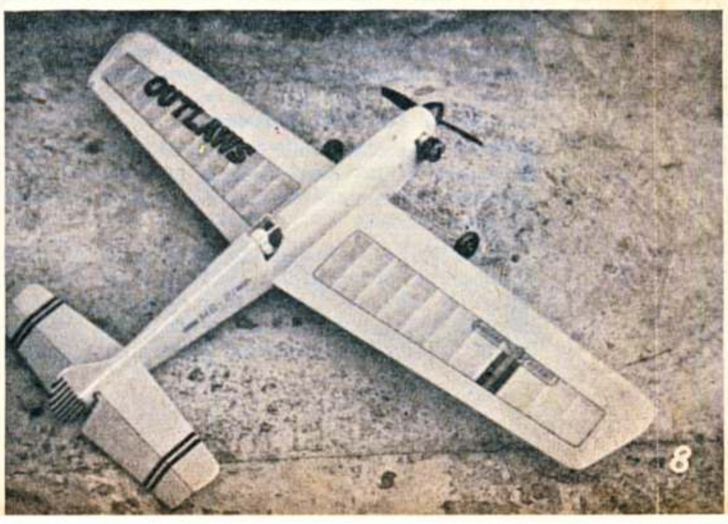

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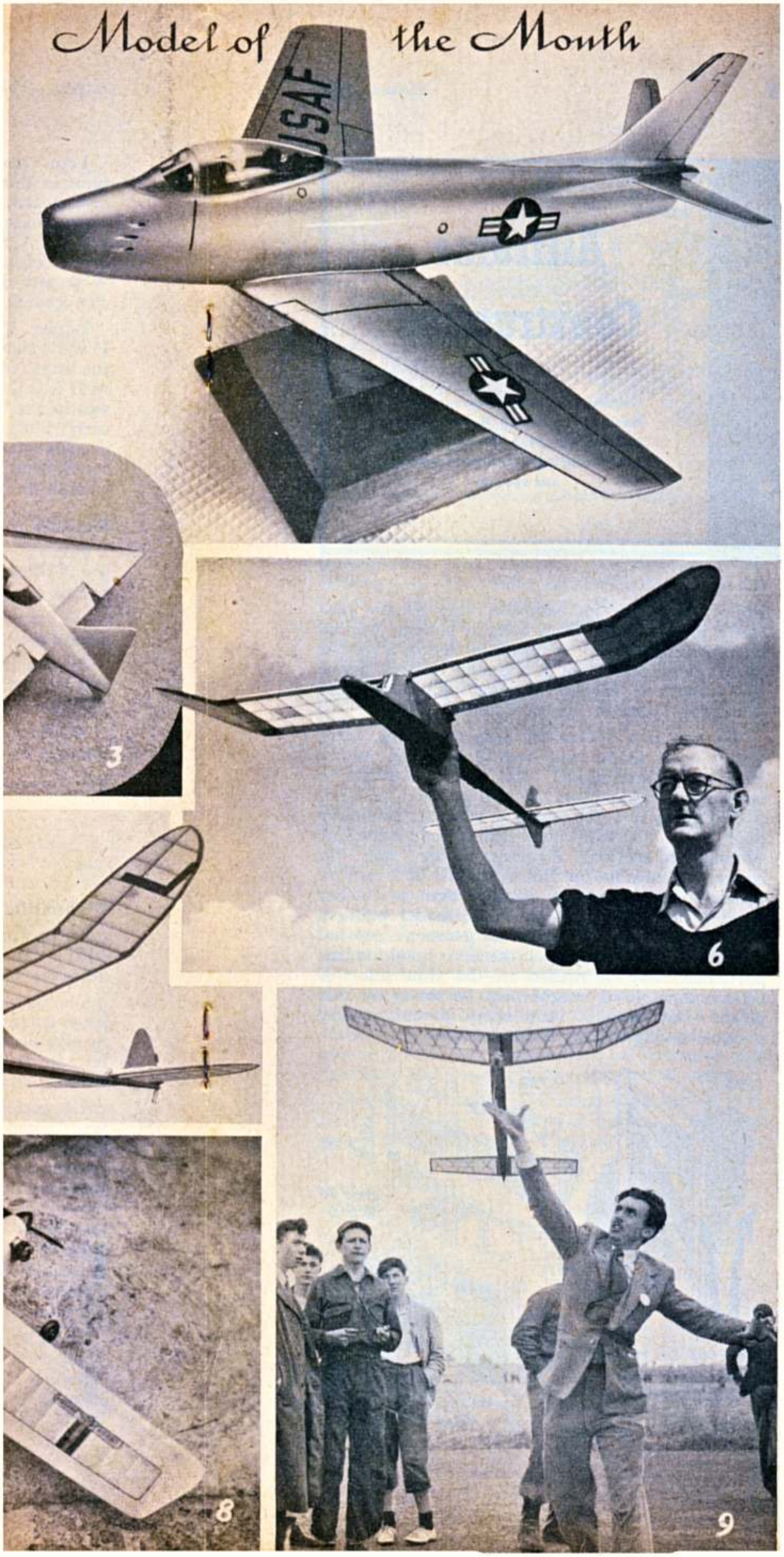
Model of the Month



NOT for a long time have we been able to select a solid as the " Model of the Month ", but R. A. Adams' excellent portrait of Phil Landray's 12½ in. span Sabre really takes the honours this issue. Phil is a member of the Wimbledon Power Club and hopes shortly to be able to offer a range of finished models to American and Canadian Air Force pilots in this country.

No. **1** could also be taken as a solid, but it is in fact a flying model of the Spitfire XIV by E. P. Edwards of the Chelmsford club. Photographer Bill Dean reports that this all-sheet round-the-pole is rubber powered, has short duration, but is impressive. A stable-mate Thunderbolt to same scale also flies well. Holding the potent-looking Ohllson 23 pylon job in No. **2**, is a power flier whose name is currently appearing with regularity in result sheets. Tony Brooks is the modeller, and he is seen after retrieving his de-thermalised job which placed 2nd at the W.E.A. Gala. Another model of his placed 5th in the International power trials, making Tony first reserve for the team.

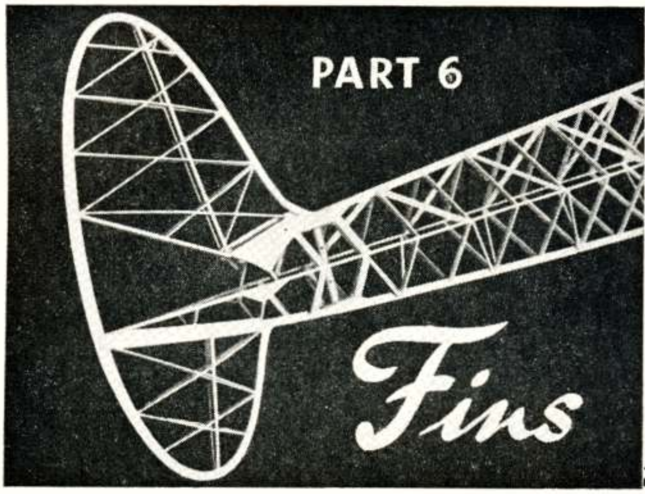
Shades of shapes to come are seen in No. **3**, which R. Hurd of Shepperton, Middlesex, designed and built to comply with class A team race rules. Wing area is 72 sq. ins. and speed is not revealed though we understand that not a few unrequested manœuvres were effected during first test flights.

1951 British Champ, Peter Wyatt, who has already won the Astral Trophy this year, surprised a great many onlookers at the International power trials when he assembled his latest experiment, seen in No. **4**. Actually it is a straight " Contender " with engine mounts and wing transposed to make it a low-wing model. A few bugs are yet to be ironed out; but we are assured that Pete is not wasting his time, so perhaps this is the start of a new trend. Another " new " power job is Geoff Lewis' entry for the Queen's Cup shown in No. **5**, which placed second in the contest at Langley.

Good use of sunlight to produce attractive lighting through the wing covering is seen in Ed Stoffel's portrait of Sid Norris, Regent's Park club, and his A/2, in No. **6**. This 50 in. span Nordic already has a 12 minute flight to its credit.

Seen at the W.E.A. Gala by R. A. Adams, No. **7**, were the APS Sopwith Pup plan 305, and the Nieuport Scout, plan 285, both modified from free-flight by owners D. Holt and A. Edwards of Godalming, to take Frog 500's as control-liners. Very smart too, they were, and what a spectacle they'd make as a combat team! In No. **8**, we have another control line job, this time an out and out stunter of 450 sq. ins. which flies at over 70 m.p.h., thanks to the powerful Atwood Glo-devil up front. Brian Harper is the owner, and as Brian is one of the stunt men chosen to fly for us at Namur, we can expect great things to happen at that International meeting.

And so to, guess who? Why, Bill Dean in No. **9**, of course, grasping at something with his left, and hurling away his " kiss " patterned 2·46 job with his right. Get up thar!!



Airframe Construction

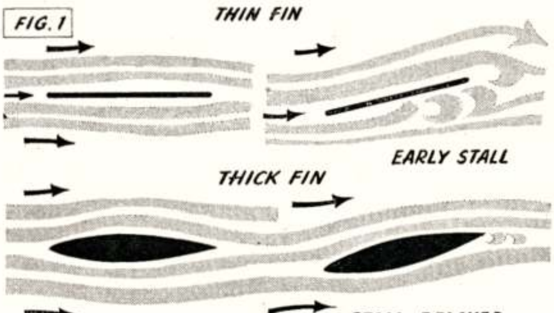
Geodetic fin in the photograph is the work of R. H. Warring who is using this form of construction extensively in his Wakefield models this season.

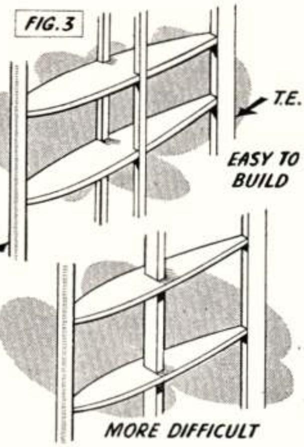
A MINOR component in many ways, it must be remembered that the fin of a model exerts a very powerful stabilising force. One has only to watch how a model misbehaves should the fin accidentally become detached in flight to appreciate this fact. It will then be equally obvious that, improperly aligned, the fin can also be an *unstabilising* factor. Too much offset for a turn, for example, and the model winds up in a spiral dive.

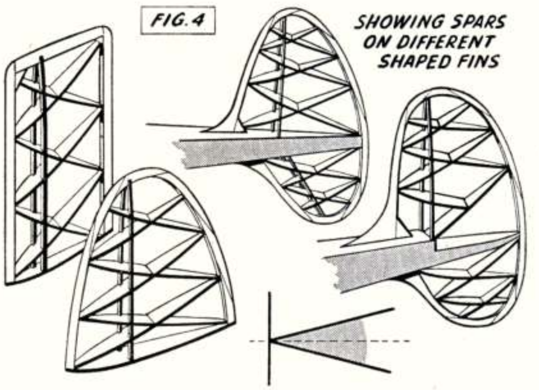
As a general rule it is best to regard the fin as a vertical stabilising surface and not as an adjustment for turn. Very rarely is the whole fin offset to produce a turn. A small proportion of the total area, either in the form of a trim tab or a rudder is used, but the effect can be the same. Other forces are generally better, and more safely used, to promote a turn.

Equally true, as a generalisation, is that a warped fin should always be regarded as a potential danger. A model with a warped or badly aligned fin may fly all right normally, but instability may appear if, for any reason, the flight speed is increased. Such instability is often catastrophic—once started it gets worse, and goes on getting worse. A glider, for example, may behave perfectly in free flight from a hand launch, but be unstable under tow. A power model, or a rubber model, may misbehave in a similar manner under full power. A warped fin rates high on the list of possible " causes " in such cases.

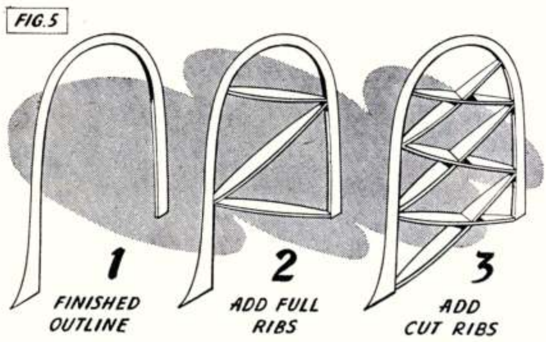
We are not concerned here with the aerodynamics or shapes and sizes of fins, but mainly with their construction. But it is interesting to note that in some cases the two go hand in hand. A thin fin section, for example, is aerodynamically poor, Fig. 1. It stalls more readily than a thicker, symmetrical section. Structurally the " flat " fin is also undesirable for this is a type of structure which will warp more readily than a thicker section. Strangely enough most model builders are reluctant to use a fin of generous aerofoil section and nearly all err on the side of making this particular aerofoil rather on the thin side. A certain amount of weight may be saved by this means—but only a very small amount. Any possible saving in drag is questionable.







AVOID TOO SMALL A GEODETIC ANGLE



Using a fin section of moderate thickness—say ten per cent.—then it is fairly easy to design a stiff structure without adding excess weight. Of all the types of built-up structures the geodetic is undoubtedly the most rigid—again without a weight penalty—but only so far as twisting goes. A normal geodetic fin without spars as in Fig. 2, for example, would be quite likely to warp into a bend, even if it would not twist out of true. To obviate this a spar or spars to absorb any bending loads is necessary, as in Fig. 3.

Geodetic ribs can be fitted into almost any fin outline. Naturally a simple rectangular outline is by far the easiest to deal with. Curved outlines may be quite difficult to design having a complete, but still, relatively simple, geodetic rib spacing. Some examples are shown in Fig. 4.

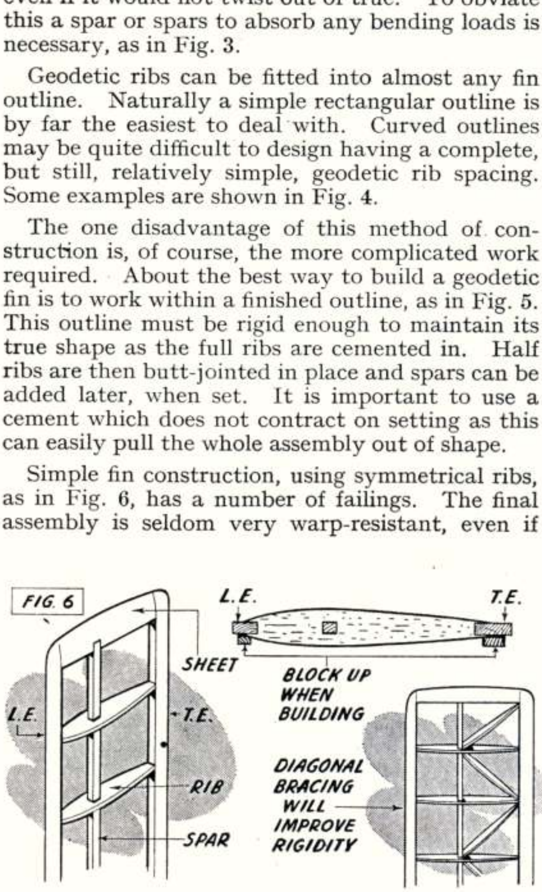
The one disadvantage of this method of construction is, of course, the more complicated work required. About the best way to build a geodetic fin is to work within a finished outline, as in Fig. 5. This outline must be rigid enough to maintain its true shape as the full ribs are cemented in. Half ribs are then butt-jointed in place and spars can be added later, when set. It is important to use a cement which does not contract on setting as this can easily pull the whole assembly out of shape.

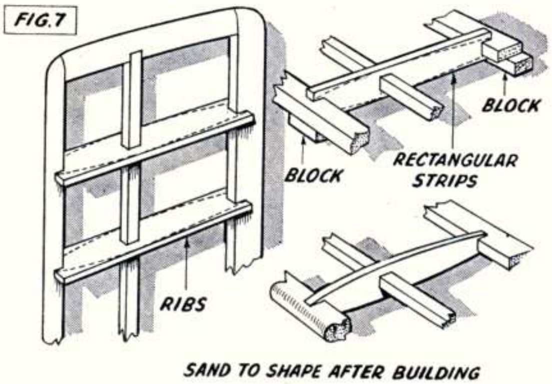
Simple fin construction, using symmetrical ribs, as in Fig. 6, has a number of failings. The final assembly is seldom very warp-resistant, even if originally true. Many people, too, find difficulty in cutting symmetrical ribs accurately so that the final section, even after sanding, is not true. Probably almost as good results can be obtained by using rectangular strips for the ribs as in Fig. 7, carving and sanding to shape after assembly. This offers an easier method of building and is usually satisfactory where fairly generous wood sizes can be employed (ribs at least 1/16 in. thick) as on power models.

Where simplicity, allied to stiffness, is the main aim there is no reason why the whole fin should not be cut from sheet. The poor aerodynamic qualities of a thin section fin can be ignored in this case—or possibly the fin area slightly increased, to be on the safe side. Sheet fins are not as heavy as many people appear to suspect, provided the right quality wood is chosen for the job. This wood needs to be stiff and light—light quarter grain, in fact, for preference. A minimum sheet thickness of 1/16 in. is recommended (1/32 in. sheet fins invariably have a tendency to warp).

Power models and gliders can quite readily use sheet balsa fins—where the thickness of the sheet is usually at least 3/32 in. Even good Wakefields, where weight saving is extremely important and fin areas are large, by comparison with other types, have appeared with all-sheet fin construction.

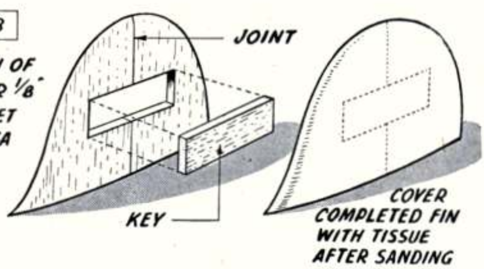
The main failing of a sheet fin of adequate thickness is its liability to split. To overcome this,





SAND TO SHAPE AFTER BUILDING

FIG. 8



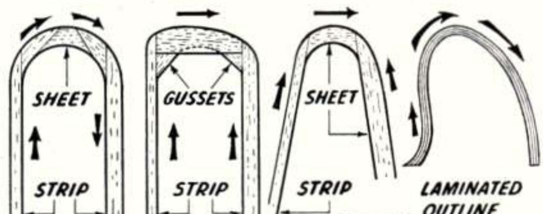


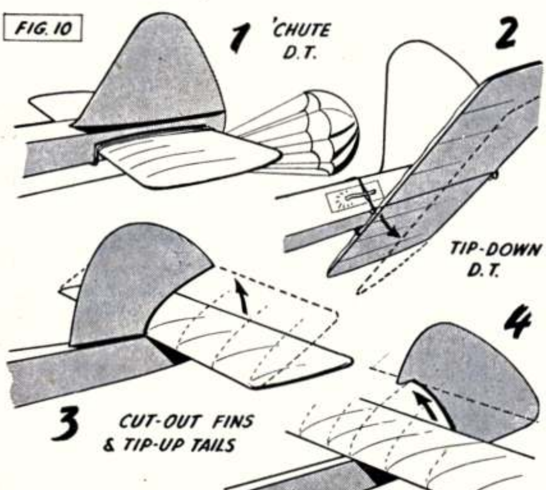
FIG. 9

tissue covering must be applied, on both surfaces, and doped in the normal manner. Excessive doping must be avoided as this will warp sheet just like a tissue-covered built-up structure.

A further improvement on large sheet fins is an inset key piece of harder wood of the same thickness, as in Fig. 8. This is particularly effective for reinforcing a joint line which may be necessary between two individual pieces of sheet required to produce the necessary fin width. The key piece should be cut first and then used as a pattern to cut the fitting slots in the main sheet pieces. As a guide to sanding to final section a pencil gripped in the fingers can be run around the outline marking the centre line position.

In built-up fin construction the manner in which the outline is produced is important. If this is weak the fin will be prone to warp. With simple shapes—straight edges and a rounded top, individual sheet pieces are often used for the curved part of the outline. These are cut so that the largest possible cementing area is given between individual pieces and, as far as possible, the grain of the wood should run parallel to the outline. All the joints should be double-cemented, as a matter of course, and checked again after sanding prior to covering. It is these cement joints which quite often tend to break loose.

FIG. 10



Laminated construction is probably better suited to curved fin shapes since here the grain can be made to follow the outline. In this case the main fault is using too soft or too weak a wood for the individual laminations so that the resulting outline is weak when sanded down to the proper section. Such a failing has been commonly noted on Wakefield models which make considerable use of this type of fin construction. The snag is, of course, the harder the wood used for the laminations the more difficult it is to bend round the former to the shape of the required outline. Some details of fin outline construction are summarised in Fig. 9.

Now what about the finished fin and its attachment to the fuselage? Usually the fin and tailplane are located together, and both detachable, although modern practice is to make the fin integral with the fuselage as far as possible. This started with power models—mainly to ensure that the fin was always maintained in the same attitude with respect to the fuselage and has since spread to gliders and rubber models. Unfortunately a fixed fin usually complicates the problem of fitting a tip-tail dethermaliser which is by far the most popular type of dethermaliser on all types of models.

Fig. 10 shows three possible arrangements with a power model tail unit. The fin is integral in each case. In the former example the demountable tailplane is passed through a cut-out in the sides of the fuselage and strapped in place by rubber bands. Despite the fact that this would seem to be liable to damage to either the tailplane or the fuselage in a rough landing, where the model is tipped over on to a tailplane tip, in practice this has given very satisfactory results. In such cases, however, it is impracticable to provide a tip-tail release and so a 'chute dethermaliser is employed.

The second method mounts the tailplane underneath the fuselage where it can be tipped by releasing the leading edge, as indicated. This, again, has been used with success on contest models but does not appear an entirely satisfactory solution. The underside of the fuselage must be shaped to conform to the upper surface of the tailplane aerofoil for positive seating and in practice it has been found easy to disturb the tailplane rigging angle by slight mis-placement of the tail. Unless provision is made for accurately locking the tailplane in place, this method of mounting may prove unreliable.

The other alternative methods shown employ a fin with a cut-out portion allowing the tailplane to be tipped up for dethermalised descent. The fin can also act as a stop to limit the tailplane movement. This is probably the simplest practical solution, retaining close grouping of the tail surfaces and the fin mounted integral with the fuselage.

Of course, an alternative solution, which has been widely used on gliders, is to stagger the tail group so that the fin is either forward or aft of the tailplane. This still enables the fin to be mounted as an integral part of the fuselage and provides a simple tailplane fitting with straightforward dethermaliser action, Fig. 11.

With rubber models similar systems can be applied, although it is very rare to find the fin and tail staggered on such types. The cut-out fin is, however, coming into widespread use. As a general rule, though, the fin and tailplane are still made detachable on these types.

One of the simplest methods of assembly, which is particularly suited to all small models, is to cement the fin permanently to the tailplane and secure the assembly to the fuselage with a rubber band or bands. Where this is done, however, some means of locking the tailplane accurately in line, when assembled, is required. Suitable balsa or dowel keys are used which locate in the fuselage. Balsa keys cemented to the underside of the tail engaging the outside of the fuselage longerons are unreliable. They are too readily knocked off and the setting may be lost.

Often a quite rigid form of tail unit assembly is used on rubber models, so concerned are the designers in getting a positive line-up of these surfaces. The tailplane locks into the rear of the fuselage and the fin, in turn, locks through this and also into the fuselage. If no tip-tail dethermaliser action is required the fin locking spar (usually of bamboo) may engage a paper tube for the full depth of the underfin. In practice, despite such rigid mounting, such tail assemblies are seldom badly damaged. The most common failure in a rough landing is that the fin spar breaks at its point of entry with the fuselage—a field repair job, incidentally, which is not too easy to tackle and still re-align the fin in exactly the same position as before. Some typical demountable tail fixing of these and other types are summarised in Fig. 12.

If general rules can be advanced—and it is difficult to do this since individual designers have their own particular preferences—best practice would appear to be to mount the fin integral with the fuselage on all types of models, as far as possible. The tailplane should then be detachable, both for ease of transport and also to make it more "shock-proof" in bad landings. The life of a good model is determined not so much by its flight characteristics as the terrain over which it flies.

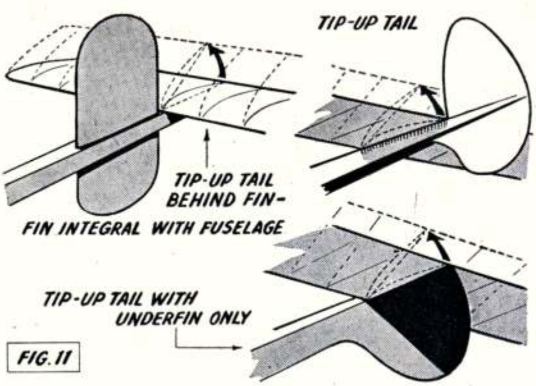


FIG. 11

Contest models, which may be perfectly trimmed and very stable in flight, are liable to land in built-up areas or strike obstructions downwind and suffer just as much strain as a badly trimmed model which dives in on its first test flight. But components must never be too flexible, for one of the golden rules of consistent flying is to have a model which always assembles *positively* the same each time. There should be no doubt at all as to whether the wings, tail and fin are correctly aligned. Once the proper settings have been found for these by trimming, cement all necessary packing in, cement in any rudder tab offset used and make sure that all these vital components re-assemble in the correct position each time. The more positive this assembly becomes, the better will be your flying.

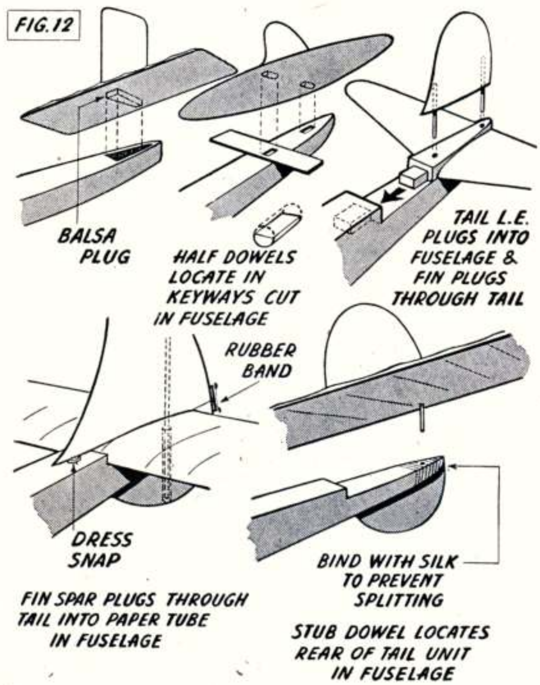


FIG. 12

ENGINE

The

PART TWO

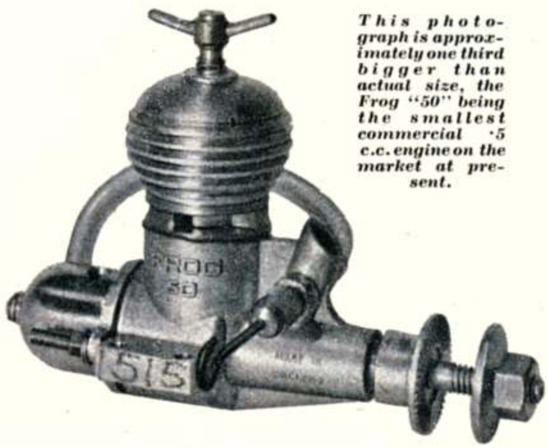
NEW SERIES

BY

RON WARRING

THE new "baby" Frog engine, or, to give it its proper name, the Frog "50", was received for test with some enthusiasm. This engine has been long promised, but production problems and the fact that International Model Aircraft have been literally unable to fit it into their working programme until comparatively recently has delayed its appearance in the retail shops until after the E.D. and other half-c.c. engines.

The Frog "50" differs in external appearance from its contemporaries in many ways. In the first place it is a far more compact engine than the E.D., with much smaller physical dimensions. It looks, and is, a scaled down Frog "150", but quite a number of detail modifications have been necessary. The new matt finish on the crankcase is particularly attractive and the finish is generally excellent. The one part which looks out of keeping with the rest of this well proportioned, tiny engine is the needle valve. This, it will be seen, also comes in for criticism later.



This photograph is approximately one third bigger than actual size, the Frog "50" being the smallest commercial ·5 c.c. engine on the market at present.

Undoubtedly, too, the model received was simply "one off the shelf", not hand picked for test. The spray bar assembly was drilled off centre.

Regarding the spray bar assembly, there is one very useful feature here. The tiny spray hole must face downwards in the intake tube for proper running. The correct position of the spray bar is indicated by a notch on one of the edges of the brass fitting. This is very necessary for it is virtually impossible to see where the spray hole is without some sort of external guide if the spray bar is dissembled and re-assembled, such as might be necessary for cleaning. This mark, too, enables you to line up the spray bar correctly should it be necessary to tighten it up at any time. The steel nut on the needle valve side does have a tendency to work loose.

The manufacturers specify that an ether fuel should be used, the recommended mixture being equal parts of paraffin, castor oil and ether. The proportion of ether can be doubled, if desired, for easier starting, although this results in some loss of power. Etherless fuels, and some other commercial fuels, are not recommended by the manufacturers as the compression setting required for starting and running is too high and might result in damage to the connecting rod.

For all the tests we used the recommended fuel mixture (equal parts) and, having mounted the engine on a suitable test rig, turned the compression right back and started from scratch to find the correct starting and running settings without prior reference to the manufacturer's literature. We quite frankly admit it took a fair time to get the engine running satisfactorily, having made these things as difficult as possible. But the resulting needle valve setting—two and a half turns open—corresponded quite well to the instruction sheet figure.

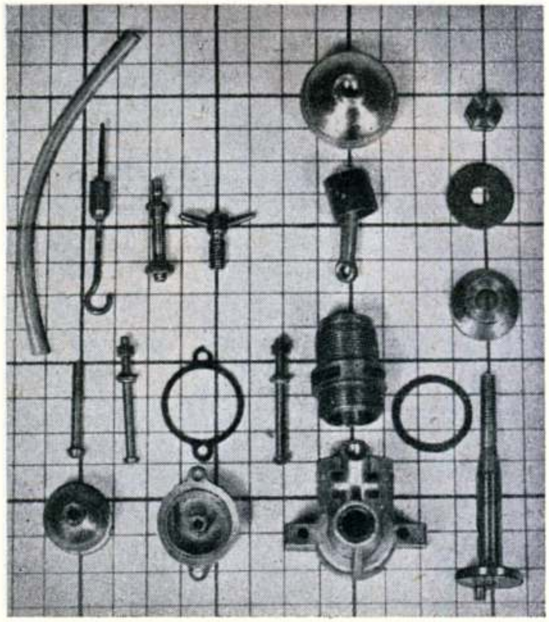
The needle valve itself does not do justice to the rest of the Frog "50". It is not as well

ANALYSIS

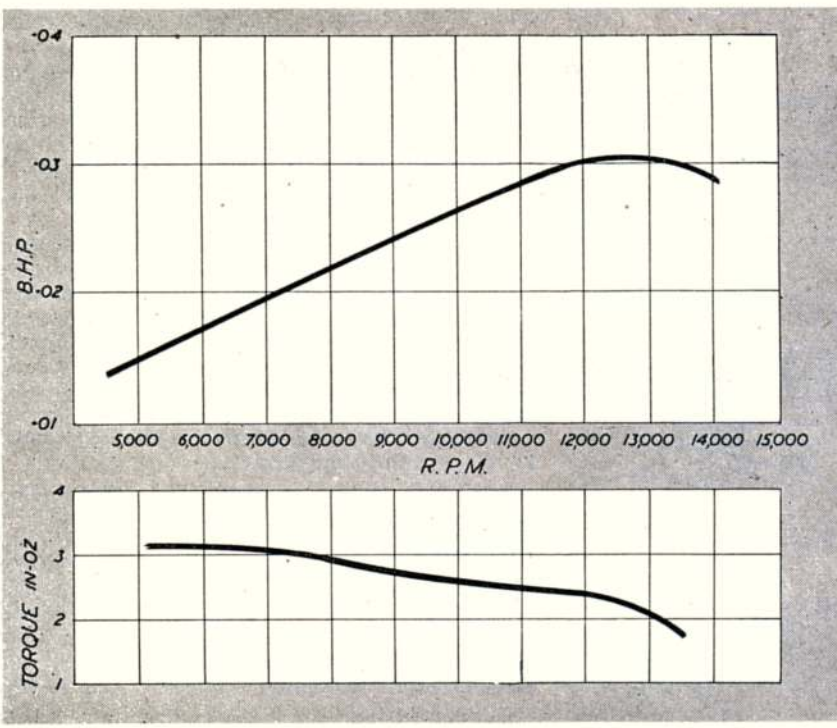
FROG "50"

finished as the rest of the engine, relatively inaccessible and extremely difficult to turn when locked sufficiently to prevent it rotating on its own under vibration. We counted ourselves fortunate in that, having once established the best running setting, the needle valve did not need further re-adjustment, except as higher speeds were approached. Here it was necessary to close the needle valve down nearly one half a turn for best possible speed.

The tank which fits the engine backplate, is held in position by a centre screw. Those aeromodellers who use the normal size Valvespout will find it necessary to enlarge the filler holes slightly, although with a tiny tank such as this we do not recommend this modification. Better to use the smaller "oiler" type Valvespout or a hypodermic. Make sure, too, that the fuel tubing extends to the bottom of the tank. Otherwise, just as you



Main background squares are one inch actual size which gives an indication of the minute size of the parts. Note generous exhaust porting and the gaskets for efficient crankcase seal, an essential feature on engines of this size.



FROG "50"

Displacement : 0·49 c.c. (0·0305 cu. in.).

Bore : ·343 in.

Stroke : ·330 in.

Bore / Stroke Ratio : 1·04 in.

Bare Weight (including tank) : 1¼ oz.

Bare Weight (without tank) : 1⅛ oz.

Mounting : Beam.

Material Specification Crankcase : Aluminium alloy.

Cylinder Liner : Mild steel, case hardened.

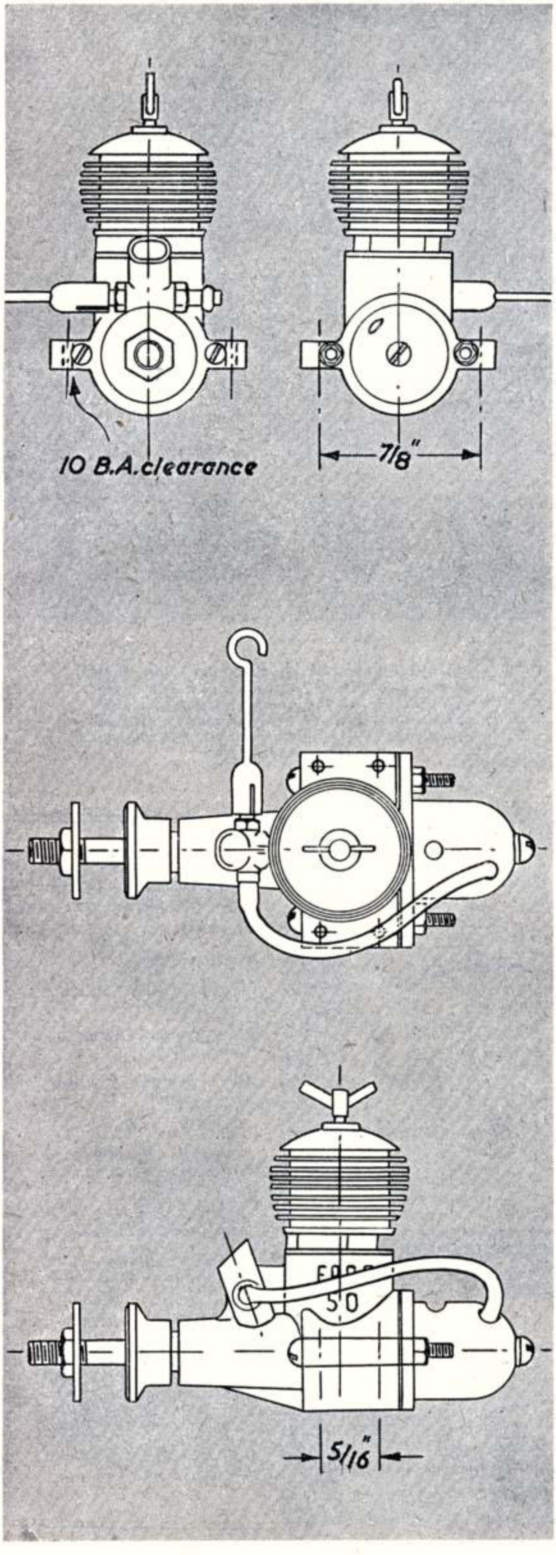
Cylinder Jacket (integral head) : Duralumin.

Piston : Mehanite.

Contra Piston : Mehanite.

Manufacturers : International Model Aircraft, Ltd., Morden Road, Merton, Surrey.

Retail Price : 49/6 (including tax).



have got the engine running it runs out of fuel and stops abruptly. The full tank, provided starting is more or less instantaneous, gives about thirty-five to forty seconds run.

For the tests we dispensed with the standard tank and hooked up a larger plastic tank. The position of this tank was fairly critical. The engine did not like being " gravity fed ", i.e., the tank higher than the crankshaft, but could readily accommodate a slight suction head. The best position was exactly level with the crankshaft.

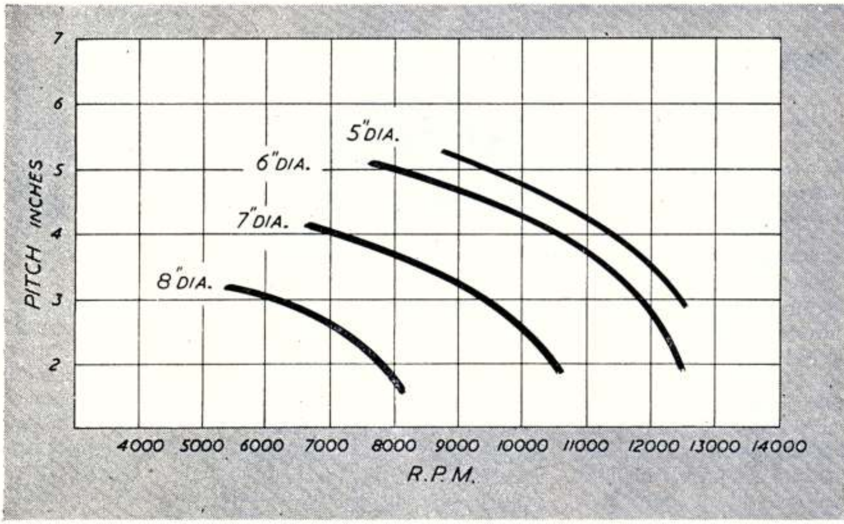
On the whole, we cannot grant the Frog " 50 " as being an engine easy to start from cold. The most satisfactory procedure was to prime the fuel line by choking, eject a quite generous prime through the exhaust port and, with compression slackened off about half a turn from the running position, flick over until the engine fires. Compression has to be restored quite rapidly to the correct running position once the engine is running, otherwise it will stop abruptly.

Re-starting with the engine hot was surprisingly good. Again compression was slackened off, this time about one quarter of a turn, fuel injected through the exhaust, and the propeller flicked over. If the engine did not fire in three or four flicks, another prime was given. Once more smart action with the compression adjustment was necessary to catch the burst of power as the prime charge burnt up and settled the engine into steady running. But this method proved almost infallible. Starting from cold the engine often " went finicky " and required a fair amount of juggling with the compression setting.

A major criticism at this point is the shape and size of the compression adjustment lever. After playing with the engine for a little while, this becomes most painful to handle, not only because the top of the cylinder gets quite hot but the lever is relatively small and seemingly possessed of sharp edges. We understand that this fault has now been remedied by the manufacturers.

The Frog " 50 " is undoubtedly an engine which will benefit from a long running-in period. The manufacturers recommended a minimum of two hours. With the engine new it swung the standard Frog 6×4 plastic propeller at some 8,900 r.p.m. After roughly an hour's running-in, speed had gone up to 10,000 r.p.m. plus. When the engine finally appeared to have settled down and as well run in as necessary the r.p.m. figure was checked out as 11,180 with the same propeller.

During the initial stages of running-in the engine is reluctant to run for more than a minute at a time. This condition improves later, but only slowly. Towards the end of the running-in period we did, as a check, let the engine run continuously at around 11,000 r.p.m. for a period of nearly twenty minutes without stopping. It ran very steadily throughout, even though at the end the cylinder head was unscrewed nearly one half a turn from the tight position. This was not due to



PROPELLER TESTS

Standard		Frog
6×4 plastic		11,180
6×5	..	8,000
6×4	..	10,850
6×3	..	11,800
6×2	..	12,550
7×4	..	7,200
7×3	..	9,350
5×5	..	9,450

Recommended Propellers : Free flight: Frog 6×4, 6×3 or 7×3 wood. Control line: Frog 6×4.

overheating. The engine was started hot and did not appear to get any hotter over this period.

One thing about the Frog, we did find it remarkably easy to throttle it down for slow speed running, if necessary. As regards normal running it was particularly happy at the high speed end of the range. At the slowest speed with which it was run with a propeller (around 6,000 r.p.m.) it was a little more reluctant to keep running. In this particular test, however, the propeller size was one which would normally be used on a 2·5 c.c. or larger engine for duration work!

A feature that is different and surprising on such a small engine is the extra long threaded portion of the propeller shaft. This enables a wide variety of propellers to be fitted without the tiresome cutting away of hubs we all abhor. Even a small flywheel and engaging dog can be accommodated on this shaft for boat work.

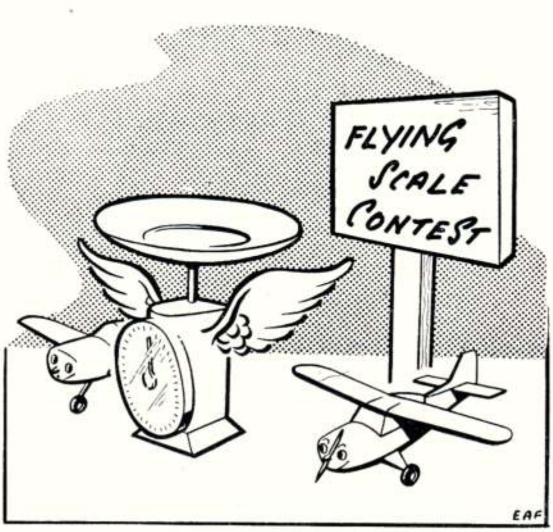
Mounting lugs are generous in size, being of sufficient depth to take the 10 B.A. beam or radial mounting bolts; when radially mounted it is not possible to use the standard fuel tank.

The use of 360° or "annular" porting on almost all of the modern miniature two-strokes of less than 3·5 c.c. has led to a common but nevertheless erroneous belief that all are copies of each other with slight constructional differences. In no class is this belief more in error than among the ·5. For although they possess the same basic porting arrangement, the timing is in each case entirely different. We strongly suspect that the long exhaust timing, with large overlap of the transfer passages, is especially intended to maintain the traditional characteristic of the engines from Morden Road, and that is flexibility in control.

All the speed tests, as usual, were made with a family of constant geometric pitch carved wooden propellers. Results are summarised in the various graphs. One puzzling feature was the fact that the r.p.m. figure with the Frog 6×4 plastic propeller was higher than with a 6×4 standard propeller. Even allowing for the greater weight of a plastic propeller, as a general rule a wooden propeller of the same pitch and diameter is faster, or at least equivalent as far as speed is concerned. On checking the Frog plastic propeller for pitch this was found to be nearer 3 ins. than the 4 in. pitch stated. This would be sufficient to explain the mystery.

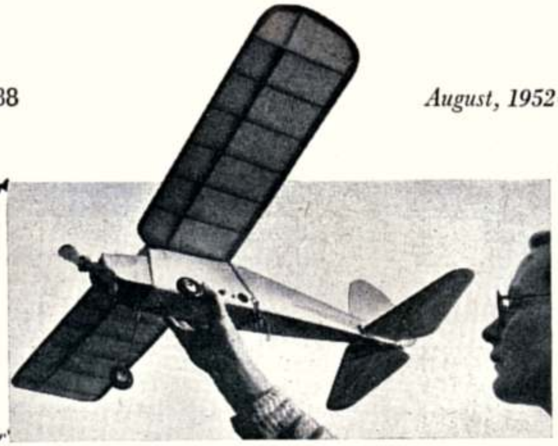
Best liked features : Small, compact size. Consistent, high speed running and high power output.

Least liked features : Needle valve assembly. Compression adjustment lever.



RADIO CONTROL NOTES

By H. BOYS



Mrs. Boys holds the author's 32" R/C lightweight model. Mills ·75 engine, Pike receiver, total weight 14 ounces.

SINCE we have had a description of the working of a transmitter, let us now consider the receiver. The best explanation so far seen has been sent by Mr. Douvaletelis of Athens. It is here re-written in a form in which it is hoped beginners will understand. Fig. 1 is the circuit diagram, and it is known as a "Colpitts" type oscillator. It will be noticed that it is very much like a transmitter and behaves in much the same way, but there is a difference. This type is called "self-quenched", but there is another type using extra coils to give "separate-quench", which we will not bother about for the time being. In the "self-quench" the oscillations build up a large negative bias across the grid which cuts off the anode current and the amplification of the valve. This bias leaks slowly away through the grid resistor and drops to a value that allows the valve to resume oscillations, and the cycle repeats all over again. The frequency with which this happens is determined by the grid condenser-resistor combination, valve characteristics, and the feedback.

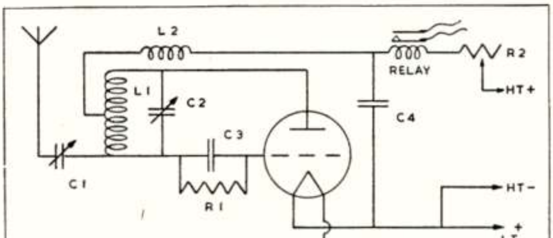


FIG. 1

When a signal is received by the tuned circuit it is impressed on the grid. As the bias leaks away, there comes an instant when the combination of bias and positive half of the signal allows anode current to flow with a resumption of oscillations. This takes place sooner with signal than without, because with signal the bias does not have to leak away so much. The oscillations then start and stop more frequently, or in other words the quench frequency is increased. This increase in quench frequency has two effects, both resulting in a fall in anode current. It allows more high frequency oscillations per unit of time with greater amplification of the signal, and it also increases the bias, which reduces the average anode current.

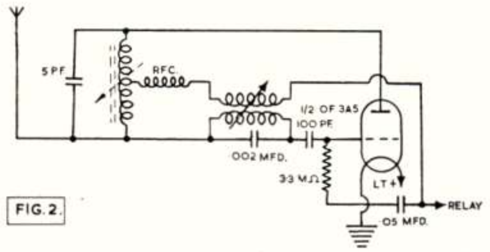


FIG. 2

Now take the case of the Separate Quench circuit, Fig. 2. In this case we have two tuned circuits, or tank circuits as they are sometimes called, the Low Frequency or quench, and High Frequency or signal circuit. Both these circuits oscillate and build up a bias on the valve. If properly adjusted the quench coils should provide most of the bias, and thereby be the chief factor in determining the anode current, and the signal circuit should only oscillate for as small a part of the quench cycle as possible. A received signal upsets this stable condition because it is impressed on the grid by the tuned circuit causing violent oscillation at the signal frequency. These oscillations, plus the increase in quench frequency (same reason as before) increase the bias and the anode current drops. In adjusting the circuit, care must be taken that it does oscillate at signal frequency, if only just, for if the bias built up by the quench coils is too great, it becomes useless for reception of any but very strong signals.

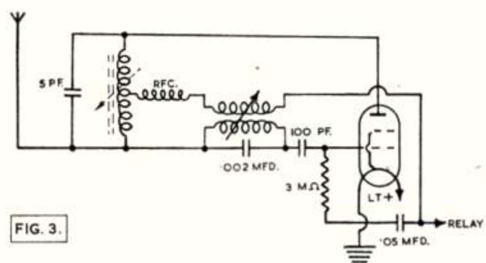


FIG. 3.

The circuit shown is for a triode, such as using half a 3A5 or DCC90, but if a pentode or beam valve is used such as 1S4, 3S4, 3V4, etc., the circuit is more sensitive if they are used as pentodes, as Fig. 3. Not only is there an increase in valve amplification but the grid-plate capacity is decreased, which allows a larger coil to be used with

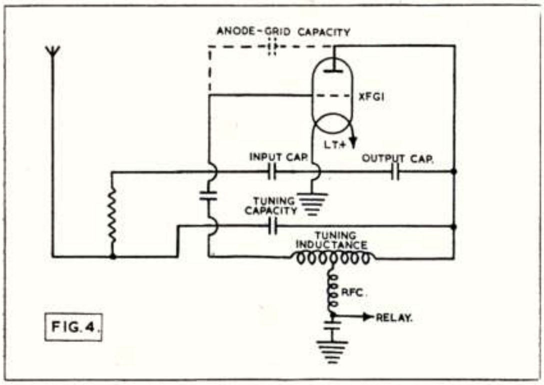


FIG. 4.

its attendant benefits, and less detuning from "Miller" effect with variations of circuit constants.

Before drawing conclusions from the above explanation as to the best possible adjustments, there is one more thing to be said. The feedback in this form of "Colpitts" circuit is governed by the ratio of Output to Input capacities. To illustrate these capacities Fig. 1 has been redrawn somewhat and appears as Fig. 4. The capacity between grid, and anode is shown dotted because it can be considered as a slight addition to the tuning capacity. If we want to increase feedback we can increase output capacity by soldering a short piece of insulated wire to earth and wrapping it a few times round the anode lead of the coil, as it would be difficult and usually impossible to decrease the input capacity unless at the expense of signal transfer from the aerial. Conversely, to reduce feedback, we can increase the input capacity by wrapping the wire round the grid lead.

Mr. Douvaletelis criticises some of the suggestions put forward for adjusting receivers, and

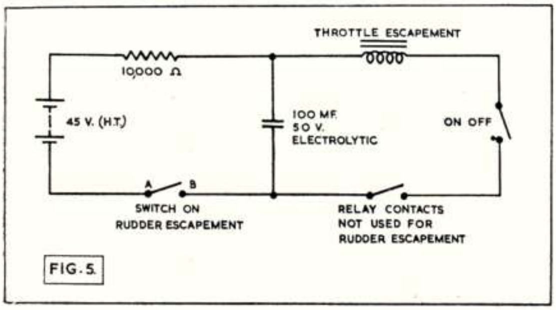


FIG. 5.

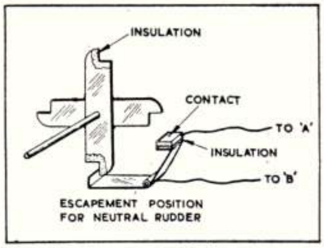
goes on to say: "Once we understand that the feedback can be easily adjusted, it becomes obvious that best reception is obtained with high 'Q' coil and low capacity, with greatest coupling to aerial (if short)". An XFG1 receiver was built incorporating the above, and it proved to be much more sensitive than a commercial type. The tuning capacity was only 5 pf., and the coil had 14 turns of 20 S.W.G. wire with diameter spacing, wound on a ceramic former 0·8 in. diameter, tuned with a dust iron core.

Another tip given is to connect the R.F.C. to the point of zero R.F. potential on the coil. This is found by connecting it first as near to the centre as possible and then with a pointed metal instrument that will go through any insulation, held firmly in the hand, touch the coil and find the spot where least effect is made on the anode current. (This should be done when receiving a signal.) Transfer the R.F.C. to this spot.

With separate quench receivers it is recommended that the quench coils should be wound in two halves so that their coupling can be varied, until the signal coil shorted the desired anode current is obtained. Then the feedback in the signal circuit is adjusted by juggling with the input and output capacities, until there is a slight drop in anode current, which signifies weak signal frequency oscillations causing a small addition to the bias. Touching the signal coil should then change the current slightly. In separate quench receivers, and usually all hard valve types, the grid resistor gives better results if returned to earth. Also with some valves working better with a lower grid resistor (1·5 M. ohms) there should be a corresponding increase in the grid capacitor (200 pf.).

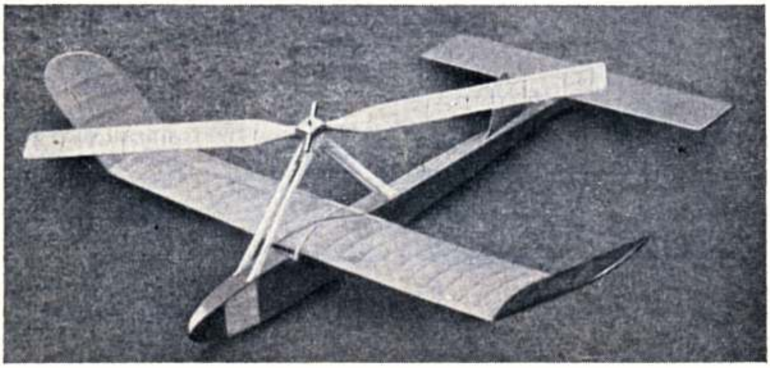
It will be very interesting to try adjustments along the above lines to a receiver of the IVY or Bolton No. 1 type. Good reports of the Bolton keep coming in, just read this from Mr. A. Brown of Liverpool: "I use 67½ volts when in my boat and this gives a standing current of 3 ma. dropping to 0·5 on signal, no aerial on the receiver and the minimum current drop at maximum range 1½ ma. It is far superior to any other Rx I have tried. On 45 volts H.T. when in the plane I get 2 ma. down to 0·5 ma. and the minimum drop on a signal too weak to operate an IVY is still 1 ma.

Throttle Control



There is not much space left for the more advanced man but a Canadian writer, Mr. Mackay, has sent a sketch of an interesting control fitted to his Ohlsson 33 powered Rudderbug, see Fig. 5. Throttle and rudder are operated by escapements. A four position type is used for the rudder with the right and left rudder teeth insulated, with an insulated contact on the pawl. This forms the switch for charging the condenser, when a signal is held on for 3 or 4 seconds after neutral rudder. On release of signal the throttle escapement is operated and the rudder will be on turn, but a short signal will neutralise the rudder without altering the throttle. Short signals then, will operate the rudder in the usual way, and long signals, after neutral rudder only, will operate the throttle. The receiver used is a Bolton No. 2 with a 3A5 valve.

GIRO GLIDER COMMENTS



With the editorial brain-box buzzing in confusion after reading through the many technical and practical comments on the Giro Glider featured in the June issue, we turned and re-read J. H. Maxwell's opinion on this unusual "Special Aircraft" record-holder to decide that his was the clearest viewpoint on the practical and theoretical aspects of the design.

Comments by J. H. Maxwell

Perhaps the simplest way of describing J. O'Donnell's giro glider is to say that it is a normal fixed-wing model with a free-wheeling propeller. True, the propeller is tilted back at 75 degrees and is called a rotor, but the result is much the same. The rotor on this glider gives no positive Lift or Thrust. It does give a little negative (downward) Lift and some Drag. Thus it is a hindrance rather than a help, and it would be even more so but for the fact that the blade sections (as in a free-wheeling propeller) are working upside down, and are therefore rather inefficient.

At first sight, it is difficult to see how a blade which is moving through the air at a positive angle of incidence can produce negative Lift. Fig. 1, (*a diagram which is included in most of these "Giro-Comments"*—Ed.), which shows a section through the aft-going blade, helps to explain this. Arrow A represents the air-flow due to the rotation of the rotor, and arrow B represents the airflow due to the forward motion of the model as a whole. These two combined give a resultant effective airflow—arrow C. This is meeting the aerofoil at a negative angle of attack and produces Lift and Drag as shown. The resultant R is substantially downwards.

FIG. 1

Probably the forward-going blade does give some positive Lift, but the overall force from the rotor is down and backwards.

To check this theoretical reasoning, I constructed a half scale replica of the rotor, and tested it in a very crude "wind tunnel". The rotor was mounted on a letter balance, and set in the blast of air from a vacuum cleaner (with the bag removed) as in Fig. 2. The angle of the rotor axis was made adjustable, and the results were as follows :—

(1) Axis angle —15° (as in O'Donnell's set-up). Rotor turned slowly in anti-clockwise direction (viewed from above). Small negative Lift.

(2) Axis angle —10° to 0°. Rotor did not turn.

(3) Axis angle +5°. Rotor turned slowly in clockwise direction. Small positive Lift.

(4) Axis angle +10°. Faster clockwise rotation. Larger positive Lift.

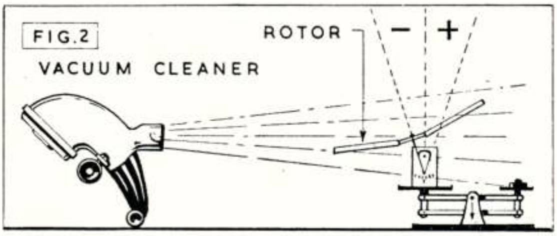
Since the airspeed in the tests is unknown, there is no point in quoting the values of the Lifts obtained, but the positive Lift at +5° was roughly equal to the negative Lift at —15°. Also, the Drag values were about the same at these settings.

From the above evidence, I think it can safely be said that the rotor on Mr. O'Donnell's model serves no useful purpose—it is merely an ornament. The only point in its favour is that it permits the use of an almost normal model while complying with the "special aircraft" rules.

Finally, a word about those rules. Clearly they were never intended to encourage models such as this. The area of the fixed horizontal surfaces should be reduced to not more than 15 per cent. of the rotor disc area, thereby forcing designers to produce *real* giro-planes.

Our tame aerodynamicist has also confirmed Mr. Maxwell's opinions, and in answer to our boffin's special request, we also include a few pertinent points from other contributors.

FIG. 2



D. W. Cooper, B.Sc., A.M.I.Struct.E., an autogiro specialist from Newcastle-upon-Tyne, remarks :—" If the wings were removed, it is hardly likely that the machine would fly . . . . . negative incidence of the rotor shaft will produce an induced velocity from the rotor disc, which accelerates the airflow over the wing and at the same time reduces ' breakaway ' somewhat like a H.P. slot . . . . . the ' wing ' loading for the complete system will be about 2·7 oz./sq. ft. only ; with this loading, anything should soar."

J. Barker, designer of the " Lulu " glider, states :—" O'Donnell's nicely proportioned glider should have an L/D of at least 8. An autogiro L/D as high as 5 would be considered as excellent . . . . . means that adding a rotor to it will reduce the efficiency . . . there will be interference between wing and rotor . . . most unlikely that the best angle of descent for glider and rotor will coincide."

B. R. Townsend, of Bourne End, Bucks., compares the ' clean ' glider and the ' rotor glider ' on efficiency to prove that " . . . Lift-drag ratio of rotor is less than Lift drag ratio of clean glider."

M. Collinson, of Bradford, queries :—" Is the L/D ratio of the combined system equal to that of either system used separately ? . . . . .the L/D ratio (of the rotor) will in this case be zero . . . . . for general aerodynamic efficiency it is inferior to a well-designed sailplane."

D. M. Rao, B.Ss., an Indian student of aeronautics at Imperial College, London, went to town with sketches and remarks based on theory and states :—" The whirling rotor system will have a definite gyroscopic stabilising effect on the model . . . . . rotors will have a certain spoiling effect on the wings, *i.e.*, the wing is not now as efficient as it was without the rotors turning over it. Also this spoiling effect will not be symmetrical . . . . . rotor system will have a high drag, and weight. . . . . . Lightness is essential to avoid instability due to high C.G. . . . . . will never be a serious competitor to conventional aircraft ; but it does offer interesting possibilities."

Bob Buragas, of New Jersey, U. S. A., airmails his opinions and says :—" It is one of the cutest pseudo giros I have ever seen . . . When wings are used to produce lateral stability, the arrangement of rotor versus wing must be considered as a biplane. If the wing becomes necessary for lift production to any great degree, the aircraft can no longer be considered a giro . . . A giro glider can be rigged with a relatively high degree of efficiency but not at an efficiency comparable to stationary wing types. And more decisively, Mr. O'Donnell's model is the greatest giro farce yet seen. Here is a perfect example of complete unfamiliarity with a design type. But, I must say, the principle of auto-rotation without lift is a unique one and proved worthy enough to set a record. . . . " Buragas then outlines his own long experiences in model autogiro design, covering indoor flights in excess of three minutes, outdoor rubber flight up to two minutes, and Jetex in the range of 55 secs. He closes with this interesting comparison :—" I note the F.A.I. allows a wing area equal to 50% of the total area swept by the rotors as a maximum. In the States we have a max. wing area. which is 100% of the rotor blade area total. Or, as they put it, 50% of the total area of the wing and rotor blade total combined. This gives us a much smaller wing and requires greater concentration on autorotation."

John O'Donnell replies

When it was decided to attempt the Special Glider Record, experiments were commenced using the largest possible wings and tail for a given rotor size. This would give the closest approximation to a normal model and which would respond to normal trimming procedure.

It was discovered in flying tests that :

1. The larger the rotor the worse the towing became and the less the altitude attained—the final version only getting 150–200 ft. on a 328-ft. towline.

2. With positive angle of axis of rotation, the rotor revolved very fast on tow, and the angle increased—finally traced to flexing in the shaft—until the rotor hit the tail or fuselage. Towing was practically impossible. With negative angle, the rotor slowed on tow and towing was possible even if difficult.

Re. the " comments " :

1. J. H. Maxwell's are very reasonable except for the assumption that the airflow is parallel to the Datum Line of the model. As the model glides slow and steep the airflow is probably approximately parallel to the plane of rotation—despite which the rotor revolves o.k.

2. The L/D ratio of the model is poor, approximately 4 or 5 : 1—this means both rotor and wing *must* be inefficient, but there appears little that can be done—increasing rotor size giving towing trouble—and decreasing rotor putting the model outside the specification.

To end on a constructive note, the use of a pair of contra-rotating rotors should solve the towing aspect and perhaps give a model more acceptable to the rotorplane enthusiasts.

And with those opinions, some of them conflicting, we close the books on yet another aeromodelling experiment with a quote from one correspondent who appears to have voiced the opinion expressed in many of the submitted giro-comments that " I realise that Mr. O'Donnell is only caricaturing some more of the ridiculous F.A.I. rules."

GADGET REVIEW

WHETHER your interest is in rubber, power, team racing or pendulum controlled sport flying, there is something of interest for your study among the eight contributions to Gadget Review this month.

Rubber fans, in particular the Wakefield cult, are always hankering to carve off or cut out that last excess dram of spare weight in their favourite contest job. To most Wakefielders, idea **A** will be by no means news. But to the thousands of others who have not been introduced to the intricacies of the built-up noseblock we give you this fine example, submitted by M. H. Gilbert of the Flying Sadlers. Total weight will be less than ·1 of an ounce—try that against a solid block of the same size, and, what is more, the built-up, lighter block is usually the stronger of the two.

Start with a 1/32 ply base former, then drill and bush a suitable length of 3/16 dowel with 16 g. tubing and fix this vertically in the base former. Cut and fit the ply curved corner formers, slotting them both into base and dowel and cover the whole with 1/32 balsa. A layer of light tissue, and a locating square on the back finishes the job, though we might mention that some of our more expert Wakefield exponents go one stage further and arrange a slide system for offset to be given on the central dowel for internally adjusted down-thrust, etc.

Idea **B** would also be appropriate to Wakefields, or any type of model where cross-section evidence is required for processing and the fuselage happens to be one of those awkward many-sided affairs. C. R. Plant of Middlesbrough suggests that a strip of scrap wood be broken into odd lengths, placed around the fuselage and cemented at the overlaps as shown in the sketch. The whole can then be slid off the fuselage, and a pencil line around the inside of the frame will give an accurate template.

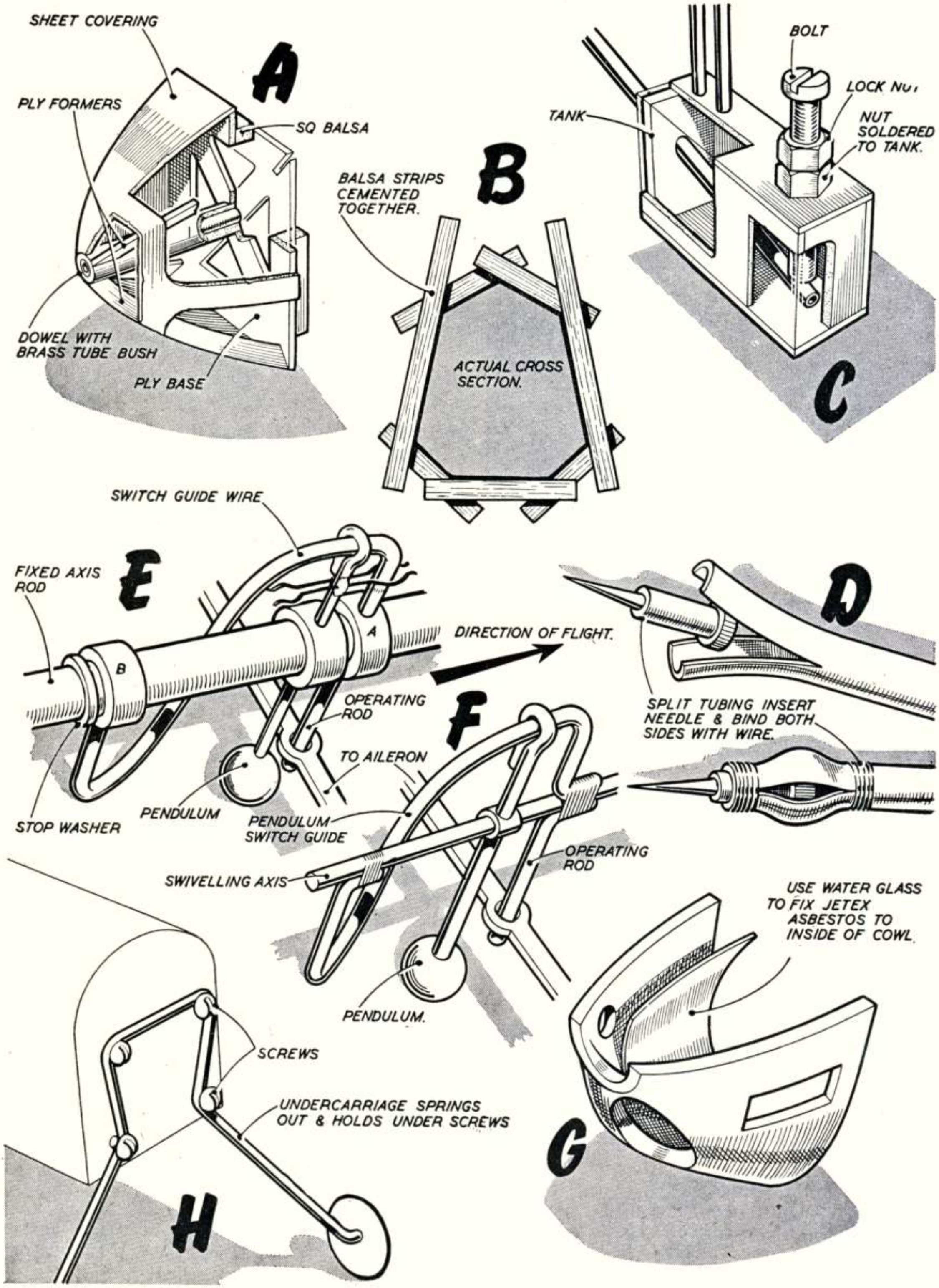
To M. Hayes of Hammersmith must go credit for a particularly useful idea for the team racers. 30 c.c. is the maximum tank capacity allowed for Class B, and 15 c.c. for the Class A models. Quite obviously it is most beneficial to work to the maximum capacity; but only those who have tried can know how difficult it is to get a T.R. tank "just right". As in sketch **C**, a tank is made as normal, with an allowance for slight oversize of up to 1 c.c., but certainly no more. Then punch a hole in the tank top, solder on a nut of suitable size and plug the hole with an appropriate bolt. We suggest something about 0 B.A. size should be ideal. A locking nut will fix the bolt in place after it has been screwed in and out to obtain exact required capacity.

Only a very small proportion of the engines available are supplied with flexible needle valve extensions, and we all know how valuable that item is to almost every power model, especially scale jobs. Well, an American, Eddie Grant of Columbus, Indiana, has come up with idea **D**, which is a means to flexible control for any kind of needle valve. Just take a length of neoprene fuel tubing, split it down the middle, bind (as in the sketch) both sides of the needle end with stout fuse wire, and you have another answer to a common problem.

Interested in pendulum controls? Or particularly pendulum ailerons? Then you will find interest in both **E** and **F** which are new improvements by Michael Kelly of Rednal, Worcs. It is a development of the aileron system used in the A.P.S. S.P.A.D., but with thought, the same principle may be equally well applied to elevators. The general idea is to add more spice to free flight stunt—no more rolling off the top in a loop, and more prolonged inverted flight. Study **E**, and imagine the job is climbing into a loop. Weight of the pendulum causes it to unclip from A and slide back and clip onto B, for inverted level trim where a normal pendulum would cause a roll-out. (At the same time the pendulum is guided by the switch wire.) As the model completes the loop, the pendulum slides forward again and re-engages for level flight. **F** is more or less the same, with simplification for smaller models. In this, the operating rod, guide wire and axis are soldered together and move as one. Now we will not claim this gimmick is fool-proof, but it certainly can give the free-flight stunt boys something to chew upon.

Tight cowls for minimum wind resistance are always the aim of team race and speed designers; but there comes the accompanying problem of how to feed sufficient cooling air to the engine, and also avoid singeing or even setting fire to the balsa cowl. In the States, Ralph Joline of Jamaica Plain, Mass., lines his engine cowls with thin asbestos, as supplied for Jetex, **G**. Water Glass is a good adhesive for the asbestos sheet, and thus equipped, any motor may be run as Hades itself without fear of burning up the balsa or blistering the paintwork. We leave the other problem of aspiration to you!

And so to **H**, as simple an undercart fixing as one could wish, and with the added attraction of being quickly detachable. Just screw four 1-in. wood-screws into the ply front bulkhead, says J. E. Chacksfield of Dorking, and bend the u/c wire so that it springs in place as in the sketch; he used the original idea on an A.P.S. Sporty biplane with great success and we too can recommend the idea after our own tests.


A
SHEET COVERING
PLY FORMERS
SQ BALSA
DOWEL WITH BRASS TUBE BUSH
PLY BASE
B
BALSA STRIPS CEMENTED TOGETHER.
ACTUAL CROSS SECTION.
C
BOLT
LOCK NUT
NUT SOLDERED TO TANK.
TANK
E
SWITCH GUIDE WIRE
FIXED AXIS ROD
B
A
DIRECTION OF FLIGHT.
OPERATING ROD
TO AILERON
STOP WASHER
PENDULUM
PENDULUM SWITCH GUIDE
D
SPLIT TUBING INSERT NEEDLE & BIND BOTH SIDES WITH WIRE.
F
SWIVELLING AXIS
OPERATING ROD
PENDULUM.
USE WATER GLASS TO FIX JETEX ASBESTOS TO INSIDE OF COWL.
G
SCREWS
UNDERCARRIAGE SPRINGS OUT & HOLDS UNDER SCREWS
H

ESPECIALLY FOR THE BEGINNER

PART XXVIII BY VIC SMEED

STABILITY

Spiral Stability

Of all design factors, those concerning spiral stability are the most elusive. Any normal model will spiral dive, no matter how stable it is in other ways, a fact which leads to more frustration than any other in model flying. Let us first be perfectly clear on the nature of a spiral dive; it is simply when a model enters a turn and drops its nose. With the nose down, the speed increases and the outer wing of the turn produces more lift, tightening the turn, which steepens the dive, which again increases the speed, and so forth. This is not, repeat NOT, a SPIN, for in a spin the model is in a stalled condition and does not increase its speed of descent. No normal model will perform more than half a turn of a spin. Spiral stability is generally conceded to be governed largely by the relationship between dihedral and the area and disposition of the fin, but the hows and whys form one of the most controversial subjects in model work.

Charles Grant, the American writer, has for years been plugging the "low C.L.A." theory—that a model with its centre of lateral area below the C.G. will be spirally stable. So many models have been built and successfully flown in accordance with this advice that a great deal of credence is placed in it; however, it is quite possible to design a model with a low C.L.A. which is unstable, so that the theory is not infallible. Nevertheless, it is helpful generally, and for average, sport-type models we have no hesitation in recommending its application. In its basic conception, the theory assumes that a model entering a turn skids slightly, and the relative sideways airstream resisting the model's movement acts through the C.L.A. to produce a righting couple (Fig. 1a).

There is a school of thought, though, which suggests that a model slips in a turn, and that therefore a low C.L.A. would tend to increase the bank and hence the turn (Fig. 1b). This means that the dihedral must overcome this extra force in the sideslip, which it can easily do—given time. If, when the model slips, its weathercock stability (governed chiefly by the fin area) immediately comes into effect, the model's nose will be instantly forced down and the dihedral will not have time to become effective. We must, therefore, balance the dihedral and fin area so that each is just adequate to do its work, *i.e.*, maintain lateral and directional stability respectively—with a minimum of interference with each other. Ideal balance produces a model which neither slips nor skids but performs a perfect turn. In this connection it is interesting to note that rudder is not essential for a correct turn in most modern full-size machines, especially of the low-wing type; application of bank results in a momentary sideslip which the aircraft's weathercock stability converts into turn. All the pilot has to do is to limit the bank and keep the nose up, and the rudder need not be touched at all. If, incidentally, he applies bank and then holds the stick still, he will spiral dive.

The best general advice which can, therefore, be given to ensure a spirally stable model is, then, to incorporate sufficient dihedral for adequate roll control and to arrange the fin area and shape to bring the model's C.L.A. just behind and below the C.G. Thus, in most cases, both slip and skid will be taken care of. The more tip rise (dihedral) used, the more forward side area there will be, and correspondingly larger fin area will be necessary. If the finished model will not fly with its designed C.G. position and the C.G. is therefore moved, some modification to fin area may be necessary to prevent instability from showing up.

Pylons

Great discomfiture was caused to the "low C.L.A." school of thought by the success of Carl Goldberg's "Zipper", the first true pylon model. Goldberg, seeking for a way to handle high power in a small airframe, based his design on indoor experience with high-mounted wings and on the belief that a model in a spiral dive is sideslipping. In his own words, "It seems that the ship is banked, getting insufficient lift from the wing, and is trying to 'ride' the side of the fuselage in an effort to hold the nose up". Thus, the provision of extra side area above and in front of the C.G.

will obviously tend to decrease the bank (as in Fig. 1b) and also the dive. This side area must still be balanced against the fin area to maintain directional stability ; Fig. 2 shows roughly how this can be done. All area forward of the C.G. has its centre at point " A ", and all area aft acts through point " B ". Provided that the total aft area times the distance from " B " to the C.G. slightly exceeds the forward area times the distance from " A " to the C.G., the model will be directionally stable. The difference can be kept small by manipulating the fin area ; the " Zipper ", for example, used a 6% fin with quite a short moment arm. Most pylon models use a lifting tail with the result that the C.G. is well back, though the short nose usually associated with this type of model partially offsets this as far as the disposition of areas is concerned.

A further effect of the high wing mount is to increase the vertical distance between the C.G. and the centre of lift. This is a big advantage, as a greater force is needed to disturb the model than is the case with a small C.G./C.L. difference. Fig. 3 shows two pendulums of equal weight on different length arms, and it is obvious that the shorter will " tick " quicker and easier than the longer. Against this we have to set the increased moment arm through which the slipstream effect on the wing will act, and also the slipstream effect on the pylon itself ; these factors contribute largely to the fact that we must still use the same amount of dihedral as a normal model would use, to control the additional rolling forces.

Towline Stability

Towline stability is really only an extension of the directional stability requirements of a sailplane, using the hook position as a pivot rather than the C.G. The increased speed of a sailplane under tow shows up any flaw in the design in this respect ; too much fin is better than too little, since an auto-rudder can be used to turn the model once it is off the line, and a glider is not so likely to spiral dive as it is not subjected to quite so many upsetting forces as a rubber or power model. With a correctly designed C.L.A. position, the ideal hook placing coincides with the C.G., but this is rarely practical. Instead, the hook must be so placed that the line pull acts through the C.G. ; this will depend on the angle of ascent of the model relative to the line. Horst Winkler's " 60° rule ", which places the hook at 60° to the C.G. irrespective of the disposition of the surfaces (Fig. 4) was used on many models for many years, but current models are using more rearward positions, 80° being a normal figure. The essential thing is to ensure that the design C.G. position is adhered to, or, if it has to be moved, that the hook is moved correspondingly. Loads of modellers " improve " a successful design by changing the aerofoil ; this is fairly certain to alter the C.P. and hence the C.G. (*i.e.*, more or less ballast required) and it is therefore not surprising if line instability shows up when the original towhook position is retained.

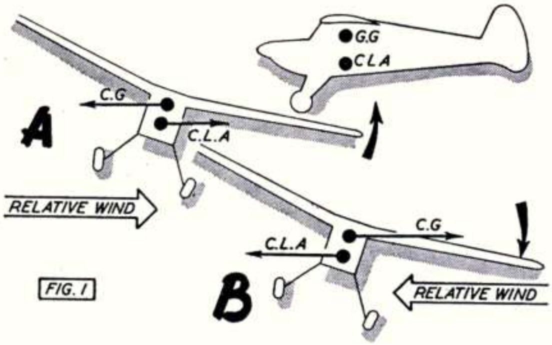
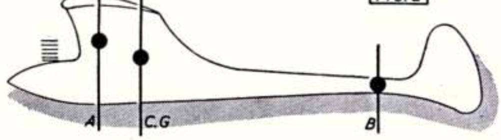


FIG. 1

FIG. 2


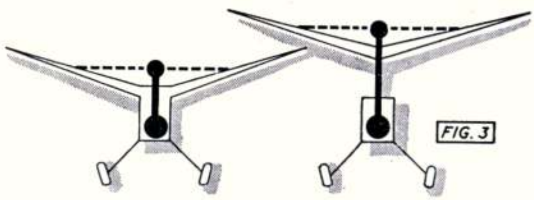
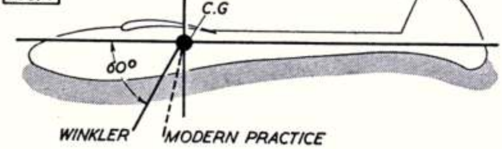


FIG. 3

FIG. 4


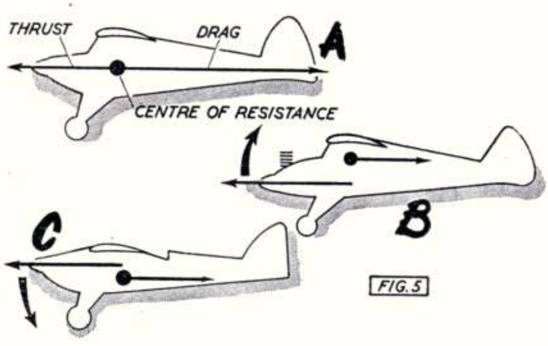


FIG. 5

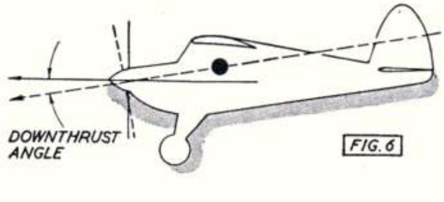


FIG. 6

The Thrust Line

An important part in design is played by the thrust line—the line along which the pull of the airscrew is centralised. All the drag of an aircraft acts through the CENTRE OF RESISTANCE, and ideally the thrust line should pass through this centre (Fig. 5a). If a model is first trimmed to glide, the introduction of an additional force in the shape of thrust will cause a nose-up or nose-down couple if the line of thrust passes below or above the centre of resistance (Figs. 5b, 5c). The tailplane in this case must be at such an angle as to create an opposing force when the slipstream strikes it or when its effect becomes more apparent at power-on speed, which renders trimming critical. With medium or low powered models it is simpler to arrange the thrust line so that it passes through or just below the " guesstimated " centre of resistance, and then to use downthrust if flight tests prove it necessary. Downthrust merely tilts the thrust line as in Fig. 6. Upthrust is rarely necessary, but sidethrust, to induce or counteract a turn, is sometimes employed, as mentioned previously.

Wing Loading

The main influence of wing loading in the model world is on flying speed. The expression simply means the weight of an aeroplane compared with its wing area, and in this country we refer to it as so many ounces per square foot. Thus, a 9 oz. model with 216 sq. ins. of wing area has a wing loading of 6 ozs./sq. ft. Lately, " total loading " has been coming into use; this merely compares the weight with the total horizontal areas, *i.e.*, it includes the tailplane. Thus, our 216 sq. in. model, having a 72 sq. in. tailplane, has a total loading of 4½ ozs./sq. ft.

Obviously, the heavier a model the more lift it needs to sustain it in the air, and if two models of the same size have different weights, the heavier model must fly faster to generate the extra lift it requires. A high wing loading, then, means faster flight, which in turn means that more power is required and that the impact speed, or landing speed, will be greater due to the faster glide. Any inaccuracy in aerodynamic design will show up at the higher speed, and any faulty structural design will become apparent when the model hits the deck.

For general purposes, the medium loading is most attractive, especially in the case of first attempts at design. The average power model comes out at around 9 ozs./sq. ft. wing loading, a figure which gives reasonable flying speeds but allows fair latitude in structural design.

We have now covered the bare essentials of airframe design (in the aerodynamic sense, that is) to the point where we can with confidence tackle a low or medium-powered model. Next month we will start in on actual design procedure, in which any small points still outstanding will be cleared up.

F.A.I. News

THE Meeting of the Model Aircraft Committees of the F.A.I. held in Madrid during the first week in May was attended by representatives from six nations, and in view of the fact that in all, 26 nations were in actual attendance at the Conference, this is a low percentage, indicating that the majority of National Aero Clubs do not give sufficient consideration to the importance of the model movement in the general aeronautical picture. The President of the Committee, Mr. Houlberg, drew the attention of the Conference to this point.

The first item on the Agenda concerned the introduction of Merit Certificates for control line and telecontrolled models which were discussed at length at the December meeting in The Hague, and after discussion, the new proposals were adopted by five votes to one. The following tests with control line models and telecontrolled models now qualify for Merit Certificates, it being understood that they are **National** certificates and not F.A.I. certificates. The new list of certificates and the qualifying tests are as follows :—

Free Flight GLIDER—RUBBER POWER—MECHANICAL POWER—SOLID FUEL JET.

LICENCE A
Three flights of more than one minute duration.
The flights must be made with the same model and on the same day.

LICENCE B
Three flights of more than two minutes duration.
The flights must be made with the same model and on the same day.

LICENCE C
Three flights of more than three minutes duration.
The flights must be made with the same model and on the same day.

Control Line MECHANICAL POWER—REACTION ((PULSE JET OR JET TURBINE) AEROBATICS AND AND GENERAL HANDLING

LICENCE A
Three flights to include the following manœuvres:
Start (Take-off)—Level flights (2 laps)—Climb—Dive—Wingover—Normal landing.
Flights must be made with the same model on the same day. Between two manœuvres, two laps must be flown horizontally at shoulder level. Manœuvres are judged for execution and completeness but are not given marks. They must be flown in the order given above. When not completed or flown in the wrong sequence, the manœuvres made will be regarded as omitted and the test will be void. Each series of manœuvres must be carried out in one flight.

LICENCE B
Three flights to include the following manœuvres :
The same series as given for Licence A, and in addition, three consecutive backward loops (wheels outside circle of loop)—three consecutive forward loops (wheels inside circle of loop)—Inverted flight (2 laps)—One horizontal figure of eight—followed by a normal landing.
The same general instructions will apply as are given under the specification for the Licence A.
All the manœuvres must be carried out in the same flight.

LICENCE C
Three flights to include the following manœuvres :
The same series as given for Licence A, and in addition, 5 consecutive backward loops (wheels outside circle of loop)—5 consecutive forward loops (wheels inside circle of loop)—Inverted flights (2 laps)—3 consecutive horizontal figures of eight—One vertical figure eight—One figure eight overhead (in the upper segment with the vertical through the flyer passing through the intersection of the loops of the eight)—followed by a normal landing.
The same general instructions apply as are given under the specification for the Licence A.
All the manœuvres must be carred out in the same flight.

Control Line MECHANICAL POWER—REACTION (PULSE JET OR JET TURBINE)—SPEED

LICENCE A
(a) Class 1 (0—2·50) c.c.). Three flights at a speed of not less than 80 kms.1h.
(b) Class II (2·51—5·00 c.c.). Three flights at a speed of not less than 110 kms.1h.
(c) Class III (5·01—10·00 c.c.). Three flights at a speed of not less than 150 kms.1h.

(d) Pulse Jet or Jet Turbine. Three flights at a speed of not less than 150 kms./h.
Each of the performances under (a), (b), (c) and (d) will qualify for Licence A.
The minimum distance that the model must cover in each flight is 1 kilometre. Flights must be made with the same model on the same day and must be conducted according to the F.A.I. rules for record attempts.

LICENCE B

(e) Class I. Three flights at a speed of not less than 110 kms./h.
(f) Class II. Three flights at a speed of not less than 140 kms./h.
(g) Class III. Three flights at a speed of not less than 180 kms./h.
(h) Pulse Jet or Jet Turbine. Three flights at a speed of not less than 180 kms./h.
Each of the performances under (e), (f), (g) and (h), will qualify for Licence B.
The same general instructions apply as are given under the specification for Licence A.

LICENCE C

(i) Class I; three flights at a speed of not less than 130 kms./h.
(k) Class II; three flighhs at a speed of not less than 170 kms./h
(l) Class III. Three flights at a speed of not less than 200 kms./h.
(m) Pulse Jet or Jet Turbine. Three flights at a speed of not less than 200 kms./h.
Each of the performances under (i), (k), (l) and (m), will qualify for Licence C.
The same general instructions apply as are given under the specification for Licence A.

Note.—From the foregoing it can be seen that there are :—
4 types each of Licences, A, B and C for free flight, which are equivalent in each group.
1 type of licence A, B and C for Control Line Aerobatics, independent of type and size of model or motor.
4 types of licences, A, B and C for Control Line Speed which are equivalent in each group and classed according to the cylinder capacity of the motor.

PROPOSED LICENCES

Licence I — **Two Licences 'A' chosen from—** Free Flight Group; Control line aerobatics; Control Line Speed Group

LicenceII — **Two Licences 'B' chosen from—** Free Flight Group; Control Line Aerobatics; Control Line Speed Group

The allocation of trophies to the World Championship events resulted in the following being approved :—

Classification	Gliders	Power Models	Wakefield	Control Line
Individual	Swedish Cup	F.N.A. Cup No. 1	Wakefield Cup	Col. Doumerie Cup
Team	—	Yugoslav Cu	F.N.A. Cup No. 2	—

The question of using the King Peter Cup for the team trophy in the Glider Championship was discussed and the matter was referred to the General Committee for their consideration. The Aero Club of Belgium was thanked for its donation of the Col. Doumerie Cup for the control line individual event, the team prize remains to be filled.

On the proposition of France, the Glider class will in future be known as the "F.A.I. Championship Glider Class" and not the A2 or Nordic Class.

Resulting from a point raised by Switzerland it was decided to create an F.A.I. Diploma to be awarded to the winning modellist and team in each of the four Championship events.

A formula for reducing all classes of power-driven models to a common basis for scoring purposes, was considered worthy of further study. It was agreed to apply the formula to the results of the Control Line Championship in July in Belgium.

The question of the advisability of limiting the cylinder capacity of motors to 5 c.c. in World Championships was discussed, but opinion was divided and the Secretariat was asked to send out a questionnaire to all National Aero Clubs on the matter, stating that the proposed date of enforcement of any decisions made will be January 1st, 1954. (*See page* 477.)

A lengthy discussion on the position of the model movement resulted in the tabling of wishes of the committee to the General Conference in the following terms :—

At this time when the practice of private aviation is encountering great difficulties the whole world over, aeromodelling would seem to be the most complete means of propaganda.

While power aircraft records are within the reach of a few tens of persons, aviation touring records interest a few hundred pilots, and glider flying a few thousand, it may be said that millions of young people in all parts of the world are interested in model aircraft records.

Besides its action as good aeronautical propaganda among the young, aeromodelling is in itself a marvellous means of education, since it makes those who practise it study the laws of aerodynamics, practise drawing, handwork, and it develops the virtues of patience and perseverance.

Furthermore, it is a real open-air sport, and one of the best.

It has too long been neglected, or looked upon as a minor activity in the field of aeronautics, but the members of the C.I.M.R. are pleased to see that the Committee of the F.A.I. now appreciates their work as the result of efforts pursued by some of them for more than twenty years.

This movement is still in need of powerful help, and the Administrative Council of the F.A.I. could give this their earnest attention.

The C.I.M.R. would ask the F.A.I. to endeavour by all means :

(*a*) *to assist effectively in the organisation of World Championships, held in accordance with its rules and regulations ;*

(*b*) *to create Certificates to be awarded yearly to F.A.I. champions ;*

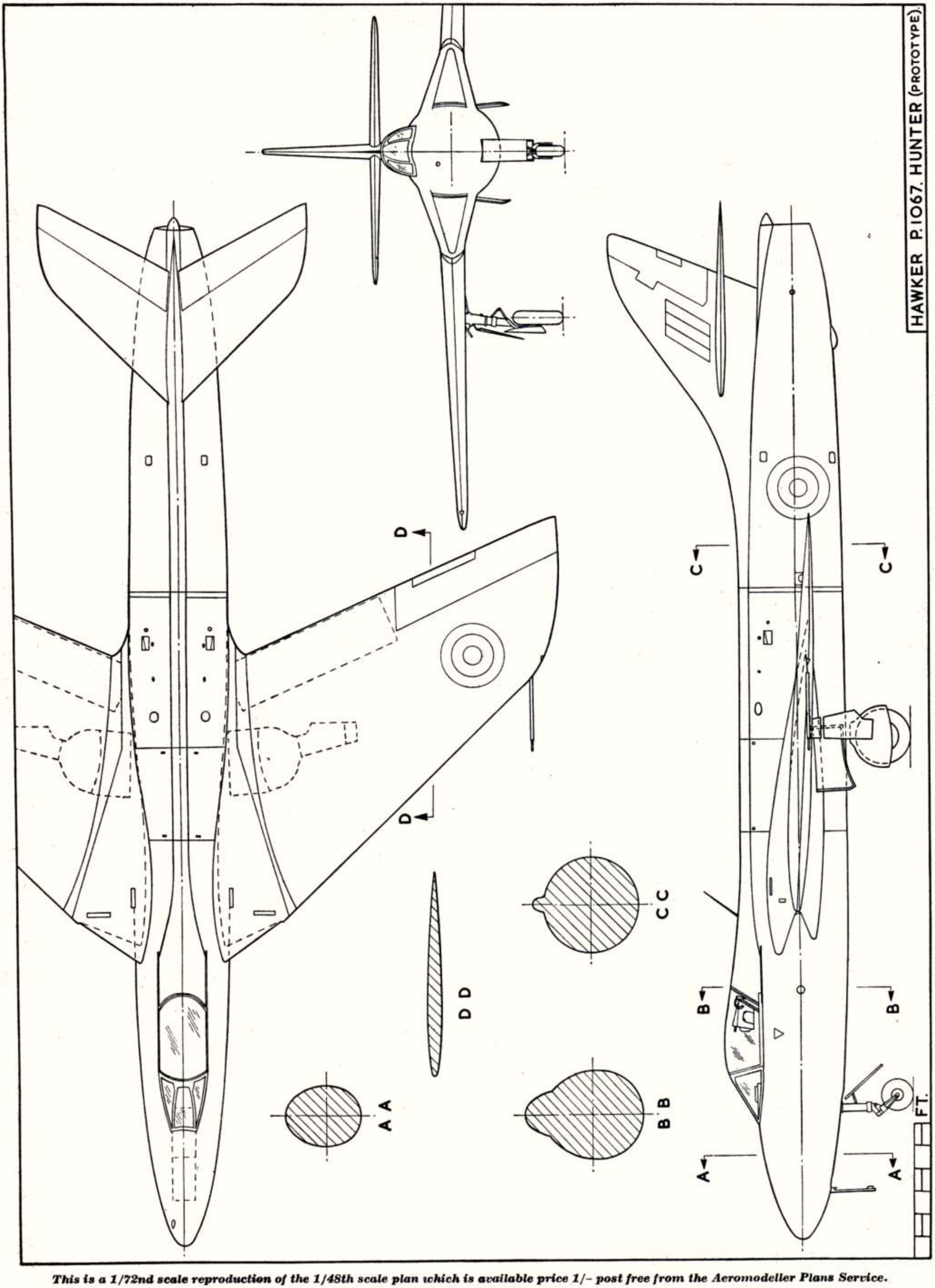
(*c*) *to obtain from Air Lines travelling facilities for aeromodellists going to championships abroad, and if necessary, to intervene with this end in view, with the I.A.T.A.*
(It does indeed seem paradoxical that this kind of publicity among young people, who may be the pilots and technicians of the future, or simply future air travellers, should be ignored, when large sums are spent every year on publicity by all companies to develop their traffic) ;

(*d*) *to approach Customs authorities to obtain all facilities granted at frontiers to teams travelling with their models, which are really "instruments of sport".*

The International Model Aircraft Committee earnestly hope that their wishes will be heard and granted. That would be the best reward the members could wish for their work.

As a result, the General Conference placed the model aircraft requirements in the No. 1 priority category and a sub-committee consisting of the Director General and the President of the Model Committee with powers to co-opt was appointed to go into the question of organising a world-wide model championship contest for 1953 covering the movement in the widest possible terms.

Note.—For the first time in the history of the F.A.I. it would appear that the model movement is receiving the attention and recognition which it deserves. Whatever other results were achieved at Madrid, this alone will mark this Conference as an outstanding one for model aviation.



This is a 1/72nd scale reproduction of the 1/48th scale plan which is available price 1/- post free from the Aeromodeller Plans Service.

AEROPLANES IN OUTLINE—No. 4

BY G. A. CULL

THE Hawker Hunter

AT the 1951 S.B.A.C. show the then un-named Hawker P.1067 became famous in a flash. In the hands of Neville Duke it bored through the Farnborough sky at a speed that compressed its presence into an impact—felt as much as seen and heard. It is commonly agreed from these runs that the P.1067 is in the 700 m.p.h. class and, with superb handling qualities, is the finest known interceptor in the world.

This supremacy seems appropriate on considering the long line of Sopwith and Hawker fighters which are the P.1067's ancestors but, more directly, the now officially named Hunter stems from three previous Hawker jet designs. First of these was the P.1040 designed in 1944/5 and first showing was at the '48 S.B.A.C. show. This beautifully clean machine, VP401, featured root-intakes to its R.R. Nene which had a bifurcated tail-pipe ejecting from the trailing edge of each wing root to make space for a third fuel tank. Another machine, VP413, was navalised to Spec. N.7/46 and this has developed into the Seahawk, now in production with folding wings of increased span for the Navy.

Produced for research, the P.1052 was a P.1040 with new swept-back wings but retained the original " straight " tail unit. After much development flying the P.1052, VX727 appeared at Farnborough last year in naval guise complete with sting-hook, and could herald a swept successor to the Seahawk. VP401, the first Hawker jet to fly, is now fitted with the A.S. Snarler rocket motor in the tail and is now known as the P.1072.

On 23rd January, 1950, Hawker's chief designer, Sidney Camm, decided to go a step further than the P.1052 and to produce a new private venture fighter with all surfaces swept-back and a straight-through tail-pipe. As a result the second prototype P.1052 was cut in two at the rear spar line and a new rear fuselage built on. One month and five days after work started, the new P.1081 was flown for the first time on 19th June, 1950, by T. S. Wade. After the new tail end was painted, Wade flew the P.1081 from London to the Brussels Aero Show in 21 mins. Numbered VX279, the P.1081 had a R.R. Nene with provision for reheat. When the machine crashed last year Wade was killed after the ejector seat parachute failed to open.

These three designs paved the way for the P.1067 Hunter which is a new design with a larger fuselage of higher fineness ratio. The prototype, WB 8188, has the R.R. Avon with reheat provision, and plans have been made to fit the A.S. Sapphire which is now developing 8,300 lbs. thrust. Unlike the P.1081, the Hunter has a Martin Baker ejector seat and has recently been flown by crack U.S. test pilots. Although subject to close secrecy the Hunter's armament is thought to consist of four high velocity 30 mm. guns and production is to commence at Squires Gate, while Glosters will also play a large part at Hucclecote. Australia is also likely to build the Hunter which has been ordered in quantity to serve alongside the contemporary Supermarine Swift in R.A.F. squadrons. The second prototype first flew on May 5th from Dunsfold.

Construction. All metal. All controls power operated and tailplane incidence is varied as part of normal control system. Hydraulically operated split flaps, wide track U.C. retracts inwards and nosewheel forwards.

Specification. Span 33 ft. 8 ins. No other details released.

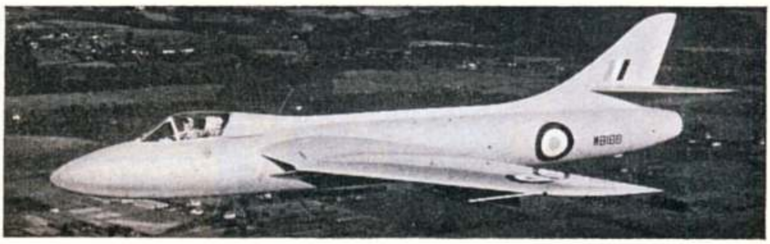
Colour. High gloss pale green all over. Roundels and fin flash in usual positions, serial in glossy black on rear fuselage and below wings. Original very large roundels above wings now replaced by smaller ones as on drawing.

Notes for Modellers. A dorsal spine runs unbroken from cockpit hood into fin. Wing fairs into fuselage by small curves and is not gradually merged. Front panel of windscreen is flat. Anti-spin chute housing below rudder will not be fitted to production Hunters.

Bearing earlier, larger diameter roundels, the Hunter in the upper photo shows off its dorsal spine and similar wing and tail shapes.

New, smaller wing roundels are seen in the view at right, where test pilot, Neville Duke, is using full flap to keep the Hunter's speed down to that of the veteran Hawker Hart G-ABMR from which this photograph was taken.

(By courtesy of "FLIGHT".)



Left: Arden ·19 screaming, I. Lucas (centre) holds back his payload Crowbar, model placed third, was second last year. Right: Col. Bowden checks wind gusts up to 25 m.p.h. Below left: In the tent, payload winner P. Snodin and partner make hasty repairs. Below them is the very attractive F.E.8 by V. King. Powered by Mills ·75, has pendulum rudder.

Whit week-end

FOUR major contests were flown off on sunny but very windy Whit Sunday, and apart from the power eliminators reported on page 468, contestants were exceedingly sparse in all events. In fact, we might go so far as to say that in spite of the Super-Scale trophy contest, there were *fewer* scale models on Fairlop than could be found on any ordinary non-contest day. Could it be that scale fans are not members of the S.M.A.E., or might it be that intending entrants omitted to submit pre-entry forms? A little of both reasons and a lot of wind finally reduced the field to two, of which J. Bridgewood won with his Vultee Vigilant. THE AERO-MODELLER Radio Control trophy goes to Sid Allen of West Essex for as few points as 100, though, for a 'bob' bet with the judges, he completed the course and made a backwards gliding spot landing after the competition. Magnificent gold wrist watches were presented, courtesy of P.A.A. to the top three in Payload, the predominance of American-powered "Crowbars" being most notable. R. G. M.

Above: Winner of Aeromodeller R/C Trophy, Sid Allen wipes down his Jr.60 influenced design. Upper left: Col. Yates gets down to his 2·5 Super Tigre in the Power comp. Lower left: P.38, 'Canberra' and Hornet by Hornchurch's Beeson, Major and Seacombe, all controliners. At right: Scale winner J. Bridgewood and Bee powered Vigilant, scaled up from A.P.S. drawings.

Scottish Page

A Rowell 60 stunter is serviced at Glasgow's White City Stadium on the occasion of the West of Scotland Area's C/L demonstration, reported below.

EXCEPT for a pigeon that strayed too near, everyone had a great time at the White City Stadium, Glasgow, on May 21st. Area Comp. Secretary Bill Meechan and his cronies swung a business deal with General Manager Ian A. Hoskins, which netted £25 for the area funds, and gave 25,000 Speedway fans a really zippy flying show. With all possible co-operation from Ian A., smooth organization by Bill Meechan, the "cream off the top" in C/L work, and dead calm weather, the display couldn't help being a success.

To cram everything into the 25 minute Speedway interval time, the boys kept three circles going all the time, one at each end of the Stadium, and one in the centre. In No. 1, Messrs. Bell and Perry dog-fought a Fokker D VIII and an S.E. 5A, until the S.E. piled in. Even before the wreckage was cleared, Rab Colquhoun's "Ambassador" was airborne, and doing the book. This is where the "doo" came in, mixed for a while with the stunt job, then flappered across to where the team racers nearly had him for pigeon-pie.

The race, between **PRESTWICK M.A.C.** and the **GLASGOW BARNSTORMERS,** was scrappy at first, on account of baulky engines, and lines getting snagged on awkward tufts of long grass. However it was fast and close flying when it did get going, with Bob Parsons of Prestwick flying his beautifully finished Amco 3·5 powered racer and Brian Harris, also Prestwick, flying Dan Mitchell's Frog 500 job.

Over in circle No. 3, the combat event of Spitfire V F.W. 190 had the crowd on operation nail-bite. Bob Murdoch with the Amco F.W. and Ian Clarke with the Elfin Spit, practically did the book, with rarely more than a quarter of a lap between the planes. A hair-raising show, and a mystery that they didn't collide. When time was up the boys got a big hand from the audience, appreciation which they certainly earned.

Still on the C/L theme, the **SCOTTISH AERO-MODELLERS ASSOCIATION** held their team racing contests on May 18th at Abbotsinch airfield, again perfect weather blessed the control liners, and slick models and flying were seen.

In the Class A race, Bill Beveridge of **POLLOK M.A.C.** took 1st, John Lindsay flying the E.D. 2·46 Racer, which had had to be rebuilt the night previous to the race. Second was Ian Cochrane of the Barnstormers, with his O.D. E.D. 2·46 model. Ian claims 45 laps at 60 with this model, blames four bust props for his second placing.

In the "B" event Bob Murdoch of **GLASGOW M.A.C.** won, with Ian Clarke flying the Amco 3·5 powered racer. Dave White, **MONIFIETH MONARCHS M.A.C.** took second place flying his redesigned Mercury I which packs an Eta 29.

To the quieter forms of model flying now, the "tooth-pick" glider style is being sported in West Scottish Area by **IRVINE & D.M.A.C.** member Bob Dunlop. His A/2 "Gatepost" flies well, but is hard to see when it gets any distance. Talking of the above Area and A/2s, Brian Harris of Prestwick M.A.C., and Ian Cochrane of the Barnstormers were selected for the A/2 trials. John Lindsay was also chosen but can't make it, a big disappointment for Irvine & D.M.A.C. Alec Clarke. Glasgow Barnstormers president has been honoured by selection for the Wakefield 100.

Back again to the Scottish Association for news of the **SCOTTISH NATIONAL POWER CONTEST.** Held at Armadale on June 1st for the Edina Trophy, this contest wasn't so lucky with the weather, the rain "comin' doon in pailfu's" all morning, and wind force keeping at about half-gale throughout the day. Joe McMaster's "Toreador" pulled it off again with 1st place, for the Paisley Club, Messrs. Beaton of Edinburgh, and Clarke of Glasgow M.A.C. 2nd and 3rd respectively.

The **KIRKALDY M.A.C.** boys have been keeping the locals amused with their control-line antics in Kirkaldy Beveridge Park recently. We wonder if any of them will be coming over to holiday at Butlin's Ayr camp, where first rate prizes are going for both C/L and free-flight comps. S.A.S. M.A.C. member Ray Maxwell is resident aeromod there, and the West of Scotland S.M.A.E. comp committee are working with him on the contest details.

EDINBURGH M.F.C. gave a total of no less than 9 hours control-lining at the Festival of Sport in that good city. They ran a "snowball" team race with entrants joining in as they pleased, which finished with no less than five pilots in the centre. A flying brick, with authentic rough cast finish, amused the crowd.

The response to our plea for "Over the Border" news has exceeded our expectations, with the result that several reports must this month stand down for the above news. Club P.R.O.'s and Secretaries should note that if they submit their news to J. G. MacArthur, "Blairmore", Seafield Drive, Ardrossan, Ayrshire, "Mac" will see to it that everybody gets their ration.

CLUB NEWS

Flanked by expert stunters, Peter Ridgeway on the left and "Gig" Eiffiaender on the right, members of the Congleton M.A.C. appear to be control-line specialists.

WHEW—the British Contest Season seems to get more and more crowded every year, and yours truly finds that about this period of each season he could do with a breather from the seemingly continuous round of contests and rallies of every description! If that is a Press Man's point of view, what of the dead keen contest supporter? With the present standard of hot contest flying, I surmise the greatest need would be a new pair of legs, chasing, for the use of!!

Beware—the Fairlop Filchers are about again! On June 15th, during the West Essex Gala, a complete speed job was stolen. The model, belonging to M. Dilly of the Croydon Club, was powered with an Elfin 1·49, has no spinner, is light grey in colour, and about a 50 per cent. tailplane. Will anyone who has any knowledge of this plane's whereabouts please advise any Croydon Club member, who will no doubt be very keen to deal with the purloiner.

South Midland Area

The Third Area Meeting was held at Henlow in very windy conditions plus rain showers, making retrieving especially uncomfortable. In the A/2 event, both Lamble (Wayfarers) and Forward (Berkhamstead) scored maximums during the first round—the only five minute glider flights of the day. Stott of Luton made a best time of 3 : 05 in the second round, with top time for third round going to Noel (Wayfarers) with 4 : 05. Final scores for the event were :—

Noel, T.	Wayfarers	8 : 22
Lamble, J.	do.	6 : 22
Clements, R.	Luton	6 : 15

In the "Gutteridge" event, Cooke (Henley) and Jeffrey (Reading) got max's, but Hilliam's (Hatfield) flight of 2 : 29 was the highest for the last round. R. F. Sandy of Henley, flying a peculiar looking Wakefield with a very extended rear end to the fuselage carrying a tiny tailplane, scored the best total of 8 : 40, with Clements (Luton) 6 : 22 and "Bunny" White (Icarians) 5 : 58 as runners-up.

The **HATFIELD M.A.C.** having transferred to the South Midland Area, members have attended meetings at Kidlington and Henlow, where J. Frazer did well enough to pass on the Wakefield Trials. Through the kindness of a local trader club member, the club now possesses two further cups, thus bringing the total sufficient for four types of contest. Junior membership has climbed steadily in recent weeks to a total of 22, many of whom show much promise in rubber and glider.

As reported earlier, **HENLEY M.C.** were successful in getting their member Sandy into the Wakefield Trials accompanied by A. W. M. Cooke who was placed fourth in the Area Eliminators. Unfortunately, both Cooke and Waldron had an off-day with their long fuselage Nordics, but nevertheless qualified for the Trials on the combined results. Natural satisfaction is recorded at Waldon's success in securing 3rd place in the "Halfax" event, and as power flying was their weakest link, it is hoped this success will give a much needed boost to engine work. Waldron flew his Elfin 2·49 powered "Contender" at 12½ oz. all-up weight, but has now installed an Amco 3·5 c.c.

LUTON & D.M.A.S. report that E. Clarke's veteran "Airmaster" has finally met its end. This pre-war job (Brown powered) found a new lease of life with R/C and a "Tiger" diesel, but a jammed actuator sent it to disaster! New converts to R/C are D. Bavister (Junior 60, D.C. 350 and E.C.C.) and W. Harrison who hopes to R/C his "Monocoupe". The "Faunch Trophy" for A/2's was won by D. Stott, his glider sporting butterfly tail. Much scale flying takes place with this group, but duration flying is being kept to a minimum until crops have been harvested.

Northern Area

BARNSLEY & D.M.A.C. managed to get the better of Leeds in the first round of the Area knock-out by 15 : 58 to 11 : 58 at Rufforth. The day was rough with a strong wind, one member losing his glider on its first flight (maximum) and completing his rounds with a rubber job, which incidentally he also lost!

The first round of the **YORK M.A.S.** summer points comp. was also flown at Rufforth when Harry Johnson returned the best time of the day with an aggregate of 13 : 11. That "Quickie" does fly!! The C/L entry for the Festival Cup on June 1st was small, only three bods turning up to fly. Conditions were difficult, the high wind making stunt flying a risky affair. Only one model became airborne! Stan Williams caught a down-draught on take-off, and that was that; brother Noel couldn't even start his motor, and so the cup was won by J. Ogilvie without real opposition.

Having the C.O's. permission to use the airfield, a model club has been formed to be known as the **R.A.F. ACASTER MALBIS M.A.C.**, and a control-line demonstration is being prepared for the Station sports to gain interest—and boost membership. Secretary is Tony Calvert, son of Northern Area Chairman.

North Eastern Area

The 4th North-East Coast Model Aircraft Competitions are to be held on the Town Moor, Newcastle-upon-Tyne, on the 10th August, and the committee responsible is confident that the event will be favoured with the usual number of entries. Events are C/L Stunt, Power, Glider and Rubber, and a concours will be judged immediately before flying commences at 2 p.m. George Robledo has promised to donate the prizes, it is hoped on the day, as the Newcastle United F.C. will have returned from their South African tour by the day of the contests.

Midland Area

Much natural jubilation is recorded at the Area successes in International Team affairs. With Ray Monks and Max Byrd in the Power Team, Byrd and Peter Royle in the A/2, and "Pop" Royle, Tom Dunkley and Ted Evans forming 50 per cent. of the Wakefield Team, a Midland Area success in at least one of these world class events is eagerly anticipated. On top of this Alan Hewitt and Brian Harper (Outlaws) will be in the team representing Great Britain at Namur. Ray Monks had qualified for the Wakefield Trials, but withdrew following his success in the Power event. To cap these successes, P. J. Snodin of Northampton came back from Fairlop with some £50 worth of timepiece strapped to his wrist as a result of winning the Payload Contest.

August 4th sees the Fifth Annual Control-Line Rally staged by the **WALSALL M.A.C.** To be held in the Walsall Arboretum Extension from 10 a.m. to 6 p.m., prizes to the value of £30 will be available in eight events. Entry forms from H. Mitchell, 63, Miner St., Walsall, Staffs.

The **SOUTH BIRMINGHAM M.F.C.** season is now well under way, and both Alan Hewitt and Phil Read qualified for the A/2 Trials. Following the difficulties at Pershore, where retrieving was handicapped owing to a local outbreak of foot and mouth disease, some machines are expected any day now to break out in blue spots, or whatever they do under the circumstances—especially one which was trodden on by a cow! Vic George is a bloke who never gives up. In the past few months he has built, and pranged or scrapped at least half a dozen R/C models, with as many different control systems, but is now getting results with a bit of crafty gadgetry of his own design.

Radio Control is engaging most of the attention of the aeromodelling members of the **CHESTERFIELD & D.M.E. AND R.S.,** both Mr. Benham and P. Pearson having achieved over 200 flights, in the latter case with a model and equipment made entirely by the owner.

The **FORESTERS (Nottingham) M.F.C.** had an exciting afternoon's sport on June 8th when they scrambled an hour for the "Raylite Cup". (Ever seen a scrambled hour?) The initial line-up resembled the boat-race, though "Honest" John Howard found few punters. The strenuous going eliminated the pin-stripe and bowler-hatted gentry, and the 30 sec. minimum/3 min. maximum rule did likewise to the chuck-glider strong-arm men, so the field was soon narrowed down to four power jobs. A stiff breeze was in force, and a minute flight meant a three or four minute trot to retrieve, but not so Douggie Bolton flying his R/C job, which amassed 7½ minutes in the first ten. However, the model came off second best when a gust caught it just on take-off. Ken Oliver was baulked by a scruffy engine, and amassed about 9 minutes in the hour; Pete Ball caught a slight riser and did 2 : 40 o.o.s. and spent the last half-hour retrieving, then having 11 : 37 to his credit. Meanwhile the tank on Jimmie Weston's Frog 50 powered "Tiercel" was too small, and his first attempts were all under the 30 second limit. However he cured this and gradually neared Pete's total, but was just beaten by the clock leaving Ball the winner. The club rubber duration record was raised by John Howard's lightweight to 11 : 15.

London Area

Latest news-sheet reports the almost complete sealing up of Fairlop, and whilst there is no impediment to any member of the public entering the aerodrome, fliers are not finding it an easy matter to get downwind for retrieving purposes. The Ministry's police continue to survey the proceedings through the windscreen of an expensive car, although ten yards from the tea van would hardly seem to be the ideal position from which to observe the reported destruction of property which is going on downwind of the 'drome.

The **ENFIELD & D.M.A.C.** now has over 50 members on its register, this being the strongest membership they have ever had. The club power duration was broken at Fairlop during the Easter holiday when R. Dudley's "Mallard" turned in a time of 12 : 58 on a 10 second engine run. Their "Banbridge Trophy" contest was won this year by Mike Brown with a Wakefield of his own design, time 8 : 17. (It had to

1952 CONTEST CALENDAR

July 20th.
- **JETEX CHALLENGE CUP.** Jetex.
- **FARROW SHIELD.** Team Unr. Rubber.
- **WOMEN'S CHALLENGE CUP.** Unr. Rubber/Glider. (Area.)

Aug. 3/4.
- NATIONALS. (Gosport).
- **THURSTON CUP.** Unr. Glider.
- **MODEL AIRCRAFT TROPHY.** Unr. Rubber.
- **"GOLD" TROPHY.** C/Line Stunt.
- **CONTROL LINE (SPEED).** All Speed Classes.
- **S.M.A.E. R/C TROPHY.** Radio Control.
- **SIR JOHN SHELLEY TROPHY.** Unr. Power.

10th **North East Coast Contests.** (Town Moor, Newcastle-on-Tyne).

17th. **International Model Aircraft Contest.** (Blackpool.)

23rd/24th. **Irish International Meeting.** (Baldonnell.)

24th.
- **All Herts. Rally.** (Radlett.)
- **Bolton M.A.S. Rally.** (Edgeworth.)

31st.
- Centralised. (Cranfield).
- **BRITISH CHAMPS.** Rubber/Glider/Power.
- **TAPLIN TROPHY.** Radio Control.
- **Daily Dispatch Rally.** (Woodford.)

Sept. 7th. **Yorkshire Evening News Rally.** (Sherburn in Elmet.)

14th. **U.K. CHALLENGE MATCH.** (Centralised.)

14th. **Cambridge M.A.C.** Team Race Rally (½A, A, B).

21st. **Butlin's Contests.** All classes. (Filey, Skegness, Ayr and Pwllheli.)

21st **Southern Counties Rally.** (R.A.F. Thorny Island.)

28th.
- **FROG SENIOR CUP.** Power. (Area.)
- **MODEL ENGINEER CUP.** Glider. (Area.)
- **South Midland Area Rally.** (R.A.F. Halton.)

Oct. 12th.
- Centralised.
- **DAVIES TROPHY.** A and B Team Race.
- **RIPMAX TROPHY.** Radio Control.
- **C/L SPEED.** All Speed Classes.

Clubs are invited to send in details of Special Galas or Open Days for inclusion in this regular Calendar.

S.M.A.E. CONTEST RESULTS

INTERNATIONAL POWER TRIALS

1.	BUSKELL, P.	Surbiton	11 : 50
2.	MONKS, R. C.	Birmingham	10 : 02
3.	NORTH, R. J.	Croydon	8 : 04
4.	BYRD, G. C. M.	Loughboro' Coll.	7 : 03
5.	Brooks, A.	Grange	6 : 53
6.	Horwick, E.	Whitefield	6 : 50
7.	Marcus, N. G.	Croydon	} 6 : 46
8.	Linford, G.	Loughboro' Coll.	
9.	Gorham, J.	Ipswich	6 : 42
10.	Butcher, N.	Croydon	6 : 31
11.	Tubbs, H.	Leeds	5 : 50
12.	Royle, P. J.	R.A.F., St. Mawgan	5 : 44

"AEROMODELLER" RADIO CONTROL TROPHY

1.	Allen, S.	West Essex	100 points
2.	Allen, D.	West Essex	50 ,,

SHORT CUP (PAYLOAD)

1.	Snodin, P.	Northampton	6 : 09
2.	Warring, R. H.	Zombies	3 : 31
3.	Lucas, I.	Brighton	3 : 28
4.	Bennett, A.	Whitefield	3 : 19
5.	Spence, E.	Brighton	2 : 45
6.	Upfold, E.	Headley	1 : 35
7.	Russell, P.	Chingford	1 : 14
8.	Waters, D.	Grange	1 : 10
9.	Lewis, G.	Zombies	1 : 04

SUPER SCALE TROPHY

1.	Bridgewood, J.	Woodlands	85·5 points
2.	King, V.	Thames Valley	53 ,,

CONTROL LINE ELIMINATORS

STUNT				
1.	RIDGEWAY, P.	Macclesfield	302·75	points
2.	HEWITT, A. J.	Sth. Birmingham	295·25	,,
3.	Jarvis, M.	Outlaws	254·75	,,
4.	Piacentini, A.	Salisbury	250	,,
5.	Taylor, C.	West Essex	239	,,
6.	Crowe, C.	Harrow	216	,,
TEAM				
1.	CLAYDON, J.	East London		
2.	HARPER, B.	Outlaws		
SPEED I				
1.	WRIGHT, P.	St. Albans	105·0	m.p.h.
2.	Eifflaender, J. G.	Macclesfield	100·3	,,
3.	HEWITT, A. J.	Sth. Birmingham	95·99	,,
SPEED II				
1.	WRIGHT, P.	St. Albans	110·5	,,
2.	Peek, G.	Chelmsford	109·6	,,
3.	Claydon, J.	East London	97·1	,,
SPEED III				
1.	DAVENPORT, R.	East London	128·075	,,
2.	Guest, F.	C/Member	127·8	,,
3.	BILLINTON, M.	Brixton	123	,,

WAKEFIELD TRIALS (PREMIER SHIELD)

1.	ROYLE, J.	Littleover & Rolls Royce	15 : 00
2.	NICOLE, R.	West Middlesex	14 : 20
3.	WARRING, R. H.	Zombies	
4.	O'DONNELL, J.	Whitefield	} 13 : 22
5.	Albone, A.	Croydon	
6.	DUNKLEY, T.	Northampton	13 : 19
7.	EVANS, E. W.	Northampton	12 : 56
8.	Marcus, N. G.	Croydon	} 12 : 47
9.	Ward, S. A.	Whitefield	
10.	Nicholls, D.	Southend Senior	12 : 41
11.	Haisman, B. V.	Whitefield	12 : 28
12.	Dowsett, I.	West Middlesex	12 : 15

A/2 TRIALS ("AEROMODELLER" TROPHY)

1.	FARRANCE, W.	West Yorks.	15 : 00+8 : 02
2.	ROYLE, P.	R.A.F., St. Mawgan & Littleover	15 : 00+2 : 27
3.	KING, M. A.	Belfairs	15 : 00+2 : 05
4.	BYRD, G. C. M.	Loughboro' Coll.	15 : 00+1 : 49
5.	Giggle, P.	Brighton	14 : 44
6.	Law, P.	West Middlesex	14 : 26
7.	Wilkinson, P.	Northampton	13 : 56
8.	Laxton, D.	Oundle	13 : 40
9.	Wrigley, A.	Whitefield	13 : 26
10.	Thomas, M.	Bolton	13 : 22
11.	Jackson, G.	Littleover	13 : 14
12.	Farrance, E.	West Yorks.	12 : 55

happen !! A junior member of the club lost his glider, the whole job going up in smoke when D/T lighting was fumbled. I'm waiting for the day this happens in a vital contest like the Trials—then we shall perhaps see some better methods produced than a naked flame.)

CROYDON & D.M.A.C. congratulate Jack North on securing a place in the British Power Team (as do we) his model being two years old ! At the same time, commiserations to Gavin Perkins who lost his model on its second flight ; Norman Marcus whose model tried to knock over a pre-fab ; and to Norman Butcher who D/T'd too early on his first flight. These three just missed the boat ! (" Butch " nearly made the double in the Keil Trophy ; with an aggregate ratio of 63 : 1 he placed 2nd, his last two flights of 15 and 18 to 1 being in steady rain.) The " boys " are going great guns in the London Challenge Cup, beating Satyrs and Surbiton in the first two rounds.

The **NORTH-WEST MIDDLESEX M.F.C.** chaps met Upton in the 2nd round of the L.D.I.C.C. at Fairlop. Weather was fine, but due to losses and prangs both clubs only managed 11 out of 12 possible flights, and after a needle match Thermaleers won the day by a minute and a few odd seconds.

North Western Area

The **CONGLETON M.A.C.** held an extremely successful C/L Rally in the local park on April 12th. Weather conditions were perfect, with no wind to worry the competitors, and Ron Buck of Five Towns took top honours by gaining first places in speed, stunt and Class B team racing. The team-racing proved the best witnessed in the Area to date, with a very high standard of flying in all heats and no prangs. The final of the Class A was very fast, with all three models almost evenly matched for speed. Cooper of Cheadle won with Gig Eifflaender (Macclesfield) a very close second only two laps behind.

WHITEFIELD M.A.C. have had considerable successes in S.M.A.E. contests recently, A. D. Bennett winning the Keil Trophy, H. O'Donnell the K. & M.A.A. Cup, and Johnny O'D. gaining a place in the Wakefield Team. Other club members did well, but not enough to make the Teams ; Sid Ward and Barry Haisman were well up in the Wakefield with 12 : 47 and 12 : 28 respectively, while A. D. Bennett and Bob Woodhouse both had 10 minutes plus. In the A/2 event, A. Wrigley was best with 13 : 26, followed by J. O'D. with 12 : 53 and Wendy Bennett with 10 : 17 (I witnessed Wendy's last flight in the A/2, she having two maximum's to her credit at that stage. Unfortunately, after getting the model right up to the limit, the job got into a down patch, thus probably relieving the tension of the Team Manager ! !)

Nordics and f/f power types form the bulk of models at present being flown by the **SALFORD M.A.C.** reasonable successes being met with the A/2's. W. Dulson and E. J. Teece were 6th and 12th respectively in the S.M.A.E. Cup, Dulson being top junior in the country. Best flights in the past month have been 10 minutes plus, by A. Crane's " Quickie " and 6 : 21 by L. Batty's own designed Nordic, the latter fellow also qualifying for his " B " Merit Certificate bringing the clubs total to four " B "s and six " A "s.

East Anglian Area

The Area experienced generally poor conditions for the Eliminator dates. J. Hume, a junior member of Belfairs, topped the aggregated results for A/2's, while D. Nichols (Southend Senior) gave the Ipswich duo of Gorham/Atkinson a run in the Wakefield class.

G. Peek amazed all with the fast, stable climb of his Elfin powered " Jaded Maid ", winning both eliminators in the Area. Miss P. R. Healy (Belfairs) shook a number of the lads when placing 4th in the first and 10th in the second Eliminators, just missing the Trials on aggregate. Placings in the Trials were well distributed, 5 to Belfairs, 3 each to Clacton and Ipswich, 2 to Southend Senior, and 1 to Chelmsford.

After negotiation, the **CAMBRIDGE M.A.C.** has been allowed the use of the recreation ground by the City Council for the All-Team-Race Rally on September 14th. Enquiries are welcomed by Peter Hoskison, 4, Hale St., Cambridge and it is hoped to inaugurate a "Baby" class ·5 c.c. Team-Race at this Rally.

Southern Area

Another Area to experience poor weather for the Elims. was the Southern group, May 11th being no exception. One or two max's were obtained in the A/2 event, but total times were generally low. Col. Yates (Headley) ended the long list of Grange successes by topping the Area results with 7 : 02. Clubs will be competing for the Southern Area Challenge Cup on July 20th at the Area Rally at Andover.

Three members of the **GRANGE M.A.C.** attended the Whit contests at Fairlop, A. J. Brooks placing 5th in the Power Trials flying an Elfin 2·49 ship. E. John, flying a similar model to that which placed 2nd in the "Halfax" had timer trouble, and could not get a full 20 second run.

Since its formation last August, the **ILMINSTER & D.M.A.C.** has made good progress, and several members are now busy with radio control. With a successful exhibition to its credit, plus the acquisition of a club Trophy, hopes are high for the future.

The 18th May was a really hot day for the **WINCHESTER M.A.S.,** the unusual heat playing havoc with rubber motors, no less than seven giving up the ghost during a contest. In spite of the heat, there were not as many thermals as one would expect, only a small one being encountered during the afternoon. H. J. Childs won with an aggregate of 5 : 06, followed by R. H. Lewis and R. Tee who were within a fraction of a second of each other, only the averaging of stop watch times being able to separate them. Bill Childs followed his success by setting a new club power record of 3 : 47 at about 9.15 p.m. a week later.

South Western Area

The **PLYMOUTH M.F.C.** held the second round of their club championships on May 25th, and with the juniors in the lead from the earlier round, the seniors set out to overhaul them. They succeeded in taking first places in the four classes of contests held, but the juniors took second placings and did not give in. Falling back a little further in the third round, the juniors are now determined to climb back in the last round, and an exciting contest is promised.

South Eastern Area

Brighton and Southern Cross members have put the Area well in the picture in recent events. Weather seems to have deterred the majority of Area clubs for the first round of the Area Championships in which Men of Kent proved the winners with a team score of 30 : 15, followed by Southern Cross (22 : 47), Eastbourne (11 : 19) and Folkestone (04 : 15). Numbers were also low for the Area Elims. on May 11th, when P. E. Giggle of Brighton and F. H. Boxall of the same club topped the Area times in both A/2 and Wakefield classes, surprisingly enough the W'field scores being higher than the gliders.

In contrast, the 19th May saw almost perfect conditions for the **ISLE OF THANET M.A.C.** and some very good times were recorded. Junior J. Thornton started the ball rolling by having a test flight from which the machine never returned, then P. Davies broke the club rubber record with a flight of over 7 minutes. W. McEvoy, out to gain a " B " Certificate, lost his " Marauder " glider on its second flight which was timed for 9 : 10—the third machine he has lost this season.

EASTBOURNE M.F.C. are unable to do any free flight work as their field is out of bounds owing to an outbreak of foot and mouth disease. The local Council have granted permission to fly C/L models on the same pitch as before, and a revival of interest in all types is anticipated. A. Stokes is expected to raise the club speed record from 109 m.p.h. with his new ETA 29 powered job of 12 inches span. I like the story by " Locky " in the latest issue of the club mag. " Marsh Mutterings ". Getting to Digby was quite an adventure for this newcomer to big meetings, but I doubt whether Sam Messon and his Northern Lights will take kindly to the description of the " gullible Yorshireman " ! ! Or did " Locky " mean garrulous ?

SOUTHERN CROSS A.C. hand launched glider contest took the form of a best flight of six affair. Bill Gravett led the open section for most of the afternoon with a time of 2 : 37, when Keith Donald managed 3 : 12 on his last flight. Bill then set to and with his fourth attempt scored 3 : 43 to head the list. In the Nordic class Donald led all the way until Junior Ivan Crouch brought out his heavyweight " Chief " and scored 1 : 57. On May 4th flying for the Lady Shelley contest was trying, the cloud base being lower than the field at times ! Grahame Gates brought out his F.A.I. maximum tailless glider of 21 ft. span and aggregated 10 : 28. The model flew straight from the drawing board and needed no trimming !

Tall Story for this month comes from D. Hemett of 5 Redriff Road, London, S.E.16. He tells of J. McDonald of the Blackheath club, who, flying a " bitsa " at Fairlop consisting of " Bazooka " wings, Wakefield tailplane, profile fuselage cut from ½ inch sheet and powered by an ED Bee, broke the tail end off on a hard landing making it impossible to refix the tailplane. In response to the many- and various—suggestions of what to do with the thing, he started the engine and launched the half-fuselage-cum-wing. Flight was surprisingly good, and the glide was in fact better than before ! This continued with the wing shedding more and more tissue until at last the wing would not take any more. The job was then flown with the tailplane alone strapped on. In all cases the climb was first class and the glide flat, although faster with each succeeding piece removed from the wing. The story is vouched for and certainly qualifies for a free sub—though whether this should go to the teller or the flier is a moot point.

Joe Rosenthal of 210, Rose Pails Drive, Toronto, Ontario, Canada writes to ask if any British aeromodeller is willing to swap engines or model talk with him, how about it?

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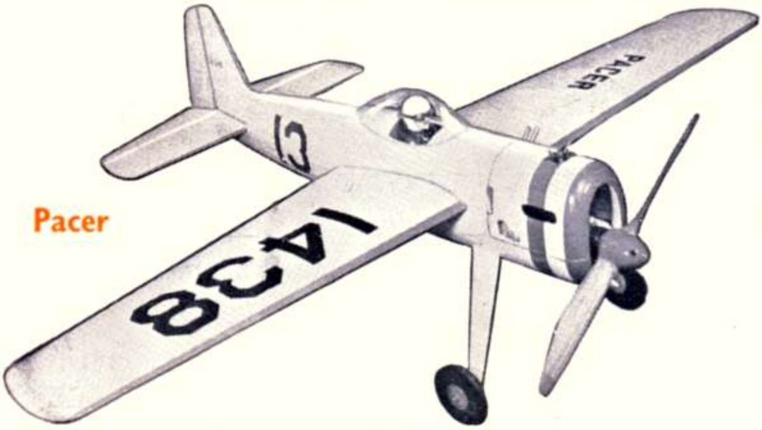

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