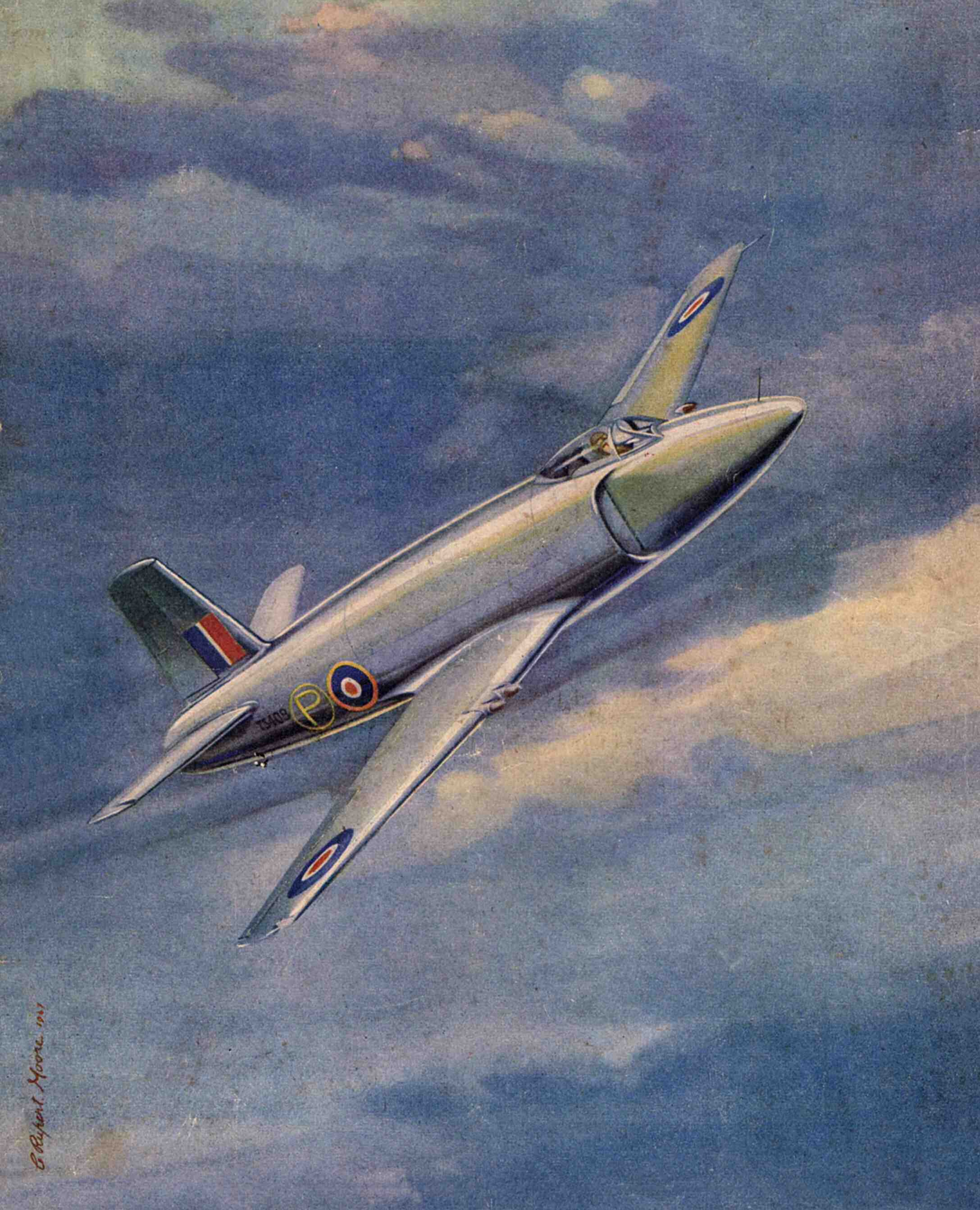
JULY 1947 **AEROMODELLER** 1/3



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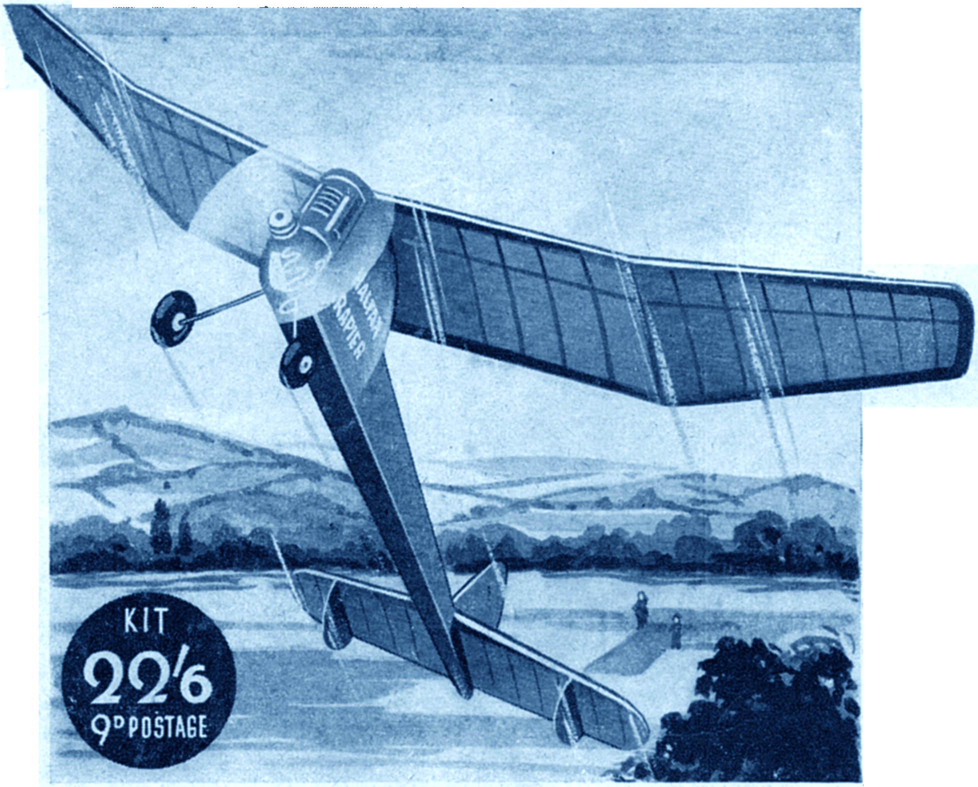

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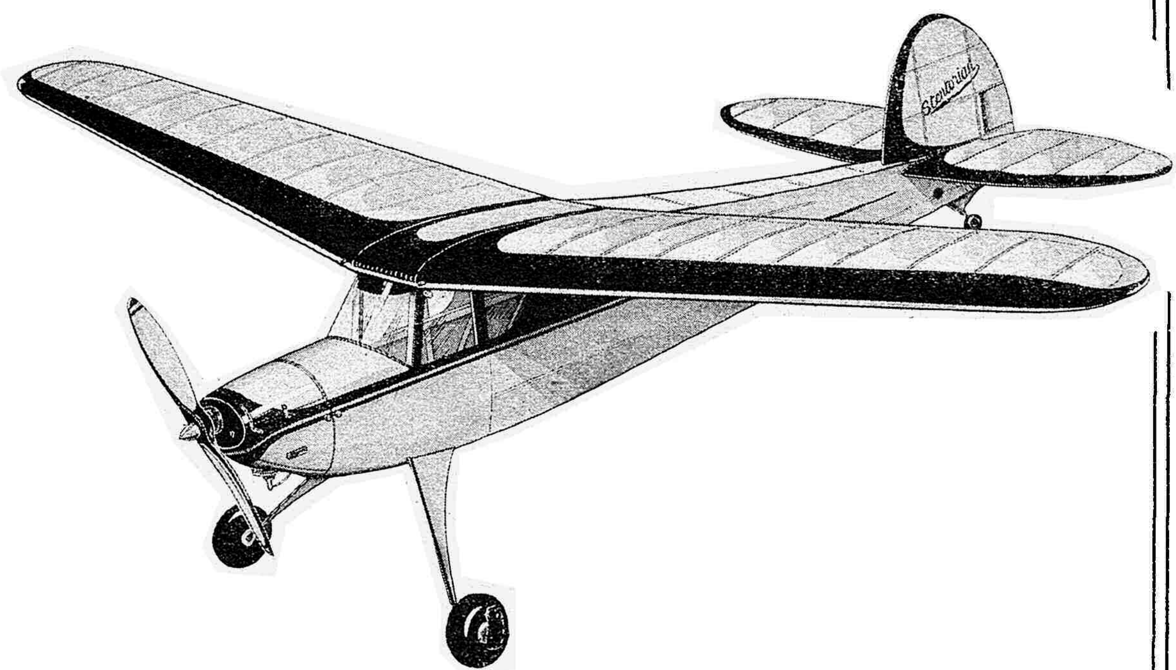

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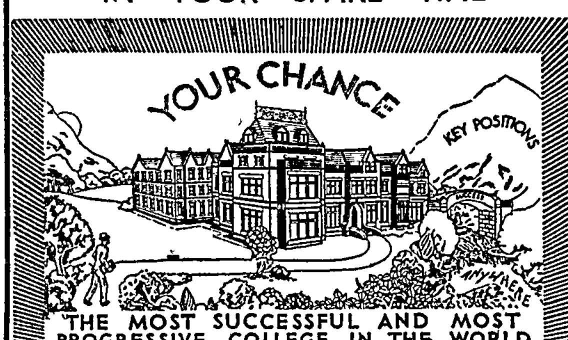

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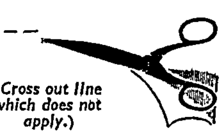

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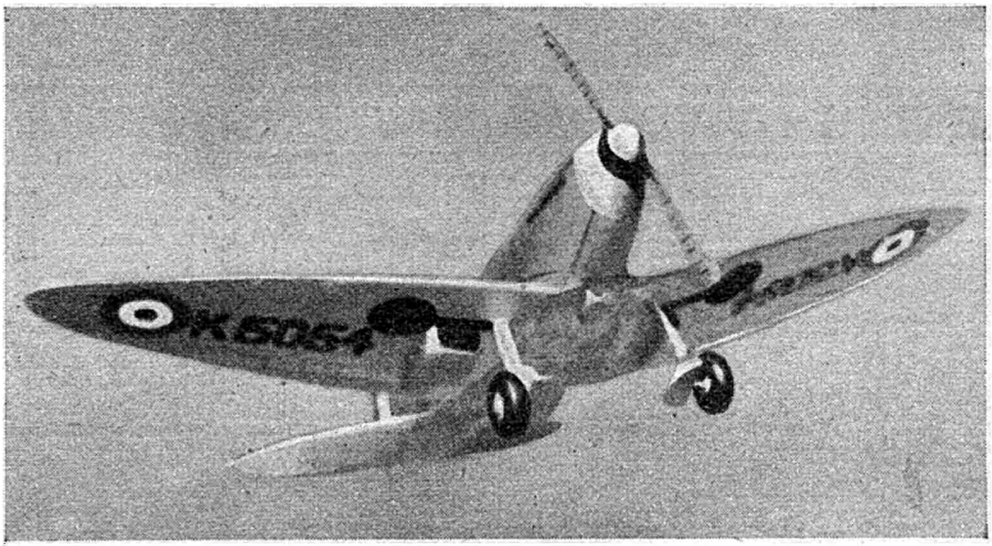

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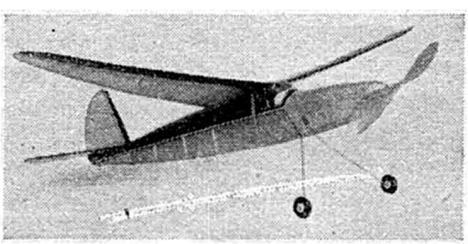

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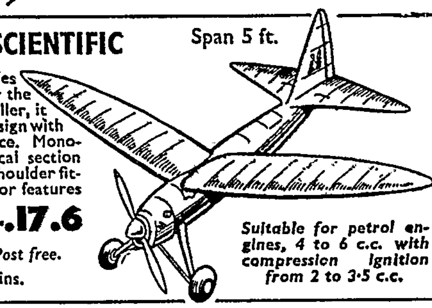

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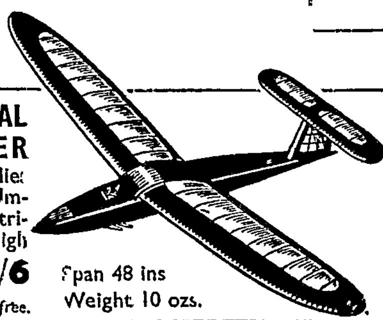

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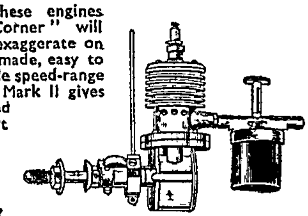

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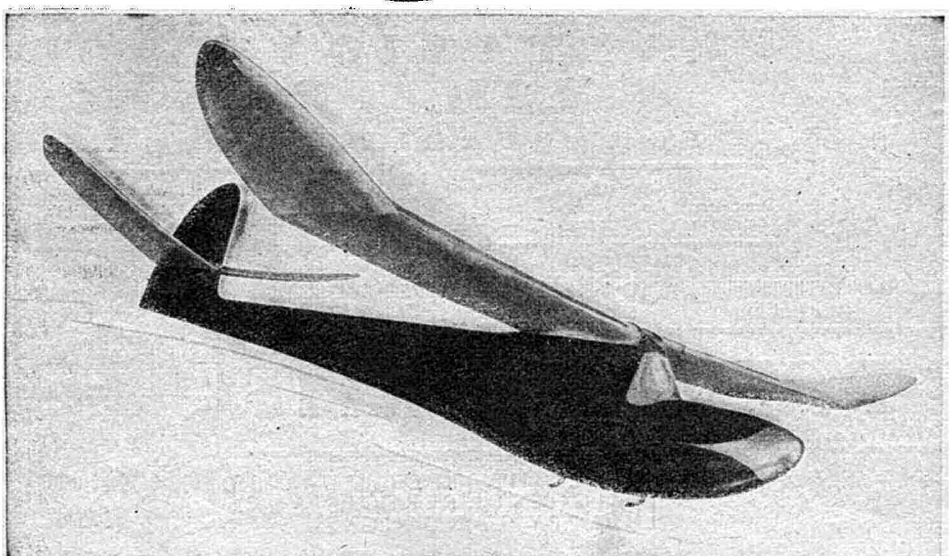

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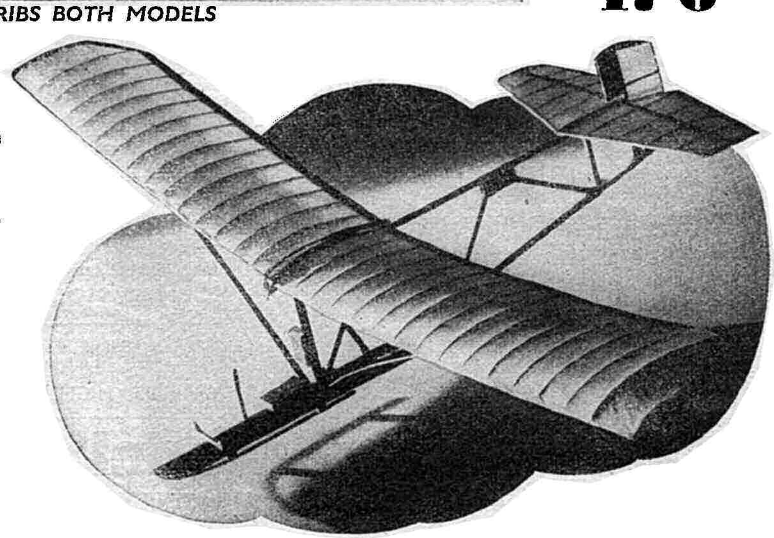

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Contents

GABRIEL AT GRAVESEND

This shot in the sweltering sun at the British Nationals gives line and beauty to the much maligned slabsider.

"Of silver wings he took a shining pair,
Fringed with gold, nimble, swift;
With these he parts the winds,
the clouds, the air,
And over seas and earth himself doth lift".

EDITORIAL

POWER CUT?

WE have been increasingly perturbed for some time over the indiscriminate flying of power-driven model aircraft in built-up areas and other locations which are unsuitable. The subject looks like coming to a head, particularly in the London area, in the near future.

We understand that a definite ban has been imposed on the flying of this class of model on Epsom Downs. Further attention is drawn to this vexed subject by a recommendation printed in the London Area News Sheet for June, 1947. A request is made to the S.M.A.E. to seek legal advice . . . " with the utmost urgency to consider the possibility of the introduction of legislation requiring—*inter alia*—compulsory registration and insurance of all power-driven model aircraft."

It is a pity that the ignoring of common-sense rules by some, and ignorance of such regulations by others, should result in complaints being raised; and the suggestion being made that it may be necessary to control the flying of power-driven model aircraft only by legislation. In our view, it is extremely doubtful whether legislation would have the necessary effect, because if matters were taken as far as that, some form of overriding " ban " or the introduction of such restrictive rules as might well-nigh put an end to the flying of these types of models, might well result.

Under present conditions, the S.M.A.E. can only suggest and formulate common-sense " rules " for the guidance of aeromodellers and the protection of the hobby as a whole; but the Society has no power to impose penalties. We are quite satisfied that no Government would delegate to the Society the power to impose penalties. There is no precedent for this in any similar hobby or movement. Naturally, as we have before pointed out, the Council of any Society can make its own " rules " and impose its own " penalties "—but only on its own members who obviously are *voluntary* members. Only the Government or statutory authorities can impose rules and penalties on the citizens of this country, and these must, of course, be binding on all.

We believe that the problem can best be dealt with by proper and, perhaps, increased " propaganda " amongst the Clubs and via the local and national press; with a view to instructing aeromodellers in particular, and the public in general; in regard to the conditions and localities in which flying of power-driven model aircraft may or may not be carried out.

We should be interested to have readers' comments on this subject with, if possible, a number of suggestions as to how this problem might best be dealt with.

British Nationals

ELSEWHERE in this issue will be found a description, together with photographs by the AEROMODELLER staff, of the British Nationals held at Gravesend on Whit-Sunday and Monday. As mentioned last month, we were unable to give prior notice of the venue as this information was not made available by the time we went to press with our June issue. It is regrettable that such vital information regarding the most important event of the season was not made available at an earlier date. In fact, *very* short notice was given, and we do feel that, in the future, arrangements should be made and published a good deal earlier.

A criticism we heard from the North and the Midlands was on the choice of Gravesend for a nation-wide event. Could not a location more in the centre of England have been found? Except from the London area there was poor attendance from many more distant parts of the country—which is easily understandable.

In regard to the flying, we congratulate the S.M.A.E. on the running of the events. Crowd control was good, as was also the administration and organisation of the competitors. The large number of contestants to be dealt with necessitated a deal of hard work for the officials concerned and their enthusiasm throughout the day was unfailing. Nevertheless, again we voice a criticism: that there were one or two officials who appeared to have " official " responsibility for certain tasks but who were apparently quite happy to leave others to carry them out! We doubt the widsom of allowing a member of the Competition Committee to participate in a contest he is ostensibly helping to conduct . . . However, all in all, the meeting may be judged a success and one which was certainly enjoyed by those who attended it. The weather, for once being favourable, two excellent days' sport resulted.

Repeat Performance!

A CERTAIN indication of the success of any venture is the demand for a repeat performance, and we are therefore particularly encouraged by the welcome accorded to our First International Meeting held at Eaton Bray last summer, when no less than seventy-seven visitors from six different countries vied with British enthusiasts for victory in every branch of aeromodelling. This year we are pleased to announce a Second International Meeting when upwards of a hundred foreign guests can be accomodated for a ten-day visit, opening on July 26th and continuing until August 4th.

In order that the Champion may hold some substantial recognition of his skill, the AEROMODELLER is presenting a Hundred Guinea Challenge Trophy to be held for one year by the finest all-round aeromodeller. Naturally there is nothing we should like better than for this trophy to grace a British sideboard, but for this to be achieved the flower of our contestants must enter in force. So that no aeromodelling Achilles may find reason to lurk within his tent, we have extended personal invitations to the best-known British enthusiasts, and invited the fullest possible co-operation of the S.M.A.E. Lesser-known enthusiasts will have their opportunity too, in the International Meeting Eliminating Trials that are taking place on Sunday, July 6th at Eaton Bray. We look forward to a battle royal as well as an opportunity of renewing many pleasant friendships made or consolidated on the occasion of our last meeting.

The 1947 British Nationals

DESCRIBED BY THE EDITOR

THE Whitsun week-end saw an innovation in British aeromodelling when the S.M.A.E staged the first of what is hoped will be a long series of British Nationals.

The standard of flying (what I saw of it !) was generally high, with some outstanding performances. At the other end of the scale, however, there was the extremely poor show put up by some competitors who were undoubtedly using these National Contests purely as a try-out for absolutely untested models, and handicapping the organisation in consequence.

The first event to be staged on Sunday, the 25th, was the " Pilcher Cup," a duration event for gliders to S.M.A.E. fuselage formula. 164 entries were received for this contest and some remarkably steady flying was witnessed. Tow-line technique was interesting to watch and varied from the experts, who played their models like expert fly fishermen, to the nuisance handful who hadn't a clue. One model that particularly took my eye was the very large aircraft flown by Yeabsley, of Croydon, this model being extremely stable and stately in flight, putting up a consistently fine performance.

As is generally recognised nowadays, glider contests are perhaps the most difficult to conduct with the complications of tow-line checking, tangled lines, etc., etc., and it was found necessary to overlap some of the contests on this day in order to adhere as closely as possible to the time schedule. The take-off area was therefore divided after lunch and the " *Model Engineer* No. 2 Cup " for general rubber-driven models commenced. A fairly varied array of models was to be seen with, rather surprisingly, a very large percentage of Wakefield models.

Whilst all this was taking place I was given the honour of conducting the " Women's Challenge Cup " event, for which ten members of the fair sex gathered at one end of the tarmac. It is difficult to state who were the more nervous, the feminine competitors or their husbands and boy friend helpers ; certainly competition nerves were much in evidence !

Some very creditable flights were put in by these ladies, and at one time it looked as though Mrs. Galbreath (Blackheath) was a definite winner with two very fine, steady flights. However, later in the day Mrs. Buckeridge (past winner of the Cup) who had been seriously indisposed through the greater part of the morning and afternoon, came along and put up a really fine performance to carry off the Cup once again, with a margin of nearly 60 points over her nearest competitor.

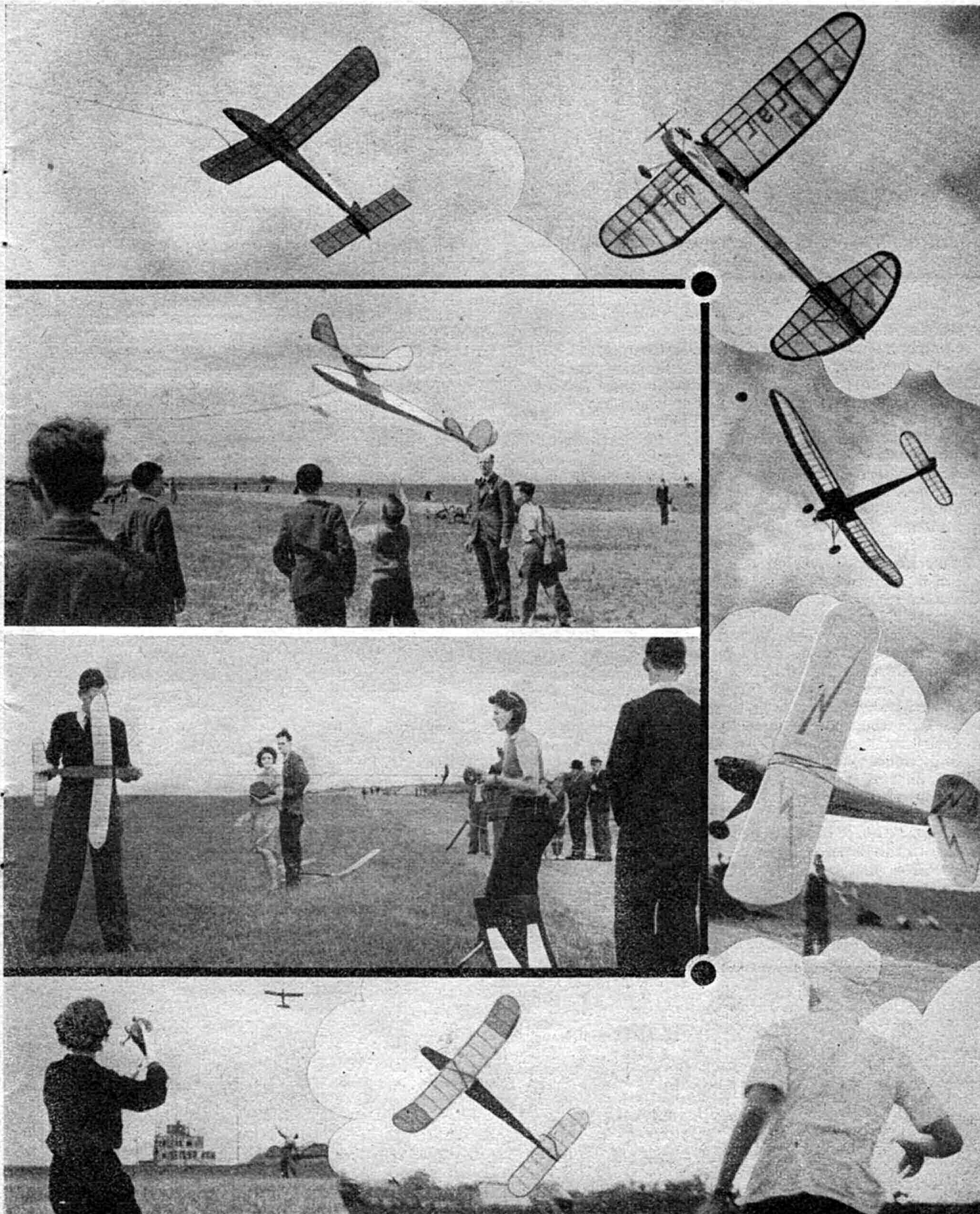
During this time the last flights for the " Pilcher " had been taken, and the " *M.E.* No. 2 " event was going strong, the 161 competitors being sent out from the marshalling enclosure in batches to the twelve take-off areas.

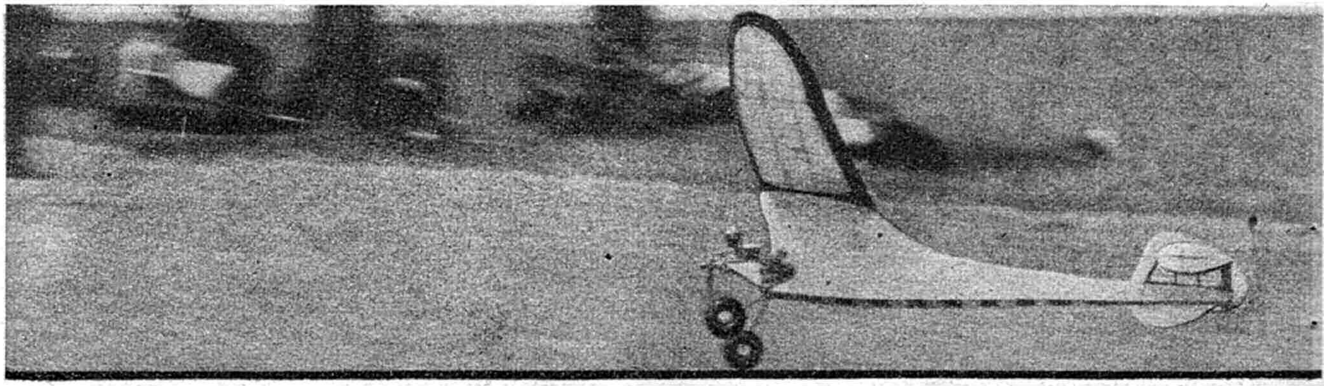
Monday again proved a beautiful day from an aeromodellers' standpoint, though undoubtedly most of the competitors would have preferred a little less breeze.

Again the first event to get under way was a glider contest, this time for the " Thurston Cup " for models to F.A.I. specification. A drop in entries was noticed, the figure for this event being 116, being largely accounted for by loss and damage to models on the previous day.

The Croydon boys again showed their supremacy in this class of flying, as the results sheets will show. The difference between the winning times in the glider events on both days is accounted for by the stronger breeze on the second day carrying models out of sight far more quickly.

The " Weston Cup " for Wakefield class models attracted 111 entries, and it is pleasing to record that this class of model is again coming in for proper attention,





with a view to possible resuscitation of the Wakefield International event next year.

A number of models flown by the Northampton Club created interest by virtue of an underslung appendage on the fuselage which gave the models a most extraordinary appearance. However, they could certainly fly and were extremely stable at all times.

The remaining contest to complete the scheduled programme was the power event for the "Sir John Shelley Cup," and did this give the organisers one big headache? *The thing that surprised and shook me was to find that a large number of competitors were entirely ignorant of the general rules for power model flying, and some did not even bother to read the conditions for the contest they were actually participating in. I maintain that this is a ridiculous state of affairs and should not be allowed to occur on any future occasion. A number of contestants did not bother to obtain a copy of the rules and were still working on what they remembered of regulations from previous years' events.*

A record total of 123 models took the field, and what a weird and wonderful array some of them presented. Being tied up with my job as marshalling steward gave me very little opportunity of seeing what took place on the tarmac, but the following observations were taken by our staff on the spot.

With three exceptions, all the models were on the small side, and included one quite interesting low-wing model. Diesel engines predominated, but in spite of this and the much-vaunted ease of starting claimed for these engines, an unwarranted percentage of baulky starts was witnessed. The vast majority seemed to get in a terrific "flap" when tied down to a two-minute limit for starting their engine up and commencing the flight, and undoubtedly the major proportion of the troubles can be written off to the account of competition nerves. A notable exception in this direction was G. G. (Pa) Harris, of Croydon, whose cool handling and general nonchalance made a very favourable impression.

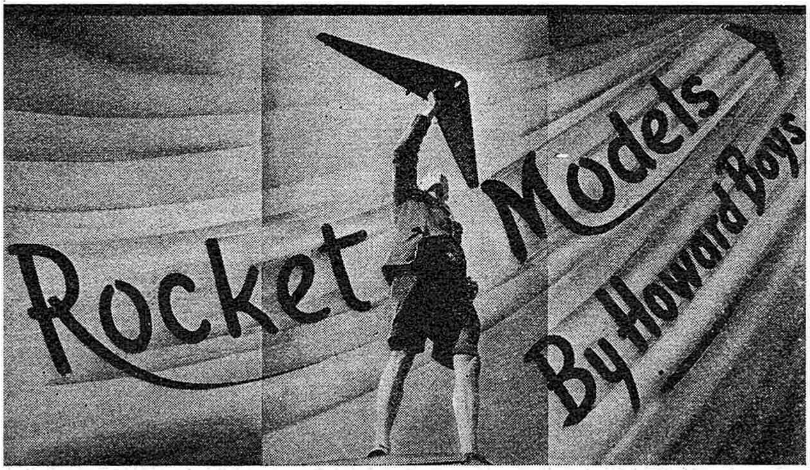
Many flights were disqualified through pushing at the take off, and it would appear that a new technique of "hands away" launching needs introducing. The climb in most cases was spectacular, but a surprisingly large number of efforts were declared "no flight" owing to exceeding the stipulated 15-second engine run.

One of the most interesting designs was a diesel-engined flying wing flown by Sammy Crow, this model being surprisingly stable in flight, although experiencing trouble generally on take off. "Gus" Gunter again showed his paces in this event, winning with a clear margin from our old friend "G.W.W.", with Eddie Kiel following close behind.

The hard-working officials are to be congratulated on the success of this meeting, and I commiserate with Mr. Turner on his colossal task of working out the official results in order to elicit the Senior and Junior Individual Champions. Points were awarded in all events, and top scorer for seniors was Mr. Standing of Croydon, who placed 9th in the "*M.E.* No. 2," 10th in the "Weston," 14th in the "Thurston" and 26th in the "Pilcher." Jimmy Wingate, of Streatham, placed 13th in the "Weston," 29th in both "Pilcher" and "Shelley," 33rd in the "*M.E.* No. 2" and 55th in the "Thurston" to carry off the Junior award. Consistently good flying gains more in these events than a spectacular win in any individual competition, and these two chaps are to be congratulated on their fine show.

And so closed a most enjoyable occasion that I hope will be my pleasure to attend for many years to come.

(*Full contest results on page* 499.)



WITH every type of power unit there are advantages and disadvantages. With rockets the advantages seem to be absence of torque reaction, a large amount of thrust when required, and no winding up or prop swinging, or other manual effort, and the power unit does not suffer in crashes. Disadvantages are the heat of the efflux, and short duration of power. They are, however, great fun, and the model can always be flown as a glider without the rocket unit.

When thinking of using a rocket to drive a model aeroplane it is natural to think of the model shooting up high in the air after the style of an ordinary sky rocket. I do not know how to obtain such a climb though have had it occur at odd times. With sufficient thrust for this sort of thing, the tendency is for the model to loop. M. Bougeret got a very good climb with his model, it was very steep but the speed was not high. This model also had a very good glide and was the best consistent rocket model flying I have yet seen.

The units for model propulsion have a fairly constant thrust for the whole time of burning, though some have a high initial burst for " take-off ".

We have two types of R.P. Unit, as they are called, available, the No. 1a and the No. 3. The No. 1a gives about $\frac{3}{4}$-oz. thrust for about five seconds. The No. 3 gives 3 ozs. thrust for 15 seconds, and has an extra burst for " take-off." The No. 1a R.P. Unit is suitable for models up to about 2 ft. wing span, providing the weight is not more than about $1\frac{1}{2}$ ozs., and the No. 3 R.P. Unit is suitable for models about " Wakefield " size. Light models seem to give better results than heavy ones. By way of interest the French rockets give about 7 ozs. thrust for 10 seconds, the size and weight being about the same as our No. 3 Units. We may of course get more powerful units one day, but the thrust of the No. 3 Unit was made to suit my " Fire Engine " for the Handley Page competition in 1945, and the Home Office people approved of these for sale to the public but stated that if the thrust, or time of burning were increased, they were to be notified.

There is a slight possibility that a rocket will explode, so the instructions say " retire immediately " for safety. I have known rare cases of early units exploding, but so far they have only blown out the front of the unit. If you come across a faulty unit, please send me details.

While burning, the thrust usually increases slightly, but this is not shown up at all clearly in the flying. The original No. 1 Units caused the model to increase speed towards the end of the power flight, but this seemed as

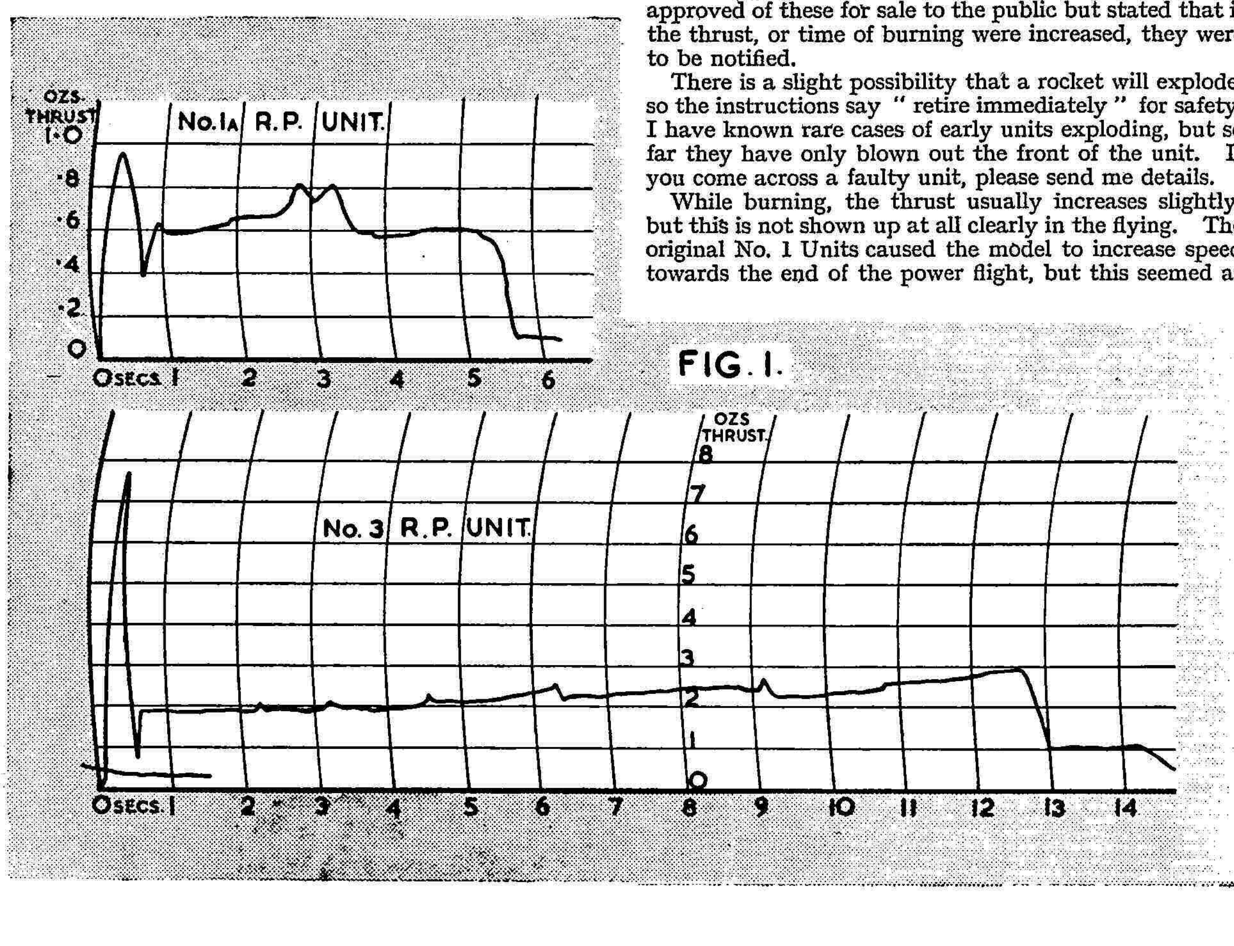


FIG. 1.

though it might be due to the total weight of the model decreasing. It did not show up until tested on a thrust recorder. It was then found to increase in thrust from ½ to 1 oz. thrust during the five seconds of burning. Fig. 1 shows thrust/time curves for the present units.

It is not possible to get exactly the same thrust from two rockets, so a twin jet type would not be straightforward. Fig. 2 shows a suggestion for balancing the thrust of two rockets against each other to operate a rudder. It would of course be necessary to experiment with the leverage and rudder area. The closer together the jets were, the less would be the trouble experienced.

The type of model suitable for rocket drive is one with plenty of space behind the centre of gravity, so that the efflux can be directed away from the model. Tailless, twin boom, or pod and boom types are good, but it is also possible sometimes to fit a rocket in the tail end of a model. I have managed this very successfully in a scale model of the D.H. Swallow. The alteration in the position of the C.G. due to the burning of the charge only results in a higher gliding speed than with the C.G. further aft. To help overcome the difficulty of the charge being well behind the C.G. the unit can be directed downwards a little, so that the thrust helps to counteract the weight. The best position for the rocket unit is as close as possible to the C.G. so that there is no change of trim. This means using one of the previously mentioned types. Tails can be kept well out of the way, and quite safe while the model is in the air, but often suffer if the model comes to the ground with the unit burning, through bad launching, or other causes. It is possible to obtain asbestos paper that can be used to protect parts of the model. I have seen various types of models flying, and the most promising have always had the rocket mounted above the wing. These have all been boom types, sometimes single and sometimes twin, sometimes low, sometimes high. Tailplanes have been low or high. Bougeret put his rocket above the wing and his tail low down, and obtained very good flights. A friend of mine has had some very good flights with a model on the style of the American Yogi petrol model. This model has a tall narrow pod, with the boom low down. The wing is on top of the pod, the rocket on top of that, the tailplane low, and twin fins.

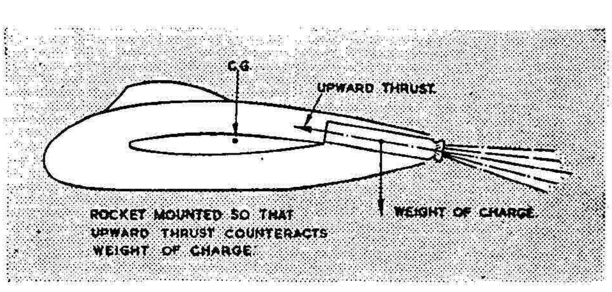
One of the best ways of fixing the R.P. Units is in a split paper tube, with a rubber band round it to make the tube grip the unit. The tube is made by winding a strip of gummed paper round a unit, though not gummed to it. Remove the unit before the gum dries or the tube may shrink on. When dry, a narrow V is cut out so that with a unit in place and a rubber band round, the edges at the wide end of the V do not quite touch. The other end can be " belled " out to make it easier to insert the rocket. This end then faces aft in the model. The length of the tube can be from about one and a half to three times the diameter of the rocket. The tube is glued in place in the model, and the rocket can be quite easily inserted and removed. If the tube is put inside the model it is best to block up the front end, and provide a good stop, so that if the model dives to the ground under power, the burning unit is not jerked into the model.

The Devil an aeromodeller would be . . . . . . Howard Boys re-appears at Eaton Bray from a cloud of blue smoke.

Another method is to have a wire or balsa cradle on which the rocket is placed, and held with rubber bands.

The best thing I have so far come across for lighting the touch paper, is an electric gas lighter. I bought an element that would screw into my pocket torch, and cut away one side so that the touch paper could be brought into contact with the red hot wire, and this did the trick. A lighted cigarette is also very good. Matches or petrol lighter can be used, but are not so good.

Be warned! It is illegal to modify a firework, and at first the authorities were inclined to the view that it would constitute a modification to attach a firework to a model aeroplane! To use an ordinary sky rocket to drive a model aeroplane would definitely be illegal.



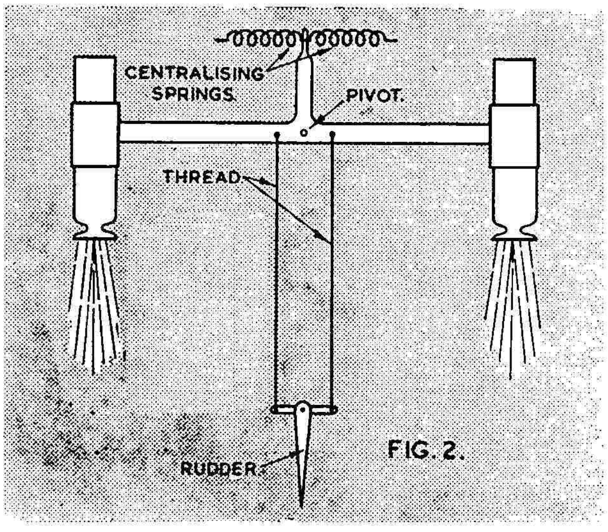
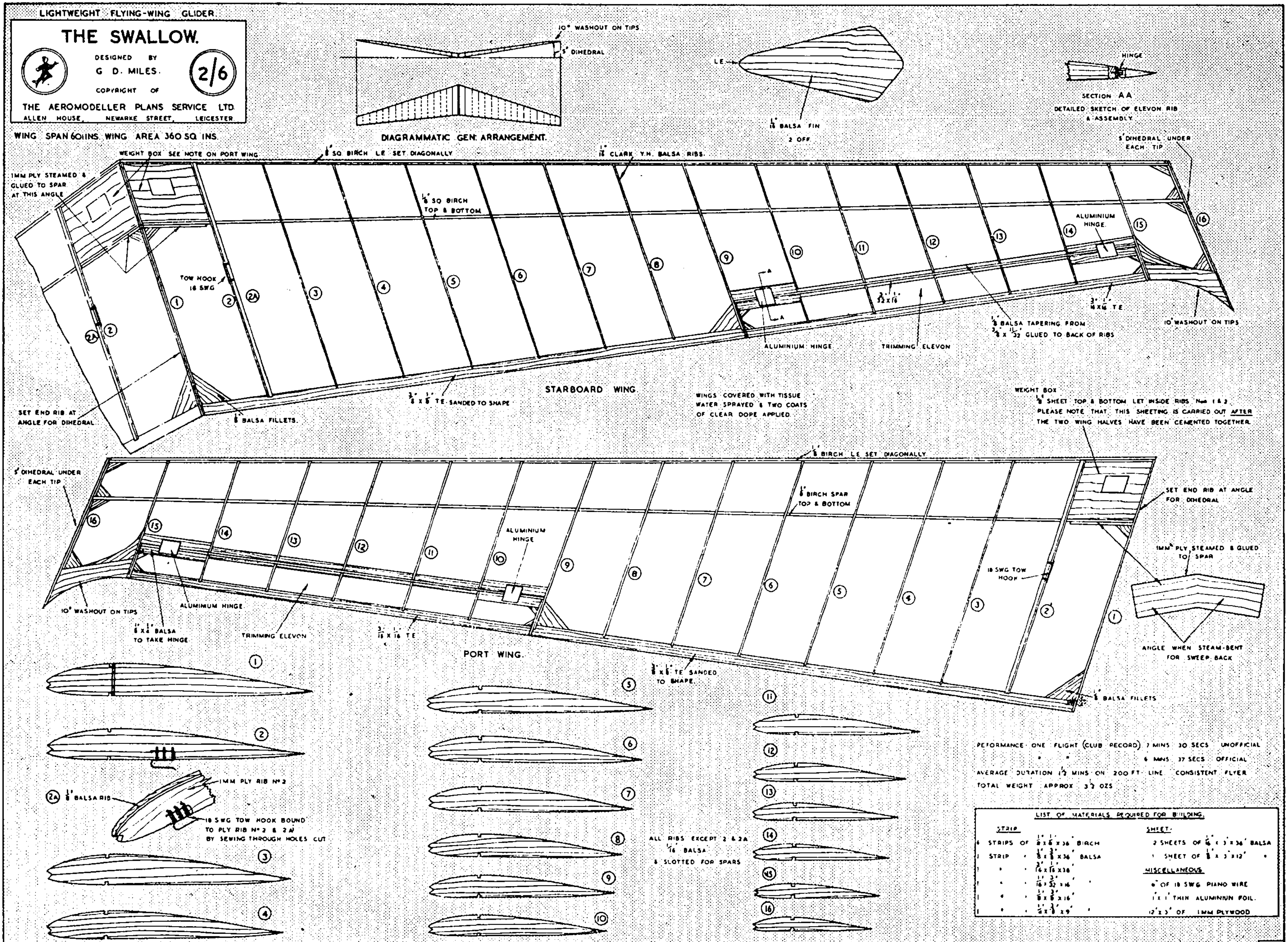


FIG. 2.


LIGHTWEIGHT FLYING-WING GLIDER.
THE SWALLOW.
DESIGNED BY G. D. MILES.
2/6
COPYRIGHT OF THE AEROMODELLER PLANS SERVICE LTD. ALLEN HOUSE, NEWARKE STREET, LEICESTER.
WING SPAN 60 INS. WING AREA 360 SQ. INS.
10° WASHOUT ON TIPS
5° DIHEDRAL
DIAGRAMMATIC GEN. ARRANGEMENT.
LE
1/16 BALSA FIN 2 OFF.
HINGE
SECTION AA
DETAILED SKETCH OF ELEVON RIB & ASSEMBLY.
5° DIHEDRAL UNDER EACH TIP
WEIGHT BOX SEE NOTE ON PORT WING
1/8 SQ BIRCH LE SET DIAGONALLY
1/16 CLARK Y.H. BALSA RIBS.
1MM PLY STEAMED & GLUED TO SPAR AT THIS ANGLE
1/8 SQ BIRCH TOP & BOTTOM
ALUMINIUM HINGE.
TOW HOOK 16 SWG
3/32 x 1/16
3/16 x 1/16 T.E.
1/8 BALSA TAPERING FROM 3/8 x 11/32 GLUED TO BACK OF RIBS
10° WASHOUT ON TIPS
ALUMINIUM HINGE
TRIMMING ELEVON
STARBOARD WING.
3/8 x 1/8 T.E. SANDED TO SHAPE
SET END RIB AT ANGLE FOR DIHEDRAL.
1/8 BALSA FILLETS.
WINGS COVERED WITH TISSUE WATER SPRAYED & TWO COATS OF CLEAR DOPE APPLIED.
WEIGHT BOX
1/8 SHEET TOP & BOTTOM LET INSIDE RIBS Nos 1 & 2.
PLEASE NOTE THAT THIS SHEETING IS CARRIED OUT AFTER THE TWO WING HALVES HAVE BEEN CEMENTED TOGETHER.
1/8 BIRCH LE SET DIAGONALLY
5° DIHEDRAL UNDER EACH TIP
1/8 BIRCH SPAR TOP & BOTTOM
SET END RIB AT ANGLE FOR DIHEDRAL
ALUMINIUM HINGE
1MM PLY STEAMED & GLUED TO SPAR
18 SWG TOW HOOK
10° WASHOUT ON TIPS
ALUMINIUM HINGE
1/8 x 1/4 BALSA TO TAKE HINGE
TRIMMING ELEVON
3/16 x 1/16 T.E.
PORT WING.
3/8 x 1/8 T.E. SANDED TO SHAPE.
ANGLE WHEN STEAM-BENT FOR SWEEP BACK
1/8 BALSA FILLETS
1MM PLY RIB No 2
2A 1/8 BALSA RIB
18 SWG TOW HOOK BOUND TO PLY RIB No 2 & 2A BY SEWING THROUGH HOLES CUT
ALL RIBS EXCEPT 2 & 2A 1/16 BALSA & SLOTTED FOR SPARS
PERFORMANCE: ONE FLIGHT (CLUB RECORD) 7 MINS 30 SECS UNOFFICIAL
" " 6 MINS 37 SECS OFFICIAL
AVERAGE DURATION 1½ MINS ON 200 FT LINE. CONSISTENT FLYER
TOTAL WEIGHT APPROX 3½ OZS
LIST OF MATERIALS REQUIRED FOR BUILDING.
STRIP
6 STRIPS OF 1/8 x 1/8 x 36 BIRCH
1 STRIP " 1/8 x 3/8 x 36 BALSA
1 " " 3/16 x 1/16 x 36
1 " " 1/16 x 3/32 x 16 "
1 " " 1/8 x 3/8 x 16
1 " " 1/4 x 3/8 x 9 "
SHEET
2 SHEETS OF 1/16 x 3 x 36 BALSA
1 SHEET OF 1/8 x 3 x 12 "
MISCELLANEOUS
6" OF 18 SWG PIANO WIRE
1 x 1 THIN ALUMINIUM FOIL.
12 x 3 OF 1MM PLYWOOD
U 265

DESIGNED BY G. D. MILES

MODELLING tyros anxious to make their first attempt at a flying wing design will find the Swallow " just their cup of tea," with the additional attraction of a model that soars like a bird and no complicated trimming procedure to worry them. Seven minutes thirty-seven seconds from a three hundred foot line and a further time yet to be ratified as a British record should more than satisfy any doubts regarding performance, so here are the building instructions as specified by the designer :—

Building Instructions.

The ribs are first cut out of 1/16 in. medium balsa, and slotted for spars. The tip rib is thinned down so that the top spars lie level.

The wing is then constructed in the usual way, making sure the ribs are set right. The trailing edge packed up with balsa to suit rib shape. Whilst the wing is setting, the elevon is built inside it. The dihedral brace is steamed to the requisite angle and glued to the spars with Casco cold water glue. The brace also acts as the back of the weight box.

The washout is steamed in whilst the wing is pinned to a board. Insert 1 in. blocks under the tips at the trailing edge.

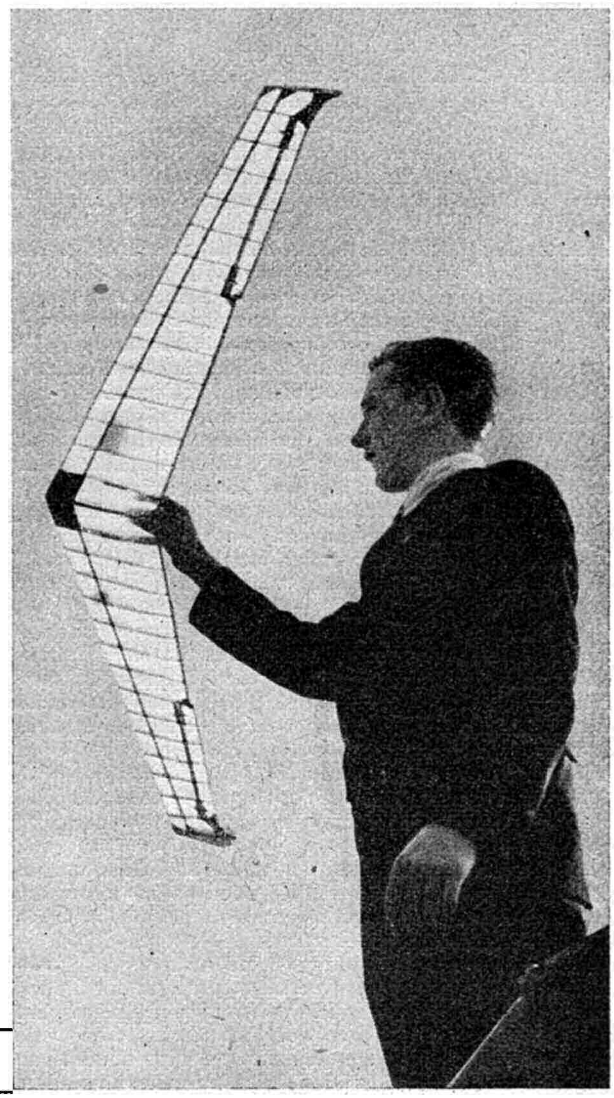
The model is then covered in tissue and given two coats of dope. Slots are cut for the tabs, and the elevon is fitted.

Trimming.

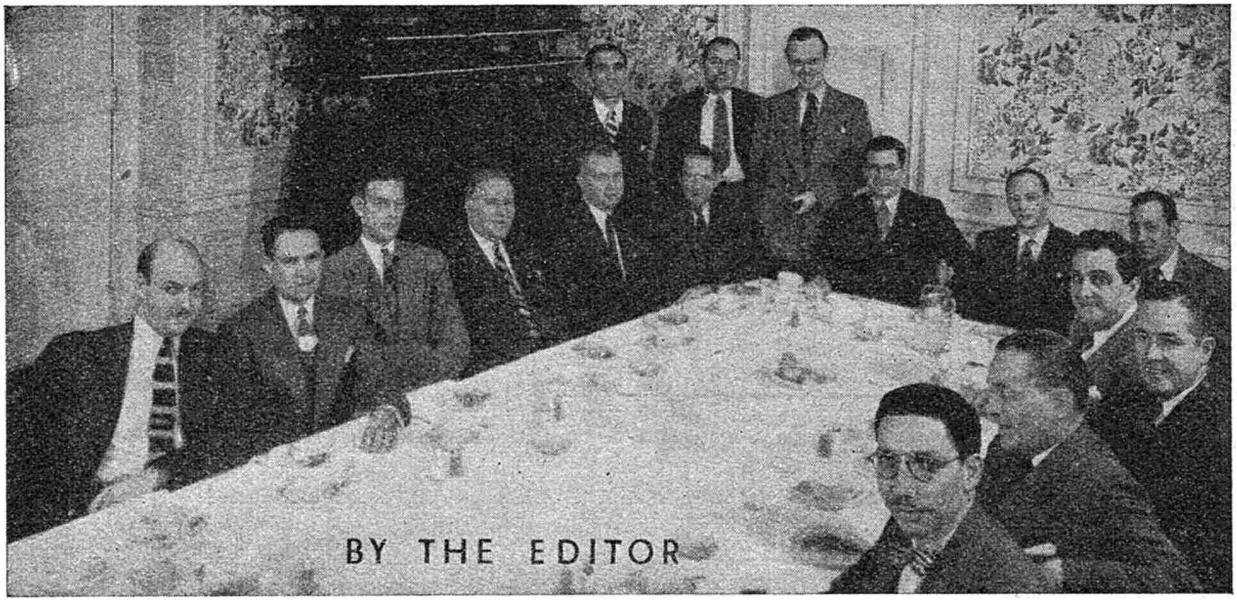
My own model flies with one tab level and the other up 1/16 in. for turn. The model should be weighted until a flat glide is obtained. Weight should be evenly distributed in each box. If the model is required to turn, the elevon *inside* the turn should be up. The model, once trimmed, is very stable and is recommended for the beginner.

Full-size drawings (see quarter-scale reproduction opposite) are available from the Aeromodeller Plans Service Ltd.

On the right is the designer hand launching the Swallow, and our heading picture demonstrates its stability in flight.



AMERICAN COMMENTARY



BY THE EDITOR

Mr. Rushbrooke at a dinner given in his honour by the publishers of various hobby magazines. Amongst those present were, Frank Zaic, Albert L. Lewis, Nat. J. Polk, Bernard Schonfeld, Alan Orthof, Howard McEntee and Jay Cleveland.

AT the beginning of this year it was decided that the time was ripe for a business-cum-goodwill trip to be made to America, and I was elected to carry out that welcome duty.

Obviously the majority of readers will not be interested in the business aspects of this trip, so I propose to give here just a brief résumé of people I met and places visited, finishing up with a general survey of the Model Aircraft Movement as compared with this country.

I arrived in New York on the evening of February 18th after a fairly comfortable trip, enlivened by two hectic storms. (Yes, I was sick, definitely ! !)

After much delay with the inevitable Immigration formalities I succeeded in getting ashore at 7.15, to be enthusiastically greeted by my old friend and correspondent, Frank Zaic. This was a very welcome surprise, particularly in view of the fact that Frank apparently knew all the ropes and whisked me through all Customs' difficulties in good time, and we were soon on the way to my hotel.

It is not my purpose here to describe New York as so much has already been written about that terrific city, but I would say in passing that after a couple of days my neck was stiff through peering up at skyscrapers, and I felt like the famous Shell poster trying to look both ways at once when crossing the road ! Believe me, New York traffic has to be experienced to be believed.

My headquarters in New York revolved around Polks' Hobbies Shop in Fifth Avenue. It is well said that if you stick around Polks' long enough you meet any and everybody in the model aircraft game, and thousands of others. Irwin and Nat Polk proved to be extremely genial hosts and their one object in life seemed to be to give me one heck of a good time.

Al Lewis, former secretary of the Academy of Model Aeronautics and now Advertising Manager for Polks, took me under his wing and we visited many places and people in company. Two very interesting trips were made to the Kingsbridge Armoury (a huge building on the lines of Olympia, London) with a terrific amount of entirely unbroken floor and ceiling space. (To give you an idea of the size of this hall I can inform you that quarter-mile lap auto races are held here twice a week, when one sees single seater midgets hurtle around at fantastic speeds.)

I fully expected to see some of the world famed American indoor flying with microfilm models, but was disappointed on this occasion. What actually was in progress were speed trials with diesel powered control-line models, and believe me these projectiles could certainly whip around. I saw as many as four models being flown in the arena on 30 ft. to 35 ft. lines, and the racket these screaming motors put up in the enclosed hall was unbelievable. One model was clocked at over 73 miles per hour, using the newly developed " Mite " engine which employs such interesting features as non-variable compression head, and bleed-off valve in the crankcase which can be used as a combined throttle and cut-off effect.

Mention of these control-line models brings me to the main point of interest on the model aviation side of my visit. America seems to have gone control-line crazy, and as a further development, speed crazy. Models that started off by being fair representations of aircraft, and which look quite realistic when flown and put through various manœuvres by means of the control lines, are now developing into engines mounted on extremely small streamlined fuselages with very small flying surfaces, and the ridiculous seemed to have been reached in one model I saw which consisted of engine, fuselage and one half wing and stabiliser, these being mounted on the outboard side of the machine. Obviously all that is happening nowadays is that a projectile is kept swinging out purely by centrifugal force and nothing else. I sincerely trust that such extremes are not reached in this country.

A really worthwhile control line model was a scale replica of a Fokker D-VII fitted with two-speed control to the motor. This is operated by a spare battery carried in the pocket of the operator, and current is conveyed through the control lines by means of a press button switch which brings into operation a second set of contact points. This model was made to taxi out into position for take-off, and then, by means of the advance control, take off and fly around, performing various manœuvres which looked quite realistic. The motor was throttled back in flight, cruising the model around quite slowly, and it could be brought into land with the engine just ticking over. This is a phase of control-line flying for which I can see quite good use, but I am afraid I have no interest in the super speed jobs which seem to be very common in America. Control-line flying to my view can serve no useful purpose other than for demonstration purposes and for the safe (!) flying of detailed powered scale models. In other words, I think we can more or less dismiss this class of model aviation as a stunt and nothing more.

One very interesting (and hectic) evening was spent in Greenwich Village at the apartment of Bernie Schonfeld of "*Air World*". A whole bunch of model boys were present, including Frank Zaic, Roger Hammer and others, and a most interesting evening was spent discussing models and personalities, and ending in the utter demolition of a joint of beef of a size not seen in this country since before the war.

A welcome surprise was the luncheon given in my honour by the various publishers of hobby magazines, etc. in New York. Many well known and famous editors were present as will be seen in the accompanying photograph.

This luncheon followed a meeting of the newly instituted Metropolitan Hobby Guild which is a body formed for the general control and co-operation of all hobbies in the New York area. I was asked to give a speech on conditions in England, and I can assure my readers that everyone was most interested in and sympathetic with our many and continued difficulties.

To enter a New York hobby shop like Polks (which Nat says they started in " self defence " because he and Irwin were spending all their time building models so they figured they might as well go into it as a business !) is an eye opener to anyone coming from the austerity of this country. Shelf after shelf and case after case is filled with all manner of kits and accessories to build every conceivable type of model aircraft, loco, boat, etc., and one tends to get " mental indigestion " at seeing such a galaxy of materials and trying to make up your mind which you would like best.

The general opinion amongst responsible modellers I met was that things are made rather too easy for the American modeller, and I was very pleased to hear it given as a definite opinion that they consider the average British aeromodeller is far more serious and gives far more attention to the design, etc. of his model than his American counterpart.

A welcome break from the hurly burly of New York was a weekend visit to my old friend Bill Winter, former editor of "*Air Trails*". Situated in a beautiful wooded section of Connecticut, this trip gave me a real insight into American life outside the cities, and was much appreciated.

My one other trip outside New York was down to Washington in company with Frank Zaic for the purpose of visiting the Academy of Model Aeronautics. A night was spent at the home of Walter Good, one of the famous brothers of radio control fame, and a most interesting evening was spent in looking over some of his equipment. A real gem is his latest receiver for fitting into a model, the whole of which would go into a space some 3 ins. by 3 ins. by 4 ins.

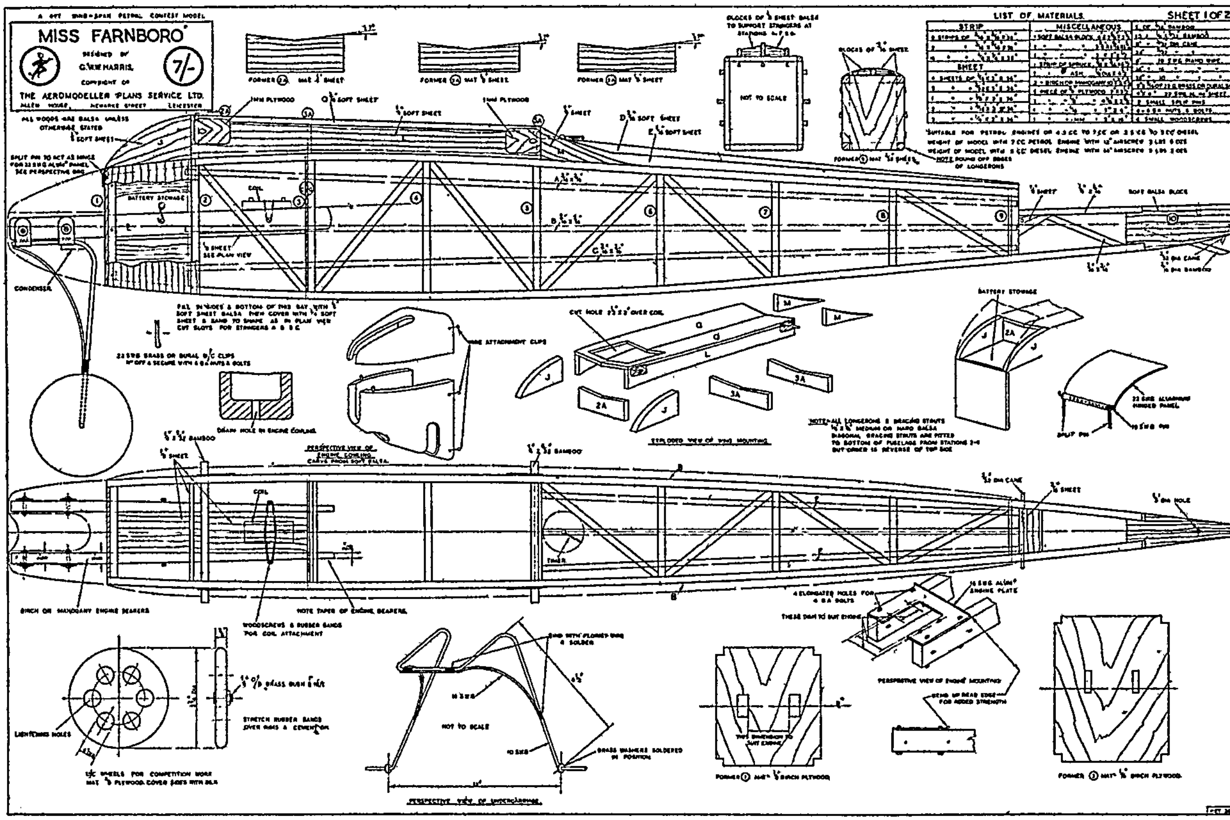
The master-mind, Ray Arden, built this motor in 1908 and flew a model with it (4 cycle).

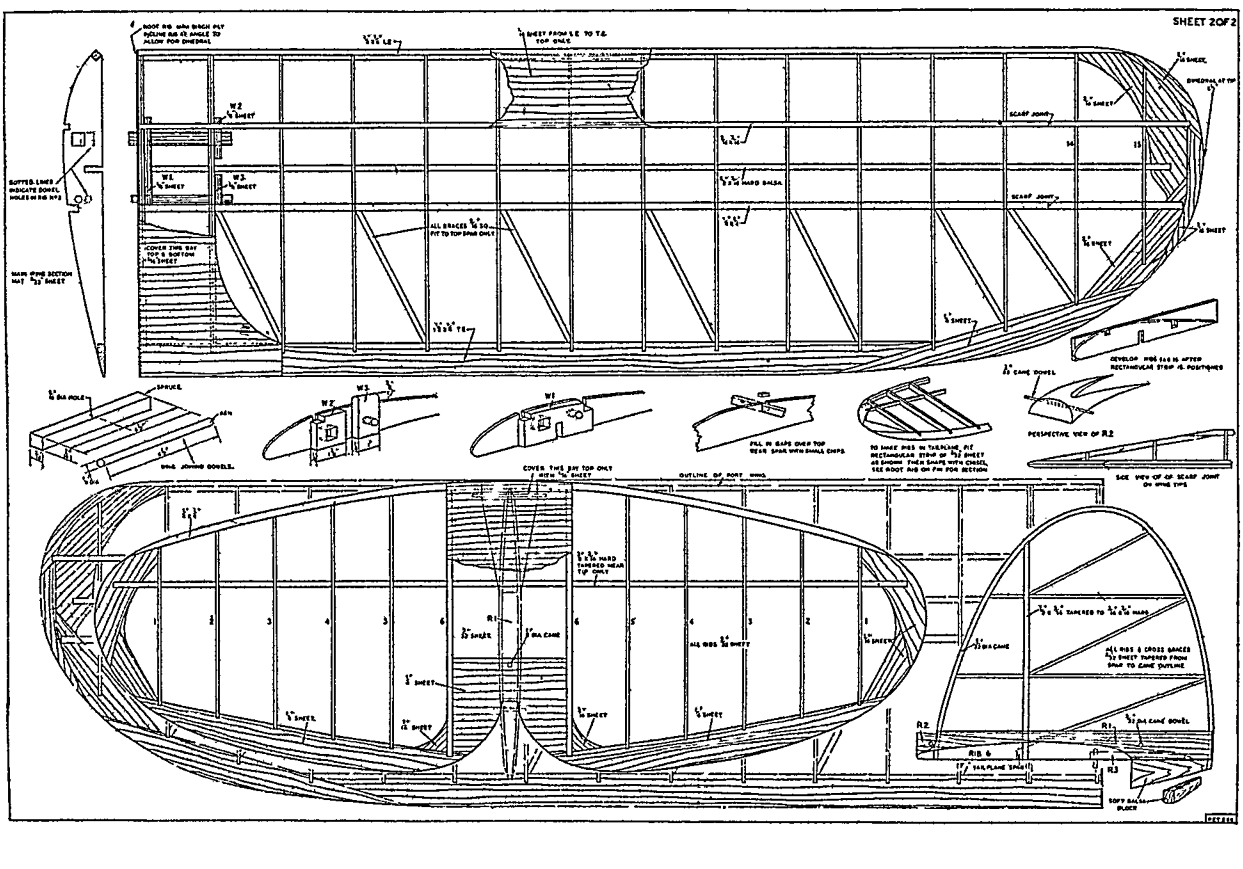
I was welcomed at the Academy by its genial secretary " Russ " Nichols. Much time was spent in discussing the aeromodelling game in general and the possibility of recommencing the Wakefield Contests at the earliest possible moment. The Americans are naturally very anxious to get moving with these as soon as possible, and great pressure was brought to bear with a view to starting in 1947. I had, however, to put the view forward on behalf of the movement over here that travel difficulties and finance would probably preclude competition this year, but we were all for making a start in 1948.

My main impressions are that the American aeromodeller is just as " nutty " as his English counterpart and just as anxious to build 'em and fly 'em as the rest. I had heard much about American hospitality and I can confirm this one hundred per cent, together with the vast amount of friendship I was shown during my brief stay.

My sincere thanks go to all those who made my visit so pleasant, and I for one look forward to the day when the trip can be repeated, preferably at a time of the year when I can visit and survey some of the fabulous outdoor meetings we have heard and read so much about.

Davis Slagle won a truckload of massive trophies with this typical example of American aerodynamic design !


MISS FARNBORO'
7/-
THE AEROMODELLER PLANS SERVICE LTD.
LIST OF MATERIALS
SHEET 1 OF 2


SHEET 2 OF 2

MISS FARNBORO

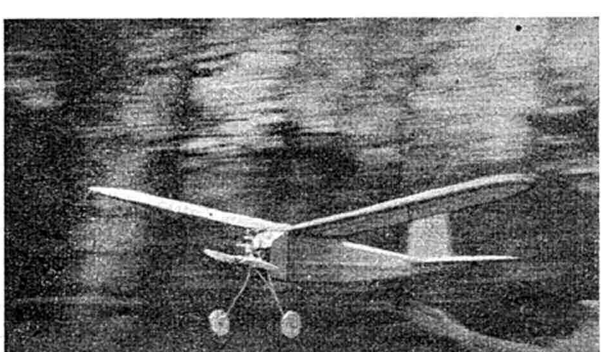
By G. W. W. HARRIS

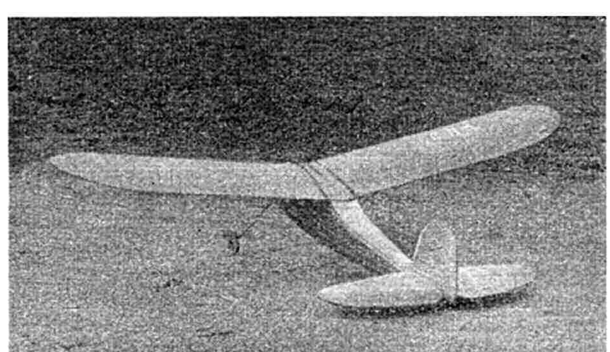
THE original model made its maiden flight the night before the 1945 " Hamley." At this time it was being flown with a 4·5 c.c. engine, which was changed later on in the season for a Super Tiger 7 c.c. engine. Fitted with a 4·5 c.c. engine, the take-off run on full power in still air is 15 feet, followed by a steady climbing circle to the left (150 feet diameter). The glide is what you make it: for contests such as the Bowden we must make sure of the take-off, which means the use of more power than is really wanted, causing the model, once airborne, to gain considerable altitude, and in order to bring it down again within the stipulated time it is best to fly the model under-elevated. With the larger engine the performance can be spectacular. I see no reason why a 9 c.c. engine should not be fitted: there is plenty of stability and strength. On one occasion " Miss Farnboro " glided into a high tension cable, then dropped to the ground some 40 feet below—the only damage sustained was a broken wing-joining dowel and a bent engine bearer plate. Unfortunately the latter was not noticed until the model was flown in the 1945 Bowden Competition . . . Yes, there's a moral in that!

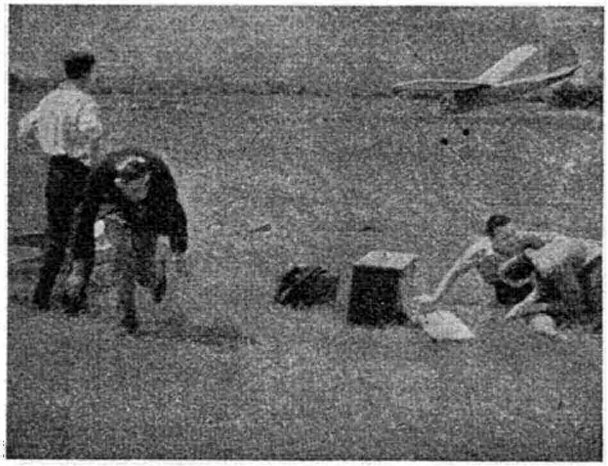
Spend an evening by the fire browsing over the plans: it won't be wasted. Although I hate doing it, I find for convenience it is best to cut out the various portions of a large drawing so that they may be pinned direct onto a reasonable size building board.

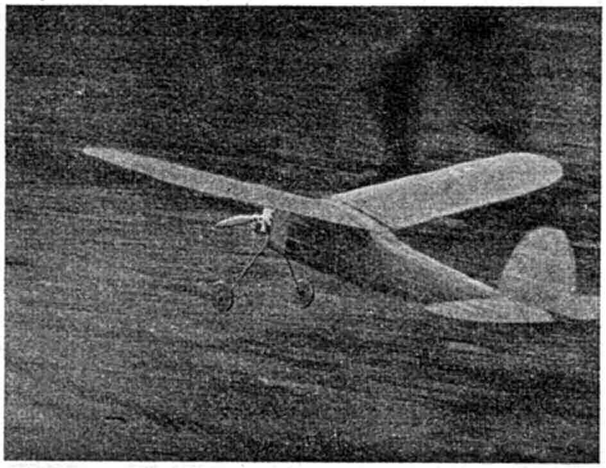
Fuselage. Pin down the fuselage drawing onto your board. Now select four lengths of $\frac{1}{4} \times \frac{1}{4}$ in. balsa of even quality and bendability; the design allows for the use of medium grade if you have no hard balsa. To prevent the structure sticking to the drawing obtain a cake of soap and rub over all joints with it. Now lay the top and bottom longerons on this drawing and set in position with joiner's pins. Cut the vertical struts off to dead size and cement in place, then fit in the diagonals. Fit in a temporary strut between the tail and extremities. When the cement has hardened, remove the job carefully from the board and proceed with the other side; while this is setting, cut out formers Nos. 1, 3 and 9, also the tail block. The fuselage sides are next mounted onto formers Nos. 1 and 3—use plenty of cement and stretch rubber bands over to pull the sides well in place while drying; pull the tail ends together and fit in former No. 9 and again use rubber bands to assist. Next, check formers for squareness on plan view and proceed to fit cross struts top and bottom, followed by the diagonals. Remove temporary struts and fit tail block. Shape up the engine bearers to the dimensions given and fit them into position; use bags of cement for this job, applying successive thin coats, allowing each coat to harden off. The bearers should be checked for alignment with two straight edges laid across them. Now cement on the $\frac{1}{8}$ in. sheet balsa to the underside of the bearers at bay No. 2. Fill in sides and bottom of bay No. 1 with $\frac{1}{4}$ in. sheet balsa, then fit the two side $\frac{1}{4}$ in. sheets and slot them ready for the stringers. Cut out formers 2A, 3A and 5A and cement them in position, fit the side panels L, M and J. Bevel off the top edges of panels L and fit the 3/16 in. sheets Q. Now go ahead and fit the stringers, wing dowels and tail skid.

Undercarriage. This is very easy to make and fit. The method of mounting is unusual but successful. It can, if really necessary, be detached for transport purposes. The wheels detailed in the plans may offend the eyes of many from the appearance point of view, but nevertheless I recommend them for the following reasons:—(*a*) their tractive resistance is low, thus assisting the aircraft to get airborne quickly and reducing the tendency of the aircraft to pitch over when landing, (*b*) drag in the air is reasonably low, (*c*) cheap to produce. I make no apologies for the undercarriage; it was designed for a purpose and it does it. To mount the engine, cut out from 16 s.w.g. aluminium a plate similar to the one in Fig. 1M. By slotting the holes a little it will be









possible to vary the alignment of the engine. Having made sure your engine fits in and lines up O.K., remove and carry on with fitting the coil, timer, and wiring, soldering all joints. Booster connections can be fitted on panel J. Give the fuselage a good clean up with medium and fine sandpaper, removing all sharp edges on the longerons and stringers.

The Mainplanes. Begin by making a plywood or metal template of the main ribs. Lay the template on a sheet of 3/32 in. balsa and cut round it with a razor blade until you have 30 off. Lay the bottom spar on the drawing, supporting it on either side with long pins, and cement the ribs in position. It will be noticed that ribs 1 and 2 are two-ply—cement these together firmly. For the moment do not bother about ribs 14 and 15. With a sharp chisel or plane taper off the trailing edge, slot it and offer it up to the ribs, using plenty of cement. Carry on now and fit the leading edge, top spars and wing tip. Note the joints in the top spars. Make up the ribs 14 and 15 as shown on the plan. The holes for the wing panel joining dowels are best made undersize in the root ribs before the ribs are fitted, then when both wing panels have been constructed the final fitting can be made more easily and accurately with the aid of square and round files. The blocks W3 project through the top surface to facilitate joining up and putting the wing panels apart. Fit the leading edge sheeting and the centre section sheeting, the diagonal struts, and, lastly, the root rib reinforcing sheets of 1 mm. birch plywood. It will be noticed that the square joining dowel has a 1/16 in. diameter hole drilled through its centre; this serves two purposes, firstly by pushing a length of wire or a pin through the hole one can be sure that when the wing panels are pushed together the dowel is centralised; secondly, in the event of a nasty prang the 1/16 in. holes ensure the dowel will fracture at its centre, thus preventing damage to the wing roots. This practice works very well.

Tail Unit. Steam the leading edge to shape, likewise the cane outline of the fin. The fin is integral with the tailplane for speed of construction; if for reasons of transport you want to make the fin detachable you could adopt the same scheme as used on my " Dude," described in September, 1945, issue of the AEROMODELLER.

Covering and Finish. My own machine was covered with red silk and clear doped. I gave the silk on the fuselage five coats of full-strength dope, the mainplane three coats and the tail unit two. I would impress the necessity of clamping down the wing panels and tail unit while each coat of dope is drying.

Preparing for Flight. Fit the engine, connect it up, check your timer and see you have a spark. Fit the wings and check for general alignment; correct obvious errors but try not to alter incidence angles. With a battery in the nose stowage, check the C.G. If the model is a reasonably faithful reproduction of the plans it should balance close to the position shown. If tail-heavy, fit the timer up forward near the battery stowage; if nose-heavy, fit the timer behind the mainplane centre section. The final weight adjustment can be embodied in the engine cowling, if required.

The model can now be hand-launched to check the glide; this should be straight and flat. Get the engine running, give it time to get warm, and adjust the contact breaker until you feel you are about half power (7 c.c. engine), face the model into wind, set timer for 10 seconds (not less), and let it go. It should raise its tail immediately and get airborne in about 15 to 20 feet and climb steadily. When the motor cuts, the nose should drop gently until the model has found its gliding speed. The model must not be allowed to glide in a wavy line. Now try another flight—this time setting the timer to 20 seconds and adjusting your motor for three-quarter power. The model should leap off the deck and climb steeply in a left-hand spiral until the motor cuts, when the glide should be fairly straight. If you have trimmed for the best gliding angle you will find yourself let in for quite a walk. For precision contests such as the Hamley and the Bowden this glide is too good and will have to be spoilt. I find this can be done by adding one or two ounces of ballast to the nose of the model (modelling clay in the battery stowage will do) and slipping a strip of 1/32 in. balsa under the *leading edge* of the tailplane. These adjustments bring the model down fairly quickly without, however, any fear of an upset. You will remember we slotted the engine mounting plate—this was done so that the engine could be turned a few degrees left or right. The engine should be offset to the right until the circle is not less than 150 feet. Additionally, the left wing can be pushed forward about ⅜ in., which will increase the turning circle diameter and give a right-hand gliding circle. In a tight turn this model does not tend to push its nose down.

Full-size Plans may be obtained as usual from Aeromodeller Plans Service, Allen House, Newarke Street, Leicester, price 7/- post free.

ANNOUNCING THE . . .

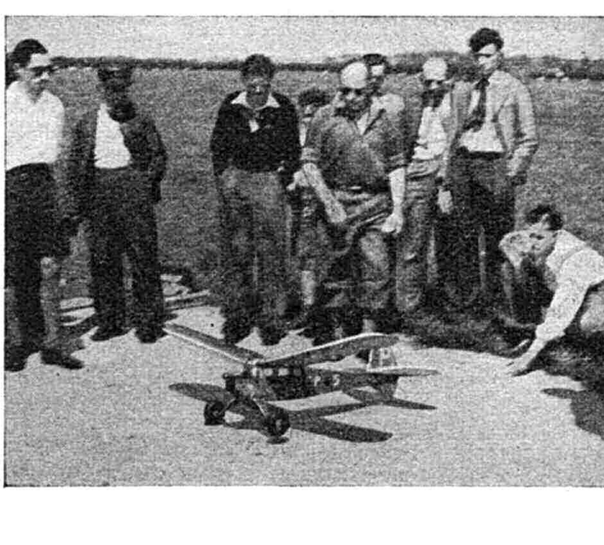
SECOND INTERNATIONAL MEETING AT EATON BRAY

26th July to 4th August

THE Second International Meeting at Eaton Bray has been scheduled to include August Bank Holiday Monday, so that this year our visitors from overseas will have an opportunity of meeting British enthusiasts on three gala days, Sunday, July 27th, Sunday, August 3rd and Monday, August 4th. In addition, mid-week meetings will be arranged, and there will be opportunities for attacks on world records should weather prove propitious. The first meeting last year attracted seventy-seven European enthusiasts, and this year facilities are available for at least a hundred foreign guests.

Apart from the facilities provided for foreign visitors, full catering facilities will be available throughout the period July 26th to August 4th, so that campers can be provided with meals at reasonable charges without any necessity to cook for themselves. All that they need do is to bring an emergency ration card to ensure the traditional " groaning board." Already two enterprising clubs have arranged a combined week's holiday to be spent camping at " the Bray " during this period.

A certain hesitation on the part of British modellers to pit their skill against the might of Europe was noted in the power events in 1946. From what we have seen of our own progress in this field there should no longer be any valid excuse for hanging back. To be quite certain that a truly representative entry takes part we have invited the co-operation of the S.M.A.E. and have addressed personal invitations to leading British competition modellers. Should any such British enthusiast who feels his past record is such as to merit an invitation, not have heard from Eaton Bray by the time this issue appears we should appreciate a line from him, as our file of addresses may not be as complete as we should wish. To prevent an unwieldy entry, eliminating trials are being held on Sunday, July 6th, winners of which will qualify for the International Week events.



Already enquiries have been received from many of last year's visitors from France, Belgium, Czechoslovakia, Denmark and Holland, while it is hoped others will be able to get away from Sweden, Switzerland, Palestine and Italy. We should like to emphasise that this is not an international meeting in the sense of nationally selected *teams* ; it is intended as an annual " get-together " of European enthusiasts to compete individually in a really friendly atmosphere.

A well-varied programme has been arranged to include a Concours d'Elegance at the beginning of each day's flying. On Sunday, July 27th, there will be events for open rubber duration, " Wakefield " formula rubber duration, rubber-powered waterplanes, both seaplanes and flying boats, and a power contest for petrol and diesel models. A start will be made at 11.30 a.m. with the Concours.

Sunday, August 3rd, is scheduled as " Trade Sunday," when members of the trade are invited to demonstrate their latest masterpieces. Again there will be a Concours for the trade and visitors, to be followed by a trade " circus "—or aeromodelling Hendon. Main contest events will be for experimental models, including tailless, canard, rocket, jet, control-line, radio-control, etc.

Climax of the meeting will undoubtedly be the Bank Holiday Monday events, when, after class concours, there will be contests for power models, open sailplanes and F.A.I formula sailplanes. Contests at each meeting will carry points for the Victor Ludorum—or Victor of the Games—who will receive and hold for one year the magnificent Hundred Guinea Challenge Cup presented by the AEROMODELLER. By Monday the field should have thinned out and the ultimate Champion to be found in the " short list." With good flying the finish should prove exciting—only a good all-rounder can hope to win. It remains to discover whether he will prove to be British, or French, or Czech, or who ? On last year's results Fillon would have held the trophy—with British successes in the power events there is no reason why it should not stay at home this year. Come along, either as a competitor or spectator, and be assured of some of the finest flying yet seen at Eaton Bray.

Above. Mr. J. R. Clark, winner of the " Dorland Trophy " lets go for his winning flight at Eaton Bray.
Left. An interesting petrol model, flying recently at Eaton Bray, about to leave the take-off strip.

Lonnie Schoenky launching his small helicopter which was placed third in the senior class at the American Nationals.

HELICOPTERS

PART TWO

BY R. H. WARRING

Free-lance Duration Types.

UNTIL comparatively recently the " duration-type " helicopter was almost exclusively confined to the United States, where helicopter contests were held at many of the important flying meetings. All of their successful models have been of the rotor-fuselage-rotor type, with the attendant problems mentioned in Part 1.

The winning model in the 1946 American Nationals was produced in Part (1) of this series and typifies the present American trend. Built and flown by Parnell Schoenky it recorded an aggregate flight time of 183 seconds for three flights, the best flight being 84 seconds.

The Americans have seldom departed from this layout for pure duration and the model illustrated appears to embody all the requirements necessary for stability and maximum performance.

With a given, or decided, rotor arrangement, the first requirement is minimum structural weight. Duration is almost solely dependent upon length of motor run, for once the power has run out, models of this type simply fall to the ground. Hence a high power : weight ratio is also necessary. A motor weight of at least 50 per cent. of the total weight is used and to accommodate a long motor an extremely long fuselage is called for. The fuselage length of Schoenky's model shown last month is four feet.

One of the most successful Continental helicopters takes a different form, although basically employing the rotating torque tube system. This is shown in Fig. 1.

The torque tube is virtually flying in the inverted position, with a self-setting stabilising fin at the top. Best flight recorded by this model has been 33-4/5 seconds. This system was originated by Rene Neuteleers of Belgium and appears to have found great favour amongst Continental aeromodellers and may be taken as typical of the present trend in those countries.

In describing the British models the writer can only speak of the experiences of his own club for any activities from other sources do not appear to have been publicised and the very few helicopter models seen outside those of the Zombies followed the general lines typified by Brockman's original job shown opposite.

It is only comparatively recently that we can claim to have developed a British design—as opposed to models following the general American trend—and that employing the different diameter rotor system. This has made it possible to group the rotors close together at the top of the fuselage and side area balance achieved by adjustable stabilising fins attached to the fuselage itself—see Fig. 2.

Both the Continental and British designs, then, employ a rotating fuselage, whilst the Americans use a " floating " fuselage. Although in the latter case it is claimed that the fuselage does not rotate we have found that it invariably does, but the effect in all cases is negligible. That is, the efficiency of the stablising fins is not affected.

A common feature of all the models is the stabilising fin(s), the Continental model being unusual in this respect in having this " floating ", and uppermost.

Both the British and American types are capable of flights up to two minutes duration in still air, whilst the potential duration of the Continental layout would appear much more limited. In our own experience the British system is more stable in wind and much more readily handled.

The mode of descent is given relatively little attention in all these models. They fall free once the power has run out, but seldom fast, so that there is very little risk of damage when they do strike the ground. The great danger is to have a helicopter dive into the ground under power, when one or more of the rotors is almost certain to be broken.

The British system can be made to descend in a reasonable manner, with the rotors uppermost and windmilling to brake the descent, but most of the trimming time so far spent has been devoted to obtaining the most efficient rotor settings for maximum power performance rather than worrying about what happens when the power ceases.

Directional Stability.

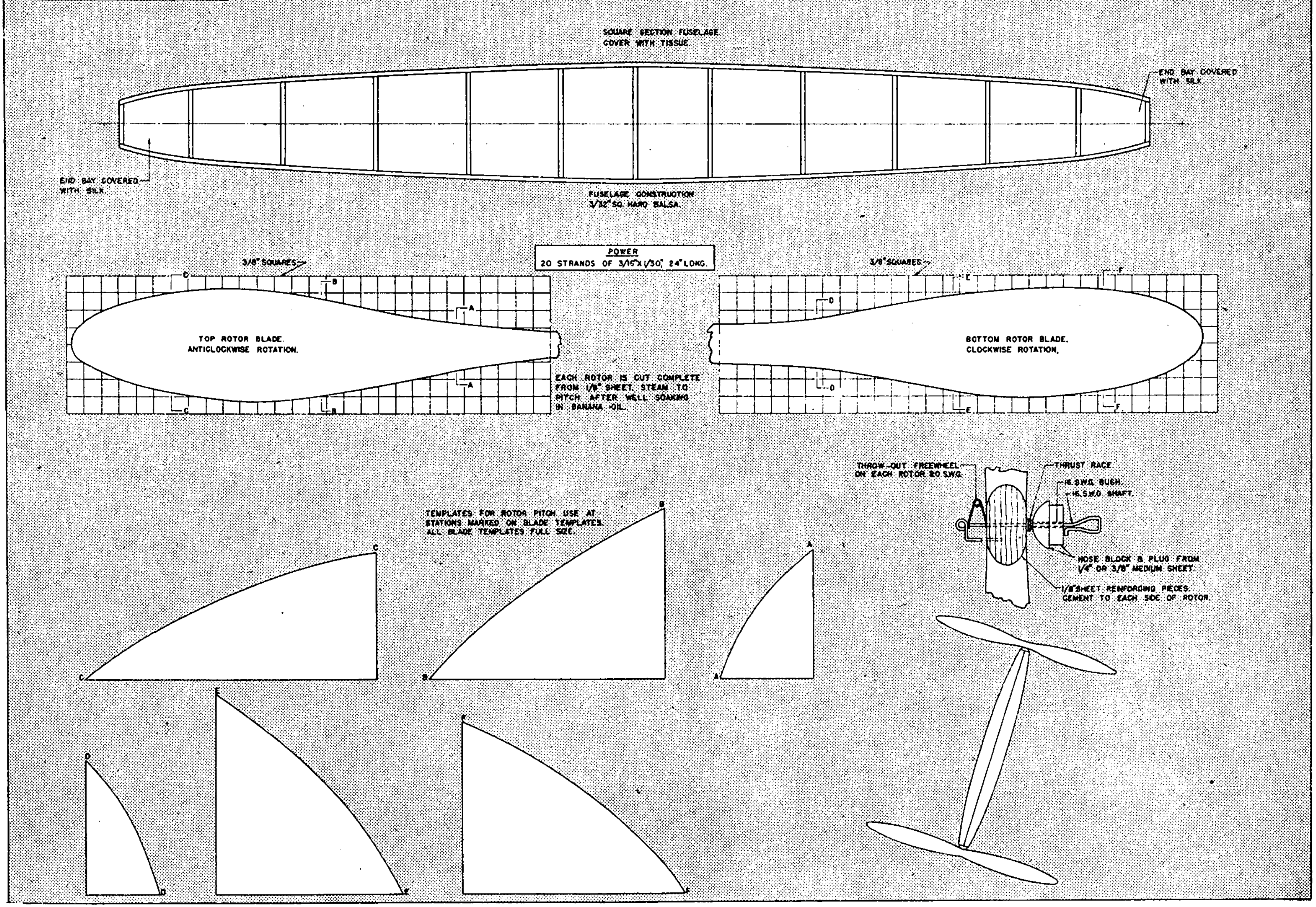
So far model helicopter designers have been concerned with only one direction of flight—upwards! In the course of various experiments we have found it possible to get perfect horizontal flight with the whole helicopter travelling on its side, but that is merely incidental at this stage.

The main requirement is therefore that the model shall continue to point upwards—at least until the power runs out. We have mentioned how unbalanced thrust forces can cause instability in this direction but have yet to consider the effect of side area location.

Although a stick-type fuselage with thin rotors may appear not to present very much side area, this effect is always there. For simplicity, consider a simple helicopter as in Fig. 3 which is ascending vertically and is then suddenly displaced—*e.g.* by a gust of wind. At one moment the model was nicely in equilibrium in

A SIMPLE OUTDOOR HELICOPTER.

DESIGNED BY D. A. BROOKMAN.



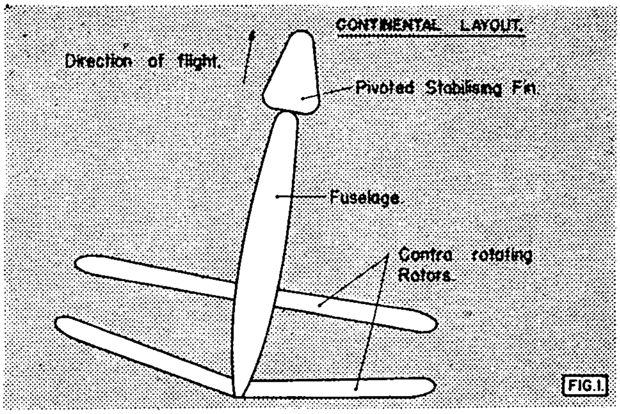


FIG. 1.

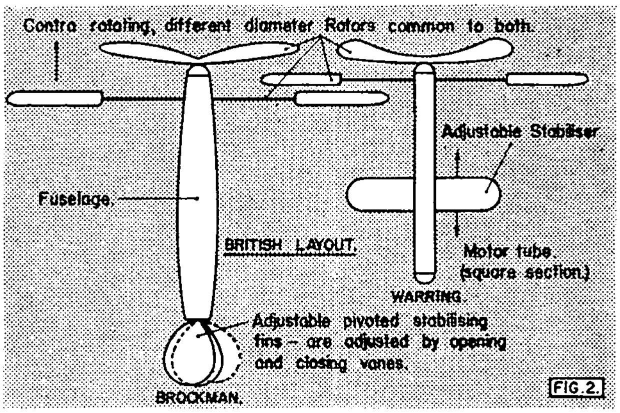


FIG. 2.

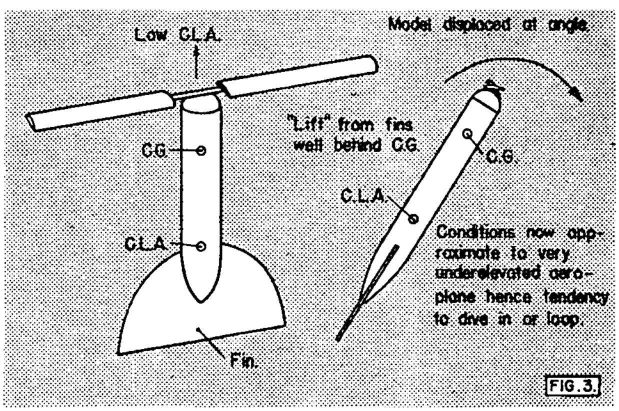


FIG. 3.

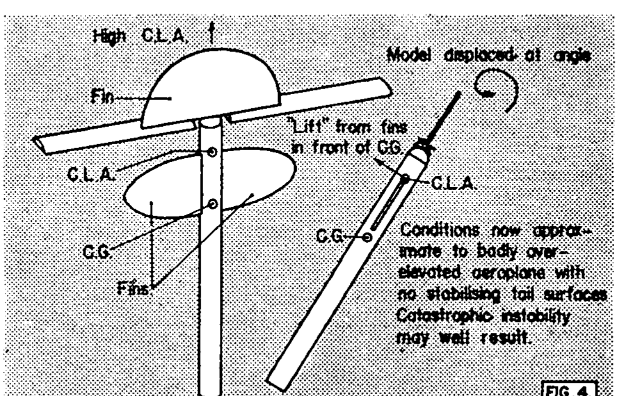


FIG. 4.

In this particular case the side area is concentrated low down by the stabilising fins. When the model tipped over these fins assume some positive angle of attack and hence begin to act like a wing. But the centre of gravity of the whole model is fairly high—hence we have the condition of a lifting surface well behind the centre of gravity, so the model dives in.

With the C.L.A. above the C.G. as in Fig. 4, again we get unstable conditions when the model is displaced from its vertical flight path. A form of catastrophic instability is introduced.

Thus for directional stability the effective *centre of pressure of the side areas of the whole model should coincide with the centre of gravity of the model.*

The only way to achieve this is by experience in placing side areas correctly, or by adjustable stabilising fins or cut-and-try methods with fixed fins. It is virtually impossible to calculate the effective side area of such a model.

The type of stabilising fin on Andre Wattayne's helicopter which will be described in a later article is ingenious in that it acts as a compensator. It has a small dihedral angle and is freely pivoted. It then adjusts itself automatically when in flight with the dihedralled face towards the pressure of air which is strongest and thus applies a drag force counteracting any tendency for the nose to wander.

Spiral Stability.

Spiral instability may be caused by unbalanced rotor thrusts, gyroscopic action, or a combination of both. The rotor thrusts may be perfectly balanced on the different-diameter rotor system with very little trouble, but may be more difficult to achieve on other types. A clue to which type of instability is occurring can generally be found in the part of the flight when spiral instability shows up.

Gyroscopic instability will usually only be noticed towards the end of the power run. When the model has almost stopped climbing and is almost hovering it may suddenly start to swing round into spiralling flight. The model, in fact, behaves very similarly to a gyroscope which has almost run down.

Normally gyroscopic effect is seldom severe with counter-rotating rotors, but is most likely to show up with two-blade rotors. Gyroscopic forces developed by any two-bladed rotor are not constant throughout one revolution, but vary from a negative minimum to a positive maximum. With more than two blades these gyroscopic forces are nearly constant throughout.

Hence three or four-bladed rotors are likely to produce a far more stable model, and if any gyroscopic instability is suspected on a model with two-bladed rotors, these should be replaced by multibladed types.

That form of gyroscopic instability common at the end of the power run is very difficult to eliminate entirely and too much attention should not be given to this at the expense of other, and more important, stability factors.

Rotor settings for thrust balance differ considerably with the three duration-type models under consideration and rotor pitch should be checked carefully against known or given values if unbalanced thrust is suspected or obviously present.

Rotor design is itself a subject of some controversy. Whilst first thoughts would indicate that the rotors should have a changing pitch angle from root to tip—like a conventional propeller with constant geometric pitch—experience has shown that a rotor with a fixed blade angle can give equivalent, if not better, results.

vertical flight, and the next moment several opposing forces are acting on it!

Unless specifically called for otherwise, therefore, rotors with constant blade angle can be used without any serious reduction in efficiency.

Close-spaced, different diameter Rotors.

On this system the upper (smaller) rotor should always have a pitch angle *at least* 10 degrees greater than the lower (compensator) rotor on units up to an overall diameter of 80 inches. On larger sizes this difference may be reduced, but the top rotor must still retain a greater angle.

The bottom compensator rotor must always have enough pitch to ensure that it gives *positive* lift. That is to say, it must have a pitch angle which insures that it is still lifting upwards when the model is ascending at its greatest rate and not downwards in opposition to the top rotor. This latter fault will show up in that the model will climb but slowly, with a rocking motion, or refuse to climb at all.

Given the bottom rotor lifting under all conditions, best duration then results by increasing the pitch of the top rotor as much as possible until the climb begins to taper off.

If the bottom rotor has too much lift it will cause spiral instability, which may be violent enough to turn the model upside down.

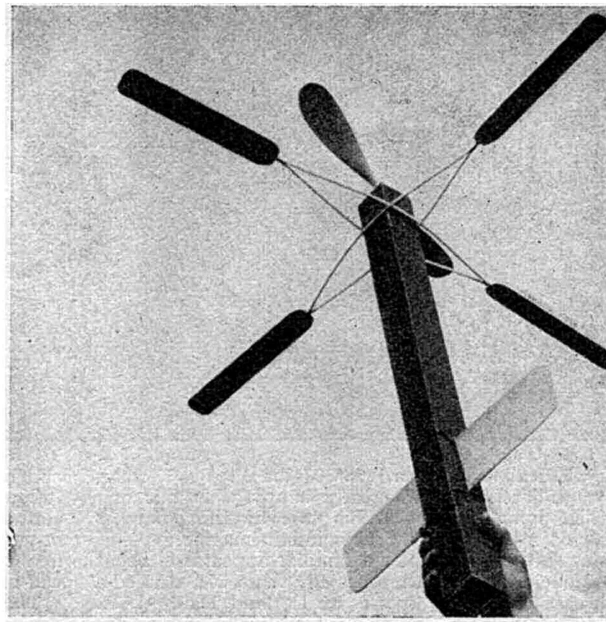
Continental system.

The method of trimming here is to match the speed of rotation of the rotors. Since the upper rotor is attached to the fuselage and the fuselage itself turns, part of the torque applied is used up in this. Hence the upper rotor is given slightly less incidence to reduce drag and allow a balance of speed to be obtained.

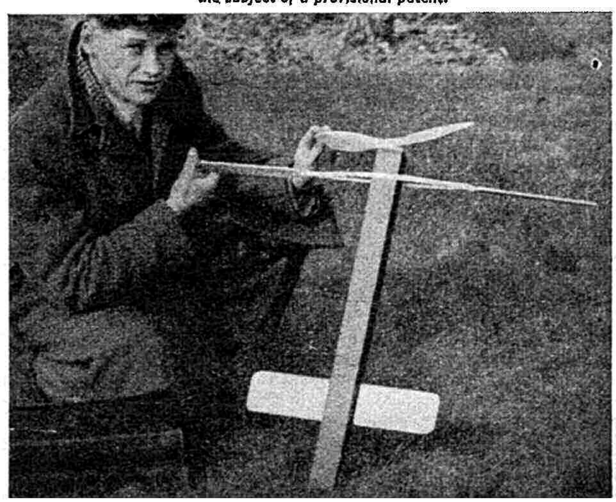
American system.

Although equilibrium can be obtained by various means the best method is to endeavour to match both upper and lower rotors as nearly as possible. An alternative scheme, which is capable of abuse, is to use a lower rotor of larger diameter and slightly less pitch, adjusting pitch and diameter to give a slower rate of revolution than the top rotor.

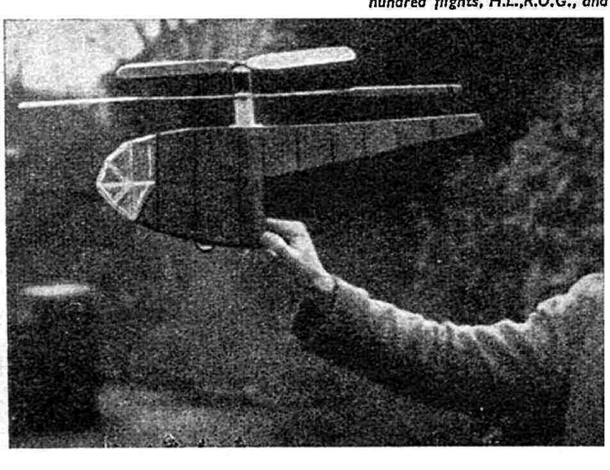
It is quite usual to find carved, propeller-type rotors on these models and even built-up rotors may be washed-out towards the tip approximating to the pitch angle change on a propeller. (*To be continued.*)

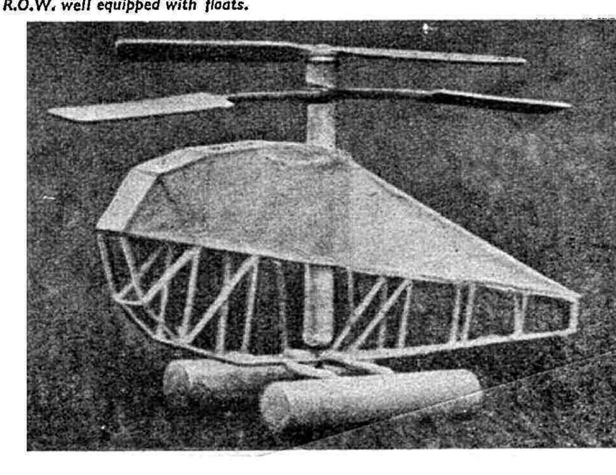


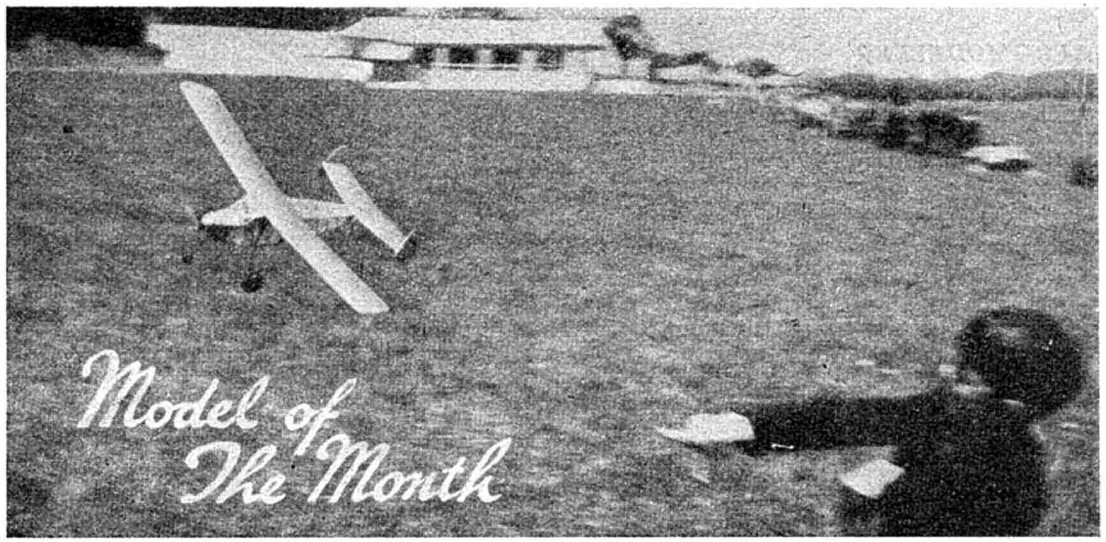
Free Lance Duration Type Helicopter by R. H. Warring fitted (above) with a four bladed and (below) a two bladed compensator rotor. The four bladed system is the subject of a provisional patent.



Below left, the author's semi-scale helicopter which holds both British R.O.G. and R.O.W. Helicopter Records. Below right another model which has made over six hundred flights, H.L.,R.O.G., and R.O.W. well equipped with floats.







Model of The Month

MODEL NEWS

SELECTED ITEMS BY FLIAR PHIL

WITH all due regard for Major F. B. Thomas, Fliar Phil is not really happy with this new fangled flying—in fact in his case anything farther removed from " control " he couldn't imagine.

Most people will notice a familiar appearance about our Model of the Month, especially those who studied a showcase full of the species at Dorland Hall. J. R. Clarke of Welwyn Garden City built this diminutive Dorland, scaling it down to half size from the standard plans, and handed it over to his small son to fly at Eaton Bray while Father attended to winning the Dorland Flying Trophy, which he did very ably, thus putting himself amongst the prize-winners in both the building and flying competitions—a notable achievement. The little model flew like a bomb, its favourite tactics being to swing up in a tight loop and hurtle down out of the sun to hit any unwary spectator in the back of the neck.

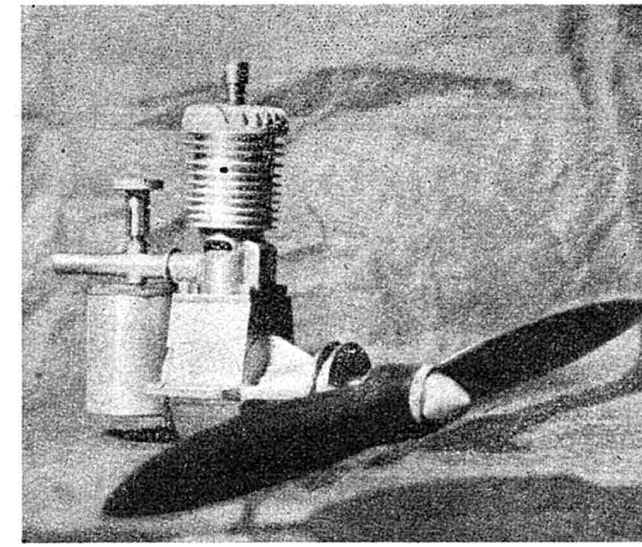
Fliar Phil has already published several photos of last year's R.A.F. Group Rally at Little Rissingdon. The photo below left was taken at the second of these Rallies held under the auspices of Air Vice Marshal Ledger, C.B.E., at Feltwell, Norfolk, on the 30th April. It shows a very interesting glider designed by Cadet Dunn from Halton, which features an L.D.C.2 section and knock-off fixtures for every component. Wings, tail, booms and pod are thus all easily removable on rearwards-pointing sliding dowels. The model's performance was as good as its appearance is interesting, and it is refreshing to see a model out of the usual formula though not in the least inelegantly so. This Group Rally, it is hoped, will become a regular annual event or perhaps even more frequent than that. There is no doubt that such semi-official encouragement for the sport will play a great part in the development of our hobby.

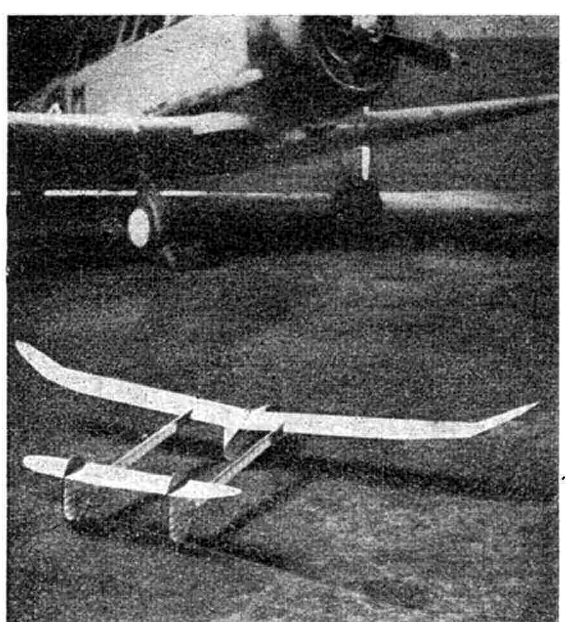
There is certainly no lack of enterprising spirit amongst the younger fraternity, as several recent photographs in this feature have shown. It seems to Fliar Phil that the " Whither Aeromodelling ? " mutterings of the pundits has little foundation in the face of the unbounded enthusiasm of the up and coming generation. Fifteen year old reader P. G. Elliston of Barnsley is characteristic of the times and sends us a very nice flying shot of his Kirby Cadet sailplane, four-foot span, which he designed and built himself. The wings and struts, very sensibly, are made to knock off in case of hard landings. A consistent average of around the minute mark is turned in with a best time so far of 80 seconds.

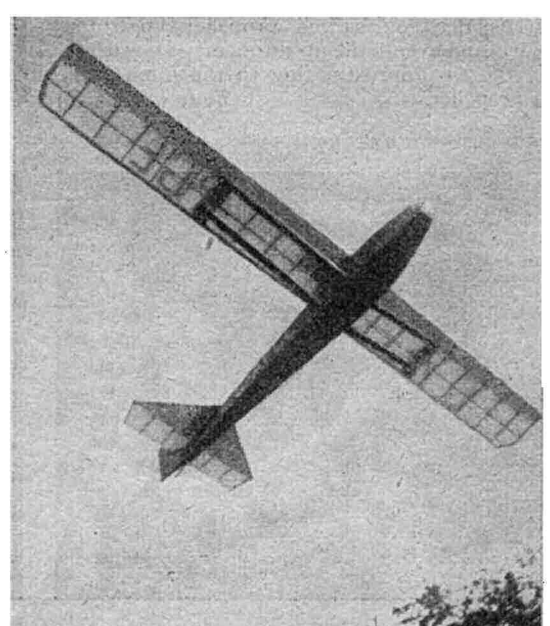
The AEROMODELLER 5 c.c. diesel has turned in pukka performances all over the country, to judge by a fair number of readers' letters that Fliar Phil has scrutinised. Not only all over this country, however, for the reliability of this design of L. H. Sparey's has attracted many busy hands abroad, especially throughout the Empire. L.A.C. Milward, serving with India Command, showed us the photo, top centre, of his own very pretty effort, a really creditable piece of work in the face of far from ideal conditions. The crankcase is somewhat different from the original owing to the fact that the specified materials were very difficult to obtain and for this particular component a piece of 3 in. diameter dural had to be " carved " to shape. The whole engine took about one hundred and twenty hours to make and has given no trouble in running. Here again lack of specified materials caused some experimentation with fuel mixtures, so hundred octane petrol, lubricating oil, and some ether carefully snaffled from the sick quarters were pressed into service. Other interested dieselmen may care to try the winning mixture—six parts ether, three parts hundred octane, and two parts oil.

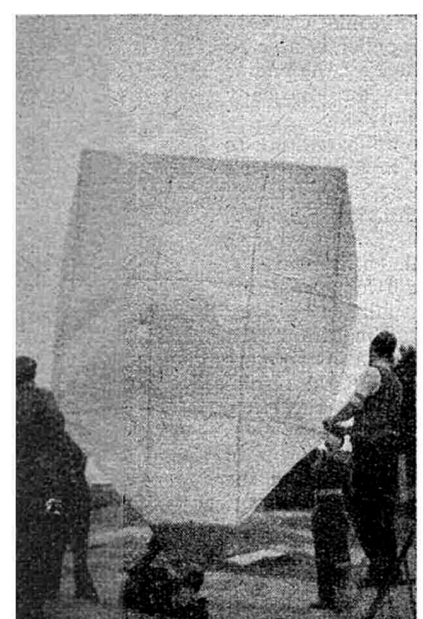
Once again Fliar Phil is pleased to hand out the laurels for a very nifty piece of modelling and photography. Our old friend Cyril Spray of Canada contributed both sections in the photo, top right. The model, of course, is a D.C.3 built from a three dollar American kit. The span is about eighteen inches and the finish is excellent. Only one little thing mars the arrangement in the photo—the old bogey of props that should be moving but aren't. Still, this is far from being the first photo that has suffered from this fault, and it is not likely to be the last, despite all Fliar Phil's hopeful haranguing.

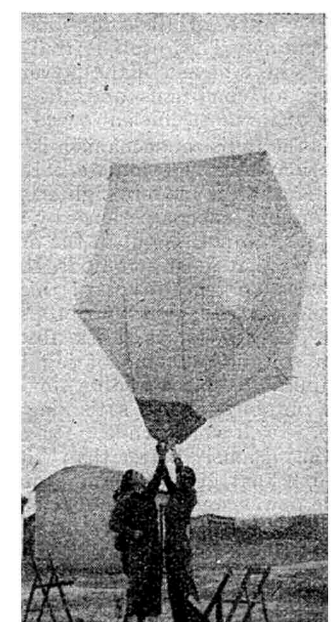
The subject of the last row of photos below is always a difficult one for this column. Any mention of hot air and the critics snigger quietly in the shade of their high pylons. However, hot air it is, in large quantities, that makes these contraptions work. They would not have found a place in Model News in the ordinary way, but they were the brain children of a group of balsa-starved enthusiasts who while serving in Palestine, felt someone really ought to make use of the plentiful wide open spaces. Modelling supplies being practically unobtainable out there, the endeavours of the bunch, led by 2nd/Lt. R. C. Knowles, were turned towards hot-air balloons. The main envelope was usually made from heavy tissue, or in the case of big balloons from light silk. A wire frame held the lower end of the envelope open, with a hinged wire cross-bar supporting a meth-soaked pad of cotton wool that kept up the supply of heated air. A neat form of " dethermaliser " is fitted by tying the bar in place at one end with thread, leaving a few inches hanging. The thread is lit when the balloon is full and released, and after a time burns through to release the hinged bar which then drops and jettisons the burning wadding. This prevents the balloon flying too far and also stops any risk of catching fire on landing. In the photos below, from left to right, are shown the various stages of release—filling, holding, releasing and the balloon well away. Note the primus stove in one of the photos which is presumably used as a " booster " for take-off !

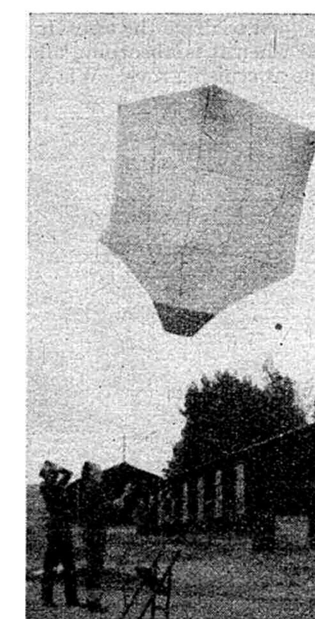


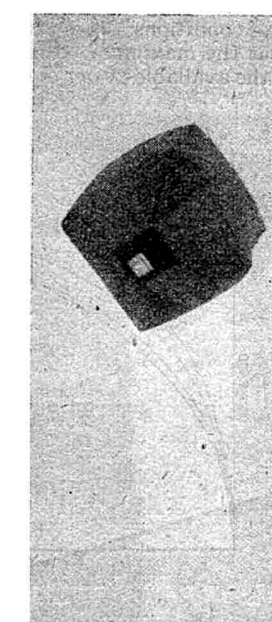


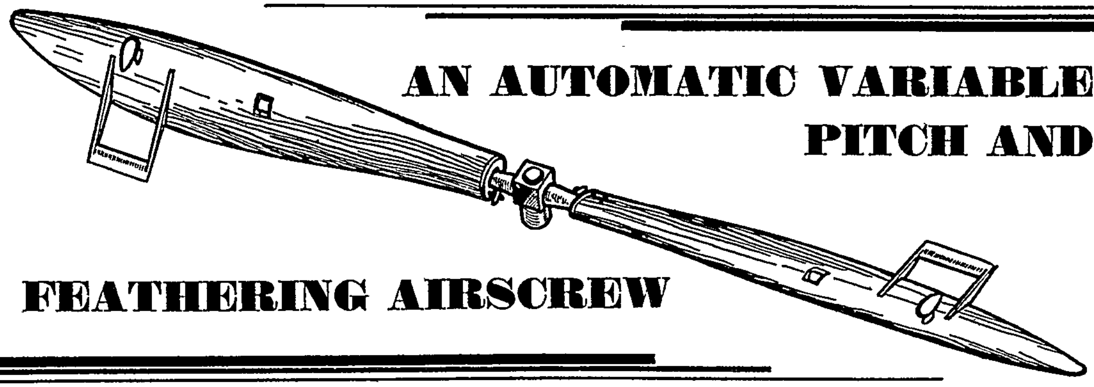












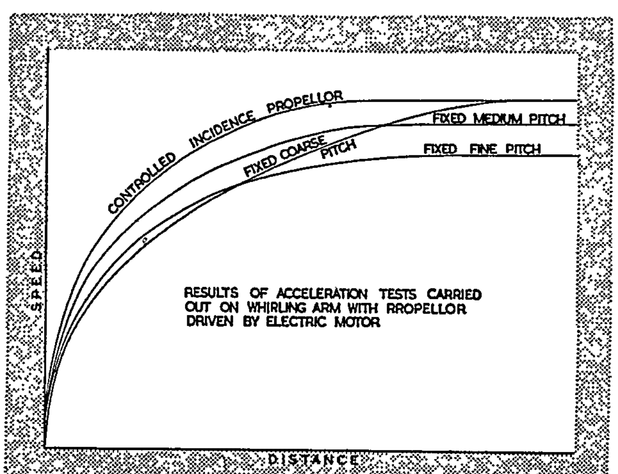
AN AUTOMATIC VARIABLE PITCH AND FEATHERING AIRSCREW

BY D · H · RUTHERFORD

WE have often seen the design of various features of model aircraft give a lead to, or at least anticipate, the designs of the full-size article. For instance, every aeromodeller knew and practised the advantages of the monoplane while the majority of full-size designers were still enveloped in a maze of struts and wires. But in one branch at least the full-size people have stolen a march on us. The majority of modern aeroplanes sport highly complex and highly efficient constant speed variable pitch airscrews. The complexity of these elegant pieces of mechanism seems to have rather frightened off the average aeromod, for with very few exceptions, little seems to have been done to catch up with the "full-sizers." True, schemes have been put forward, and in some instances experimented with, to use the tension of a rubber motor to adjust the pitch, and I seem to recollect that our esteemed D. A. R. proposed using a centrifugally controlled constant speeder. No, I fear the modeller's idea of efficiency is still the folding single blade.

This unsatisfactory and stagnant state of affairs has been worrying me for some time ; so much so that I have got down to some research (high brow for sweat and midnight oil) on the subject, to such effect that a report of progress appears to be indicated, so here goes !

A fixed pitch propeller always has to be a compromise ; it can only be at its most efficient under a particular set of conditions. It is usually designed to drive the aircraft at the maximum possible speed when it is absorbing all the available power of the engine at cruising revs. When the machine is moving slowly, as at take off or when climbing, the pitch of the propeller is too coarse to be efficient, its torsional drag is high, it absorbs a lot of power and doesn't give much thrust. This is all because the angle of incidence of the blades is excessively high under these conditions, the blades may even be stalled, and consequently the lift-drag ratio is low and the efficiency is likewise low. When the aircraft is moving slowly, in order to keep the angle of incidence of the blades at its most efficient value while the engine is running at its most efficient speed, the pitch of the blades must be fine, while when the machine is moving fast with its engine still at the same speed, the pitch must be coarse. The constant speed airscrew, by means of an engine-driven governor and a hydraulic or electric motor, automatically adjusts its pitch in such a way that its torsional drag is always just sufficient to keep the engine speed constant at the value selected by the pilot. Thus, when the pilot is ready to take off, he sets his speed control lever to the revs. he wants the engine to run at and then opens the throttle. When the engine revs. reach this value, the pitch of the propeller automatically increases until its drag is just enough to stop the revs. from rising any higher. As the machine is stationary, this occurs at a fairly fine pitch, and the thrust is consequently high, producing good acceleration, but as the machine accelerates, the engine revs. tend to increase, so the pitch of the prop. increases automatically to prevent it. The result is that the propeller is able to make the best use of the power supplied by the engine under all conditions and the engine is automatically kept at its most efficient speed of revolution.



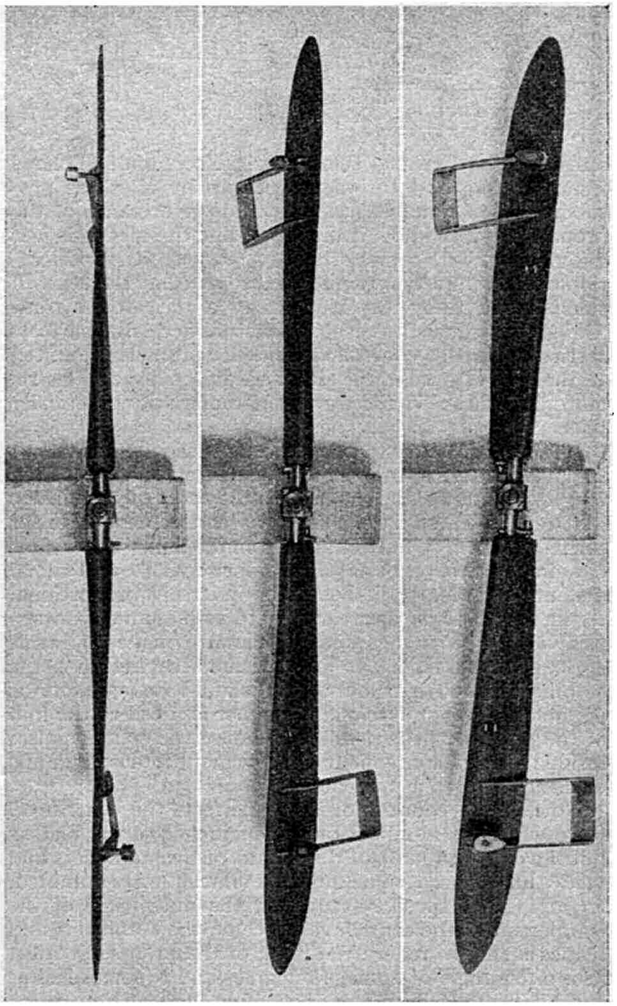
As the full-size mechanism is very complicated, not to mention heavy (complete aeroplanes have been built lighter than a modern fighter propeller !) any attempt at copying, except perhaps by a watchmaker (which I, for one, am not) is out of the question. Combined with the fact that most aeromods. have little equipment, the vagaries (and crashery) of this life call for something simple, particularly as our props. are usually in the very best place to act as shock absorbers. I'm afraid that even so, the outcome of my labours is a little more complicated than a folding single blader, but the results I've obtained are so satisfying that I think the extra work is well worth while. The acceleration that it gives is conspicuously better than with a fixed pitch prop. of a pitch that gives the same maximum speed with the same power, and, though it is not designed as a constant speed airscrew, when it is fitted to an i.c. engine, it can be adjusted to give practically constant speeding, so that the engine can be run up to full revs. on the ground and the mixture properly adjusted, with the assurance that it will continue to run at about the same speed whether it is climbing or diving, and when the engine stops, the prop. will feather itself most efficiently.

I call my design the " Controlled Incidence Propeller " because the pitch is controlled by direct adjustment of the angle of incidence of the blades. To forestall an avalanche of protest, let me hasten to add that this doesn't mean that the angle of incidence is necessarily kept constant, because that isn't usually a desirable state of affairs at all, and it is quite simple to adjust the propeller to give any desired results.

The principles involved are very simple. I have considered the blades as being wings and I have fitted each of them with a stabilizer to control its incidence in exactly the same way that we fit a tailplane to an aircraft to act as stabilizer and control the angle of incidence of the mainplane, or if we are bitten by the " tailless " bug, we can give our prop. blades a little backsweep and wash out the tips to give the necessary stability. I haven't tried out the latter scheme, but I see nothing to prevent it being done with success. The result of this arrangement is that while the aircraft is stationary with the prop. revolving, the blades are held in fine pitch, while as the machine accelerates, the pitch automatically increases and is always maintained at the desired value for the particular conditions of forward and rotational speeds prevailing. Thus, greatly improved acceleration and rate of climb are obtained. I'm quite well aware that it's a crazy scheme, but it has the saving grace that it actually works.

In practice, the blades are mounted on bearings attached to the boss in a similar way to a full-size variable pitch propeller, but the bearings can be made much simpler than the full size ones. In fact, the bearings of my first effort were nothing short of crude, being simply bits of brass tube lashed to the blades and running on a spring wire spider fitted to the boss. In my more refined later design, I use brass blocks embedded in the blades and having holes that are threaded over pieces of spring wire which project radially from a fairly substantial metal boss. The wire projects as far as possible into the blade to give it adequate support, and a little brass collar is soldered on to the end to retain the blade. This solder must be really good because the centrifugal force on the blade may be quite high, and few happenings are more disconcerting than to have prop. blades wandering off on their own at high velocity along unpredictable trajectories ! Be careful not to underestimate the effect of centrifugal force. A blade weighing half an ounce and six inches long, revolving at 3,000 r.p.m. is trying to pull itself off its hub with a force of about 24 pounds, and if it suddenly breaks away, it will be travelling at about 50 m.p.h. The bearings should be quite free, but not loose enough for the blades to rattle about. A very small quantity of oil can be applied, but it soon gets thrown off. It is probably a better proposition to insert dry graphite into the bearings when they are being assembled, as it stays put much better than oil. Better still, there are special bronze self-lubricating materials that are impregnated with graphite and don't need oil; these may be used with advantage if you can get hold of any.

The blades should be of twisted form like full-size ones, so that at cruising speed the propeller has a true helical form to enable all parts to give of their best. Under other conditions, of course, the form will not be truly helical, but this is an inherent difficulty with all variable pitch propellers. The propeller should in fact be designed to suit cruising conditions, using normal methods of design.

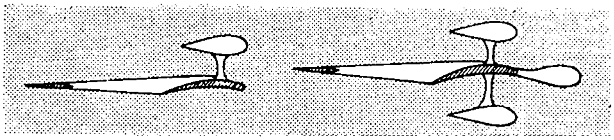


Feathered *Coarse Pitch* *Fine Pitch*

The stabilizers will then look after all other conditions.

Having got the blades mounted on the boss, they are each provided with little outriggers or booms carrying " tailplanes " or stabilizers. I have fitted mine about two-thirds of the blade length out from the boss. This is about the best position for them because this part of the blade contributes most of the thrust. They don't have to be very large, about 1 in. by ½ in. for a 12 in. diameter prop., and about one and a half blade widths behind the trailing edge of the blade. They are quite thin and should be sanded to a streamline shape. The relationship between the stabilizer and the blade is determined in much the same way as that between a mainplane and a tailplane, that is, so that the stabilizer holds the blade at an angle of incidence of about 6 degrees under normal working conditions. This figure won't necessarily remain constant when the prop. is operating as I mentioned before and as I shall now enlarge upon.

Centrifugal force acting on the blades and stabilizers has the effect of pulling the blades into fine pitch all the time unless we take precautions to prevent it, in spite of the efforts of the stabilizers to control their incidence. This can be overcome by fitting counterpoise weights to the blades, mounted on arms projecting at right-angles to the stabilizers. These counterpoises should be



streamlined to reduce their drag. Now don't all howl that the drag and turbulance set up by all these protuberances is going to muck up the performance of the prop., because I know it ought to, but the fact is it just doesn't, and with a properly adjusted prop, the acceleration of the aircraft is so much improved that the take-off run is reduced by anything up to about 40 per cent. The graphs show the results of actual acceleration tests carried out with a controlled incidence propeller mounted at the end of a whirling arm and driven by an electric motor having speed and torque characteristics practically the same as a petrol engine.

It is not necessary to place the counterpoise weights at the same distance from the hub as the stabilizers. They may, for instance, be attached to the roots of the blades, but they will then have to be heavier to compensate for the reduction of radial distance from the hub. The weight has, in fact, to be inversely proportional to this radial distance. Similarly, it has to be inversely proportional to the length of the arm carrying it, so it is an advantage from a weight-saving point of view to make the arms as long as possible. It goes without saying that the stabilizers and their outriggers should be as light as possible. If a large diameter spinner is fitted to the hub of the propeller, it is possible to house the counterpoises inside it with a consequent improvement in aerodynamic efficiency as well as appearance.

Now, if the counterpoising is perfect, the centrifugal force will have no effect on the incidence of the blades, but if we leave a little of the weight of the stabilizers and blades unbalanced, some quite useful results are obtained. At any given speed of rotation, the magnitude of the component of the centrifugal force on the stabilizers and blades trying to reduce the pitch of the prop, is greatest at a pitch angle of about 45 degrees and becomes less as the pitch angle decreases, becoming zero at zero pitch angle. As the pitch angle at the point where the stabilizers are attached will never normally exceed 45 degrees, we can, for practical purposes say that the pitch reducing effect of centrifugal force increases as the pitch angle increases. If we over counterpoise, the effect is, of course, reversed. If we accurately counterpoise and allow the angle of incidence to remain constant, at high pitch angles the torsional drag of the prop. increases, thus tending to reduce the speed of revolution, a very undesirable state of affairs as it occurs at high forward speeds, but if we leave a little of the stabilizer and blade weight unbalanced, the angle of incidence will be reduced as the pitch angle increases, thus tending to keep the rotational speed constant provided the torque remains constant. I have arranged my counterpoise weights to be a tight sliding fit on their arms so that I can adjust them in or out until I get the results I want. It only takes two or three shots to get it right. A little consideration will show that the stabilizers will also try to keep the speed of rotation constant, because, in the same way that a stable aircraft increases the angle of incidence of its mainplane and starts to climb when its airspeed is increased, when the propeller is revolved faster the angle of incidence of the blades will increase, thus increasing the thrust and also the torsional drag, which in turn prevents the revs. from rising as high as they want to.

It will be pretty obvious that when the power gives out and the prop. stops revolving, the stabilizers will trail out behind the blades and feather them. In fact, if they are left to their own devices, they will rotate the blades beyond the fully feathered position, so it is an advantage to fit stop pegs to the roots of the blades and to the boss to make them feather to the position where they give least drag. It's also advisable to fit stops to limit their movement in the other direction, that is to say, to prevent the pitch from decreasing below a fixed minimum. This practice is of particular value when the prop. is driven by a rubber motor. When the propeller is first released, the torque is at its greatest, and if the pitch is allowed to become too fine, the prop. will race, and although it will produce enormous thrust and acceleration, you can have too much of a good thing, and I've found it best to limit the fine pitch to a value that gives sufficiently rapid take off and climb without using up too many valuable turns. The increase of incidence with increase of revs. which I mentioned before helps to conserve turns by increasing the incidence at the beginning of the run and reducing it as the prop. slows down when the torque decreases. The result is that we use our rubber to full advantage throughout the run.

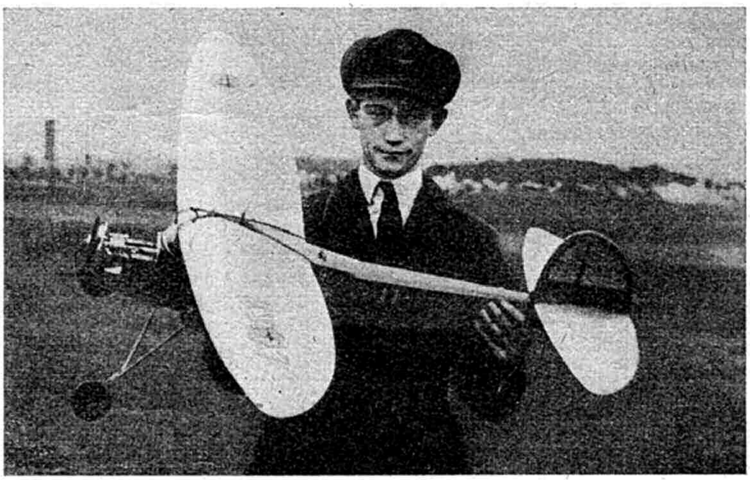
When the propeller is driven by an i.c. engine it will, of course, need to be rather more substantial than when driven by rubber, as otherwise the bearings will tend to hammer and wear unduly. There is also a further precaution that should be taken. A two-stroke has the rather disconcerting habit of varying its speed cyclically during each revolution, for during the firing stroke the engine is turning the propeller, but during the compression stroke the prop. is turning the engine. A four-stroke is much worse, but four strokes are rare on aircraft, anyway. Due to the inertia of the stabilizers and counterpoises, the continually recurrent acceleration and deceleration tends to make the blades flap, which isn't conducive to high efficiency. Fortunately we can easily neutralize this effect by placing further counterpoises opposite to the stabilizers and first counterpoises.

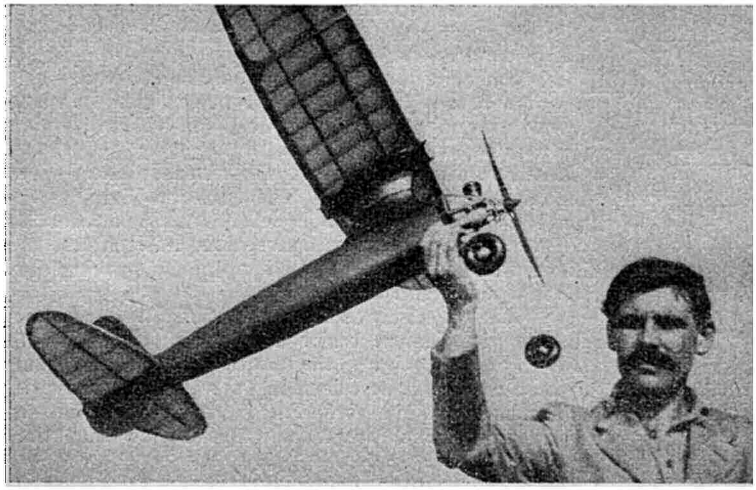
In action, when the propeller first starts to turn, the stabilizers pull the blades into fine pitch, in fact the pitch angle will equal the angle of incidence unless we have fitted a minimum pitch stop. As the propeller starts to turn, it starts to move a column of air backwards, and as this air accelerates, the pitch angle automatically increases and the thrust is maintained at a high value so that the aircraft accelerates much faster than it would do with a fixed pitch propeller designed to suit cruising conditions. When the machine reaches cruising speed, the pitch will have increased to the correct value to suit this condition. When a fixed pitch propeller is moving an aircraft from rest, it is at first stalled because its pitch is too high for this condition, and so the thrust is poor and the acceleration of the aircraft low.

I am not going to suggest that the present controlled incidence propeller in any way approaches the ultimate in design, but I think it is an advance and I hope it will encourage others to embark on a study of the problem. I am continuing my investigations and hope to be able to report progress before very long. One of the principal problems that has to be solved in producing any type of variable pitch propeller is that of providing satisfactory bearings for the blades. Full-size propellers have pre-loaded ball or roller bearings which have to be capable of transmitting terrific horse powers and standing up to centrifugal force of the order of 50 tons. They are consequently so stiff that they require considerable force to rotate them, and in any case this type of bearing would be far too heavy and complicated for a model.

Probably one of the oldest active aero-modellers, NORMAN LEES is almost as well known all over the country as he is in the North. Building models from birch, spruce, wire and silk when Bleriot flew the Channel, he was a founder member and Chairman of the old Halifax M.A.C., and is at present Vice-President and Competition Secretary of the Bradford M.A.C. British Seaplane Record 1938, Pilcher Cup 1939, Wakefield Team 1939, Runner-up Individual Championship 1940, are a few of his laurels. His early taste for Wakefields is inherited by son Dennis, who is taking over while Lees Senior turns to less energetic power modelling.

Jet and power enthusiast, F/Lt. J. A. LONG is a familiar figure at most National power events, when service duties do not preclude his attending. Made history as the first modeller to make a recorded flight with a free flying jet-propelled model, powered by a jet unit of his own design. At present little is known of his particular interests, but his attraction to power flying has never waned. The photo right was taken after he had won the power contest at Little Rissingdon last year—one occasion when his usual bad luck gremlin did not officiate.

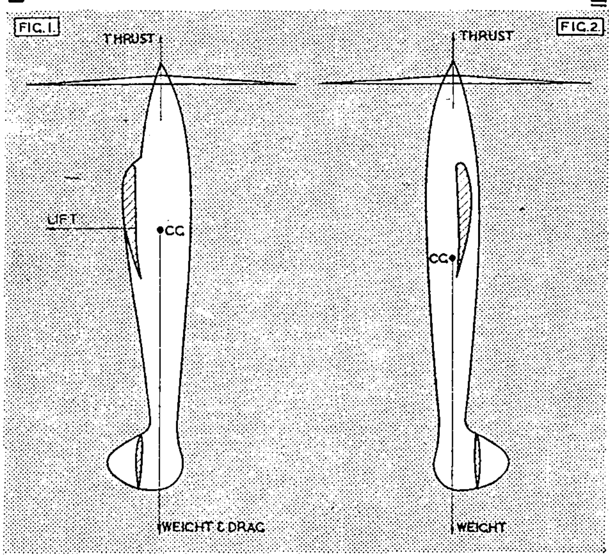


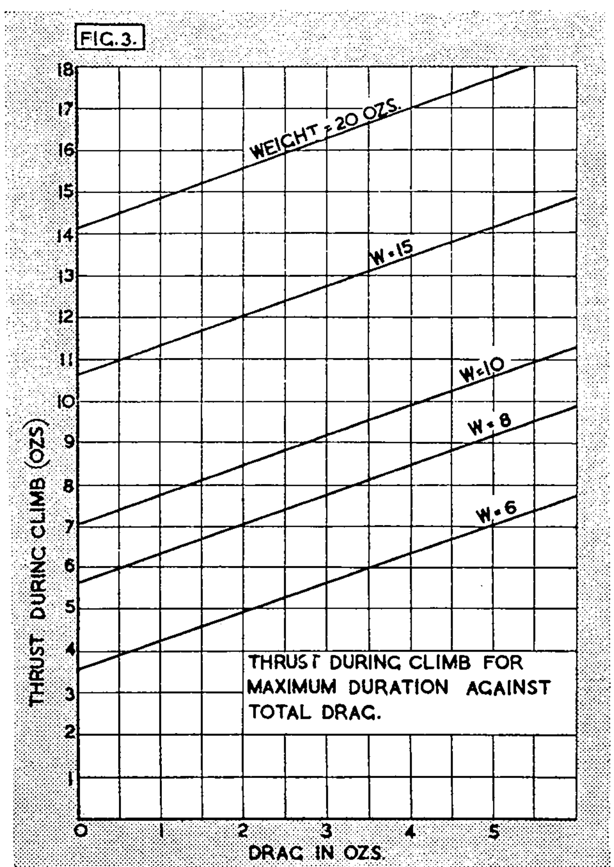


A frequent visitor to Eaton Bray, H. C. AITKEN of the Non Coms M.A.C. from Bedford has often figured in the prize winners. 25 years old, a refrigeration engineer, he started modelling in 1938 with a Wakefield by Bullock. Now one of the growing band, after four years F.A.A. service, of addicts to the lightweight pylon polyhedral powerhouse formula. Takes time off occasionally for gliding, however, as when he won a first and second at Eaton Bray with his Sunnanvind, 8 mins. o.o.s. Incidentally, only his friends can recognise him now, as he informs us that his ferocious "fungus" is a thing of the past.

AERODYNAMIC DESIGN PART IX

BY JOHN HALIFAX





WE saw last month that the problems associated with climbing flight are by no means as simple as theorists have tried to tell us in the past. For instance the much-used rate of climb formula which is based upon excess horsepower and total weight is hopelessly inaccurate when large climbing angles are considered—and this is an age of phenomenal ascents; which brings us back to the most important feature of the subject—the fact that airspeed varies as that rather objectionable symbol:

$$\sqrt{\cos\theta}$$

—where θ is the climbing angle.

In other words, if we call the flying speed in normal horizontal flight V_t we get

Climbing speed $= V\sqrt{\cos\theta}$ . . . equation 1.

Mathematicians please note : Lift is not equal to weight during the climb, but to a component of it ($W\cos\theta$) Substitute this in the flying speed equation, and the inference above follows automatically.

Now when a machine is climbing vertically $\theta = 90°$ and the cosine of this angle is zero. In other words, flying speeds is zero at 90°, according to equation 1. That this is untrue is manifest from Fig 2, and observation on the flying field : considering only the former, it is obvious that if the static thrust exceeds the weight, the model *must* move upwards *à la* helicopter.

As a matter of interest, your scribe once saw a machine do this without any " downthrust " at Halton aerodrome just before the war. A certain veteran who shall be nameless had constructed a missile from birch plywood and spruce, and for all that its thrust exceeded its weight. Leaving the ground rapidly it quickly assumed a vertical attitude. Thus it would have done excellently, but unfortunately, it did not stay thus, and observing its probable flight path I put myself flat on the ground as quickly as possible. The model continued the " rocket loop " under full power, and impaled the sod with horrible force.

The cause is shown in Fig 1, where it is obvious that an unbalanced lift force is tending to pull the machine over to the left. Some people will say no doubt that this pull is balanced about the C.G (which it is if the machine is in the normal flight attitude relative to the airflow), and that therefore this cannot account for the loop. Again, the picture is given by the $\sqrt{\cos\theta}$ theory is not complete when applied to 90° and taking things generally it seems unwise to attempt a mathematical solution at the moment.

Let us rather consider the climb associated with normal models, where there are no " unknowns ". From the $V_c = V\sqrt{\cos\theta}$ rule, it can be proved that :—

Rate of climb (in ft./sec.) $= \sin\theta\sqrt{\cos\theta}$ . . . equation 2.

A little consideration shows that there must be one angle for which R/C is greater than for any other, because at the two extremes (90° and 0°) R/C=0. This optimum angle can be found mathematically.

Mathematicians please note : Differentiate with respect to θ and equate to zero. The equation simplifies to $2\cos^{3/2}\theta - \sin\frac{1}{2}\theta = 0$, which yields 54° as the answer. If you are really bound by convention, differentiate the differential : a negative result is obtained, proving that R/C is a maximum at 54°.

54°—what precisely is the use of this ? Well, for one thing it gives us an easier and much more accurate method of determining the motor size for maximum duration than that described in Part 1 of this series.

From the formulæ given last month we see that we must arrange for a thrust from the airscrew such that

(*continued on page 489*)

CONTROL LINE COMMENTARY

By F. B. THOMAS

The author's latest model, a really delightful flying scale Tiger Moth, 40 in. span, 2 c.c. Majesco diesel powered.

CONTROL-LINE flying never seems to have "caught on" in this country, although it is enormously popular in America. It is possible that the shortage of engines in this country is largely responsible for this state of affairs, and I can imagine that many aeromodellers hesitate to build a control-line model for fear of breaking their precious engine.

Control-line (or U control) flying is not difficult once the knack has been acquired. It's very like learning to swim or to ride a bicycle in that respect, and disaster is only likely to occur in the stage of learning. Once the "feel" has been mastered, there is no reason why a model should crash, unless flying in a high wind is attempted. My brother and I have been flying these models for many years and have never had a serious crash resulting in damage to an engine. If the aspiring control-line pilot adopts the suggestions I am going to put forward he will pass safely through the only difficult phase of this branch of aeromodelling without jeopardising his engine.

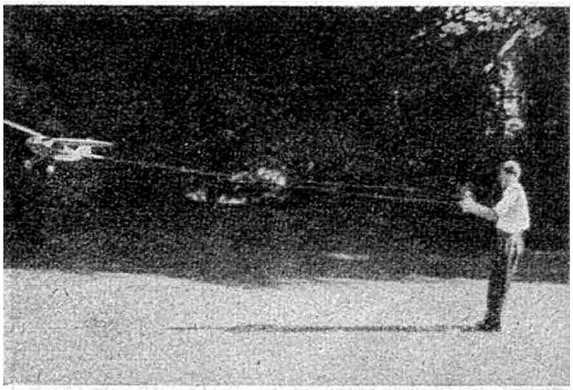
Since there must be many who are unfamiliar with even the rudiments of control-line models, I am giving a brief description of the accepted layout.

Basically, a control-liner is a round-the-pole model with a controllable elevator. The pilot stands in the centre of the circle and takes the place of the pole. He holds in his hand the control grip, from which two lines run out to the model. The lines are connected to the control plate in the aircraft, and movements of the control plate are communicated to the elevator via a push-pull rod running inside the fuselage. The pilot revolves in the centre of the circle as the model flies around him, so that he is always facing the model. When airborne, the model is forced to fly in a circle of which the lines form the radius and the outward or centrifugal pull of the model maintains both the control lines in a state of tension. A backward rotation of the control grip pulls on the upper line and eases the tension in the lower line, and this in turn causes the control plate in the aircraft to rotate and the push-pull rod raises the elevators, causing the model to climb.

Now, since the model is being forced to fly in a circle the outer wing is travelling farther than the inner wing in any given space of time, and therefore the outer wing tends to lift more than the inner. As the model gains speed, this would have the effect of causing the model to over-bank, which would ultimately result in a sideslip inwards towards the pilot. To avoid this, the control lines are passed through fairleads attached near the inner wingtip, or the lines can be buried inside the wing and let out through the wingtip. The latter arrangement looks the better, particularly on a scale model. Fig. 1 should make the above description clear.

I would strongly recommend anyone who is keen to try his hand at U control to start off with a rubber-driven model. Such a model can be made in a few days and a few hours spent flying it will fit anyone to fly a powered machine with confidence and safety. The model on which I turn the "*ab initio*" loose is a crudely constructed affair, but it can be dived happily into the ground without breaking. It dispenses with the usual control plate, and the wing can be slid fore or aft on the fuselage for trimming without upsetting the relation between control grip and elevator. When bending the fine aluminium tube for the control line guides, pass a wire into the tube first. This will avoid kinking. If the tube has a seam in it, place the seam on the outside of the curve. Fig. 2 shows the general arrangement, and I do not think that a detailed description is required. The fuselage is long to secure a long motor run and to reduce the sensitivity of the elevator response. The wing has no dihedral and should be set at zero incidence; use plenty of elastic and short (20 ft.) control lines—ordinary linen thread works well. Fly only in a dead calm, and have an assistant to help in the winding process and to release the model for you when you are ready. Trim the model nose heavy so that the centre of gravity lies about 1 in. behind the leading edge of the mainplane.

For the first power-driven attempt I advise a converted free flying model which will fly slowly with



Left—the author's brother flying a highwing model on short lines, and right, the model showing the braced fairleads for the control wires on the port wing.

great stability. Its only snag is that it will be very unruly in a wind, so confine your flying to calm conditions, and using not more than 30-50 ft. of line. The reason for this caution is that the average free flying model has too much dihedral for control-line work, and if it is circling high up, the slightest cross wind will get under the tremendous lateral area presented by the upturned outer wing, the model will drift inwards towards the pilot, the lines will slacken and the control will be lost and a crash will follow.

The conversion to U control of a free flying model presents a few difficulties. If the fuselage is wide enough, the control plate can be sited in the fuselage. Since our conversion is to be used really as a self-trainer, appearance is not important, and if the fuselage is too narrow, the control plate and push-pull rod can be placed externally. Remember that our plate has to stand a fairly considerable pull, so make it robust. Fig. 3 shows the plate I normally use. It must revolve freely on the spindle and the latter must be very securely anchored to the machine *at the centre of gravity*, or very slightly behind it, and remember that the centre of gravity must be ¼ chord from the leading edge of the mainplane. If the centre of gravity is any further back, the machine will fly in a tail-down attitude and will have no length of glide when the engine is cut.

It will be appreciated that movements of the control grip are communicated to the control plate only if the lines are constantly in tension. Should the line slacken control is lost and it is important at this moment that the elevators should return on their own to the neutral position. To accomplish this, a tension spring (or rubber band) is used as shown in Fig. 3.

If our conversion is a conventional high-winger, the wing-tip fairleads will have to be sited some distance below the wing or some form of outrigger (Fig. 4) so that the lines run out horizontally from the pick-up wires attached to the control plate. The lines I use are of 29 lbs. flax fishing line, which to my mind is preferable to wire, which tends to curl up or kink. The outer ends of the lines are tied loops which are fixed to the "safety pin" ends of the pick-up wires.

The push-pull rod running to the elevator is of ⅛ in. birch dowel rod, with piano wire ends bound and cemented in place. Make sure that this rod has a clear run within the fuselage because all unnecessary friction must be eliminated in the control system. A hinged elevator must be fitted and two simple types of hinge that I found efficient are shown in Fig. 5. The elevator should have a travel of 35°–40° above the horizontal, and about 25° below it.

It is essential that any engine-driven model be fitted with an engine cut-out which can be operated at will by the pilot. The use of a time-switch or a metered quantity of fuel is useless. Unless the motor can be stopped by the pilot when he wants it stopped, accurate and safe flying are impossible. For a petrol model the simplest solution is a small radio tumbler switch mounted on the side of the fuselage between the exit slots of the pick-up wings. Fig. 6 shows the set-up. The third (slack) line runs through a third hole in the fairlead, and is attached to the control grip to be operated by the pilot's left hand.

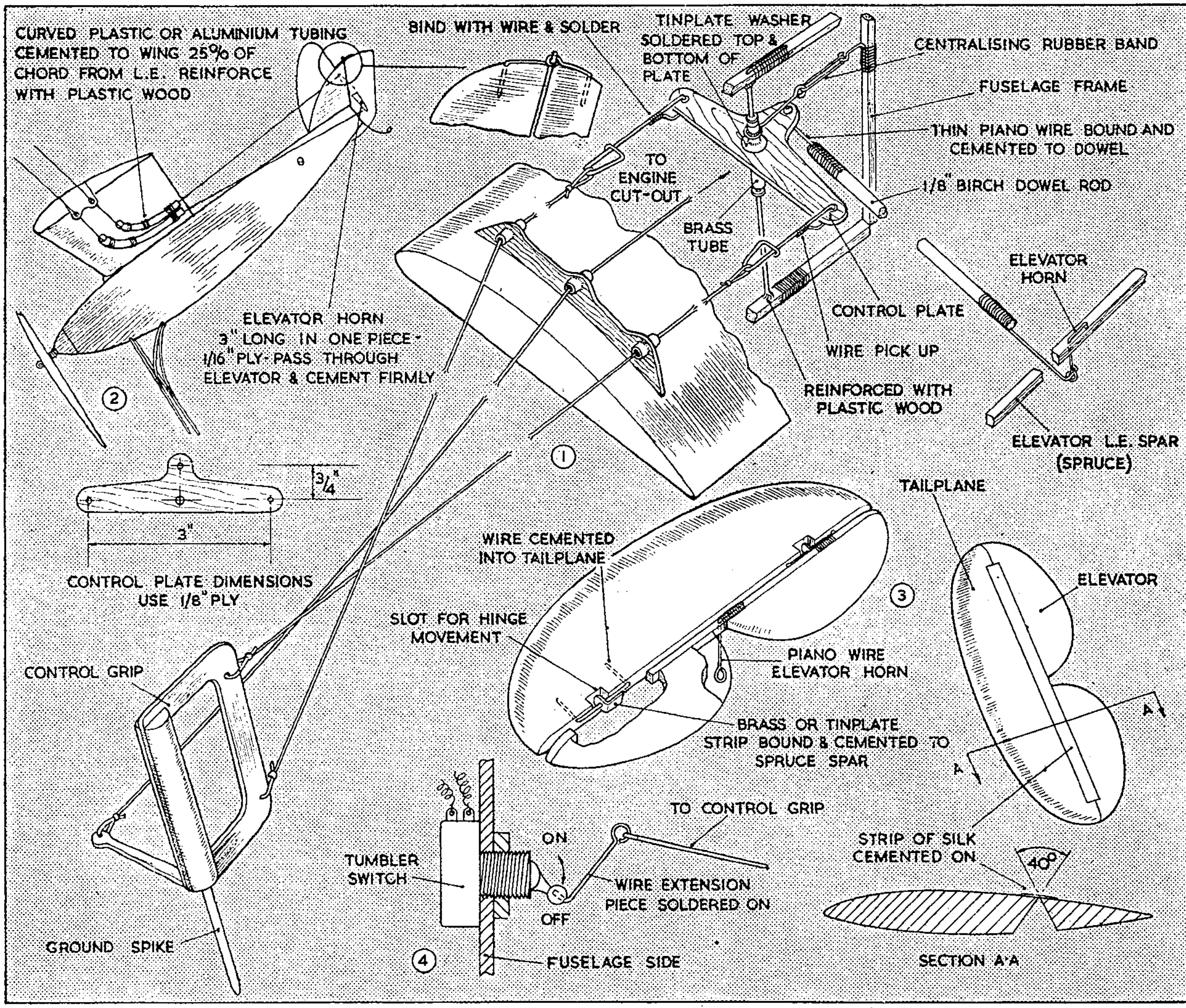
If your converted power model has a diesel engine, the cut-out device will depend on the type of stopping mechanism on the engine, and if any reader gets stuck with this, I can let him have details of types I've used. Most of these have been some form of spring-loaded cut-off operated by the third line through a trigger release.

I'd advise you to use a knock-off engine mount on your first power model, and keep your wing loading down to 14-16 ozs. per sq. foot. If the loading comes out much below this (say 12 ozs. sq. ft.) clip a bit off the wingtips.

When you've put in several hours' flying time on your conversion and are completely *au fait* with the technique of flying it, you can safely embark on the most fascinating part of U-control modelling, the building of scale models. True scale modelling is never possible in a free flying machine, due to the necessity for a large dihedral and a forward position of the undercarriage. Control-line models can have a scale amount of dihedral, and a normal undercarriage. Remember always to offset your fin 5° towards the outside of the circle to maintain line tension, and to hold up the nose of the model when she is circling high up. One word of warning when you are scaling down a full sized aircraft for a U-control model, the tailplane area will be too small, due to scale effect, to give it adequate stability so add about 10% to the area of your scaled-down tailplane.

In a future article I will go in detail into the technique of flying these models, and describe an alternative installation for the control plate.

Correspondents writing to Mr. Thomas, c/o The Aeromodeller, must enclose a S.A.E. Control Line enthusiasts will be pleased to know that the plans of an elegant beginner's design by Mr. Thomas will be published with the next Control Line Commentary. Ed.



Aerodynamic Design (*contd.*)

Thrust during climb = 0·809 W + 0·588 D . . . equation 3 —for 54°. But since calculating the climbing thrust is very involved, it is better expressed in terms of normal flight—even at the expense of some accuracy.

Remember J ? We encountered it in airscrew design, and saw that it was the equivalent of angle of attack in aerofoil theory (Aerodynamic Design, Part 2). Provided that this remains constant (i.e. that airscrew revs. vary with flying speed), thrust varies as the square of the flying speed, and horsepower as its cube. Now the speed of a model I.C. engine *is* lower during the climb than would be the case for level flight. Similarly a rubber motor, although the position is more complex because of the constantly decreasing torque. So it is approximately correct to say that

Thrust during climb = T cos θ

when T is the thrust in level flight.

For maximum rate of climb this becomes

Thrust (climbing) = 0·588 T . . . equation 4.

Now we can tie everything up :—*For maximum duration the thrust in level flight should be equal to the weight plus the drag of the model*—

i.e. T = D + 1·38 W . . . equation 5.

Experimental Method.

The ideal method of obtaining thrust and drag is of course by direct measurement in a wind tunnel. This is obviously impossible for the great majority, but fortunately excellent results can be obtained from a car.

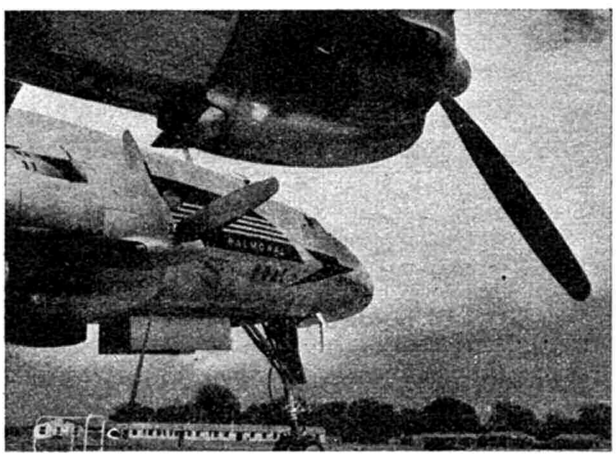
On a still, cool evening, with absolutely no wind, get your assistant to slowly accelerate a car in which you are standing with the model held high up in its flying attitude. The speed at which the model lifts gently in the hands should be noted : this is the flying speed.

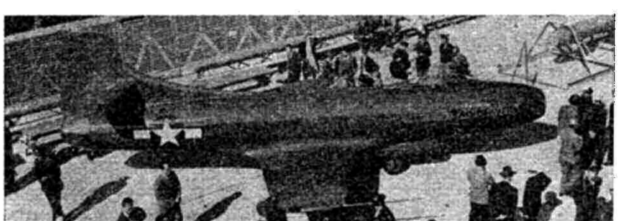
Part two of the experiment is alarming to watch, but much safer than it sounds. Attach a spring balance (graduated in ounces) to the top of the car's windscreen, and the free end to the tail of the model. With the model's engine running the car should be accelerated up to the flying speed again (i.e. the *model's* flying speed) and the reading on the spring balance taken. For maximum duration this reading should equal the model's weight.

Rubber Motors.

Starting with a large motor, the number of strands should be reduced until the average thrust equals 1·38 times the weight. The average should be taken for the first 30 seconds motor run, based on six readings taken at six second intervals, with the aid of assistants.

(Martin and Kelman Photo.)





Central Press Photo.)

New R.A.F. Colour Schemes.

In accordance with Air Ministry Order A.413, issued in May, 1947, new and simplified colour schemes are introduced for all R.A.F. aircraft.

It has been decided to revert to the pre-war roundel on all aircraft, *i.e.*, red, white and blue, the position and radius of the roundel to remain as at present. The requisite bright red and blue colours will be used as soon as material shortage is rectified, but for the present the war-time " flat " finish will have to be used. The proportions of the colour bands are to be as follows :—Where " R " is the radius of the roundel, the radius of the red inner is one-third of " R " and the radius of the outside of the white band is two-thirds of " R." Fin flashes will remain unchanged, except that the white band will be increased to the same width as that of the blue and red.

New colour schemes for aircraft are as follows :—

Wooden and fabric aircraft (*e.g., Mosquito, Wellington, etc.*) *:* Doped silver all over, unless the aircraft are used as (*a*) night fighters, (*b*) night bombers, or (*c*) trainers.

Day fighters : Painted with a silver finish and with the smoothest surface possible to produce the best performance.

Night fighters : Camouflaged dark green and medium sea grey on the top surfaces and medium sea grey underneath. Fins, rudder and spinners painted medium sea-grey. Upper and lower camouflage meets on centre-line of fuselage.

Night bombers : Camouflaged in medium sea grey on top surfaces and anti-searchlight black underneath and on the sides.

(Top to Bottom)
THUMBS DOWN. Extensive redesign is to take place on Glenn Martin's new 202 airliner, which was to have been in regular service this summer. First prototype, NX 93001, is seen here on test over Maryland.
STATELY HOMES OF ENGLAND. "Balmoral," registered G-AHEM, which is one of the five Lockheed Constellations operated by B.O.A.C. across the Atlantic.
HOT ROD. Painted entirely scarlet, the Douglas Skystreak jet aircraft is designed for trans-sonic speeds. It spans 25 ft. and mounts a G.E.C. TG-180 turbo-jet engine. Below are two Beech Model 18 monoplanes bearing Turkish insignia.

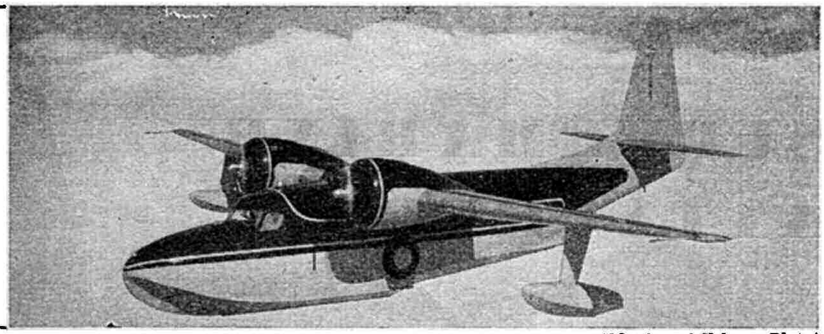
(*Top to Bottom*)

EXECUTIVE TRAVEL. The 12-seater Mallard is the latest of a long-line of Grumman amphibians for executive transport.

MY HAT ! A Sikorsky S-51 of Helicopter Air Transport on air-mail pick-up.

PUSHING TYPES. Above is the 4-seater Waco Aristocraft and below the Douglas Cloudster, both with airscrews in the extreme tail. Advantages claimed are improved view and less noise.

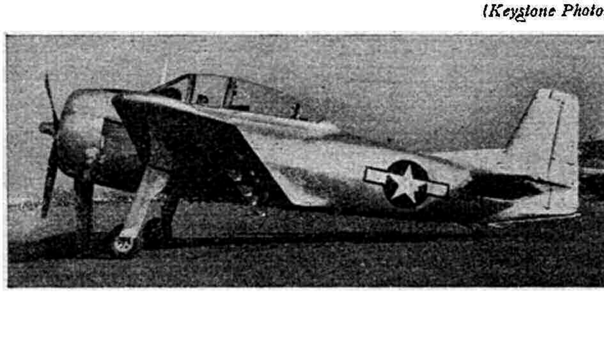
SEE THAT MUSTANG TAIL ? Post-war development of the Harvard for U.S. Navy training is this XSN2J-1 which mounts a 1,100 h.p. Wright radial and has a top speed of 270 m.p.h. at 20,000 ft



(*Martin and Kelman Photo.*)

(*Martin and Kelman Photo.*)

(*Keystone Photo.*)



Coastal aircraft : Camouflaged in medium sea grey on the upper surfaces and glossy white underneath and on the sides. White vertical tail surfaces and spinners. Serial number in light slate grey.

Training aircraft : Trainers, other than operational or semi-operational types which are to have normal operational finish to simulate realistic conditions, are to be painted silver if of wooden or fabric construction or left unpainted with a polished bare metal surface. In addition, a band of identification yellow is to be painted round the fuselage and each mainplane. Small aircraft will have bands 2 ft. wide ; medium size aircraft will have 3 ft. bands and large aircraft will have 4 ft. wide bands. Bands will be located half-way between the roundels and the fuselage on the wings and between the roundel and the tail on the fuselage.

Communication aircraft : Polished aluminium finish or silver doped.

Photographic reconnaissance aircraft : Painted with a silver finish and the smoothest surface possible for high performance.

Air Observation Post aircraft : Camouflaged dark green and dark earth on upper and lower surfaces.

Target-towing aircraft : Painted as trainers see above), but additional markings on the undersurfaces consisting of night black stripes, 3 ft. wide, running from port forward to starboard aft and inclined at 60 degrees to the lateral axis of the aircraft. The distance between the centre-lines of the stripes is to be 9 ft., and the centre-line of one stripe is to intersect the centre of the port roundel.

Record Meteor.

Of interest is the news that the record-breaking Meteor IV of the High-Speed Flight, EE 549, has now made its appearance with the standard clipped wing and is finished in high gloss light sky blue on all surfaces. It bears the code recognition letters " J-MR," which indicates a connection with No. 245 (Fighter) Squadron.

Initials on Aircraft.

It is not generally known that officers of the rank of wing-commander and higher in the R.A.F. are permitted to bear their initials on their personal aircraft in the guise of code letters. The letters are often painted in some special colour and outlined in silver. The late Ian Gleed's Spitfire in North Africa will be recalled (" IR-G ") and Tempests belonging to wing-commanders in Germany at present bear the letters " RDE," " JCB " and " JH." A famous aircraft of the " doodlebug ' period was Wing-Commander R. P. Beaumont's Tempest V, JN 751, which bore black and invasion stripes on the wings and encircling the fuselage, and the letters ' R ' and " B " either side of the roundel. This aircraft had normal camouflage, but the spinner and cannon stubs were painted bright yellow.

AEROPLANES DESCRIBED LI

The SUPERMARINE ATTACKER

THE Attacker jet fighter had its genesis in June, 1944, when the crack Supermarine design team responsible for the Spitfire and Spiteful submitted to the Ministry of Aircraft Production their suggestions for the layout of a jet-propelled successor to these famous aircraft. These designs were approved by the Ministry and later in the year the Specification E10/44 was issued to cover the original project and enable the development and constructional work to begin without delay.

From the outset, close collaboration was maintained with Rolls Royce, thus ensuring the finest possible layout for the Nene installation. Production was expedited by the utilisation of standard Spiteful wing panels with the exception that the radiators were deleted in favour of extra fuel tanks. When hostilities ceased in August, 1945, production of the first E10/44 was well advanced at the Hursley Park factory, near Winchester, and it was decided to continue with the project on a reduced peacetime tempo.

On 27th June, 1946, the protype E10/44, TS 409, was given its maiden test flight by Lt.-Commander Jeffrey Quill at Boscombe Down, near Salisbury. The aircraft was first shown publicly in September, 1946, when it made a spectacular appearance at the S.B.A.C. Display at Radlett before a distinguished international assembly.

Two further prototypes have since been built, TS 413 and TS 416, and these aircraft differ from the original machine in being fitted with arrester hooks beneath the fuselage. This navalised version is built to the Specification E 1/45.

The Attacker is not at the moment in production, but development work is proceeding with all three prototypes and much valuable data on high-speed flight is being collected.

As will be gathered from Mr. C. Rupert Moore's excellent cover painting and from the accompanying photographs, the Attacker is left the natural aluminium finish all over, with normal Service roundels and serial number.

Specification :—Single-seat jet-propelled monoplane fighter of all-metal construction, with stressed skin. Laminar flow aerofoil with split trailing edge flaps and Frise ailerons. Inwards-retracting undercarriage with Vickers oleo-pneumatic shock-absorbers. Retractable tail wheel. The jet unit is mounted amidships, behind the pressurised cockpit. Cordite-operated ejector seat for the pilot. Air intake ducts either side of the front fuselage.

Power Plant :—One Rolls-Royce Nene 1 gas turbine unit of 5,000 lb. static thrust.

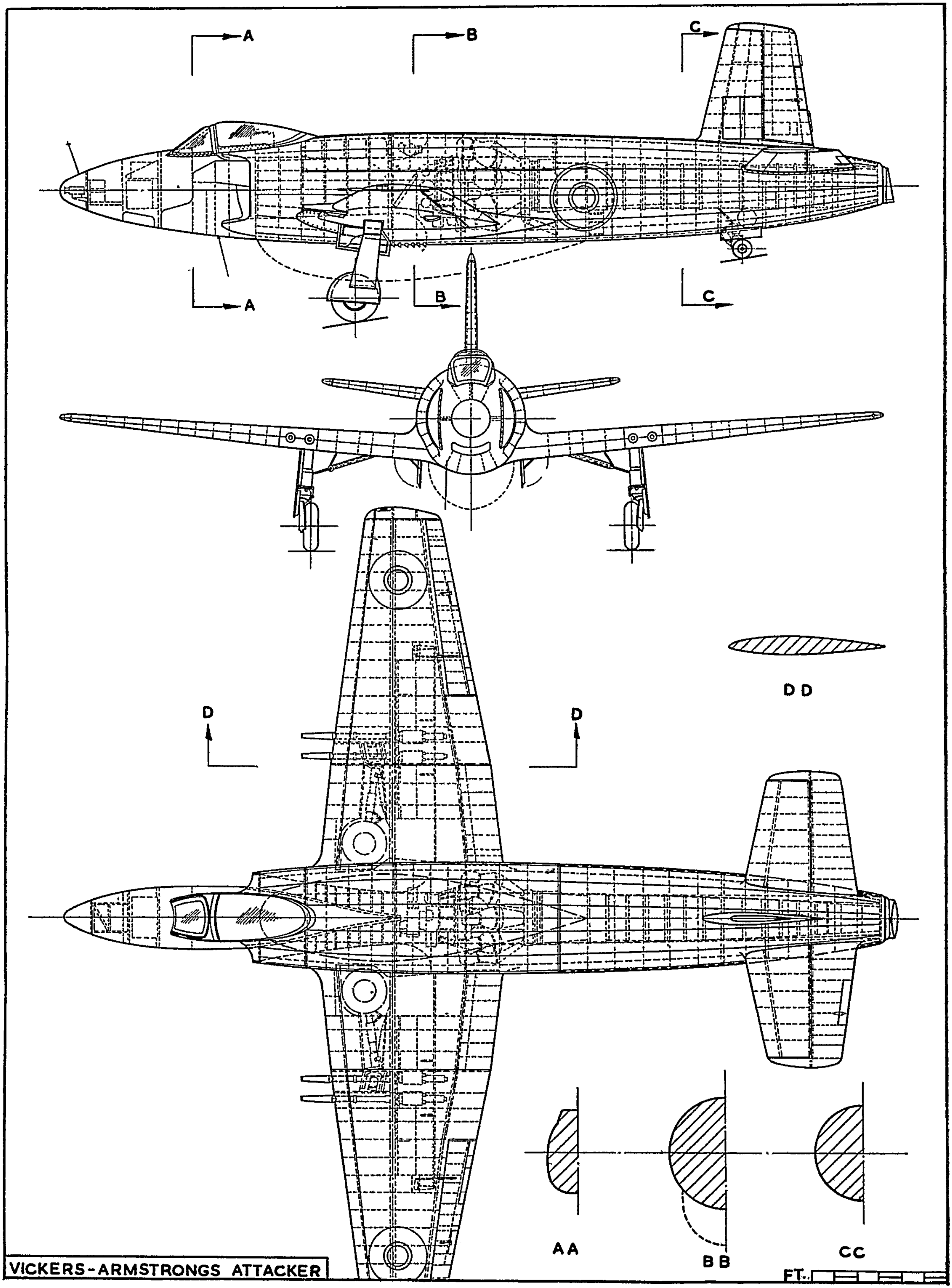
Dimensions :—Span: 36 ft. 11 ins. Length: 37 ft. 6 ins. Height (tail down): 9 ft. 11 ins. Wing area: 226 sq. ft.

Tankage :—Normal: 310 gallons. Maximum (with 270 gallon drop tank): 580 gallons. Armament consists of four fixed 20 m.m. Hispano cannon mounted in the wings.

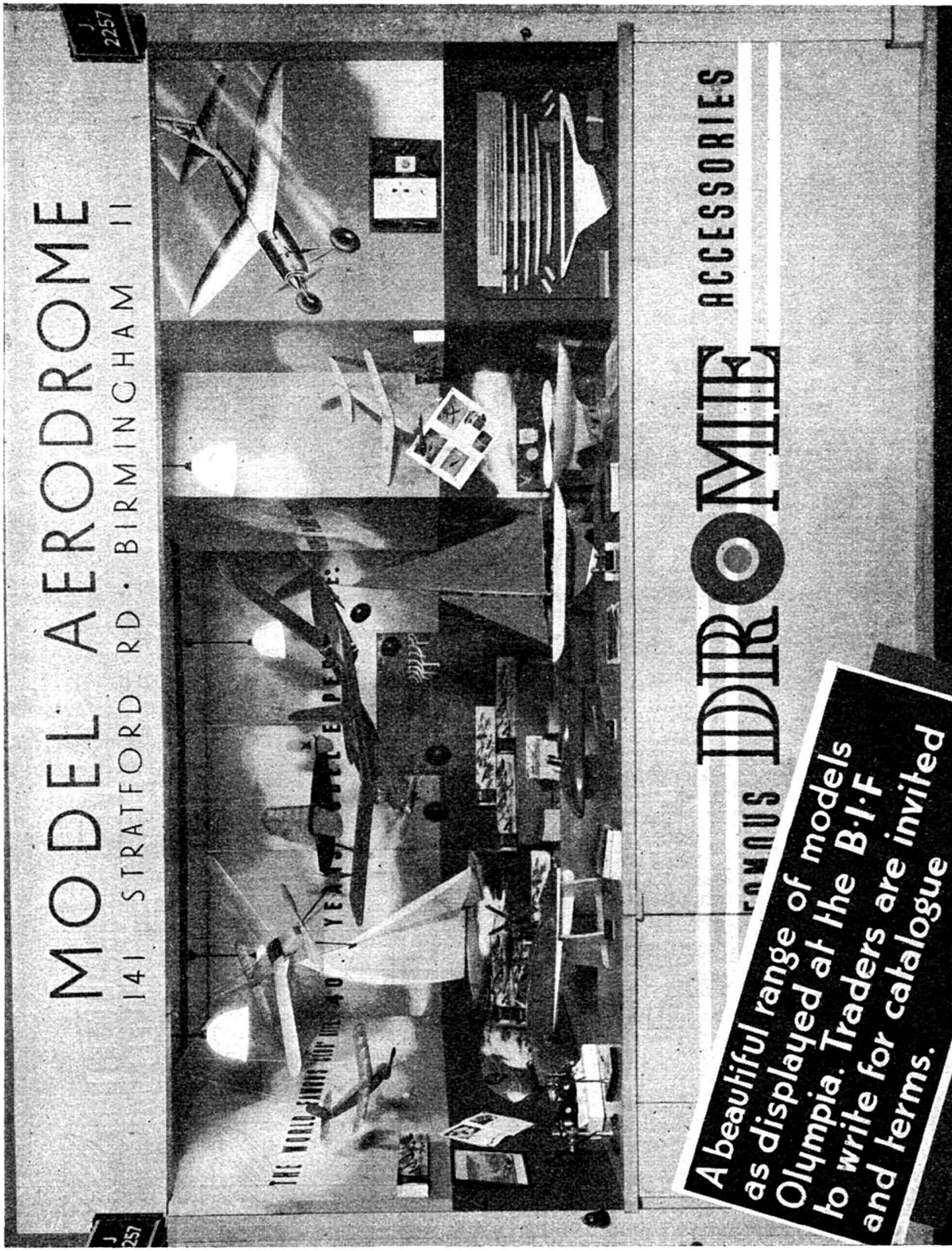
Weights :—Loaded (normal): 11,300 lbs.

Performance :—Maximum level speed: 590 m.p.h. at sea level; 583 m.p.h. at 10,000 ft.; 561 m.p.h. at 20,000 ft.; 538 m.p.h. at 30,000 ft. Rate of climb: 6,600 ft./min. at sea level; 5,600 ft./min. at 10,000 ft.; 4,500 ft./min. at 20,000 ft.; 3,280 ft./min. at 30,000 ft. Climbs to 10,000 ft. in 1·64 minutes; to 20,000 ft. in 3·61 minutes; and to 30,000 ft. in 6·17 minutes. Operational ceiling: 48,500 ft. Normal range cruising at 380 m.p.h.: 410 miles. Maximum range cruising at 392 m.p.h. with 270 gallon drop-tank: 1,100 miles. Maximum endurance: 3·78 hours. Take-off run to clear 50 ft. obstacle: 847 yards. Landing run over 50 ft. screen: 855 yards.

"Flight" Photos.

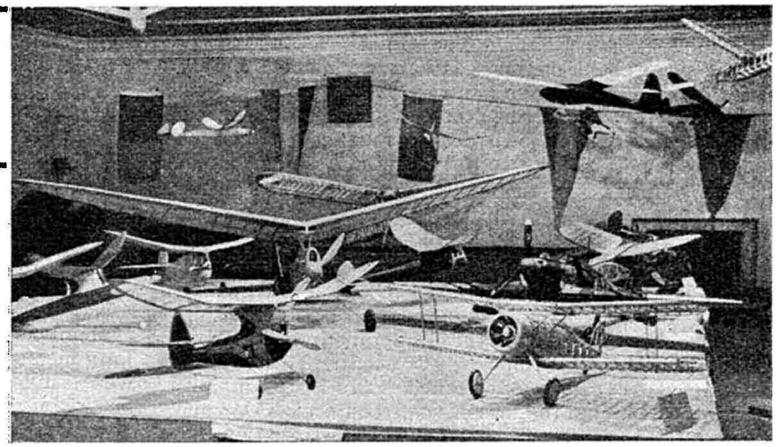


VICKERS-ARMSTRONGS ATTACKER



MODEL AERODROME
141 STRATFORD RD · BIRMINGHAM 11
FAMOUS DROME ACCESSORIES
A beautiful range of models as displayed at the B·I·F Olympia. Traders are invited to write for catalogue and terms.

CLUB NEWS
BY CLUBMAN



A fine show of models from "down under" at the Victoria M.A.S. exhibtion in Melbourne.

INTEREST this month somewhat naturally leans to S.M.A.E. matters, partly in view of the recently-held British Nationals, reported elsewhere in this issue, and also the A.B.A. link-up. An interim News Sheet reports that a preliminary meeting made great strides, and it should not be long now before the whole movement is operating as a combined unit—to everyone's benefit.

One aspect of the Nationals I would enlarge on, and that is the instances of poor sportsmanship witnessed from time to time. I never thought it would be necessary for this charge to be levelled at aeromodellists, but some instances were too blatant to be overlooked, and I appeal to the S.M.A.E. to introduce some means by which this sort of thing can be eliminated. There is a small section of pot-hunters whose sole object seems to be a delight in looking for loopholes in the necessary rules and regulations for the conduct of a contest.

I am all in favour of the simplest and least restrictive rules possible, but if the sort of practice referred to above continues, we shall end up with a book of rules inches thick in an effort to counter all the moves these Smart Alicks get up to. I suggest that these types mend their ways, and—as M. R. Knight said in a speech at the Dinner held before the Contests—" don't allow competitions to become too serious—and, above all, remember it is a hobby."

Results of the Flight Cup and Wakefield Contest held in April and May are now available, which show that Croydon made a clean-up in the former event, while the provincials made a much better showing in the Wakefield class. (Watch the Northampton chaps with this class of model—they seem to be able to do their stuff any time.)

A few months ago we published details regarding pen-pals in France, and the Editor of the French paper *Décollage* is pleased that a number of readers are now corresponding with his countrymen. There are still some French lads not yet accommodated, so, if any of you would like to start in writing and comparing notes with these lads, write to The Editor, "Décollage," 4 bis, Rue du Bouloi, Paris 1.

FLIGHT CUP, 13/4/47

1	G. W. W. Harris	Croydon	737.5
2	J. Hall	Croydon	701.75
3	N. Marcus	Croydon	668.9
4	M. Farthing	Croydon	620
5	F. J. Adams	Northampton	617.5
6	W. A. Geddie	Zombies	610.7
7	S. A. Miller	Luton	594.1
8	F. Hain	Northern Heights	581
9	B. V. Haisman	Liverpool	576
10	W. Wright	Hayes	561.2
11	J. Higgin	Bradford	554.5
12	T. A. Teesing	Croydon	538.3

(243 entries)

WAKEFIELD CONTEST, 4/5/47

1	C. Houghton	Luton	760.75
2	E. W. Evans	Northampton	627
3	P. Johnson	Valkyries	605.5
4	G. E. Salt	Birmingham	552
5	F. J. Adams	Northampton	541
6	D. Salloway	Rochdale ATC	532
7	C. Doughty	Birmingham	431.9
8	S. T. White	Northampton	429.2
9	B. V. Haisman	Liverpool	426
10	D. W. F. Harrison	Birmingham	422.6
11	F. Ogden	Rochdale ATC	417
12	F. Hurts	Valkyries	412.5

(69 entries)

A very well organised affair was that staged by the Southampton Branch of the Air League of the British Empire on May 18th, and it is a pity that the weather played its usual tricks, causing the cancellation of a large part of the programme. I went along, and can sympathise with the organisers and contestants! Everything was laid on for a really fine day's flying, and I would congratulate those responsible for the arrangements of a well-thought-out show. The Concours class was won by Mr. R. O. Richards, of Southampton M.A.C., a fellow club member gaining a silver medal for putting up second best time in the Open Rubber event with a time of 3 : 02. The winner of this contest was D. C. Butler, of Surbiton, who won the cup with a total of 4 : 22. The remainder of the cups are held in abeyance, and will be disposed of in some future competition.

The **SWANSEA & D.A.M.C.** celebrates its first birthday, and has now found both its feet and wings. Club records set up in the past twelve months are:

Wakefield :	L. Webb	2 : 12 (r.o.g.)
	T. M. John	4 : 55 (h.l.)
Open Rubber :	M. Vickary	2 : 30 (r.o.g.)
	M. Vickary	4 : 25 (h.l.)
Sailplane :	J. Benson	1 : 15 (h.l.)
	H. Thomas	2 : 05 (w.l.)
Indoor :	J. Hayman	1 : 44 (r.t.p.)
	M. Vickary	1 : 59 (free flight)

There is good news for all Merseyside modellers this month. The **MERSEYSIDE M.A.S.** has acquired " the Ideal Flying Ground." Situated in North Wales, there is a huge expanse of open country for about six miles around, and it has already been found that six-minute flights and longer may be observed all the way. The junior section of the club has now been affiliated to the Liverpool Boys' Association and so has the use of extensive playing fields on three nights a week.

The **BELFAST F.C.** celebrated the return of good flying weather by turning out in full force on May 11th. Outstanding flights of the day were 14 : 20 by G. Drew's Wakefield, 22 : 26 by N. Osborne's own-design glider, and A. McLaren's 5 : 00 with his " Zenith." A week later the visit of the Phoenix M.A.C. provided wins in both the contests held for G. Drew Plans are in hand for the Annual Rally, particulars of which can be obtained from N. Osborne, 41, Albion Street, Belfast.

An error in the name of venue for the forthcoming **HUMBERSIDE RALLY** appeared in last month's issue. The name of the aerodrome is HEDON, *not* Hendon! Sorry, chaps. The Guild's second contest of the year, held on May 11th, were marred by bad weather, and although entries were plentiful, few succeeded in completing three flights. Mr. Turner, flying a glider of his own design, managed to find the only thermal of the day, resulting in the loss of his model.

Wakefield:	Barnes	3 : 19·5
	P. Beer	2 : 49·7
Open Rubber:	H. J. Beer	2 : 46
	W. K. Lyth	2 : 33
Open Glider:	Turner	3 : 01·5 o.o.s.

The **DONCASTER & D.M.F.C.** Gala Day will be held on August 3rd, and any individuals or clubs wishing to attend are asked to obtain full details from Mr. M. A. Hetherington, 19, Imperial Crescent, Town Moor, Doncaster. D. Helliwell clocked 3 : 15·7 to win most points in the first of the season's club contests, K. Wyman being second with 2 : 48, and B. Fox third, 2 : 19·5.

The Walthamstow M.A.S. and Woodford D.A.A. have now merged to form the **WEST ESSEX AERO-MODELLERS** with Fairlop Aerodrome as flying ground. D. Perkin's 54 in. span pylon gas job set up an initial club record of 11 : 06 on a 20-second engine run, whilst A. W. Green helped his club to win comfortably in their round with Blackheath in the London Area Cup with a flight of 3 : 26, flown in drizzle.

The **GREAT YARMOUTH M.F.C.** have their flying field on some marshes, " which stretch for nine miles in one direction, and except for two rivers and various dykes, make an ideal flying ground." T. Andrews caught a whopping thermal there on the 11th May, his " Raff V " finally disappearing from view bang overhead after clocking 5 : 30

A. Hand, of the **CHINGFORD M.F.C.**, has been hitting the high spots lately *vide* his flights of 13 : 45 o.o.s. from Epsom (model returned after three days), and his aggregate of 7 : 33 in the " Flight Cup " Others to set up some good times are " Tubby " Knight, whose " Wraith " glider aggregated 4 : 43, and Woods, who flew his rubber-powered model for 5 : 30.

The **LUTON M.A.S.**'s " Collins Trophy " was held in conjunction with the S.M.A.E. Wakefield formula event on the 4th May, and although it rained practically all the time, one fine spell blessed the competitors, which enabled them to get in their flights and some fine flying was witnessed. Houghton won the Club and National event, and his flight of just over 7 minutes was an example of perfect trimming. A week later, H. Merry won the " Holton Cup " for juniors, his 6 ft. span sailplane flying away o o.s. and recovered a week later

Good news comes frae way ooop Yorksheer—where the well-known and highly successful **HALIFAX M.A.C.** has been revived. Clubroom is at the Scout Headquarters, but the problem of a suitable flying ground is still outstanding.

After a somewhat uncertain beginning, the **BLACK-POOL & FYLDE M.A.S.** " Tomlinson Cup Day " changed into a near-perfect flying day, with warm sun and very little breeze. C. Davey won with his " Minnie Wake," three flights being 1 : 11·8, 1 : 31 and 1 : 29. R. Brownson placed second with an aggregate of 2 : 45·7.

The Todmorden M.A.C. and Todmorden Power M.A.C. have combined to form the **TODMORDEN YOUTH CENTRE M.A.C.** with headquarters at the local Youth Centre. A first Open Day was well attended from clubs in the vicinity, nine groups competing.

Winners: Open Rubber—E North (Halifax), 4 : 24·5; Open Glider—J. Heyworth (Rossendale Valley), 6 : 38·1; Open Power—F. Dennis (Halifax), 1 : 56·8.

Whilst the Nationals were under way at Gravesend, the **GOOLE & D.M.F.C.** were holding a Gala Day at Kilpen. Full results of which were:

Duration (Senior):	H. J. Beer	(Hull)	7 : 23·5
	E. Magee	(Hull)	4 : 52
	D. Hellewell	(Doncaster)	4 : 03
Duration (Junior):	D. Boothman	(Doncaster)	5 : 57
	P. Beer	(Hull)	3 : 34
	F. Warren	(Goole)	1 : 42·5
Gliders (Senior):	B. Fox	(Doncaster)	6 : 14·8
	— Messon	(York)	6 : 13
	J. Hessle	(York)	5 : 01·5
Gliders (Junior):	T. Beer	(Doncaster)	2 : 55·8
	T. Pve	(Goole)	1 : 26
Power:	H. Vauvelle	(Leeds)	1 : 45
	R. V. Foster	(Leeds)	1 : 35
	B. Fox	(Doncaster)	: 54

Members of the **SOUTHAMPTON M.A.C.** flew for a memorial trophy in honour of one of their members who lost his life whilst intruder flying during the war. M. Coxon won the event with three fine flights (rubber-powered) of 2 : 13, 1 : 21·2 and 4 : 26, the model being lost on the last flight. J. Churchill gained second place with one flight, his model also going into the blue after 6 : 08·4. The same fate overtook the third and fourth placers, with times of 4 : 09 and 4 : 08·6. M. J. Richards made best time in a Wakefield event, clocking 1 : 37·6.

The **COVENTRY & D.M.A.C.** best meeting to date took place on May 11th in ideal weather, when some 40 members turned up at Bramcote 'drome. Diesel-powered jobs were to the fore, L. Watts putting in a flight of 4 minutes plus from a 45-second motor run.

Old timers can still show their paces in the **BRISTOL & WEST M.A.C.** C. S. Wilkin's slab-sider braving poor conditions to turn in a total of 3 : 51 in the Wakefield contest. A. H. Lees' nine-year-old streamliner placed second! Better weather a week later enabled M. Ayres to clock 12 : 50 with only 200 turns on the motor. The waterplane contest drew a large entry despite steady rain. K. W. Moon, the winner, was the only entrant to make three successful take-offs, his aggregate being 1 : 47·5, whilst G. Wooll's one flight of 0 : 36·4 was enough to get him second placing. A. G. Taig's first flight of 4 : 44·6 o.o.s. with his new lightweight won him the Freshman's Cup. The Bartlett Trophy (open rubber, glider and power events) will be flown on August 17th at Filton Aerodrome, and clubs within a 40-mile radius of Bristol are invited to attend.

The first **BLACKHEATH M.F.C.** contest of the season for the Secretary's Cup, flown at Epsom Downs, resulted in a win for Mr. Dudley, with Galbreath and Crow taking the other places. Dudley's machine was timed 5 : 00 o.o.s. on its second flight.

After having two contests " blown out " in three weeks, the **HARROW M.A.C.** managed, some good weather for their round in the L.A. Cup when they tied with Hayes. Whilst testing, K. Lloyd's diesel job flew five miles in 1 hour 20 minutes on a 10-second motor run! Other members were more careful, the only other loss being C. Thomas's " Mick Farthing " glider.

The **LEICESTER M.A.C.** had a most successful day's flying on May 11th, when four contests were held.

Power Duration (20 sec. motor):	R. Wade	1 : 38	1 : 41	1 : 45
	G. Dunmore	1 : 01	1 : 04	: 45
	F. Shaw	: 57	: 34·5	1 : 13
Power General (30 sec. motor)	K. Laverick	: 45	1 : 17	: 20
	B. Cave	: 45	: 16	: 30
	B. Knight	: 52·5		
Rubber Duration:	P. Matthews	3 : 35	1 : 47	1 : 49
	K. Stothers	1 : 13·5	1 : 13	1 : 30
	R. Wade	: 59	1 : 04·5	1 : 04·5
Open Glider:	K. Laverick	: 49	5 : 20	1 : 29
	A. Bantock	1 : 15	: 35	: 36

Perfect weather (how that item keeps cropping up! It's so long since such a matter has happened, it must receive its due recognition) was experienced by the

GREENFORD & D.M.F.C. for their round in the L.A. Cup with Streatham. No wind and bags of thermals caused the loss of two of the contest models before the start of the comps, whilst another was fortunately recovered. Times on these flights were 10 : 00, 6 : 04 and 5 : 34. During the comps (which Greenford won by a margin of 405 points) L. Barr broke the existing club record with a flight of 12 : 35 r.o.g., whilst D. White pushed the glider record up to 15 : 00.

Another club to show new figures on the records chart is the **BUCKSBURN A.C.** Whilst flying with the Aberdeen club, the duration figure was raised to 6 : 30 by A. McKenzie, flying a " Mick Farthing Lightweight."

The **RUGBY M.A.S.** had a hot afternoon for their club duration contest recently, giving them their first taste of thermals on a new ground. Mr. Reading raised the club record to 5 : 20 with his " Polydi," only to see this figure beaten by Mr. Turner with a flight of 9 : 07 with his " Ajax," both models being lost.

Turner	**2 : 00**	**1 : 35**	**9 : 07**
Reading	**1 : 34**	**1 : 03**	**5 : 20**
Marsh	**: 49**	**2 : 08**	**: 59**

Mr. Clarke later raised the club glider record to 2 : 22.

A new club room will soon be opened at the Gun-Sight, Crayford, for the benefit of the **NORTH KENT M.A.S.** St. Albans were entertained for the first round of the L.A. Cup, when perfect weather (wot, again!) produced the usual crop of flyaways. The final result was in doubt until St. Albans turned in a seven-minute flight and clinched matters, totals being St. Albans 1666·85 to N. Kent's 1549·1. The contest for the " Roberts Flying Boat Trophy " will be held this year on 31st August. This is an open event. Full particulars from Mr. T. Newell, 10, Veroan Road, Bexleyheath.

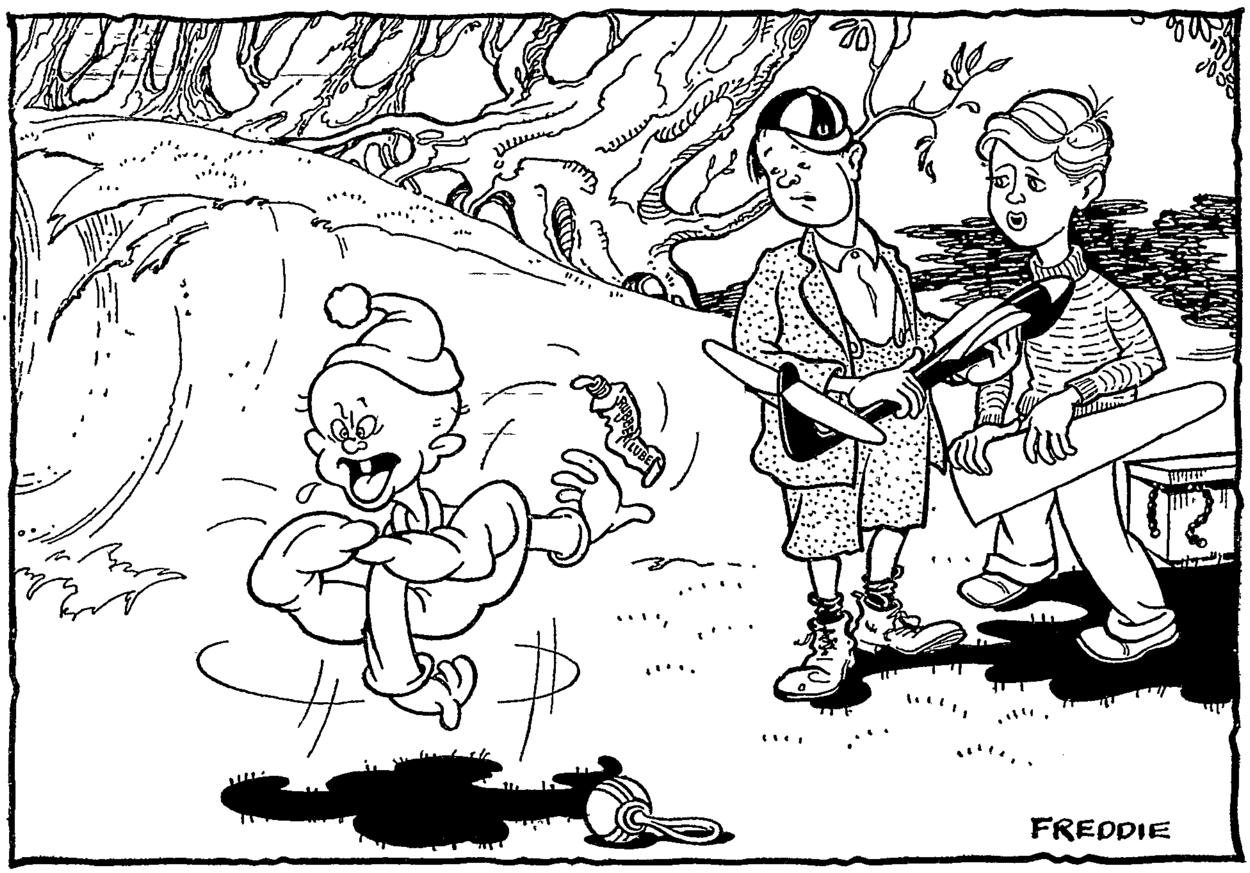
The first post-war Rally organised by the **SALISBURY & D.M.E.S.** attracted many enthusiasts and a large crowd of spectators. A northerly wind blowing down Old Sarum made thermals non-existent, but A. M. Piacentini managed to average 1 : 19·26 for three flights in the rubber event, with M. Russell best in the glider class with a best flight of 1 : 10.

The indoor season of the **DURHAM CITY M.C.** was rounded off by A. J. Nunn raising the r.t.p. record to 2 : 05 r.o.g. Outdoor activities are now in full swing, the Whitsun meeting proving very successful. Average times were put up (wind being a bit too strong for an aeromodeller's fancy), the best competitors being A. J. Nunn, who aggregated 46·6 in the H.L. glider class, K. J. Warriner, 3 : 18 in the rubber class, and W. Jackson, 3 : 12 in the glider event.

After performing the " Wandering Jew " act for over a year, the **SOUTH NOTTINGHAM M.F.C.** have secured the use of a good flying ground, and full advantage has been taken of the weather to set up a new list of club records, as follows :

Glider :	**A. Sturgess**	**4 : 50**
Duration :	**G. Hocken**	**3 : 09**
R.O.G. :	**D. Coleman**	**1 : 00**

Yet more records ! The **WARWICKSHIRE M.A.S.** had a hectic day when W. S. Saunders clocked 7 : 00 o.o.s. with his Zaic " Floater," only to have this figure raised by P. Buckley, who obtained a time of 13 : 44 o.o.s.—also with a " Floater." Later in the day R. Double made a flight of 13 : 20 with a lightweight duration job.



" ALFIE'S DONE IT AGAIN, WE'LL HAVE TO FLY THE GLIDER "

National Records.

DURATION Record Type	CLASS A Unrestricted (Motor not over 2·5 c.c.)	CLASS B Unrestricted (Motor 2·5 to 5 c.c.)	CLASS C Unrestricted (Motor 5 to 10 c.c.)
Petrol Monoplane Fuselage R.O.G.			Frazer, A. T. 16 min. 25 sec.
„ „ „ R.O.W. (Tank or Open)...			
„ Biplane „ R.O.G.			
„ „ „ R.O.W. (Tank or Open)...			
„ Flying Boat „ R.O.W. (Open Water only)			Bowden, C. E. 0 min. 30·4 sec.

	70 to 150 cms. span	150 to 250 cms. span	250 to 350 cms. span
Glider, Hand-launched F.A.I. Rules, 328 ft.	Gosling, R. F. 5 min. 35·8 sec.	Peckett, G. 6 min. 57·5 sec.	
„ Tow-line Launched F.A.I. Rules, line 100 meters (run not to exceed 75 meters)	Scrivener, D. 42 min. 3 sec.	Minney, R. 43 min. 3 sec.	
„ Winch-launched F.A.I. Rules, line 200 meters (655 ft.)			

Rubber Indoor Monoplane Stick R.O.G.	McKenzie, R. M. 8 min. 48·2 sec.	Rubber Indoor Monoplane Fuselage R.O.G. ...	Gilbert, D. 4 min. 33 sec.
„ „ Biplane Stick R.O.G.	Rock, R. 2 min. 31 sec.	„ „ Biplane Fuselage R.O.G. ...	Rock, R. 2 min. 45 sec.
„ „ Rotoplane R.O.G.	Mawby, L. B. 0 min. 32·2 sec.	„ „ Helicopter R.O.G.	McKenzie, R. W. 1 min. 38 sec.
„ „ Ornithopter R.O.G.		„ „ Scale R.O.G.	
„ „ Round the Pole R.O.G., Class A, 1 oz. max.	Rock, R. 5 min. 54·4 sec.	„ „ Round the Pole R.O.G., Class B 2 oz. max.	Rock, R. 3 min. 38 sec.
Speed (any type) R.O.G., Unrestricted	Farthing, M. 50 m.p.h.		

DURATION Record Type	CLASS A Unrestricted	CLASS B Up to 144 sq. in. 5 oz. min. weight	CLASS C Up to 210 sq. in. 8 oz. min. weight
Rubber Outdoor Monoplane Fuselage R.O.G.	Copland, R. 27 min. 56 sec.	Rippon, C. A. 16 min. 35 sec.	Copland, R. 27 min. 56 sec.
„ „ „ „ R.O.W. (Tank or Open)	McKenzie, R. 8 min. 16·3 sec.		
„ „ „ „ Type 1-1-P-O R.O.G.	Paveley, D. 1 min. 37·1 sec.		
„ „ „ „ Type 1-1-P-O R.O.W. (Tank or Open) ...			
„ „ „ „ Type 0-1-P-1 R.O.G....	Needham, C. W. 1 min. 6·2 sec.		
„ „ „ „ Type 0-1-P-1 R.O.W. (Tank or Open) ...	Parham, R. J. 1 min. 3·3 sec.		
„ „ „ „ Type P-1-1-P R.O.G.			
„ „ Biplane „ Type 0-P-2-1 R.O.G....	Young, J. O. 31 min. 5·125 sec.		
„ „ „ „ Type 0-P-2-1 R.O.W. (Tank or Open) ...	Needham, C. 7 min. 24·7 sec.		
„ „ „ „ Type 0-2-P-1 R.O.G....	Bunce, F. A. 1 min. 16·5 sec.		
„ „ „ „ Type 0-2-P-1 R.O.W. (Tank or Open) ...			
„ „ Tailless „ Type 0-1-P-0 or 0-P-1-0 R.O.G.	Boys, Howard 1 min. 24·5 sec.		
„ „ „ „ Type 0-1-P-0 or 0-P-1-0 R.O.W. (Tank or Open)			
„ „ Rotoplane „ R.O.G.	Crow, S. R. 39·5 sec.		
„ „ Helicopter „ R.O.G.		Warring, R. H. 21·4 sec.	
R.O.W.		Warring, R. H. 22·08 sec.	
„ „ Ornithopter „ R.O.G.			
„ „ Scale „ R.O.G...	Marcus, N. G. 5 min. 21·75 sec.		
„ „ „ „ R.O.W. (Tank or Open)			
„ „ Flying Boat „ R.O.W. (Open Water only)	Sayers, H. 42·33 sec.		

CROYDON & D.M.A.C. started the season well by winning the Surbiton Gala, and have followed this up with remarkably consistent placings in National contests—eleven out of twenty-five prizes at the British Nationals going to this club. St. George's Heights were knocked out of the L.A. Cup, though it looked pretty grim at one time! Congratulations, Croydon, on a fine showing.

A number of aeromodellers in Clacton are trying to get the old pre-war club going again, and would appreciate interested modellers getting in touch with Mr. D. A. Lawrence at 133, Park Square West, Jaywick Sands, Clacton-on-Sea. Another chap who wishes to get organised is R. Hockenhall of Stanwardine Park, Baschurch, Salop. Any takers?

And now to wind up this month's news on a note of warning!! I am getting far too many reports of power models making fantastic flights when "the owner forgot to set the timer" or "the timer did not function." Please note the Editorial remarks on this subject, and try and get down to fool-proof flying immediately.

THE CLUBMAN.

NEW CLUBS

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CHIPPENHAM M.A.C.
J. Bunting, 17, Ashton Road, Chippenham, Wilts.
FLEXBURY PARK A.C.
J. D. Lyle, 5, Burn View, Bude, Cornwall.
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D. R. Rowbottom, Modelcrafts, Pied Bull Buildings, Leigh Road, Leigh, Lancs.
WIMBLEDON & D.M.A.C.
N. G. Taylor, 145, Kingston Road, Wimbledon, S.W.19.
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NORTH LEICESTER & D.M.A.C.
F. G. Birden, 47, Radford Drive, Braunstone, Leicester.

"BRITISH NATIONALS" RESULTS

PILCHER CUP (164 entries)

1	A. Geddie	Zombies	825·4
2	R. Yeabsley	Croydon	690·2
3	R. North	Croydon	455·2
4	R. Landymore	Chelmsford	405
5	E. Bennett	Croydon	404·5
6	R. Teasell	Northern Heights	391·4
7	S. A. Taylor	Bushy	385
8	— Barnard	St. Albans	346·5
9	A. H. Dadd	Springpark	343·9
10	D. Houghton	Belfairs	338
11	R. J. Perry	Birmingham	337·5
12	— Hall	Croydon	352·2

WOMEN'S CHALLENGE CUP (10 entries)

1	Mrs. A. M. Buckeridge	Northern Heights	258·2
2	Mrs. Galbraith	Blackheath	199·4
3	Miss P. Mayo	Streatham	176·5
4	Miss B. Marsh	Zombies	143·86
5	Mrs. G. Tansley	Northern Heights	109·8
6	Mrs. Morgan	Cardiff	109·7
7	Mrs. L. Close	Brentford	86·5
8	Mrs. Eves	Upton	70·2
9	Mrs. V. Mayo	Streatham	27·4

MODEL ENGINEER No. 2 CUP (161 entries)

1	M. Wilkinson	Northampton	429
2	W. A. Page	Harrow	423·5
3	D. Lofts	Northern Heights	407·5
4	P. Chandler	Croydon	367·25
5	J. Thimidis	Zombies	357·8
6	— Lanham	West Essex	355·55
7	D. G. Lees	Bradford	354·25
8	P. Wicks	Northampton	344·9
9	— Standing	Croydon	316·6
10	B. Haisman	Liverpool	310·9
11	J. Pilcher	Croydon	305·9
12	— Marcus	Croydon	301·3

THURSTON CUP (116 entries)

1	— Dean	Croydon	365·9
2	R. Mead	Northern Heights	339·9
3	R. Yeabsley	Croydon	284·8
4	— Sprateley	Hayes	267·2
5	— Marcus	Croydon	253·9
6	R. Hinks	Luton	251·2
7	K. Young	Northern Heights	249
8	G. A. Caddicks	Worthing	243·2
9	T. Lanfranchi	Bradford	240
10	S. Mayo	Streatham	227·4
11	R. F. L. Gosling	Merseyside	225·4
12	G. E. Salt	Birmingham	220

SIR JOHN SHELLEY CUP (123 entries)

1	R. Gunter	Bushey	221·2
2	G. W. Harris	Croydon	167·1
3	E. Keil	Zombies	165·6
4	W. Dean	Zombies	130
5	T. Pollard	Bushey	124·5
6	— Stuart	Dublin	110
7	— Collinson	Bradford	91·1
8	M. Booth	Zombies	83·5
9	T. Smith	Bushey	77
10	A. Shine	Surbiton	74
11	R. Calvert	Bradford	69·25
12	K. H. Lloyd	Harrow	68

WESTON CUP (111 entries)

1	G. E. Salt	Birmingham	626
2	J. Pilcher	Croydon	613·3
3	G. W. Harris	Croydon	305·5
4	D. Brockman	Zombies	264·6
5	A. R. Parker	North Kent	264·5
6	A. Clark	Streatham	254·5
7	— Glennie	Brentford	243
8	A. G. Bell	Northern Heights	240
9	S. A. Miller	Luton	230·9
10	— Standing	Croydon	217·9
11	R. Smith	North Kent	217·4
12	— Eckersley	Bradford	211·1

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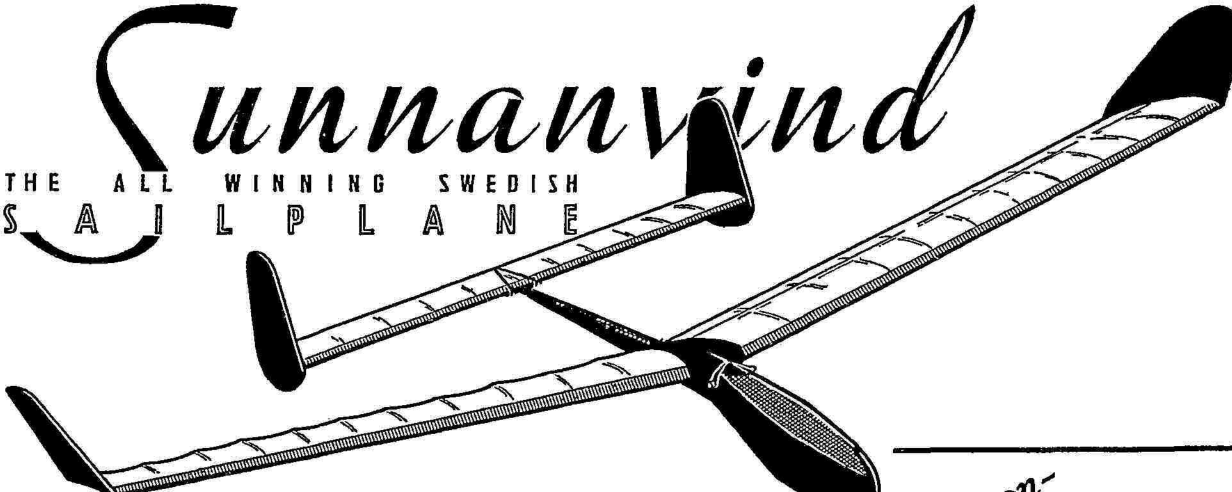

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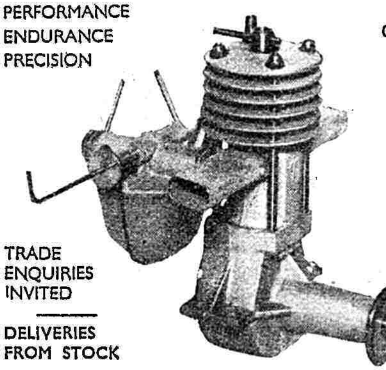

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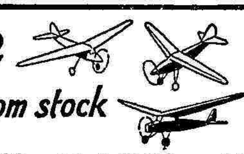

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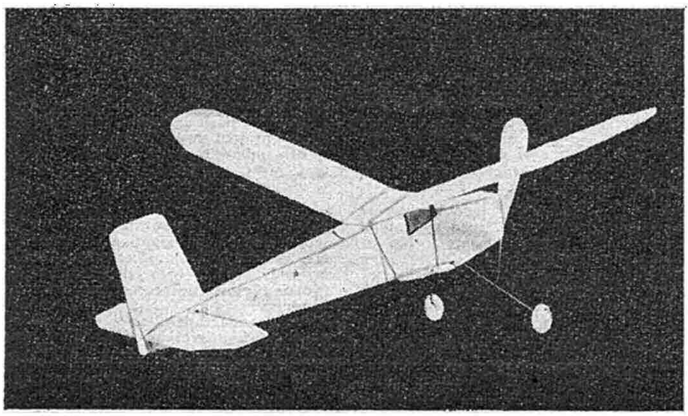

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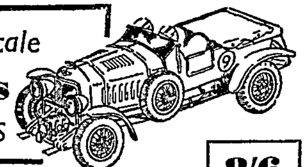

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DISPOSAL

"A.F.P." Vols. I, III, IV, 17/6 each ; Vols V and VI, 25/- each. £4. 10s. 0d. the lot —D. Stenning, 25, Matlock Coversham, Reading.

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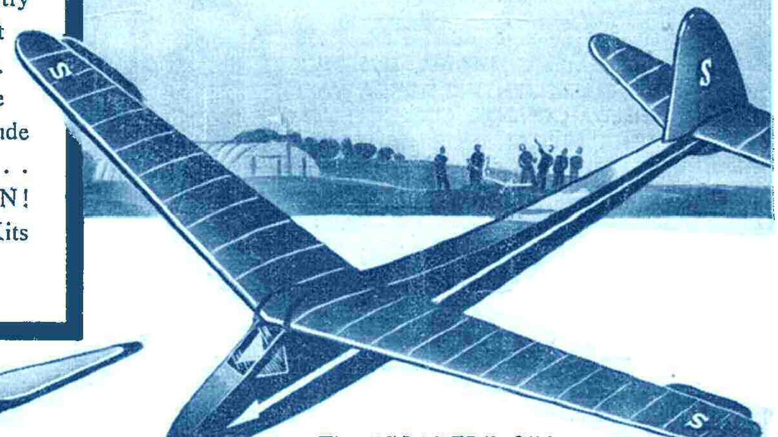

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