AERO MODELLER

MARCH 1953

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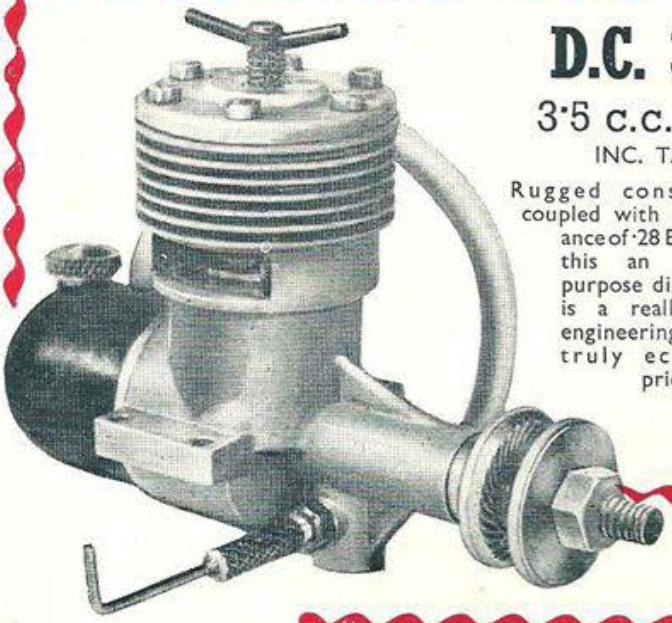

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INC. TAX

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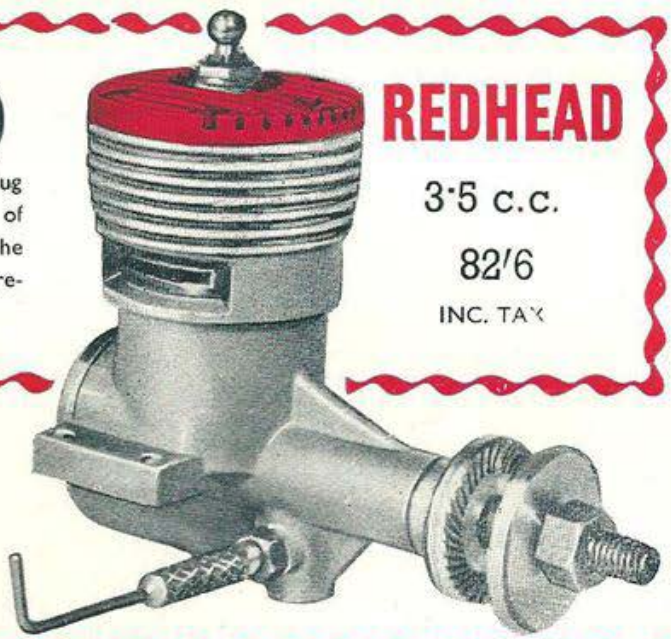

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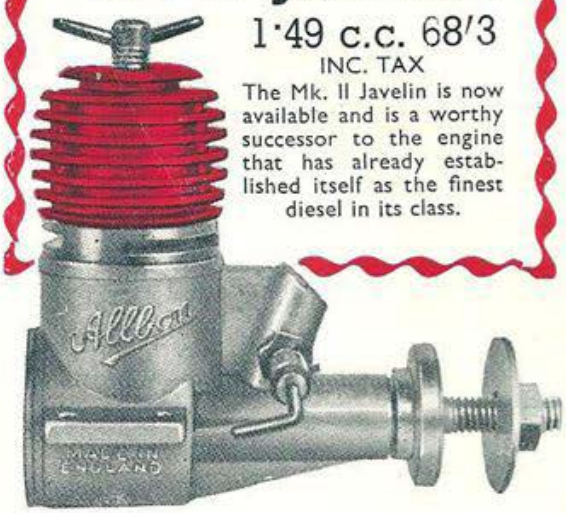

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Tiger Moth, 33" ...	34/7
Frog	
Cirrus, 48"	21/0+4/6
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Vixen, 36"	12/4+2/8
Powavan, 48" ...	22/1+4/11
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Keil Kraft	
Skylon	10/3+2/3
Slicker 42	17/6+3/11
Outlaw	22/6+5/0
Bandit	18/6+4/2
Ladybird	18/6+4/2
Pirate	12/0+2/8
Cessna 170	18/6+4/2
Luscombe Silvaire ...	18/6+4/2
Piper Super Cruiser	18/6+4/2
Southerner, 60" ...	40/0+8/11
Southerner Mite, 32"	10/6+2/4
Skyleada	
Point Five	7/10+1/8
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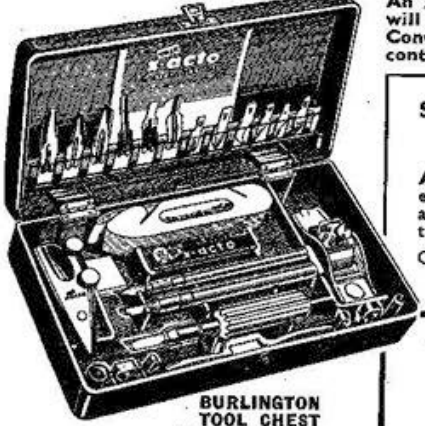

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Mills P.75	60/0+10/9
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Skystreak 40" ...	10/6+2/4
Phantom	18/6+4/2
Scout Biplane ...	22/6+5/0
Phantom Mite ...	11/6+2/7
Veron	
Beebug	12/0+2/8
Panther	25/0+5/6
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D.C. 350 Glowplug	82/6
Allbon Dart Mk. 2	67/6
Elfin ·5	67/6
E.D. Baby ·46 c.c.	55/–
E.D. Bee I c.c.	57/6
E.D. 1·46 c.c.	60/–
E.D. Racer 2·46 c.c.	82/6
Elfin 2·49 c.c.	70/–
Frog 150	49/6
Frog 500 Glowplug	75/–
Amco BB 3·5 c.c.	115/–
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Arden 199	55/–
D.C. 350	45/–
E.D. Bee	35/–
Frog 500	45/–
E.D. Racer 2·46 c.c.	50/–
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K.K. Spitfire	3/8
K.K. Hurricane	3/8
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Eaglet, 23"	5/6
Competitor, 32"	8/7

GLIDERS

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Keil Invader, 40"	7/11
Keil Cub, 20"	3/1
Frog Fortuna, 48"	15/–
Frog Diana, 36"	9/–
Mercury Marauder, 64"	17/9
Veron Vortex, 66"	22/7
K.K. Chief, 64½"	22/8

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ESTABLISHED 1935

AERO MODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

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"Covers the World of Aeromodelling"

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Contents

Editorial and Advertisement Offices :
38, CLARENDON ROAD, WATFORD, HERTS. Tel.: 5445

A Great Year

WITH the publication of the International Contest Calendar (see page 180), aeromodellers all over the world are able to budget ahead for these important International events, and more especially the vital World Championship Contests.

Unfortunately, the International list has made necessary very considerable modifications to the National programme which had been compiled some weeks ago, but was held back pending decisions on the World Championships, etc. Probably the greatest alteration is the necessity to take the British Nationals back to the Whitsun period, as the Society officials and other persons will be otherwise engaged at Cranfield in August.

With Sweden foregoing the option to again conduct the Wakefield Contest by virtue of her win in 1952, the F.A.I. accepted the S.M.A.E.'s offer to stage this vital contest together with the Power Championships, which were the prerogative of this country by virtue of Barry Wheeler's win in Switzerland last year.

British aeromodelling is again indebted to the Senate of the College of Aeronautics, Cranfield, who have once again placed the admirable facilities of the airfield and buildings at our disposal for the accommodation of this very important meeting. The date, of course, was dictated by term requirements, it being impossible to accommodate the championships during the college term.

A committee has been formed to deal with all aspects of the Cranfield meeting, and information will be published from time to time, particularly with regard to accommodation, proxy flying, etc.

Remaining World Championship events will take place in Italy and Yugoslavia, though the exact date for the Control-line Contest has yet to be announced. We look forward to receiving this information in the near future ; also, the clarification of conflicting information which has appeared in foreign journals, for whilst our information is that the Championships will comprise all three speed classes in 1953, outside information indicates that one class only will be flown each year.

In view of the comparatively early date for which the Control-line Championships are scheduled, it is to be hoped that the situation is speedily finalised, for this will greatly affect the selection of a British team.

Lesce Bled in Yugoslavia will again accommodate the Glider Championships, and it will be interesting to see whether similar conditions are encountered as in 1951, when Oscar Czepa startled the aeromodelling world with his " toothpick " design.

Amongst the numerous International events, we particularly welcome the introduction of team-racing to be staged in Holland next September, and although this is not in the World Championships class (and therefore unlikely to receive official support from the S.M.A.E.), we trust that one or more of our highly successful team-race combinations will be able to attend the Dutch meeting.

Cover Picture . . . .

For the first time it is our pleasure to present a "solid" on the cover, and it is F. E. Phelps' 1/36 scale Hawker Hunter prototype which takes the honour. With fully detailed cockpit, including ejector seat and neatly moulded canopy, the Hunter is shown to best advantage by the excellent photography of K. Edwards, a friend of the constructor.

Heard at the Hangar Doors

International Rule Changes

Decisions reached at the recent F.A.I. Conference will greatly affect the general conduct of future meetings, and we welcome the limitation of International Teams to a maximum of four members each, plus a team manager. We have felt for some time that the continued discrepancy in team numbers was unequitable, and undoubtedly caused—in this country at any rate—a certain amount of ill-feeling. On the broad issue, the limitation to teams of four will ease the financial strain—a factor that will benefit all countries.

The " no flight " margin has been increased to 20 secs., for 1953 and its adoption into National rules should be automatic. It is our opinion that National rules should follow International regulations as far as possible, for we have suffered in the past with competitors not being *au fait* with requirements due to normally working under different rules to those encountered at an International meeting.

Agreement was unanimous on the shortening of glider line lengths, and the application of the 50-metre line is to be applied in 1954. We anticipate that the adoption of the shorter line will greatly facilitate the conduct of meetings, for the expected shorter durations will help to contain models within aerodrome boundaries, and even more important, will enable competitors to better retrieve their models in time for subsequent rounds.

However, the rule that will probably cause the greatest discussion in this country is that modifying the Wakefield model specification. Though the alteration affects only one factor, this will have the effect of almost completely reversing current practice. In future, a maximum weight of rubber is imposed, the lubricated weight being 80 grammes (2·82 ozs.), with the total model weight remaining at 230 grammes (8·113 ozs.).

Hitherto the general aim has been to reduce airframe weight to a minimum, thus allowing a high power / weight ratio, and some of the more expert enthusiasts have succeeded in producing frameworks of around 3 ounces, quite capable of sustaining the enormous strain imposed by a 5-ounce motor. The weights will now be reversed, and though we hear of individual objections to the alteration, we have no doubt that the aeromodellers of the world will rise to the challenge in the same way as they have done in the past.

One thing will evolve, namely, a better application of propeller design allied to power output, for—with some notable exceptions—far too many modellers nowadays counter faulty design by piling on the power, and few indeed are the true 230 gramme Wakefields. There's no doubt about it, it is going to tax the modeller's ingenuity far more to get a " 5 ounce frame/3 ounce rubber " job off the deck than obtained when the reverse was the case.

Spotters' Championship

There was a time when we used to pride ourselves on the ability to identify the many and varied shapes of aircraft to be seen in the wartime sky : but oh ! how this confidence was shaken at the All-England Aircraft Rec. Competition, organised by the Aircraft Recognition Society. Of the 35 shapes projected for a second apiece on to the screen, our grand total of correct assumptions was pitifully small. Yet among the 246 competitors who entered in 82 teams from Service units, the R.O.C., A.T.C., Boy Scouts, Women's Junior Air Corps, Civilian Clubs, the United States Army and the Royal Netherlands Air Force, there were two individual entries who managed no less than 31 correct identifications. One of these, we are pleased to report, was aeromodeller M. M. Gates, who will be remembered for his series of articles on powered tail-less models, and his " Ghoul " design which we published in 1951. Mr. Gates was individual champion spotter in 1952, but on this occasion the trophy goes to Mr. Hooks of the R.O.C. who was able to distinguish even the various Mk. numbers with greater accuracy.

Other trophies were presented by the President of the Society, Mr. Peter Masefield, to Royal Observer Corps Post 19/Y2, from Wallington, the top scoring team for two years running, and to

No. 305 (Ashford) A.T.C. Squadron, the leading cadet team.

Speaking after the contest, Sir Frederick Handley Page gave a most illuminating talk in "down to earth" manner and without being technical, explained the why's and wherefore's of his company's crescent shaped wing aircraft, the new "Victor". Sir Frederick, we gather, is not at all in favour of the Delta, unless it is for small supersonic fighters, and he gave a great many commonsense reasons to bear out his point.

Clubs interested in Aircraft Rec. and wishing to enter this contest next year, would be well advised to ask us to put them in touch with the organisers *now*. It would certainly be a feather in our cap if an Aeromodelling team could take the honours!

Motor-cycling loss

We regret to report the death of popular South Birmingham M.F.C. Secretary, Ron Greaves, who died from injuries received when his motor-cycle skidded on an icy road on the 26th December, 1952.

Ron was a founder member of the South Birmingham club, and had been Hon. Secretary for the past ten years. Well known and popular in the Midland Area, he was also a regular attender at Eaton Bray camps, and although not a keen contest flier, would turn out in all weathers to fly a sport model or encourage juniors. We further know his personal record as a willing worker in the Midland Area, and his aid will be sorely missed in the future.

Natty Neckwear

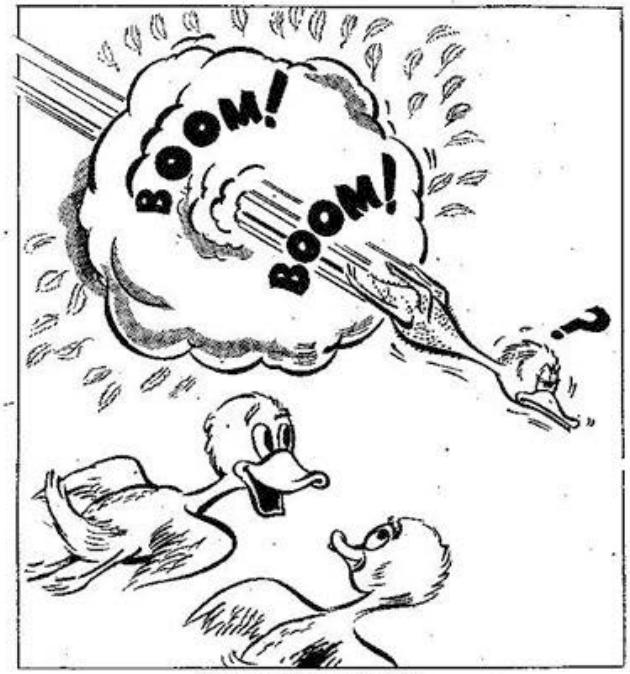
It is quite on the cards that many new S.M.A.E. members do not know that specially prepared neckties are available from the Society, but from now onwards they have no excuse for not being aware of the existence of these neat adornments of the human frame—if aeromodellers can really be classed as human!

Made from silk and rayon, the ties are dark blue in colour, with the S.M.A.E. symbol in silver, the whole being a useful item of the well dressed aeromodeller's apparel at the very modest charge of 10/–. Supplies are limited, so order at once.

Three or One?

Though the F.A.I. Report on page 171 states that the World Championships for Control Line models will in future be confined to speed classes, it is not clear just what categories will be involved for this year. The S.M.A.E. Delegate is emphatic that International Classes I (2·5 c.c.), II (5 c.c.) and III (10 c.c.) will be competed; other journals indicate that separate classes will be contested each year, with the 10 c.c. category forming the 1953 Championships.

Whilst we have an open mind on which of the systems would be best, we trust the true situation will be speedily stated, for it can only be a headache to those responsible for team selection with conflicting requirements reported in various sources.



"He's through!!"

Reproduced by courtesy of "FLYPAPER" S. Africa.

Insurance for Jets

P. Donavour-Hickie advises us that he is attempting to negotiate adequate Third Party Insurance for the flying of reaction propulsion units, thus enabling the speed enthusiasts to enter National and International speed events once more. Such flight will, of course, be confined to control-line, in accordance with Home Office requirements. Those readers interested should contact Mr. Donavour-Hickie at his address at Bonners Place, Horley, Surrey.

Corns in your Engines?

One of our staff members (we are not prepared to admit which) is one of those unfortunates who are prone to the peculiar malady of "corns". Notwithstanding numerous kindly words of advice, the main theme of which implied that a little extra exercise might solve the situation—he purchased a bottle of corn-cure from the local chemist.

Proceeding with the first "dab once nightly" process, he was at once assailed by "Wish you wouldn't take your beastly engines to bed with you", etc., etc. Apparently there was a distinct niff of diesel fuel in the boudoir! This went on for several nights, until at last the repeated complaints prompted a precautionary sniff at the mixture in the little bottle. Lo and behold—it might well have been diesel fuel! A glance at the formula on the label revealed a high ether content, and one or two other additives that would not have been out of place in a fuel tank—plus a dash, but apparently not enough, of the wonder element—Chlorophyll.

The rest of the bottle has now gone into a standard fuel mix, and will, we hope, save our engines from the common corn!

LUSCOMBE 8A "SKY PAL"

DESIGNED BY
FRANK LEES

6/-

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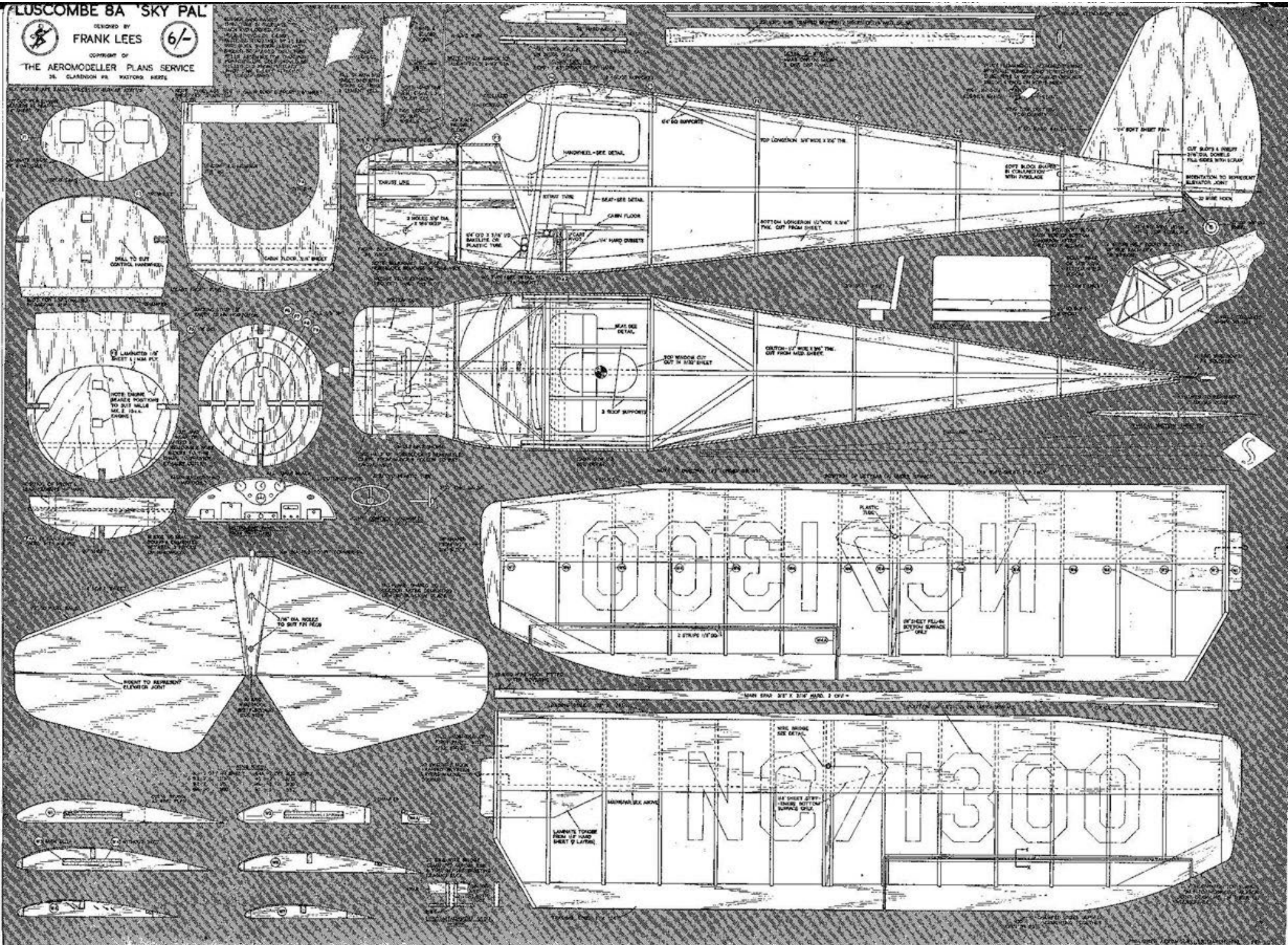
THE AEROMODELLER PLANS SERVICE
39, CLARENDON RD, WATFORD, HERTS.



● A PERFECT 63 IN. FLYING SCALE MODEL WITH TWO IMPORTANT FIRST PLACES IN 1952 CONTESTS

Luscombe 8A
SKY PAL

BY FRANK LEES

Hon. Sec., Ashton M.A.C. . . . Comp. Sec., Avro M.A.S. . . . Married, with four sons . . . Aged 32 . . . Section leader draughtsman at Avro's . . . chief interest is in scale models.

THE Luscombe 8A " Sky Pal " was produced in America and it was from this design that the " Silvaire " was derived. The model at 63-inch span is the result of three years' research and was chosen because it included what was considered essential in a scale model of the high wing variety, i.e., wide root undercarriage legs, single wing-struts, fairly high aspect ratio, stressed skin construction and fairly large gap between wings and tail. The first model produced was 42-inch span, and from the results obtained, including 1st, in the Daily Dispatch Rally, 1951, it was decided to make the 63-inch span version, whose successes in 1952 were 1st at the Yorkshire Evening News Rally and again 1st at the Daily Dispatch Rally.

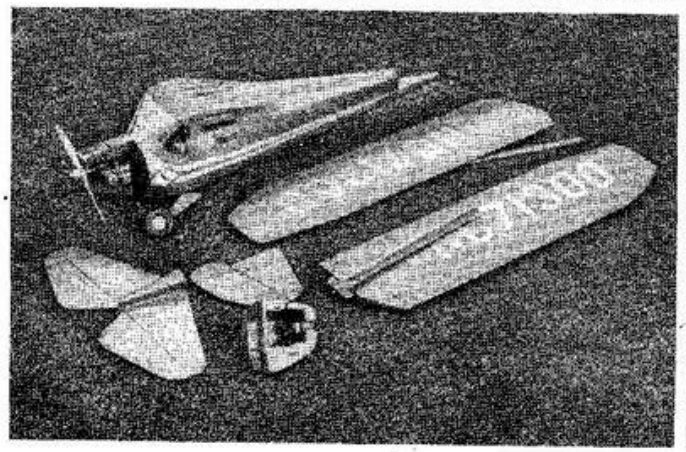
The all-sheet tailplane and fin, sheeted fuselage and wing leading edge provide the basis for producing a finish better than, or equal to any, and the flying characteristics and appearance make the model a pleasure to handle. Although a model which may be undertaken by anyone with average experience it is not considered suitable for beginners. Full instructions for building are included with each full size A.P.S. plan; but to whet your appetite, we give you some of the flying gen. Engine used in the original was a Mills 1·3 diesel.

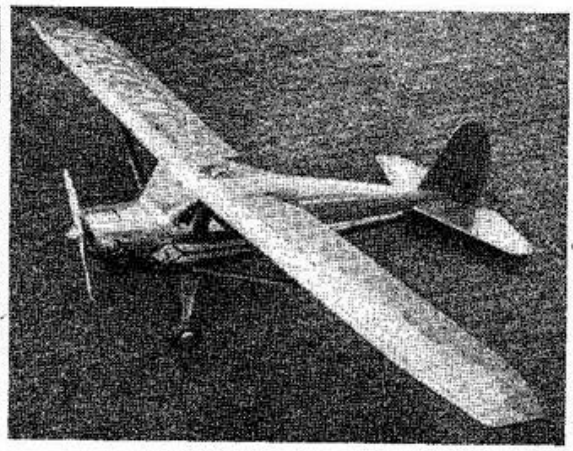
Trimming. It should be stressed that the trimming of the model should begin by ensuring that all the surfaces are true to each other and that the model balances correctly. Under power, the original model turns in wide left hand circles and glides straight, but it is possible to make the model turn in any direction since wing incidence may be varied by cementing thin card to the port or starboard wing tongues.

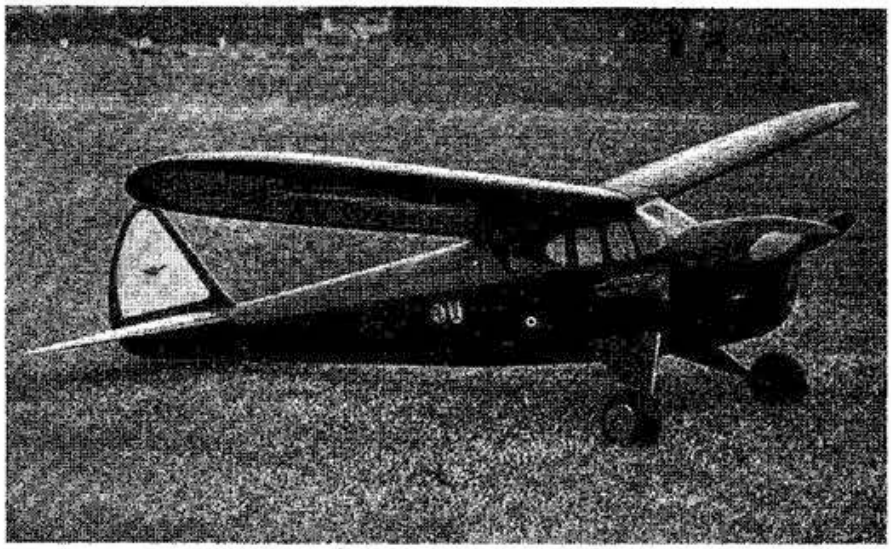
Choose a calm day and hand glide the model over long grass or soft ground. Achieve a glide which borders on the steep rather than the shallow, otherwise the model may stall if flown in windy conditions. Balance out tendencies to dive or stall by adding weight to nose or tail, or by altering wing incidence. When glide is satisfactory, the first power flight should use an engine run of approximately 10 seconds with the engine throttled down to its lowest " revs ". If the turn under power appears safe, further flights on gradually increasing power should be tried. If turn appears somewhat steep, make adjustments by altering wing incidence or changing engine thrust line.

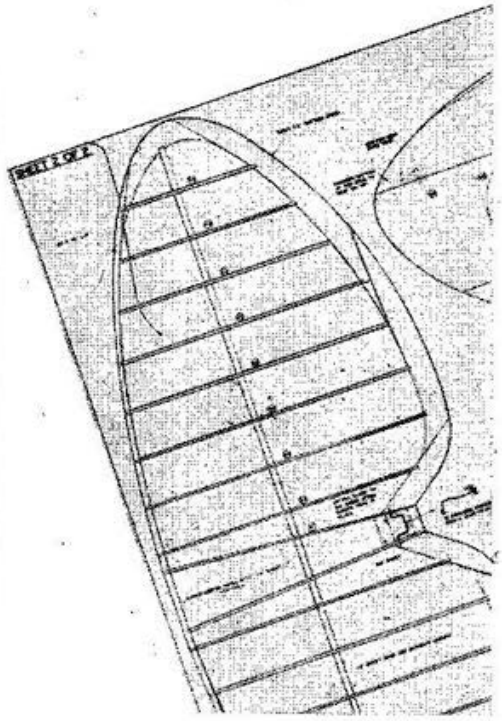
Full size copies of the 1/5th scale plan opposite may be obtained price 6/- post free from the Aeromodeller Plans Service. A complete booklet of building and flying instructions accompanies each plan.

Easy dismantling, and crashproof component fixtures are evident in the left hand view. At right, the " Sky Pal " displays its Concours winning finish in bright red with yellow trim.



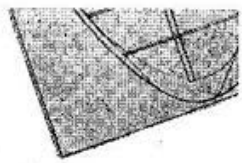






MERCURY IV

Designed by Mick Smith



THERE'S a strange fascination about a big model, and when full-scale realism is incorporated in pleasing lines such as we have in Mick Smith's Mercury, the result is a design of distinction.

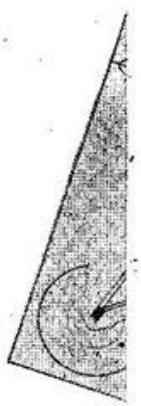
This is Mercury Mark IV. It was fitted with an American Forster 16 c.c petrol ignition, as were its earlier versions, and it was built soon after Mick Smith returned to this country after service overseas with the R.A.F. in South Africa and Rhodesia.

As soon as it appeared at the first large rallies after the war—the big Midland Area "do" at Walsall Airport, the Northern Heights Gala and the first Nationals—it collected crowds of admirers, and many a sigh of appreciation.

Mick would swing the great big prop., slowly trim the butterfly throttle and needle valve for near maximum revs., then, with a slight push to get things moving, he would release Mercury for a long bouncing take-off, followed by a beautifully stable flight. In those days, the 16 c.c. Forster was the only motor available that would pull the five pound model into the air. With slightly revised construction, the version now available in Plans Service is suitable for any 10 c.c. engine of reasonable reputation; the Super Cyclone is shown on the plan, but the Ohlsson, Atwood, Fox, Micron or Nordec would do as well, and the Anderson Spitfire 64 would be ideal.

The prototype will not be remembered only for its performance in the air, for no doubt many of our readers will find its outline familiar, and recall the Third National Model Aircraft Exhibition in 1946 at Dorland Hall. It was there that the Mercury stole the show and won the Senior Championship Trophy for its constructor. The magnificent finish of this eight-foot span winner had to be seen to be believed, and even though displayed so that a plan view could be obtained, it was impossible to see and appreciate all of the intricate cockpit interior detail. Through the opening cabin door one could have access to real cockpit controls.

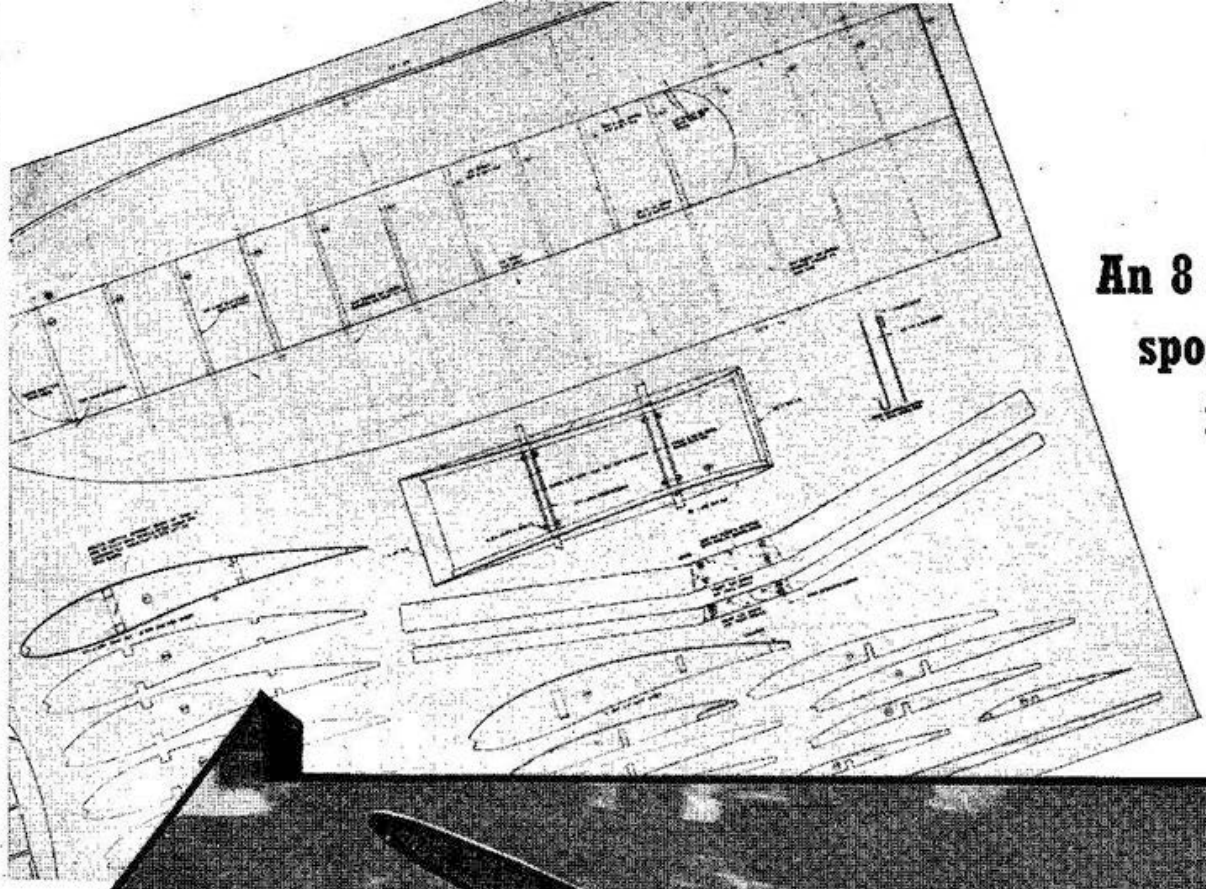
The choke and needle valve mixture controls were operated by push-pull knobs on the dashboard, whilst the ignition advance-retard could be altered with movement of a quadrant. All that was needed to make the realism perfect was a dummy pilot.

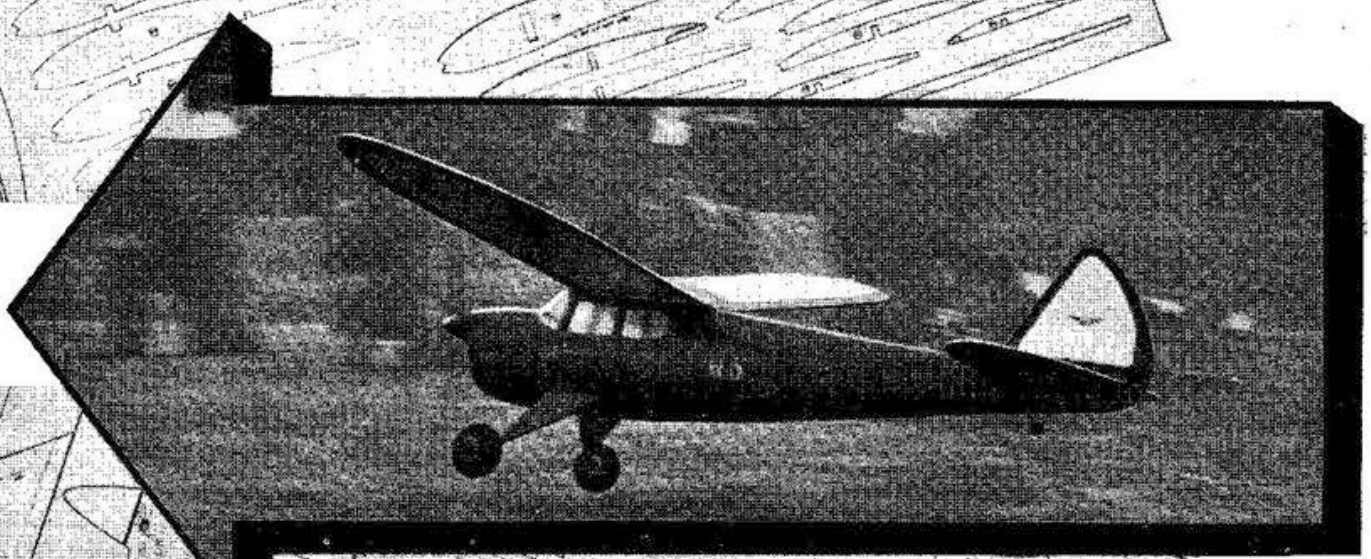


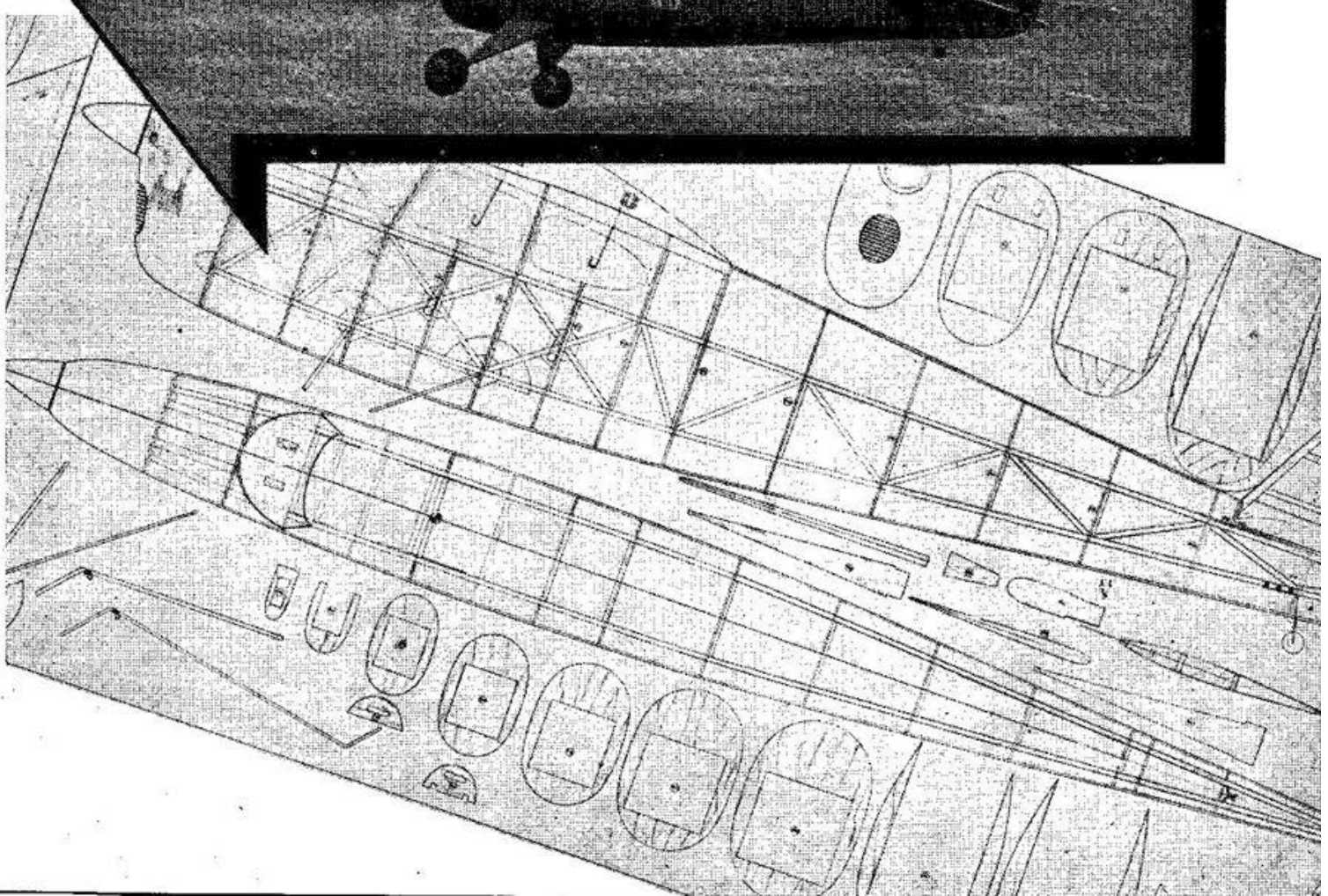
Duplicate Mercurys have been built from plans in circulation among Mick's South African and Rhodesian contacts. All give the same high quality performance, and it would not in the least surprise to learn some day that a radio-controlled edition has been flown. For the sport flier who likes something "big", with plenty of room in the engine and radio departments, this model is a certain first choice.

Incidentally, we might also mention that this is one of the biggest plans in our range, the total length of the two 38½ ins. wide drawings is no less than eleven feet, all crammed with detail. In addition, a special set of building instructions, plus, of course, the A.P.S. transfers, are issued with each set of full-size plans, price 12/6 post free from the Aeromodeller Plans Service.

An 8 ft. span sport model ideal for radio control







Strength of Tissue Covering

How heavy is a coat of dope? How much stronger is heavyweight grade tissue — revealed here

by H. P. Goldsack

MANY facets of aeromodelling have come under review in the past and pretty well every stone has been turned from compression ratios of C.1. engines to geodetic construction of airframes, but notable for its absence is information on covering material, particularly tissue. It is in an attempt to throw a little light on this subject that these experiments have been conducted.

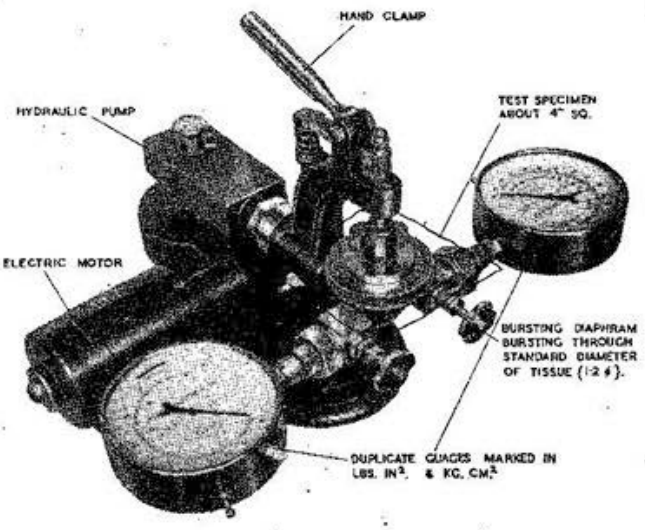
Whilst the greatest care has been exercised in conducting these tests and the best chemical and paper testing apparatus has been used it must be borne in mind that paper is essentially a heterogenous substance and results obtained are liable to variation, sometimes of astonishing magnitude. In order to minimise this risk each experiment was conducted at least six times and the mean value taken.

Before reviewing the results, a word about the apparatus used might put the meaning of the values into better perspective.

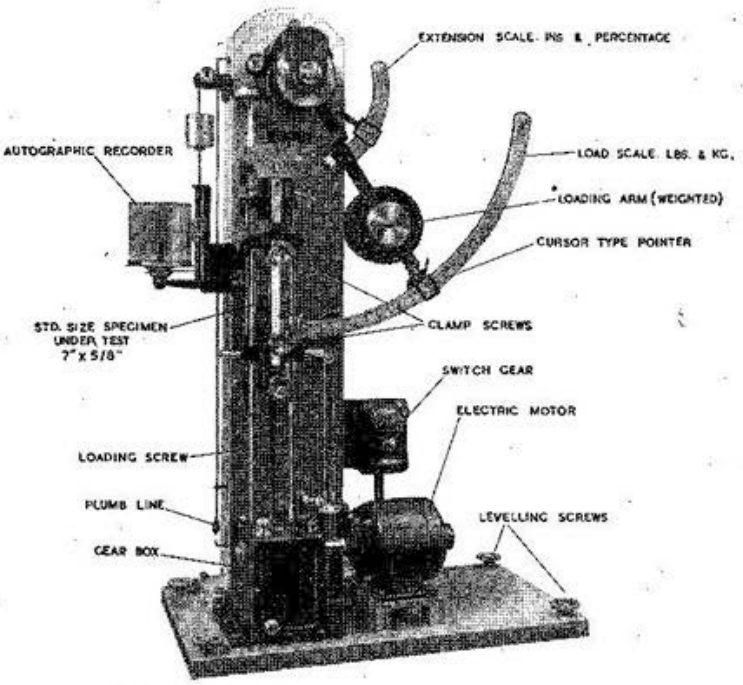
The "bursting strength" of the tissue is obtained by exerting an even pressure over a standard circular area and increasing the pressure by a sensitive hydraulic press until the specimen ruptures when the instrument on the press records the maximum pressure obtained.

In obtaining the "tensile strength" a strip of prepared tissue doped up in normal manner and cut to a standard width across the fibre lay is subjected to a steadily increasing tensile load, evenly applied across its width, until failure takes place. The ultimate tensile strength being recorded on the dial of the testing machine. It was in this test that the greatest variations in reading occurred as the strip being of a standard length of 7 in. it was inevitable that in that distance the strength would vary a little, thus the values found are like those of a chain whose greatest strength is in its weakest link.

Valuable and extremely sensitive scientific instruments used by Mr. Goldsack to provide this illuminating information on model covering tissues, are seen in these photos *(courtesy of Messrs. Goodbrand & Co. Ltd.)*



PAPER BURSTING STRENGTH TESTER



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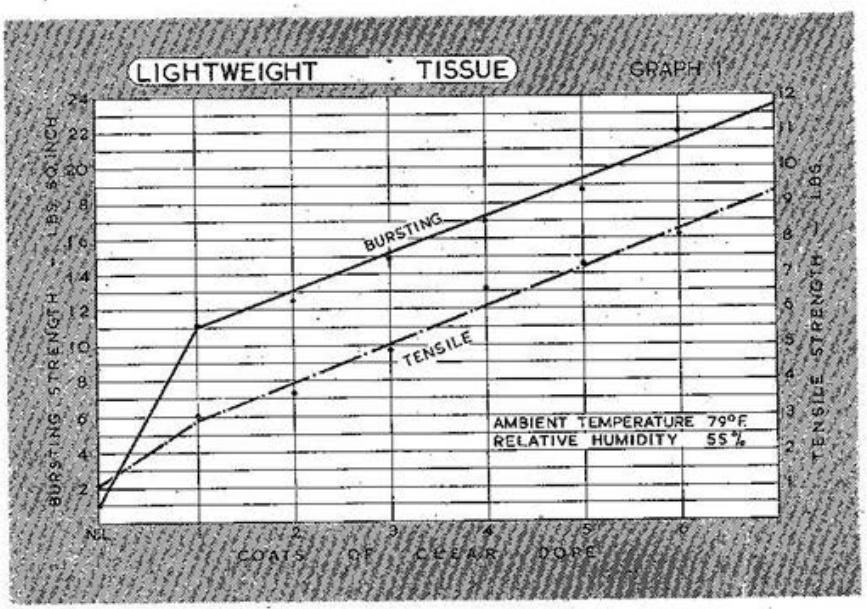


Graph 1. Lightweight Tissue
Bursting and Tensile

Tissue used : White Tissue of good quality and of a representative type used for rubber models.

As will be seen, the tissue increases its bursting strength 1,000% on acquiring its first coat of dope. This is due to the binding action of the cellulose dope on the fibres of the tissue preventing them from sliding past each other—rather like soaking a straw mattress in glue! After the initial soaking, the majority of the dope subsequently applied lies on the surface and forms a skin. This skin is homogenous and its strength from the experiments seem to prove to be roughly proportional to its thickness.

The tensile test gives an increase of only 300% on the application of the first coat of dope. This is due to the fact that the tensile load was applied at right angles to the lay of the fibre and the effect of the interlacing was at a minimum and the strength of the tissue derived almost entirely from the dope film. The value of the tensile strength is a representative one and based on the load required to break a $\frac{5}{8}$ in. wide ribbon.

In ascertaining the thickness or "caliper" of the tissue a "Deadweight Thickness Testee" is used. This is a micrometer in which a standard pressure of $7\frac{1}{2}$ lbs. square inch is exerted between the anvils.

The weight of the sample is found by weighing a $\frac{1}{4}$ square foot specimen on a chemical balance.

During all these experiments care was taken to ensure that weight and thickness, bursting and tensile tests were all conducted under recorded atmospheric conditions for which wet and dry bulbs thermometer readings and barometric pressures were taken.

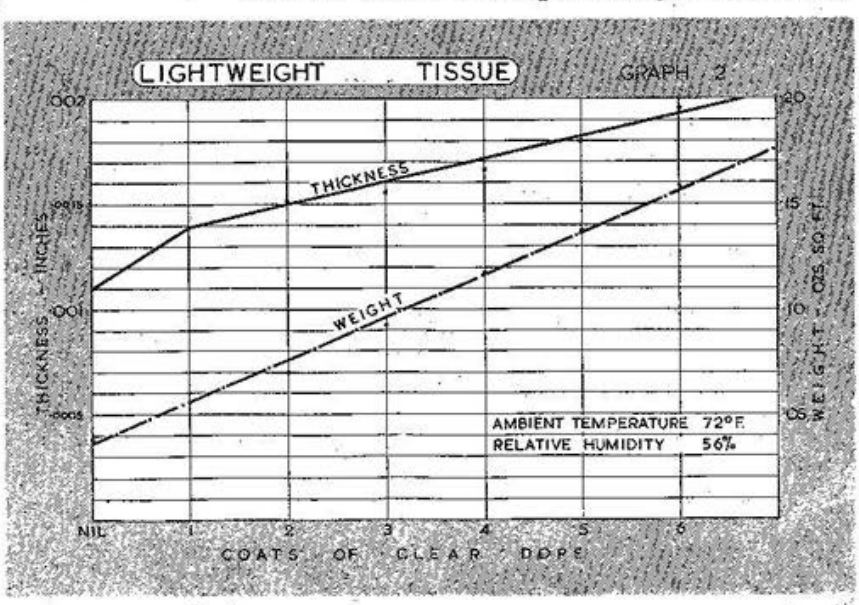
The dope was applied to the tissue by brush at a room temperature of between 70°F and 72°F to avoid "bloom" and allowed to "cure" at this temperature for 1 hour and then kept at about 60°F for 24 hours before testing.

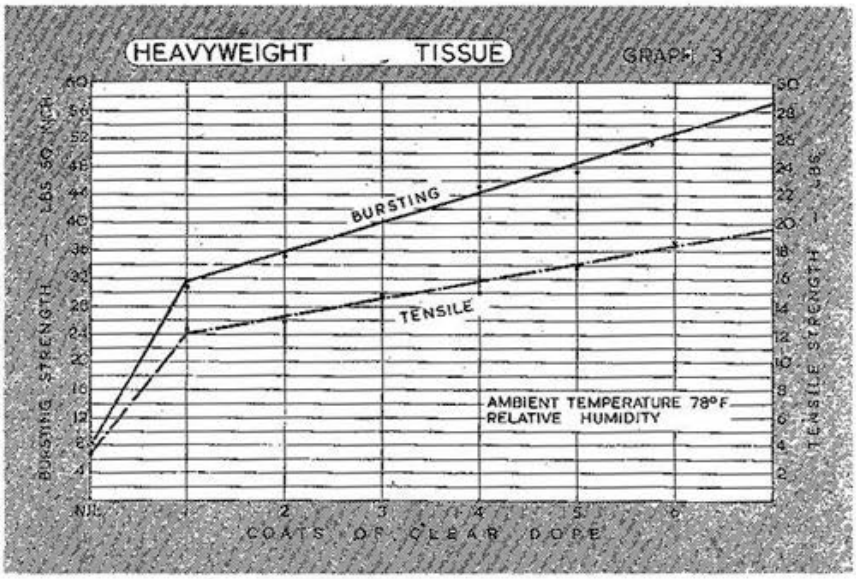
Thus it will be realised that all reasonable precautions were taken to ensure that the results of the tests were affected as little as possible by "foreign" influences.

Each test, as will be seen from the graphs, is made up of seven experiments, one on the plain, untreated tissue, the others on doped tissue, in all they represent over 330 separate tests. It was my original intention to carry out tests to see if dope strength changes greatly after a passage of time; in view, however, of the formidable number of tests involved I'm afraid it is a job I must defer until I have more opportunity to devote to tissue research.

Graph 2. Lightweight Tissue
Weight and Thickness

The thickness increase shown is not due to the thickness of the dope film alone as on the application of the first coat a sharp increase is experienced. This is evidently due to the stiffening action of the cellulose on the tissue preventing it from being





crushed by the 7½ lb. in.² load of the micrometer anvils. After the initial coat the increase is steady at about ·001 in. per coat of dope.

As may be expected, the rise in weight is constant at all stages.

Graph 3. Heavyweight Tissue
Bursting and Tensile

Tissue used : Heavyweight White Modelspan.

The increase of bursting strength on the first application of dope is only 400%, but it must be borne in mind that the initial strength is very high at 8 lbs., nearly three times that of your daily newspaper! After the first coat the strength increase is constant, but at a higher rate of increase, due perhaps to a greater absorption of dope into the "pores" of the paper.

Tensile strength exhibits a sharp rise on the first coat due to the increased bonding action of the dope on a thicker paper. After the first coat, however, the strength rise is comparable to that of the lightweight specimen.

Graph 4. Heavyweight Tissue
Weight and Thickness

What has been said about Graph 2 applies also on this graph. The thickness increase is not so marked by comparison, due possible to the extra bulk of the tissue but in all other respects the results are similar.

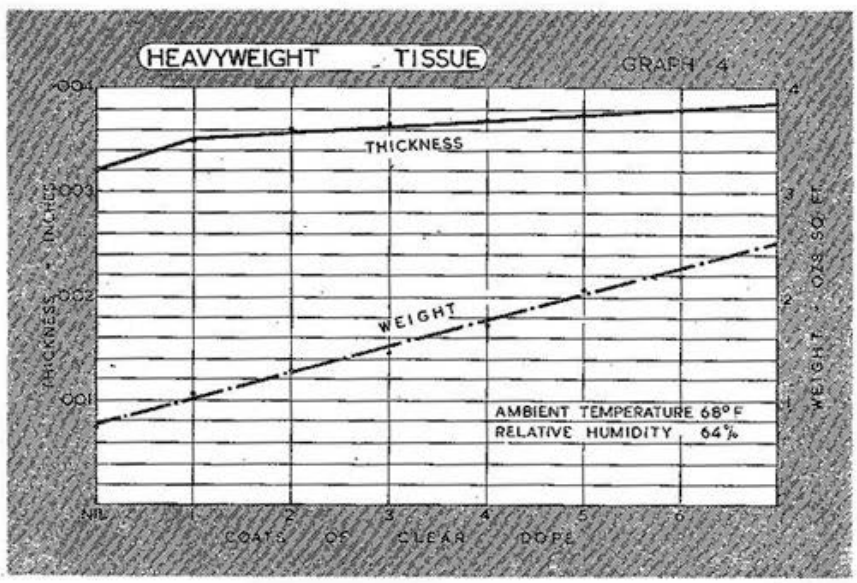
I will not attempt to draw any conclusions from this other than those already made except that it is interesting to note that Heavyweight Tissue with one coat of dope has greater bursting strength and less weight than a Lightweight Tissue with six coats of dope.

In closing I should add that the values given are empirical and that due to the heterogenous nature of paper no values can be found such as stress in tension and thus there is no Modulus of Elasticity, etc., such as is obtained in metal, rubber, glass or any other more constant substance.

Nevertheless, much useful data can be drawn from the experiments and apart from the weight, etc., wing strength in bending may be more closely calculated with reference to the strength imparted by the tissue in tension, although an arbitary neutral axis must be assumed, as no compressive help can be expected from the covering.

This, however, is a subject in itself and it is left to the reader to avail himself of the information and apply it to his own particular problems.

In a later series of experiments Mr. Goldsack will be dealing with the effects on tissue strength and weight of pigmented dopes, banana oil fuel proofer, etc. These will be covered in a second article to be published later, whilst yet a third article will give the results of tests on miscellaneous covering materials. It may also be possible to deal with the humidity and its effect on various types of treated covering providing the tests can be conducted analagous to practice. (Ed.)



An authoritative survey by HOWARD G. McENTEE, formerly Editor of "Model Airplane News", now one of America's leading exponents on Radio Control.

RADIO CONTROL IN THE U.S.A.

Fran McElwee, right, with his well-known "Robot" at Dallas. This, a heavily loaded model, uses McNabb radio gear, and is powered with a McCoy '19 motor equipped with a Walker pressure tank.

AS was the case in England when the use of a frequency around 27 mc. was authorised, R/C has had a tremendous spurt of activity. Our "licence-free" spot is at 27·255 mc., and note that this is a spot—not a band. It was opened in March of last year and the results of this relaxing of the rules are expected to be far reaching. Our spot frequency is not really licence-free, since it is necessary to apply for a station licence under the Citizen's Radio service; however, no operator's licence is needed, so there is no necessity to learn the code or take any examinations. To operate on this spot, the transmitter must be crystal controlled and the output no greater than 5 watts. So it may be seen that our country is still not as enlightened as yours! Still, this new arrangement is vastly better than we have had so far, and the upsurge of R/C flying is proof that it has long been needed.

The fact that crystal control is required has bothered quite a few of the boys, as the tuning-up problems in both transmitter and receiver are entirely different from those we have had. Some crystals require lots of regeneration, while others do not, but are pretty fragile and subject to damage, if circuit conditions are not just right. Most of our transmitters are powered by dry batteries and there are not very many tubes that will work with a filament voltage of 1½ and yet handle several watts of plate power. The old faithful 3A5 does not do too well as a crystal oscillator, because of high R.F. crystal current, but the 3A4 has come into wide use and seems to be the standard now. Two circuits using this tube are shown here; the triode version will put out about 25 per cent. more power than the pentode circuit, but some crystals will not stand the higher R.F. current.

Operation on 50 mc. is still high, most hams sticking to this band. Then too, we have the 465 mc. section of the Citizen's Band, where the Macnabb equipment has been certified for use. This is the only one that *can* be used on 465, and the owner is not allowed to do any service work on the transmitter, though he can change batteries as needed.

The efforts of several years by the A.M.A. R/C Committee under the guidance of Dr. Walter Good have finally paid off in our 27 mc. spot; while it doesn't offer the freedom that the English fliers enjoy, it is probably the best we will get, and it has really stimulated R/C development here, as the A.M.A. knew it would. If nothing else, this exposition of our licensing problems should make every English R/C flier offer a solemn vow to check his frequency most diligently, and to extend every effort to operate well within his very lenient regulations!

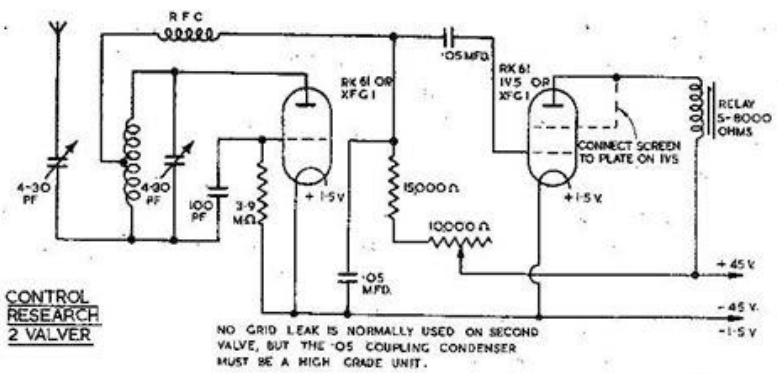
Now, what about planes and equipment? The old faithful Rudderbug is still seen at every meet and practice field. The original of this ship, built by Dr. Good in 1948, is still flying strongly and at Washington, in June, 1952, was flown for a new F.A.I. record for R/C endurance. The time made was 40½ min., of which over 26 minutes was under power. However, Dr. Good has been heard to declare that he guessed it was time to design a new ship—let's hope it is half as popular as the "Bug".

There is an unmistakable trend over here towards smaller ships and smaller engines. We have seen Gene Foxworthy fly his 2/3 full size "Hoosier Hotshot", which carried the rather heavy Citizenship receiver, and it is a sweet performer with a very nice glide. This plane is an exact miniature copy of the job with which Gene won the 1950 Nationals and has an area of 350 sq. in. to carry a total of 28 oz. Lots of quite successful ½A planes are flying here, almost all of them with the lightweight gas-tube receivers.

Typical of the trend towards smaller models is this two-thirds size "Hoosier Hotshot", shown here with designer Gene Foxworthy. Receiver is the McNabb Citizenship, wing area 350 sq. ins., weight 28 ozs.

To cope with conditions of wind found at almost every meet, builders are beginning to turn to ships a bit smaller than the "Rudderbug" and more heavily loaded. Fran McElwee's "Robot" (plans for which were published in AIR TRAILS, as were Foxworthy's original "Hotshot") is one of these. The "Robot" could be called a "hot" ship, but this is what is needed in windy locations. We clearly recall McElwee's winning flight at the 1950 Mirror Flying Fair on Long Island; most other modellers who dared tempt the gales had blown rapidly downwind and out of sight, or had cracked up. Mac launched his brand new and hardly tested plane, which bored steadily upwind with scarcely a deviation, made his "cross-country" points, then did quite an array of stunts. The rather heavy, fast ship (by standard of early 1950) would dig right back upwind whenever required, and as a result Fran got in a good long flight—under perfect control—and collected top points. This plane spans 60 in. with 576 sq. in. area, weighs 68 oz. with Citizenship receiver installation, and is flown with McCoy ·19 engine and Walker pressure tank.

Other contest fliers are adopting the "hot, heavily loaded" ship formula; the average preferred size, despite more and more midget planes, remains around 5 ft. span. This seems small enough for ease of handling and transportation, yet can be seen in the air at a good distance, and is large enough to carry good sized batteries and any combination of receiver and actuator now in general use.



Sad to say, we see very little scale model R/C over here. Most builders seem more interested in building to a certain set of size and performance specifications, rather than duplicating true scale appearance. It must be admitted however, that even for contest purposes, R/C planes are probably more "realistic" than any other class of models, except those built strictly to scale outline.

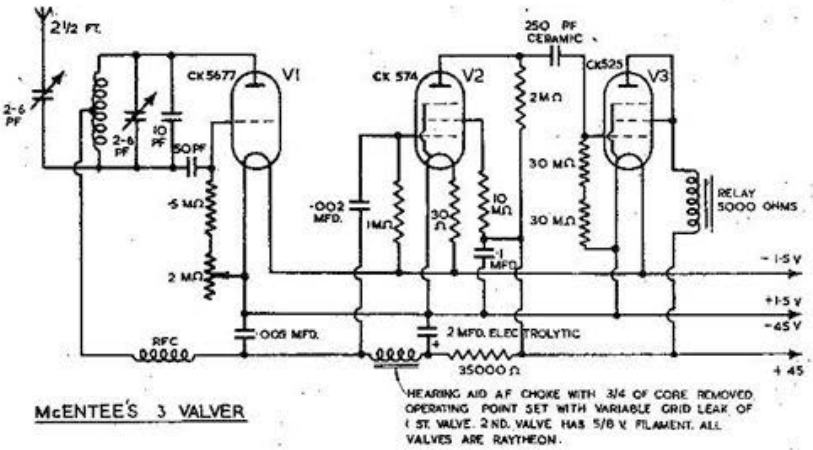
A large group of modellers in Northern California have long specialized in large, heavy planes, with practically no dihedral, and usually fitted with audio-tone control equipment. These planes run around 8 to 9 ft. span, and many pounds of weight. The radio apparatus is that developed by Rockwood and uses tuned reeds. Even these fliers, however, are building lighter, smaller ships now since the radio equipment has been refined and lightened, but the planes are still over 5 ft. span and one pound per square foot wing loading.

We have a few new kit designs intended expressly for R/C flying and more are on the way. For some time, Berkeley's "Super Brigadier", a 58-in. span ship generally used with ·19 engine, has had the field to itself. This concern has brought out a 38-in. version of this plane, and DeBolt and Jasco have both entered the fray with out-and-out R/C designs. It's conceded now that the kit makers really missed a good bet when they passed up the Rudderbug! R/C builders are breaking out with low wingers, pushers and even biplanes, so we look forward to a really interesting season designwise.

In the field of equipment we see a bit more variation, and, while the sale of kits and ready-built apparatus continues at a good rate, by far the largest number of sets seen are homemade, though it must be admitted that most of them are to standard patterns.

A year or so ago a severe shortage of RK61's hit us. Raytheon stopped making these tubes temporarily due to defence orders, with the result that good RK61's became worth their weight in uranium! At about the same time, however, the supply of XFG–1 tubes reached good proportions, though this tube was found to be a rather poor substitute for the RK61, since most receivers were operating on 50 mc. and the XFG–1 was simply substituted without making the necessary circuit adjustments. There are plenty of both tubes available now, but during the period of gas tube shortage everyone started playing with multi-tube circuits, the best-known so far being a two-tube "conversion" kit worked

up by Control Research. In this arrangement, it is possible to use RK–61's that are no longer workable in the normal single-tube circuit. As shown herewith, the first tube must be a gas type, either the RK–61 or XFG–1 working well. It is operated at about ·5 ma. idling plate current; this drops to about ·1 on signal. The second tube can be the same, or good results are had with various sub-miniature pentodes, which change from an idling current of ·1 ma. up to 1½ ma. or more on signal.



McENTEE'S 3 VALVER

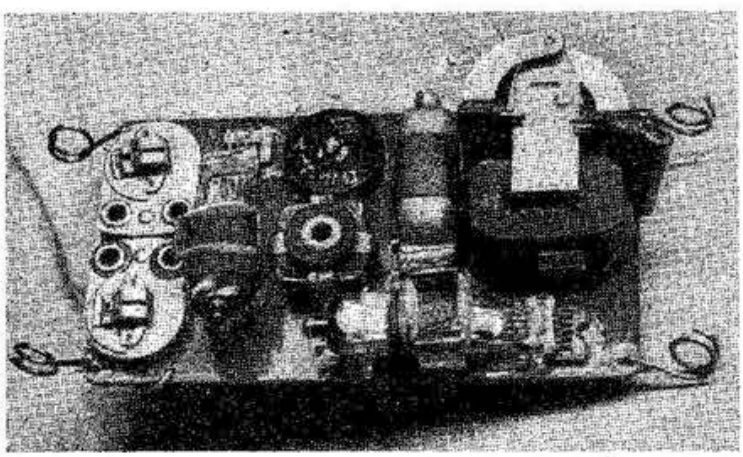
These circuits are generally less critical of tube ageing, antenna loading and battery voltages than their single tube predecessors, and seem destined to retain their popularity, even though the supply of RK–61's is now back to normal. The gas tubes have much better life in these circuits and the large plate current change makes it possible to use smaller and lighter relays than the ever-popular but rather heavy Sigma 4 F. Also, and even of more interest, relay adjustment is entirely non-critical and many experimenters find they can dispense with rubber band shock absorbers for the receivers. These receivers are now mounted rigidly in the plane, or at the most are packed in sponge rubber, mainly for crash protection.

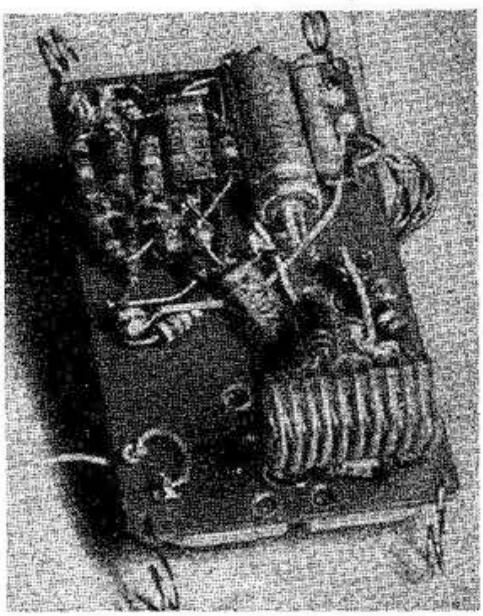
The writer developed a 3-tube receiver several years ago, the main objective being insensitivity to dropping battery voltage. As will be seen from the diagram, it consists of a superregen detector, high gain pentode AF amplifier, and a relay tube. There is nothing new about the principle of operation, which was popular way back before the RK–61 (or RK–62 as the first version was labelled) came on to the scene. The first tube is operated so that it "hisses" good and loud; the hiss is amplified by the second tube and serves to bias the last tube to about ·1 ma. With a signal, the hiss decreases and the final tube plate current rises to about 1 ma. It could be raised even more, but this has proven ample with the light Kurman relay used. The second and third tubes are hearing aid types, so total A drain is only about 90 ma., and total B current is ·4 ma. with no signal, and about 1·3 ma. with signal. Sensitivity is very good, and if properly set, the receiver will function well from full battery voltage down to 1 v on the A and about 36 v on B.

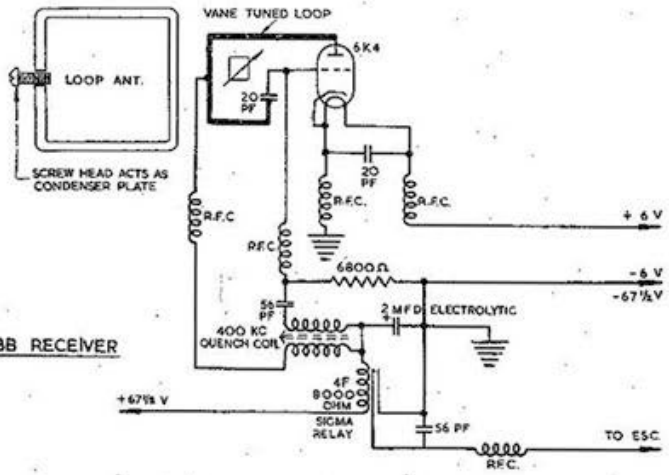
This receiver is a real success and has proven very reliable, but it has a lot of parts—just that many more components that could fail. It appears that the most favourable field of development is in 2-tubers with as few extra components as possible, and feverish work is now under way all over the country to develop THE receiver. Thus it may be that the acute gas tube shortage was a blessing in disguise! Even so, some experimenters have found that "cooking" defunct RK–61's will often restore a good measure of life.

The McNabb Citizenship apparatus is in quite wide use, despite its rather high price, and has given a good account of itself. It is popular with contest fliers, due to the licence angle; the 1950

Top and under view of the McEntee 3-valve receiver.







MACNABB RECEIVER

Nationals winner used it, and there were a dozen or more at the Nationals in 1951, with almost a third of the entry using it in 1952.

Transmitters remain low powered, and a large majority of them are now crystal controlled. While the half-wave dipole reigned supreme on 50 mc. the shift to 27 has brought out a lot of verticals, mostly of the quarter-wave size. The 465 mc. Macnabb transmitter uses a tiny half-wave dipole and a reflector mounted right on the case. Many fliers have mastered the technique of launching the plane with one hand while they carry the transmitter in the other; they are thus ready for immediate control.

Most fliers stick to a simple push button for transmitter operation but more experimenters are trying out what we generally call " Beep Boxes ". These are simply motor-driven keying controls that send out the required number of pulses to shift the plane escapement as needed. Fliers who use these control boxes feel that they can concentrate solely on the plane operation, with no necessity to remember sequence.

The escapement still reigns supreme in America. We've often speculated on the lack of originality among U.S. builders in the line of actuating equipment, or intergear as you call it. It has always seemed to us that English builders were more inclined to gadgetry, and willing to spend uncounted hours on complex mechanisms, while American builders are much more anxious to get the job done and the ship in the air. The simple escapement which is available in inexpensive kits, or completely finished, facilitates this. More and more systems are appearing, however, for motor cut-off and two-speed operation. Dr. Good has used a simple thermal cut out on his motor for several years. The heater element is connected across the escapement coil and the transmitted pulse must be 3 or 4 seconds long to trip the thermal unit; this gadget works best with 4-arm escapements, which are held in the half-positions with signal on, to actuate the thermal heater.

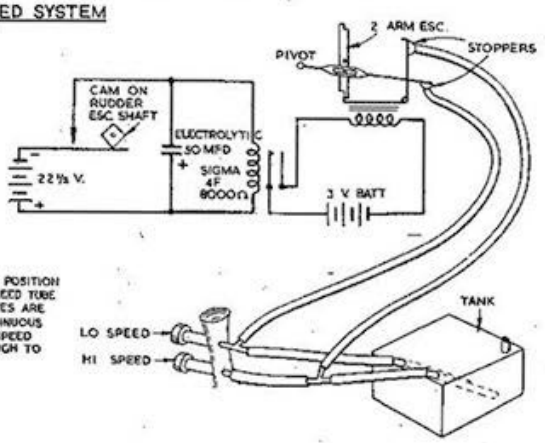
The 2-arm escapement is more widely used here, possibly because operation is simpler, but more likely because these units can be had everywhere while the 4-arm units are not so widely distributed.

One of the many ingenious schemes of motor 2-speed control is reprinted here by courtesy of AIR TRAILS. It was used by Howard Bonner, and was instrumental in his 2nd place, 1951 Nationals win. It will be seen that two needle valves are used, plus a second escapement. The regular rudder escapement has a cam and pair of contacts attached, so set that the contacts are open in the neutral positions. An escapement with good bearings is required, as no slop or wobble can be tolerated. A Sigma 8,000 ohm relay is connected to these contacts as shown. It does not operate when normal rudder pulses are transmitted, but pulls in momentarily on four quick pulses. This brief operation kicks over the second escapement which closes the stopper from the low-speed needle valve tube, enriching the mixture and slowing the engine. The four pulses are fast enough not to allow even a wiggle of the plane, and they leave the escapement right were it started position-wise. It takes four more pulses to open the stopper, thus killing fuel feed through the low speed needle and restoring high speed motor operation.

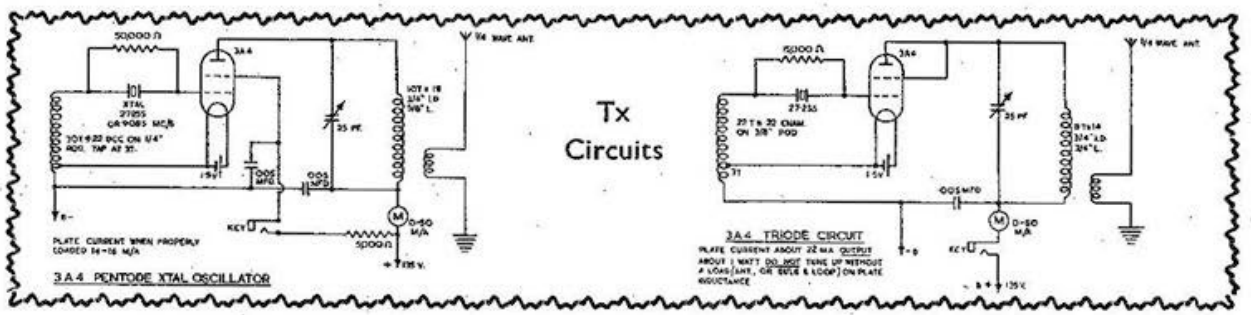
Utility of this arrangement has been extended by the addition of another T-pipe on the high speed needle; the end of the tube from this goes to a stopper fastened directly to the escapement armature. Thus, when the armature is pulsed continuously for several seconds, the motor may be stopped but it does not stop when the escapement is pulsed momentarily to work the slow speed mechanism. Bonner has developed a special escapement with these valves built into it, for those who cannot build up their own.

The Rudevator man, Herb Owbridge, has decided that his novel unit didn't offer the advantages it seemed to promise at first. The reason was that when the vane was set for enough angle to give good elevator action, it was far too much for reasonable rudder action. A year ago he worked out a new type of escapement in co-operation with Howard Bonner (who markets it) that has many advantages over the older types, and is already in wide use here. It is called a " Compound " escape-

BONNER 2 SPEED SYSTEM



SHOWN IN LOW SPEED POSITION - STOPPER CLOSES BLEED TUBE & BOTH NEEDLE VALVES ARE DRAWING FUEL CONTINUOUS PULSES OPEN HIGH SPEED STOPPER LONG ENOUGH TO KILL ENGINE.



ment and has only one neutral position ; there are three operating positions, one each for right and left rudder, and a third that gives practically neutral rudder but closes a pair of electrical contacts, for motor two speed or other uses. In use, one pulse gives right—for example—two give left, and three change motor speed. There is no sequence ; you can get half a dozen rights without any lefts, if you want. This escapement is widely used by beginners, but has been found very helpful to the " hot " fliers as well.

More interest is being shown in pulse proportion operation, and quite a few of the experimentally-inclined are trying it. The rudder actuating equipment is usually of the rotary style used for several years by George Trammell. These actuators can be made to weigh as little as 1 oz. and still have ample power for a six foot plane. Current drain is very low as compared with escapements. One we have used draws only 90 ma. on $1\frac{1}{2}$ V., and flips the rudder as energetically as one could wish. These actuators must be home made, of course, as none are marketed ; furthermore, round alnico magnets of about 1 in. diameter by $\frac{1}{4}$ in. thick, with a hole or soft metal centre bushing, are difficult to obtain. Still, activity in proportional operation appears to be on the increase.

E. L. Rockwood, the audio-tone expert, continues development of his systems. The most popular seems to be the 3-tone equipment which is usually employed to give right or left rudder as desired, with the 3rd tone reserved for motor 2-speed. He also offers a 5-channel system. Very low transmitter power is needed for this equipment and it is practically interference-proof, as a modulated carrier of the precise note of the reeds is needed to actuate the receiver.

The winner of the 1952 Nationals, Alex Schneider used Rockwood equipment as did several other participants.

We are glad to say that the Nationals—and other meets, too—show more variety of equipment both in the R.F. and actuating lines, than ever before. This, plus the unmistakable signs of increased R/C activity in general, give hope that we'll see more new and original developments here than we have in the past.

Though actual figures are hard to arrive at, we believe many more R/C events were held in 1952 than previously. R/C was flown at many of the Plymouth qualifying meets and there is some feeling it may eventually be included in the Plymouth Finals.

The A.M.A. policy is to change rules only every two years. R/C rules will show quite a few alterations, a new set having been drawn up to go into effect early in 1953. For one thing, there will be an entirely new event called the " Pattern Flight ", which can be accomplished with the simplest control equipment. It consists of a series of manoeuvres (straight flight, S-turn, figure eight, rectangle, spot landing), that are judged for precision. In addition, there will be the usual stunt list, but the points for these have been overhauled. Though the Flight Pattern looks easy, it has been found pretty difficult to do it perfectly, especially in any sort of wind (just try it yourself !), and has been found an ideal event for small contests, with limited personnel and time. The new rules will remain in effect till early 1955.

When the present A.M.A. R/C rules were first made up, it seemed that an escapement-rudder ship would have little chance of winning. At the 1951 Nats, Jim Walker won with 271 points, using his complex pulse selector system ; even so, a large proportion of entrants with rudder-only topped 200 points. In 1952, there were only 10 out of the 33 active entrants with rudder-only. One big reason for this is the fact that the meet was held in California—heart of the " tuned reed country". Thus the growing interest in different scoring systems. Also, we hear cries that there should be several classes, one for multi-control systems and another for the simple rudder jobs. Personally, we can't see the need for this yet. Having watched good operators put their rudder-only ships through beautiful loops, stalls, spins, rolls, etc., we still feel that multi-control can, and often does, mean multi-trouble. This has been borne out in contest results, so we predict no " class separation " in R/C for some time yet.

As a final word on the growth of R/C here, we should note that there are dozens of R/C only model clubs now active in the U.S. This does not mean the members of these clubs spurn all other forms of plane modelling—in fact, many are also active members of the " general " model clubs—but they find the special problems of R/C make these " exclusive " clubs desirable.

★ GADGET REVIEW ★

YET more gadgets for you to log for future use—there seems to be no saturation point for this feature—every day brings us a new idea from the postbag! Some are not so new, and others are improbable figments of imagination; but those we publish are thoroughly checked, passed and approved. Take Peter Holland's gimmicks as an example; he has no less than four of the sketches opposite to his credit . . . and where did he find them? On his old jobs stored away in the attic! A few moments with the sketch pad and architect Peter (Apsley Club and 1951 A/2 team—remember?) had recorded a half dozen or so gadgets, from which we weeded four of the most appealing. Perhaps you've a similar store of discarded models for which you created some special idea—you've no need to be an architect, and there's no necessity even for a sketch pad—just rough out the general principle in an understandable manner, and we shall soon let you know if it can earn you money.

Pete's first gadget is **A**, an idea that takes a little extra understanding; but it is well worthwhile considering for use on any of the "whopper" size sailplanes which are so reluctant to dethermalise with a parachute. It has also been fitted to an A/2 with similar beneficial effects. How many times have you seen a glider disappear upwards in spite of its d/t 'chute in full sail? Here's the principle. The usual 'chute is used, but as it opens, it moves a wire lever and lowers the cams supporting the tailplane. With positive tail, the model then dives at a shallow angle (Pete says 30° is suitable and safe) and the 'chute acts as a dive brake. Get it? Well, why not try it?

Self explanatory is **B**, just a piece of piano wire shaped as shown, secured to the cement tube nozzle with a suitable nut (it cuts a thread on the soft metal). Now, if you have to make a long "run" of cement along a piece of sheeting or strip, there's no need to run off the edge—the wire guide will keep you straight, says Pete H.

George Woolls of Bristol read our recent feature on props and nose assemblies, where we talked about soldering a washer to propshafts for free-wheelers. George sent us **C**, an idea that obviates soldering yet has all the advantages of the rear washer. You have two bushes, the 16 s.w.g. tube bush on the shaft is the longer one, and a 14 s.w.g. tube bush around it is fixed in the prop. All tension on the nose block is now taken by the 16 gauge tube, when on power or free-wheeling.

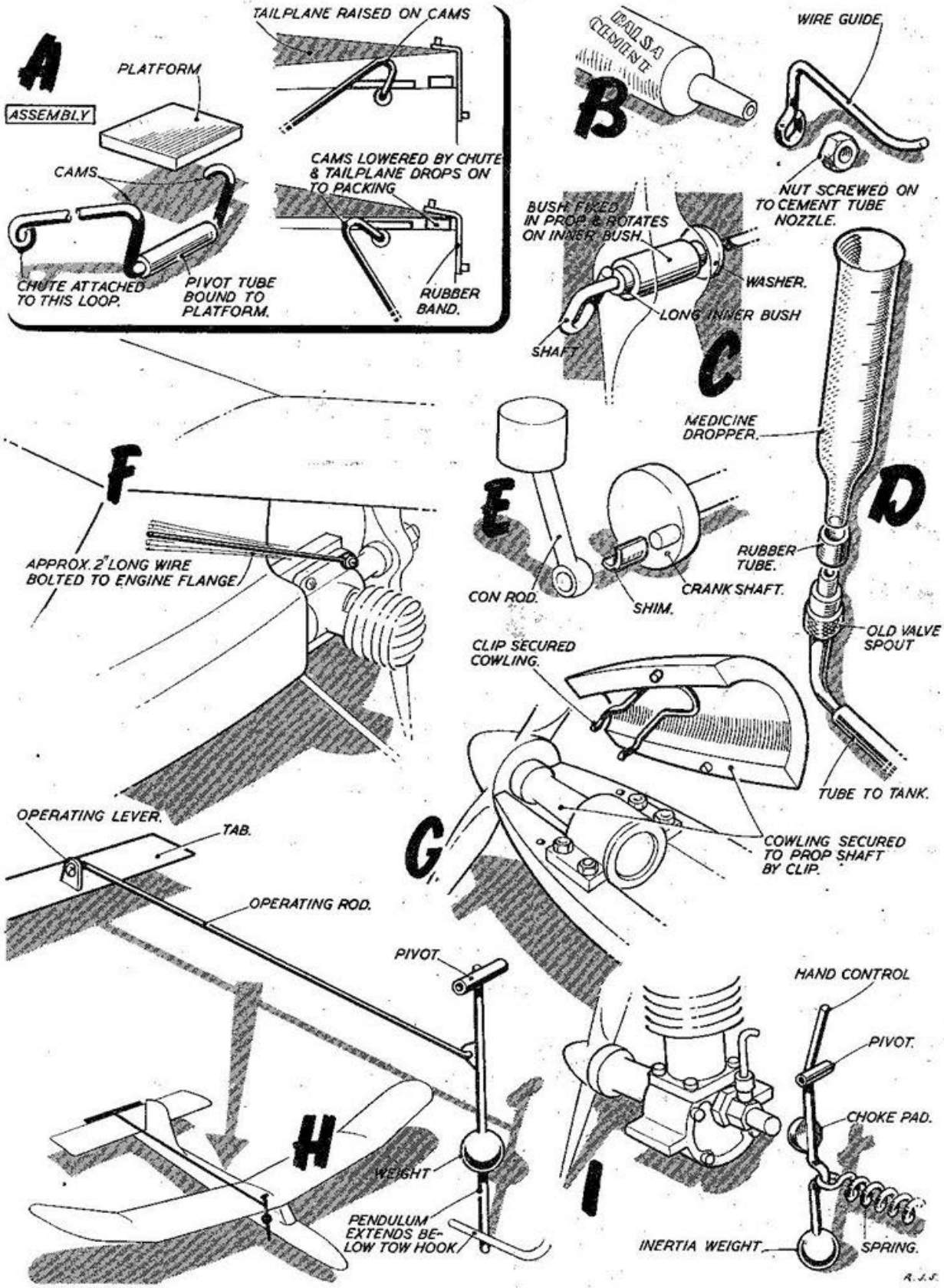
There's many a sport model flying about with its tank concealed inside the fuselage, leaving the owner with no knowledge whatsoever of just how much fuel is there for each flight. K. Dickinson of Redcar suggests **D**, which is no more than an ordinary eye dropper, to which you can connect a Valvespout nozzle. Graduate the eye dropper with doped lines so that you can tell how much to give for so many seconds, and now you can fill the tank with the precise amount of fuel required. From Cheadle, in **E**, J. F. Sharples sends us his quick cure for a worn big-end. Peeling chrome plating will very often take up just the right amount of play in the con-rod and give the engine another chance in life.

Back to that man Holland and his brainwaves in sketch **F**. Perhaps you remember those vibrating reed tachometers that were so much in vogue a few seasons ago and seem to have disappeared since. In any case, if you were not one of the rev.-conscious types, we had better explain that if a piece of 20 s.w.g. piano wire is rigidly attached to any part near the running engine, then *at certain revs.*, vibration will set the wire moving fan-wise at its other end. With the commercial reed tachometer, the length of the wire was adjustable so that it could be used for a wide range of speeds; but with just one engine to check in this case, all you have to do is to bolt on about 2½ ins. of wire to the engine lug. Now run the engine to maximum revs. required and proceed to clip the wire until, by trial and error, you find the exact length to give a "fan" vibration at those revs. A glance at the built-in rev. indicator will then tell you if the engine is doing its stuff, whenever you need to know.

Yet another from Pete H. is the secret cowling clip in **G**, an idea so useful that we have ourselves incorporated it in our latest off the building board. Book this one specially for next scale model and let's not see ghastly rubber band attachments in future.

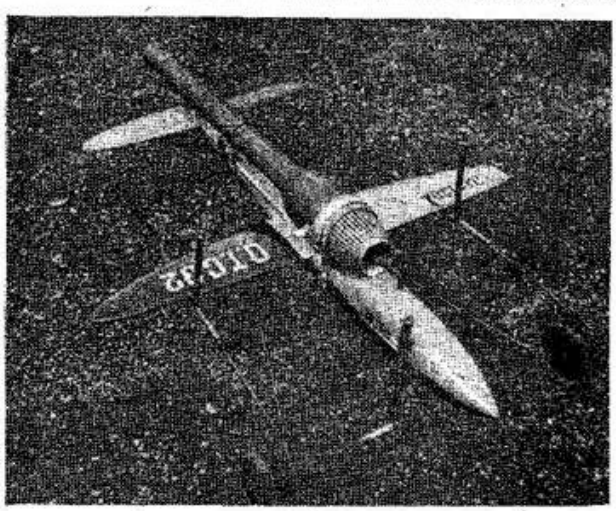
Now for the old faithful pendulum, aeromodelling's (and "Gadget Review's!") lifesaver. Again, in **H**, we have one that is different, this time for gliders—and with a dual purpose. It comes from D. J. M. Webster of Arbroath, who substantiated the idea with a photo of his 44-in. glider plus elevator. He recommends an elevator that is 15 per cent. of the tailplane, and for a 44-in. model, a 3-in. pendulum with a half-ounce weight. Now what happens is that on tow, the elevator is "up" and a perfect vertical overhead launch is possible; then, when off the line, the swinging pendulum does its stuff with longitudinal stability.

Yet another pendulum comes in **I**, and again a double-barrelled purpose. The pendulum choke operates in a spiral dive to cut out the engine, and also acts as a choke for easier starting by virtue of an extension for hand operation. This one came from F. J. Fahy of London, N.12.

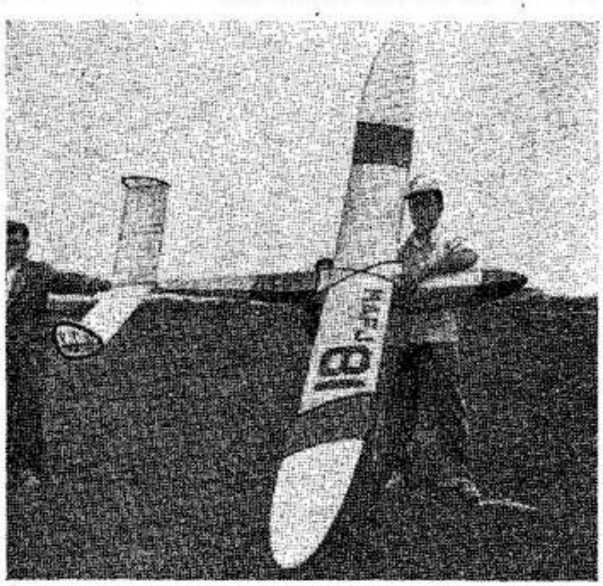

A
ASSEMBLY
PLATFORM
CAMS
CHUTE ATTACHED TO THIS LOOP.
PIVOT TUBE BOUND TO PLATFORM.
TAILPLANE RAISED ON CAMS
CAMS LOWERED BY CHUTE & TAILPLANE DROPS ON TO PACKING
RUBBER BAND.
B
BALSA CEMENT
WIRE GUIDE
NUT SCREWED ON TO CEMENT TUBE NOZZLE.
C
BUSH FIXED IN PROP & ROTATES ON INNER BUSH
WASHER.
LONG INNER BUSH
SHAFT
D
MEDICINE DROPPER.
RUBBER TUBE.
OLD VALVE SPOUT
TUBE TO TANK.
E
CON ROD.
SHIM.
CRANK SHAFT.
F
APPROX. 2" LONG WIRE BOLTED TO ENGINE FLANGE
G
CLIP SECURED COWLING.
COWLING SECURED TO PROP SHAFT BY CLIP.
OPERATING LEVER.
TAB.
OPERATING ROD.
PIVOT
H
WEIGHT
PENDULUM EXTENDS BELOW TOW HOOK
I
HAND CONTROL
PIVOT.
CHOKE PAD.
INERTIA WEIGHT
SPRING.
R.J.S.

NOW is the time for our overseas readers to start seriously thinking about the International contests in 1953, and urging their respective organisations to send a team, if not in person, certainly in the form of four models for proxy flying. We fully realise the expense this involves, and we are well aware that expensive despatches of proxy models from faraway countries have not always been justified in the past. But this year, as you will read in the F.A.I. report on page 171, there are two events at least, where top class proxy fliers can be employed to full advantage.

These are, of course, the Wakefield and World Championship Power events to be held at Cranfield, Bedfordshire, in early August. Remember—a proxy flown job won the latter event in Switzerland last year—this could quite easily be repeated with one of your country's entries—so how's about it, modellers? Start working on your organisers; there will be quite a number of top line British fliers anxious to fly your entries for you.



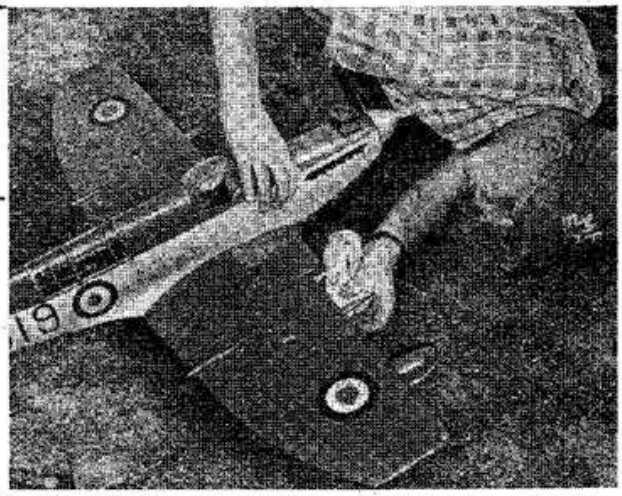
Biggest piece of news we have this month is from **NEW ZEALAND,** where, we hear, that Frank Bethwaite and Les Wright have got together and beaten the world's duration record for radio control. Full figures are not yet available; but we hope to give you more gen, and a report on the N.N.Z. Nats. in next issue. Whilst talking of that part of the globe, we have news from J. B. Scott, Secretary and organiser of the M.F.C. of **AUSTRALIA.** In October they held their "Open Annual Championships" at Camden aerodrome, 40 miles from Sydney, and the C/L events took place in Erskineville Oval. Apparently these boys are affiliated to the American Plymouth Aero League, and fly under A.M.A. rulings. There's a strong leaning towards the American type "Carrier deck" and "Combat" contests, the winning model of the former event is pictured over at top right. Though obviously pro-U.S.A., we note that almost all the scale jobs mentioned in the report are from British designs—there's a point there somewhere!



In **ISRAEL,** a National contest for Gliders brought representatives of 18 clubs (or rather,

Top: Y. Hayashida, veteran Japanese Wakefield flier and his '52 model. Looks like a spot of Jaguar influence has taken place! Centre: OS jet model by K. Takechi of Osaka holds Jap record. Longitudinal fins distinguish this Ogawa Seiki jet unit. Bottom: A. Kudo, Jap tow-line record holder, and his 11 ft. 6 ins. model.

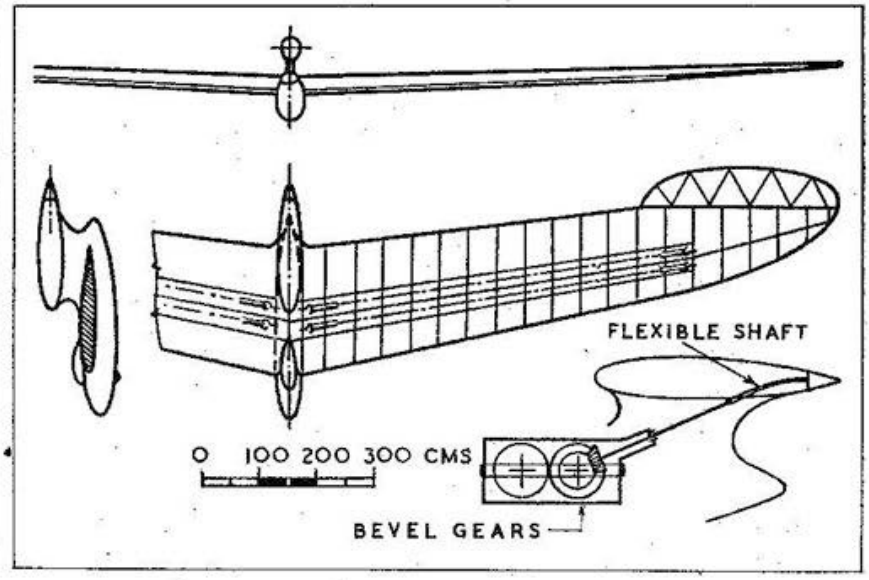
***Right : Carrier event winner in Australia, John McNichol, and his Firefly.** (Courtesy Press Feature Service, Sydney).*
Centre : Heinz Grass, 28-year-old German modeller, and his Webra 2·5 converted Keil Kraft Piper Cruiser for C/Line, which made its first flight on New Year's Day.



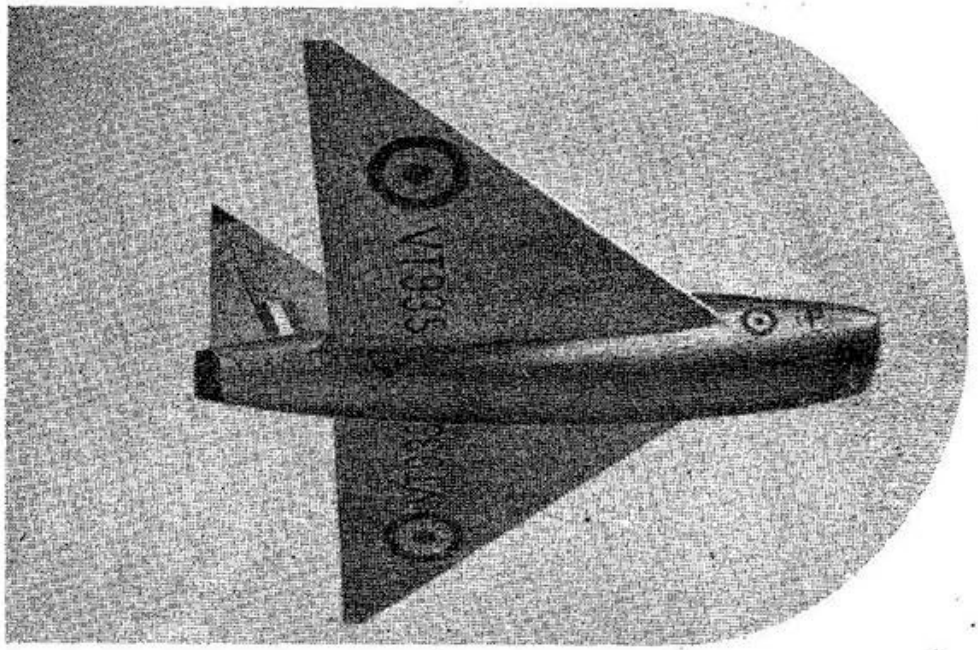
branches of the Aero Club of Israel) for a grand get-together or " Yom Iyun " at Tel-Aviv airfield. And believe it or not—they actually wanted to have some *bad* weather ! Incredible though it may sound, the Israeli boys have yet to learn bad weather flying techniques, so they would just like one sour day to know what it can be like !! However, they were disappointed, although they had a thermal-free day. Three minutes counted as a maximum, and the event was won by 16-year-old Zvi Hermelin of Haifa with his " Jinx " at 7 : 14. Keener types will recognise this name as one of Britain's own Norman Marcus's designs, now available through A.P.S. As a break from the hobby, the evening's social event included fun and games—one of which involved two blindfolded bods trying to feed cake to each other on spoons ! Sounds like just the thing for the bar at Cranfield in August !

Rather belated news, but all the same, very interesting, is the list of records established at the Third All-JAPAN Contest. Three hundred modellers entered through eliminating events at eight different centres and travelled to Tokyo. Judging by the free flight times, they must have had a wow of a day, the half-A record going up to 8 : 56, Class A to 8 : 36 and Class B Open up to 11 : 00—or maybe they don't use dethermalisers ! Rubber times also jumped to 8 and 11-minute figures, but the best news for the Japanese boys came with the high speeds set up with locally made control-line speed engines.

In Class B (5 c.c.), the record went up to 104 m.p.h., in 10 c.c. it jumped to 133·3 m.p.h., with H. Kondo flying his own home-constructed motor, and biggest time of all was K. Takechi's 137 m.p.h. jet job, a picture of which is on the page opposite. It could quite well be a fact that these records are now knocked even higher — how about letting us know, Japan ?



Unique plan at right is of a Polish rubber-driven flying wing with four separate motors and gears. A powered version with unspecified engine also exists. Span is in the region of 70 inches.



THE DELTA WING

By
John W. Fozard
D.C.Ae., B.Sc.(Hons.), Grad.R.A.S.

Last month we had the reasons for the delta wing; in this concluding part of the article Mr. Fozard offers diagrams of practical layouts ranging from a team racer to a Queen's Cup project.

THE delta planform is æsthetically and aerodynamically at its finest when it is used in what is termed the blended wing-fuselage arrangement—the " blended delta " for short. In this variant the leading edge sweepback and the t/c ratio are varied across the span to give an aircraft in which the wing and fuselage are blended together so that the " fuselage " is merely a local thickening of the wing and a drawing-out of the wing leading edge to form a nose. In the blended delta all the streamwise sections are pure aerofoils and there is no wing-body interference since the whole aircraft is a lifting surface. Fig. 1 shows how this blending is achieved by combining a given planform with a given spanwise variation of t/c ratio. The local absolute depth at any spanwise station is given by multiplying the chord at that section by the t/c ratio at the section, and if both the variation of chord and the variation of t/c ratio are smooth and continuous curves, the absolute depth (i.e., the front elevation of the aircraft) will be a smooth continuous curve. Fig. 1 has been drawn using a basic 10 per cent. t/c symmetrical section. This basic section is " inflated " or " deflated ", to match the local required t/c ratio. On the outer wing of the model in Figure 1 where the t/c is 5 per cent., the wing section is the basic 10 per cent. section with its ordinates factored by 0·5. At the centre-line of the aircraft where the required t/c ratio is 12 per cent., the factor to be applied to the basic 10 per cent. t/c section would be 1·20.

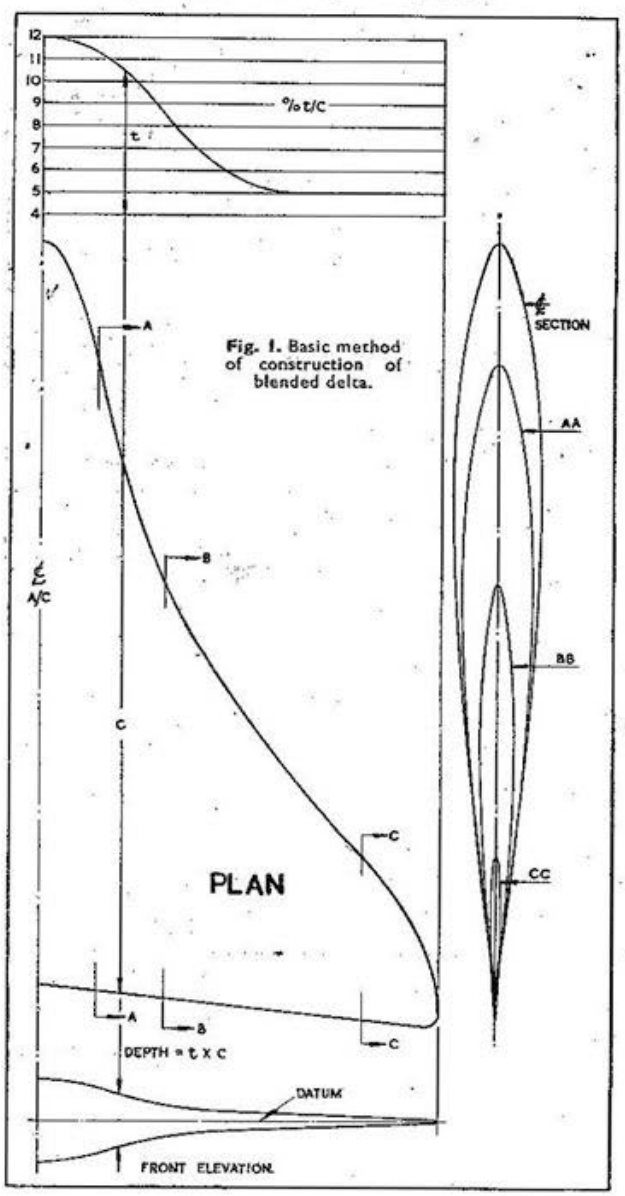


Fig. 1. Basic method of construction of blended delta.

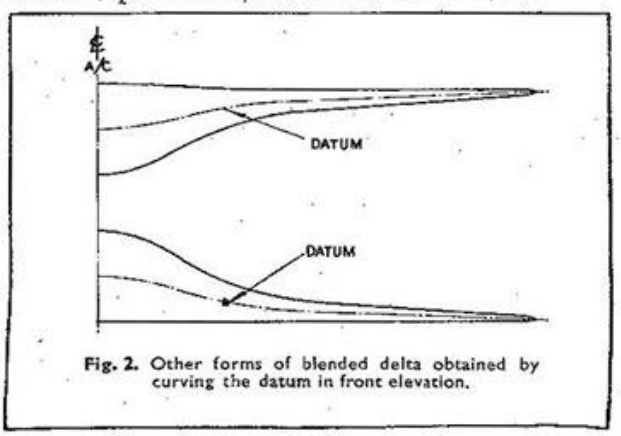
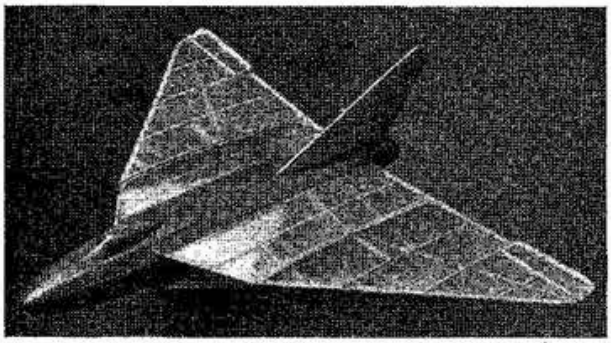


Fig. 2. Other forms of blended delta obtained by curving the datum in front elevation.



Opposite : D. P. Golding's scale Boulton Paul 111 for Jetex 200 or Jetmaster with augmenter tube is 24 ins. span and weighs 4 ozs. Above : Semi-blended delta by R. J. Balmer for Jetex 100 is small scale version of L.S.A.R.A. project in Fig. 7. Span 16 ins. Weight 2¼ ozs. Area 95 sq. ins. Airspeed 30 m.p.h.

The datum taken when drawing the front elevation of Fig. 1 is a straight line, and thus the basic wing-fuselage is symmetrical about this datum in front elevation. If the datum on which the front view is drawn be made a curve, then it is possible to obtain, by varying the degree of curvature of this datum, front elevations which correspond to other positions of the wing relative to the "fuselage". Two such front views are shown in Fig. 2 and these are "re-arrangements" of the front elevation shown in Fig. 1.

At this juncture it is necessary to point out that if Jetex motors or ducted fans are used, the required area of the "jet pipe" will mean that towards the trailing edge of the wing the diameter of the pipe will be such that it can no longer be accommodated entirely within the aerofoil section. This need cause no despair, for the local maximum depth of the section can be arranged in the early stages of the design to be greater than the depth of the "jet pipe" and hence it will be possible to fair in the "jet pipe" smoothly from the maximum depth to the end of the pipe. This is demonstrated in Fig. 3, and the great merit of this type of

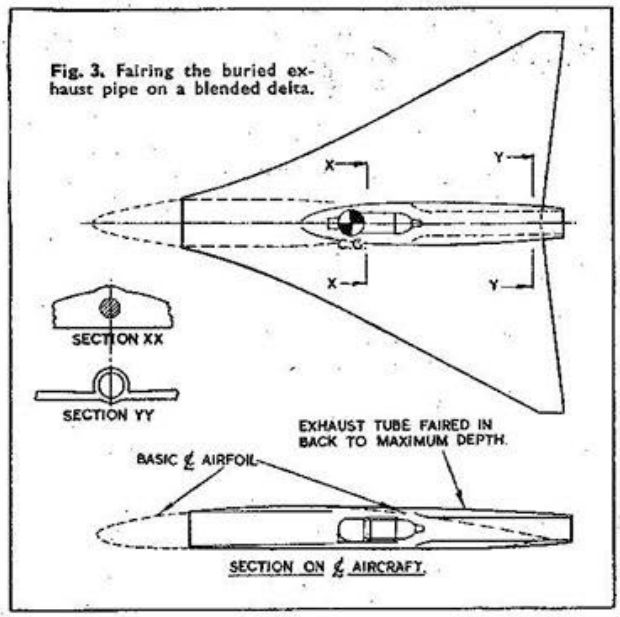


Fig. 3. Fairing the buried exhaust pipe on a blended delta.

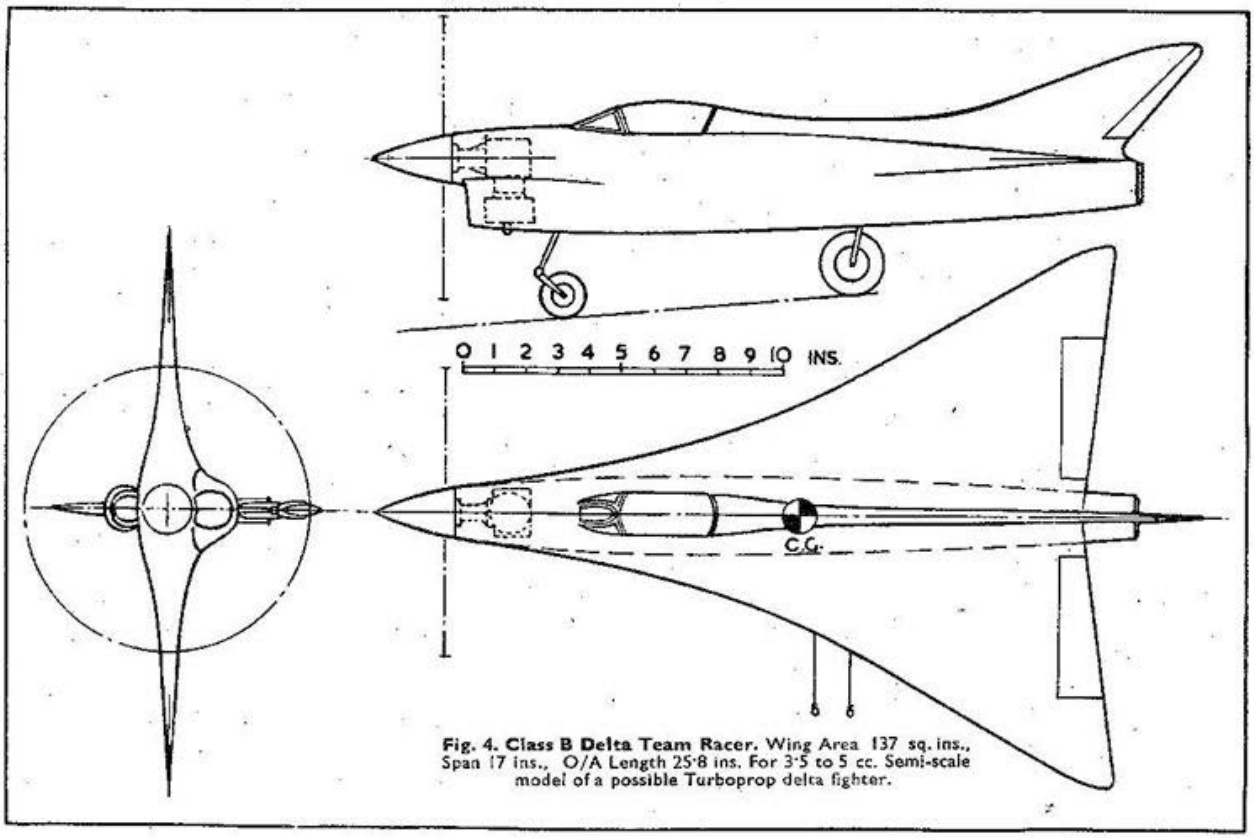
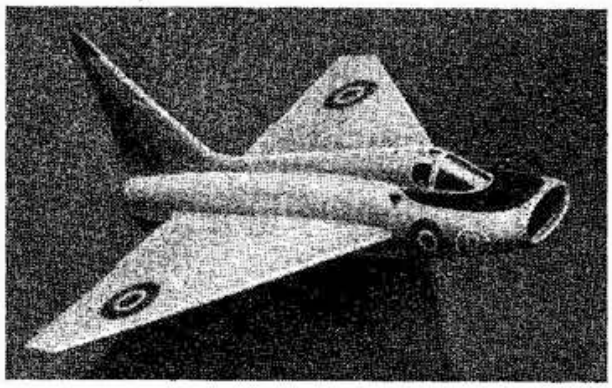


Fig. 4. Class B Delta Team Racer. Wing Area 137 sq. ins., Span 17 ins., O/A Length 25·8 ins. For 3·5 to 5 cc. Semi-scale model of a possible Turboprop delta fighter.



Another scale B.P.111, and one that has been flying for almost two years. Built to 1/24, it weighs 3¼ ozs. and is fitted with a Jetex 100 unit.

installation is that it does not increase the projected frontal area of the model.

The application of the blended delta to a Class B control-line team race model is shown in Fig. 4. The model is a semi-scale representation of a possible turboprop fighter. The diesel or glowplug engine is carried inverted with the cylinder head in the underslung intake which, in the full size machine, would run back and upwards to the engine mounted in the centre section. This engine would drive the airscrew through an extension shaft running under the cockpit floor. The bicycle undercarriage of the model is an unusual feature, but it lends itself particularly well to this type of model.

Queen's Cup Model

A possible candidate for the Queen's Cup is shown in Fig. 5. In this model the wing is of constant 5 per cent. t/c throughout and it has been given a few degrees of incidence relative to the fuselage. The twin fins have purposely been mounted well outboard to avoid slipstream effects.

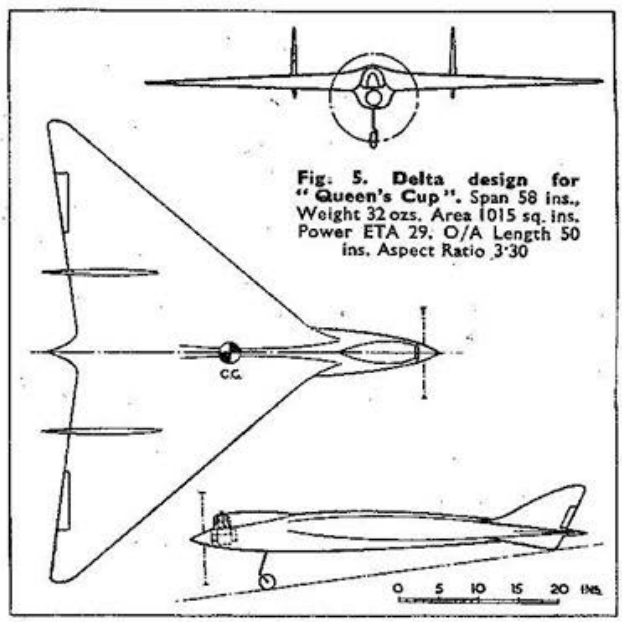


Fig. 5. Delta design for "Queen's Cup". Span 58 ins., Weight 32 ozs. Area 1015 sq. ins. Power ETA 29. O/A Length 50 ins. Aspect Ratio 3·30

For the Pulse Jet

Fig. 6 gives some idea of what is possible by building a blended delta round a pulse-jet unit. In this model an all-moving delta tailplane mounted on the fin is used for control in pitch. This surface is of necessity small, since at high speeds it will be a very keen and effective control. (Why is it that all-moving tailplanes are not more widely used in control-line models ? They have many advantages over the conventional tailplane-elevator combination, especially on stunt models.) A monowheel undercarriage is shown in the figure but a drop undercart or a dolly would probably be better. Because of its low interference drag a model such as this might well turn out to be a good deal faster than a model of the same weight and power built in the conventional jet model style.

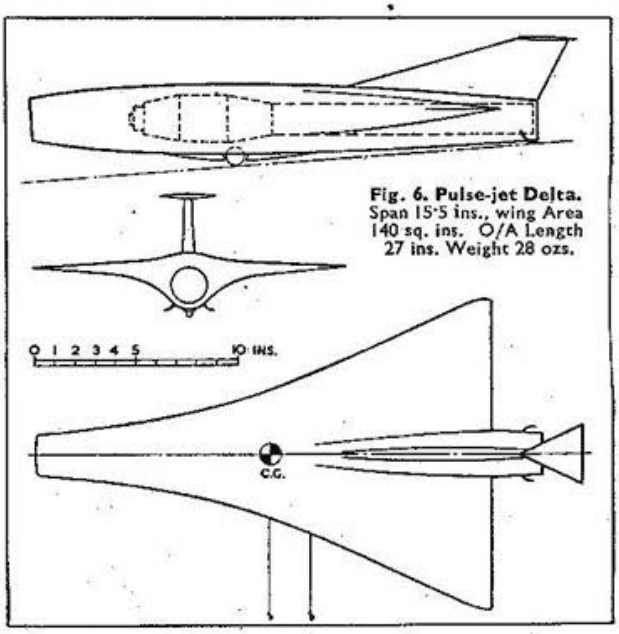


Fig. 6. Pulse-jet Delta. Span 15·5 ins., wing Area 140 sq. ins. O/A Length 27 ins. Weight 28 ozs.

Finally we can turn to radio control and as an example of what is possible in this field a description follows of an ambitious delta model designed and being built for the L.S.A.R.A. by the author and Mr. R. J. Balmer. Drawings and a full size mock-up of this model were on show at the 1952 Model Engineer Exhibition in London. Fig. 7 shows a three-view G.A. of the aircraft. A four-channel proportional control radio receiver is to be carried and with this the model can be controlled, using miniature electric actuators, about all three axes. Directional control is through a normal rudder but longitudinal and lateral control are achieved by the use of all-moving tip control surfaces. Each of the all-moving tips has its own actuator and the electronics are arranged such that these actuators work in the same sense for pitch control and in opposite senses for roll control. The other trailing edge controls shown in the figure are merely pre-set trim tabs.

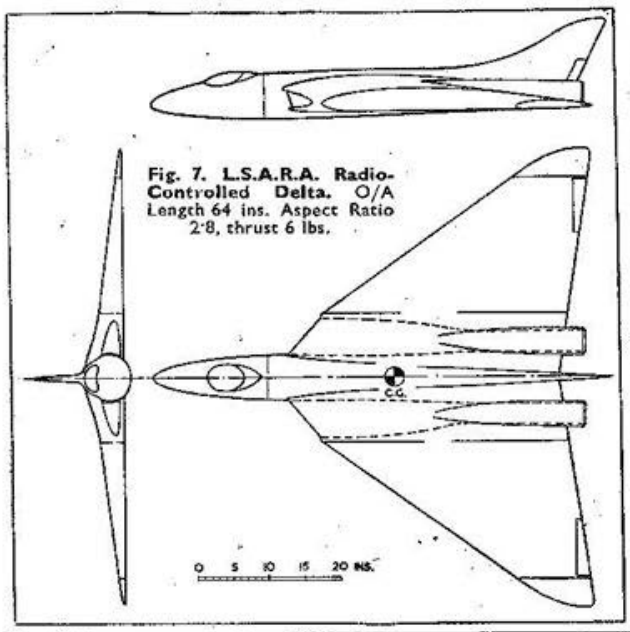


Fig. 7. L.S.A.R.A. Radio-Controlled Delta. O/A Length 64 ins. Aspect Ratio 2·8, thrust 6 lbs.

Power is provided by eight specially boosted Jetex 350 motors in two clusters of four. These motors exhaust into 3 in. diameter jet pipes which are ducted forward to the twin wing root intakes giving, it is hoped, a considerable degree of augmentation.

To conclude, the delta planform can provide something new and exciting in model aircraft but as yet it is largely untried—especially in the contest field. The author hopes that by this article a few (at least !) of the more adventurous and imaginative of the modelling fraternity will have been stimulated to build and fly delta-winged models. At any rate do not let us scoff at the delta and condemn it out of hand as a mere novelty; let us at all events give it a fair try.

In the sphere of full size aircraft the future is made visible to us now — revealed by the shape of present prototypes.

. . . the delta is indeed the shape of wings to come.

Readers are invited to submit photographs of their own delta models for inclusion in a future issue.—Ed.

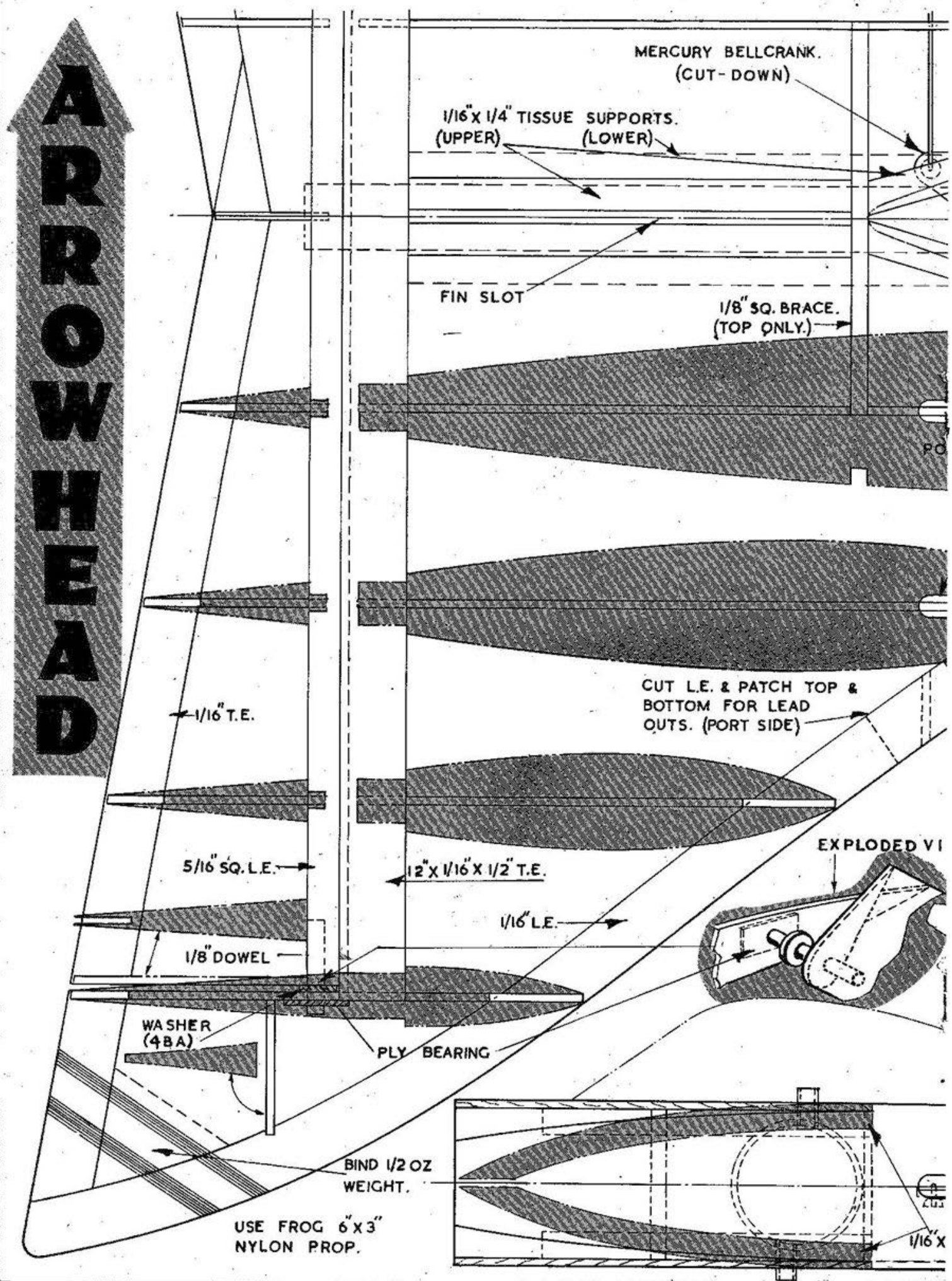
Like to build a Delta? — full-size Plans are overleaf for the

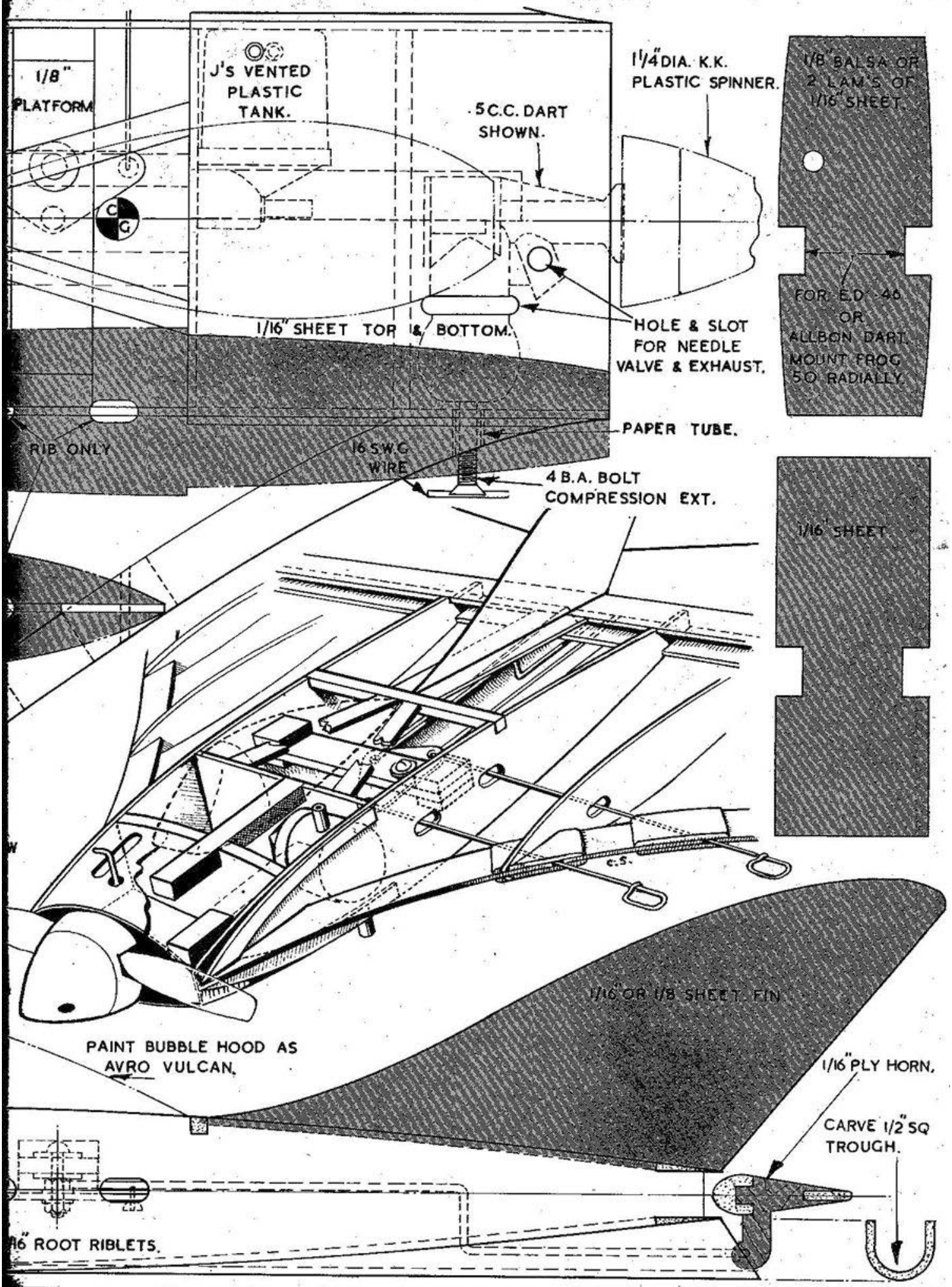
Arrowhead

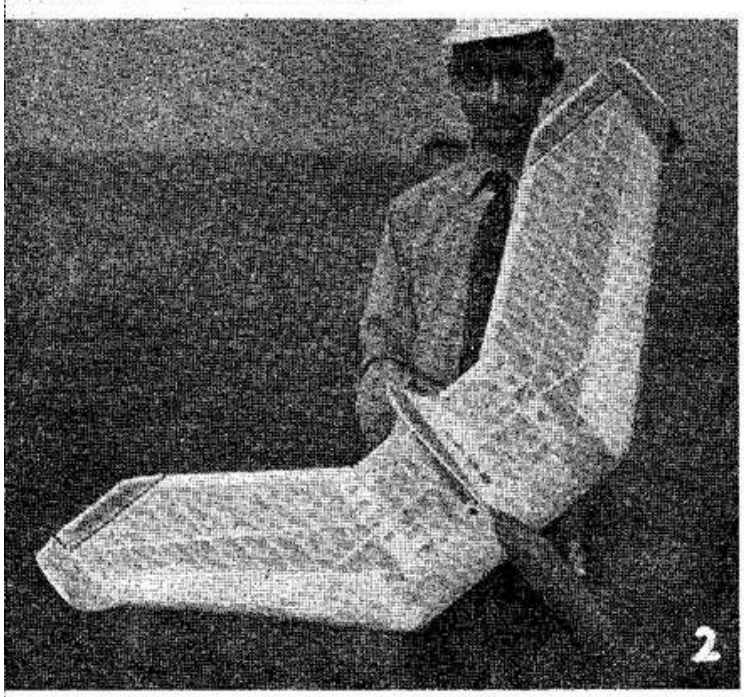
SPECIALLY DESIGNED FOR THE POINT-FIVE DIESELS BY RON MOULTON AND STUNT FLIGHT TESTED WITH THE ALLBON DART. CAN BE BUILT FROM ONE SHEET 1/16 BALSA PRICE 1/2d.

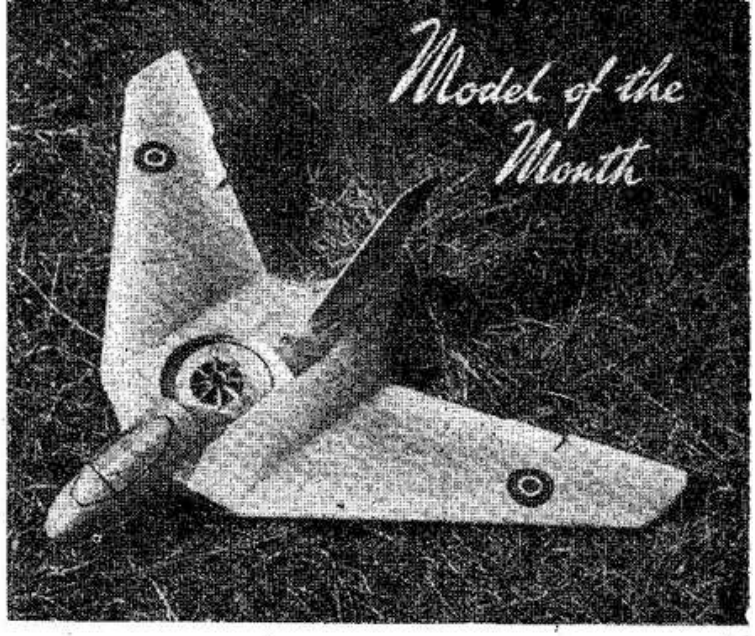
HAVE you a point-five diesel, a spare tank, a few odd lengths of wire, scrap balsa, dowel and ply ? Then all you'll need to make this stuntable little delta is just one sheet of $\frac{1}{16} \times 4 \times 36$ ins. medium balsa and 5 ins. of engine bearer—it's as simple and inexpensive as that! Flight tested on 22-ft. lines with both the ED ·46 and Allbon Dart, Arrowhead is fast, manœuvrable, and very pleasing to the eye. It's just the model for flying in a restricted space—and the noise quotient of its baby motor should bring no objection to use of the village green or nearby school playground.

Ready to start ? Well, if you have $\frac{1}{16} \times 4$ ins. sheet: carbon trace the eight ribs, leading edges and fin as close together as possible and leave one end free for the nose sheeting and bulkheads—the front one can be laminated. Strip whatever is left into $\frac{1}{4}$ in. and $\frac{1}{2}$ in. for T.E. and braces. Pin centre ribs over the plan, join up with the bulkhead /bearer assembly, and two 12-in. lengths of odd T.E. Lift off plan and add platform with bellcrank, $\frac{1}{8} \times \frac{1}{8}$ in. brace, tank and engine, then nose sheeting. Working " in the hand ", add the end ribs, then leading edges and tip T.E.'s, two other ribs and root riblets. Elevator is built over plan, with odd L.E. stock as a basis. Ends are dowelled to pivot loosely in ply facings. Join up pushrod, cut and " patch " L.E. for lead-out wires, add paper tube for compression screw extension, then fit the fin and under-trough with $\frac{1}{4}$-in. covering support strips on either side. A half-ounce tip weight is bound in the starboard tip, then cover with Modelspan, fit a bubble hood—and fly!


ARROWHEAD
MERCURY BELLCRANK. (CUT-DOWN)
1/16"X 1/4" TISSUE SUPPORTS. (UPPER) (LOWER)
FIN SLOT
1/8" SQ. BRACE. (TOP ONLY.)
1/16" T.E.
CUT L.E. & PATCH TOP & BOTTOM FOR LEAD OUTS. (PORT SIDE)
5/16" SQ. L.E.
12"X 1/16"X 1/2" T.E.
EXPLODED VI
1/16" L.E.
1/8" DOWEL
WASHER (48A)
PLY BEARING
BIND 1/2 OZ WEIGHT.
USE FROG 6"X3" NYLON PROP.
1/16"X


1/8" PLATFORM
J's VENTED PLASTIC TANK.
5 C.C. DART SHOWN.
1¼" DIA. K.K. PLASTIC SPINNER.
1/8" BALSA OR 2 LAM'S OF 1/16" SHEET.
C G
1/16" SHEET TOP & BOTTOM.
HOLE & SLOT FOR NEEDLE VALVE & EXHAUST.
FOR E.D. .46 OR ALLBON DART. MOUNT FROG 5° RADIALLY.
PAPER TUBE.
RIB ONLY
16 S.W.G. WIRE
4 B.A. BOLT COMPRESSION EXT.
1/16" SHEET
C.S.
1/16" OR 1/8 SHEET FIN
PAINT BUBBLE HOOD AS AVRO VULCAN.
1/16" PLY HORN.
CARVE 1/2" SQ TROUGH.
1/16" ROOT RIBLETS.





OUR " Model of the Month " choice can usually be distinguished for its exceptional building standard, high gloss finish, neat covering and all that goes to make a Concours d'Elegance winner ; but this time we have something which distinguishes itself as a technical advance and is, at the same time, an example of ingenious construction. It is, we believe, the first free-flight model to be powered by a centrifugal fan, using diesel drive. As will be seen, the air intake is on top of the fuselage (the fan cover is removed), and the air is directed into the normal jet passage. Credit for this " Swallow " goes to J. Coatsworth of Croydon, who has similar models of the Cougar, and Hawker P.1052 and P.1081.

Facts and figures of the D.H.108 are :—Span 24 ins. Weight 7½ ozs. Power—Allbon Dart, and first flight, September 27th, 1952.

Now to No. **1.** An excellent action portrait of R. Burling's (Oundle Club) sort-of-a Piper Cub in a nicely controlled left-hand turn. Action shots of this nature are not at all easy to get—all credit therefore, to S. Beesley who stopped this one.

Talking of the shape of wings to come ? Then have a look at R. G. White's development of the A.P.S. " Crowfly ", in Number **2.** Leading edge sheeting, detachable fins and hinged elevons are principal changes, and flying tests have been conducted with one or more of the fins detached. Though it flew well without any fin at all, it was prone to rolling about on the towline, a not unnatural effect of zero side area ! Clubmate D. Lee (Upminster) is holding the model while the builder clicked off the 1/50th second at f/16 with Kodak Super XX.

Another glider, and still not quite conventional, appears in No. **3.** The photo is an all Malton Club effort, where W. Turley catches H. Cryer as he is about to launch T. Smith's " Condor ". My ! What a lot of d/t fuse you use ! !

Over to top right, and a superb example of patience. No. **4.** which comes from I. F. Stowe in far off Doonside, New South Wales, Australia. It is a 1/18th scale Douglas Dakota designed for a pair of Mills ·75 c.c. diesels. Span is 64 ins. and a pendulum rudder was originally fitted.

Free flight was not very satisfactory, so a pair of Frog 150's and a bellcrank assembly made it a controliner. Retracting undercarriage and full lighting scheme complete this super detailed job. Handy background for photos of this type is the plain tar macadam road surface.

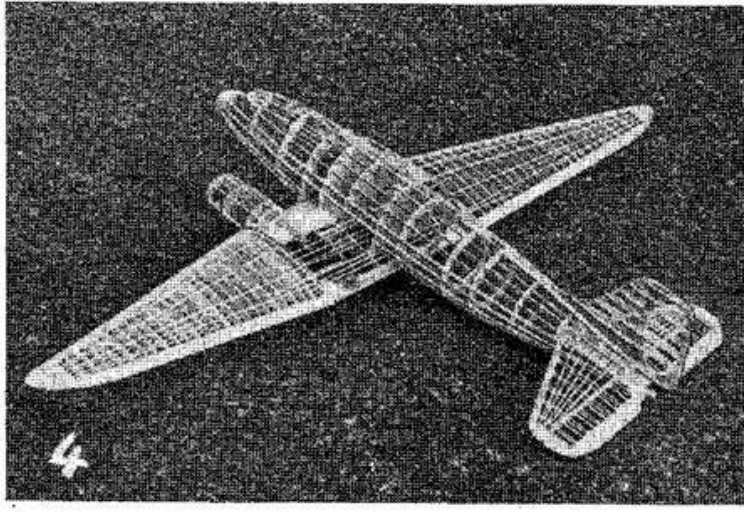
Could that be a scaled-up Rigid Midget (October '52 issue) in No. **5**, or do our eyes deceive us? Well, much as that could be a fact, this shoulder wing sports flier by Bob Woollett of Yalding in Kent, was in action long before the Vic Dubery creation appeared in our columns. It has been flying for over three years now, and known as the "Sprite", it spans 42 ins. and is 28 ins. long. The power unit is the ever popular Mills 1·3 diesel. There's something about this 'plane, at second glance we almost convinced ourselves it was a free-flight K.K. Phantom! Must be a coincidence of design lines, we know that Bob Woollett's designs are original, his high wing "Phoenix" is one of the prettiest models in A.P.S.

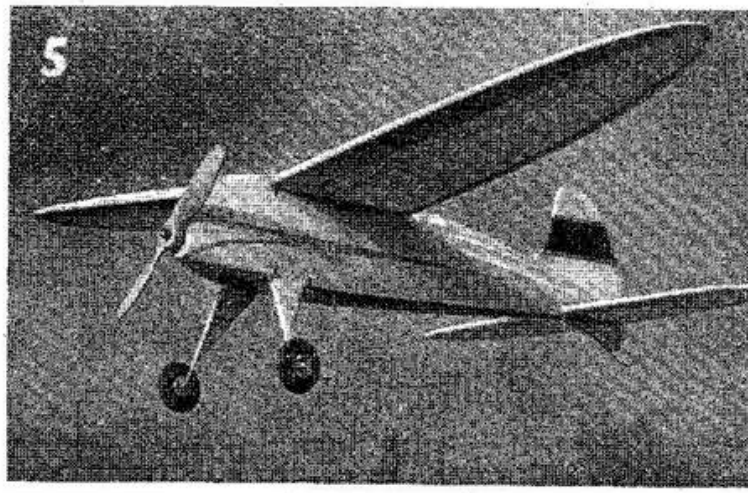
Now to a non-flier, the solid in No. **6**, of the Focke-Wulf 190-D-9 German fighter, comes from L. Brock of Sydenham, who made the model when he was 15. Carved entirely from balsa, the model is to 1/48th scale plans supplied through the Aeromodeller Plans Service—it is therefore a very accurate job! Full radar antenna and cockpit detail has been added, whilst the undercarriage was originally arranged to retract up into the wings. Displaying a reluctance to stay in the "up" position, the unit is now permanently fixed "down".

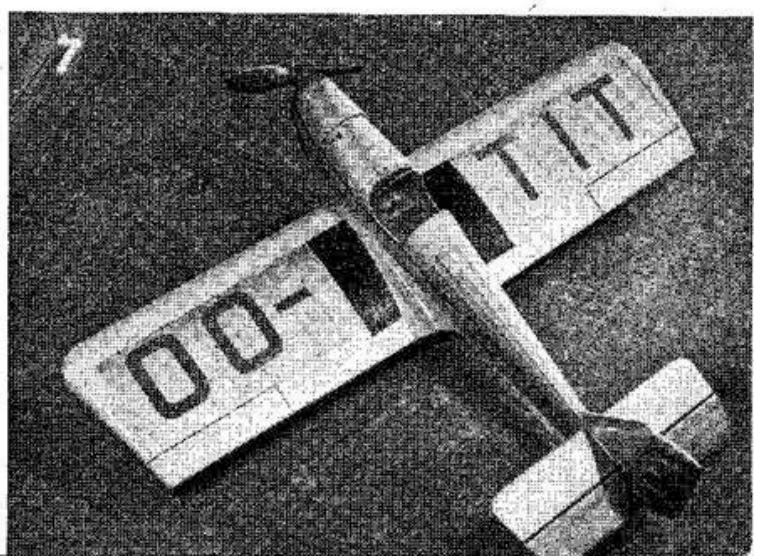
Now to our control-line scale stunt model of the month in No. **7**. The popular A.P.S. "Tipsy Junior", this time, the 28½ ins. span version. Corporal Godfrey of the R.A.F. Old Sarum in Wiltshire is the constructor, and he has finished the model in scale colouring of yellow and silver, with red trimmings. Presumably the walk-way panels are painted black—a very good idea for realism at this part of a model is the use of fine "wet and dry" paper cemented on, to give the correct rough and dull effect. Try it on your next scale job!

In his letter accompanying the photo, Peter Godfrey tells us of the exceptional economy of his E.D. Mk. IV 3·46 c.c. diesel. He uses a standard commercial 30 c.c. tank (and usually they are 2 or 3 c.c.'s under capacity), and gets a flying power run of 8½ to 9 minutes non-stop. This is at an airspeed of 55 m.p.h. which is not so very fast, but would of course be higher with a smaller model. With this duration, his E.D. would appear to be quite a useful asset for a team racer, remembering of course, that the final deciding factor is speed in which pit stops are completed. Long range flying at slow speeds doesn't always win a team race, but it is certainly easier on the pocket.

Now how about a photograph or two of those revolutionary models you've designed to win all the 1953 contests? If you have a swept wing, crescent wing, delta wing—or a rotary wing model that you think is really out of the rut—we shall be glad to give a showing in this regular feature.

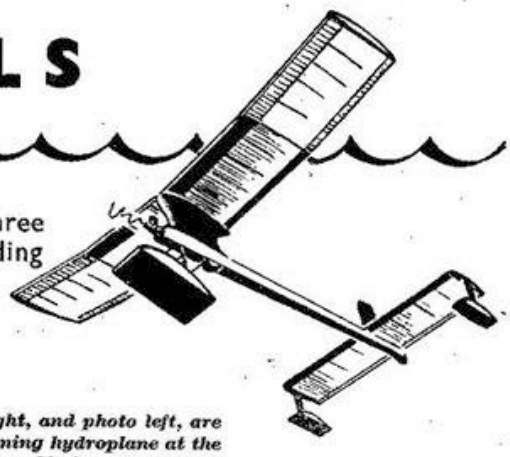


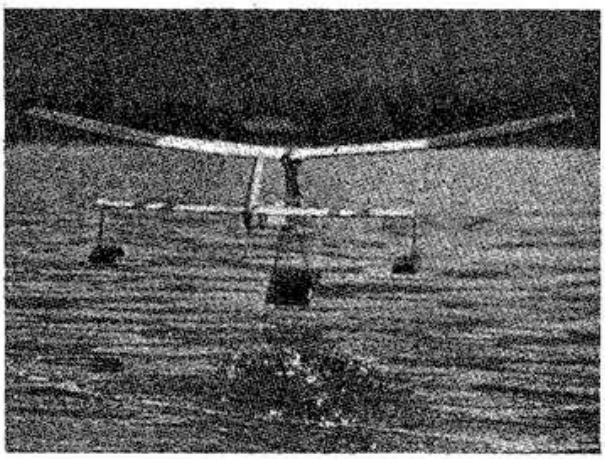




HYDROMODELS

Part Three Concluding





Sketch right, and photo left, are of the winning hydroplane at the 1952 Swiss Nationals held at Lake Lucerne. Model is by F. Pieters, a Dutch aeromodeller, now a member o ;the Winterthur Group.

TWIN pontoons are probably the most popular form of float undercarriage—in theory. Those of the vast army of semi-scale fans (who comprise 80 per cent. of power enthusiasts) who want to build a floatplane nearly all visualise a twin-float lay-out, naturally, since this arrangement more closely resembles full-size practice. Few models of this type are seen, however, probably due to lack of data and the fact that modellers seldom have the opportunity of seeing a twin-float job in action.

In practice, experience indicates that pontoons are far from a difficult or critical proposition. Water characteristics are good, the long narrow floats giving good directional stability, and even scale track gives ample lateral steadiness. Should one float unstick before the other, the model will go into a very wide (and usually safe) circle, with every chance of getting airborne. Take-off is slower than with either of the three-float gears, which is an advantage from the pure spectacle point of view; even a fast-climbing job will run for thirty or forty feet before easing off into its climb. Given a reasonable glide, alighting back on water is less likely to result in tipping, although a tendency to bounce may become evident. In the air, drag is rather higher, but a tremendous increase in stability, particularly spirally, is apparent, so that it should be possible to reduce dihedral and effect other modifications which might at least compensate for the extra drag.

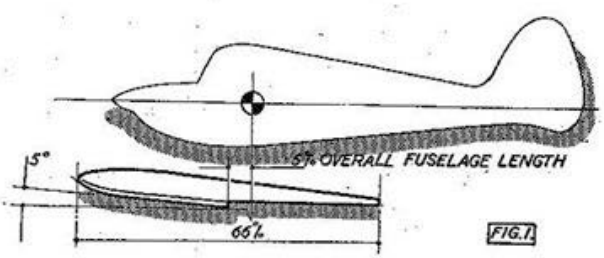


FIG. 1.

In general, for the average sport model, the float length should be 66 per cent. of the overall fuselage length. Cross-section is then determined by using the total volume required, usually at least 5 cu. in. per oz. of aircraft weight (*i.e.*, 2½ cu. in. per float). Steps are advisable, and are best located at 50 per cent. of the float length. The float position should be such that the step occurs 5 per cent. of the model's length in front of the C.G. (Fig. 1); on normal machines this gives ample protection against nosing over. Float incidence should be such that the lower line of the float forward of the step makes an angle (the deadrise angle) of 5 degrees to the aircraft rigging line; the after-part of the pontoon is less important and its underside can be parallel with the rigging line or again at 5 degrees to it. Track should be about 20 per cent. of the wingspan or a little more, and care must be taken to ensure that both pontoons are parallel.

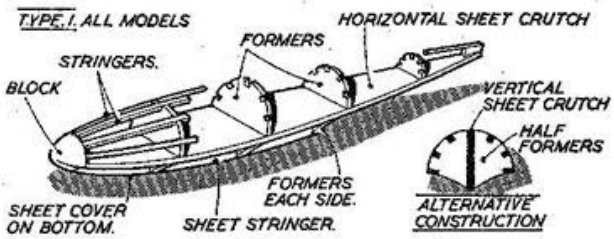
Cross-sectional shapes in use vary widely, the simplest being a rectangular section which works very well but is somewhat lacking in modern scale appearance. Giving the sides a little tumblehome and veeing the bottom improves efficiency slightly and looks rather better. Elliptical tops with vee'd bottoms mean more work but look scalish and are probably the most efficient; the vee need only be in front of the step, with a deadrise angle of 15 degrees maximum, and the afterbody under-surface can be flat. Little advantage is apparent with vee'd rears, concave undersides, or flared floats. Width should be 1½ to 2 times depth, and the float noses should be kept rather broad. From the step back the height should remain fairly constant, allowing the sides to taper in to a knife-edge. Fig. 2 shows some shapes and methods of construction in general use.

When mounting, some form of springing is desirable provided that the floats remain reasonably rigid and do not vary their incidence. Two wire struts per side permit them to spring slightly

outwards and/or backwards, and this would appear to be the best form of mount. Chief considerations for pontoons then are (i) 66 per cent. of fuselage length, (ii) enough cross-section to produce at least 5 cu. in. per oz. weight, (iii) 5 degrees deadrise angle, (iv) step 5 per cent. of body length forward of C.G., (v) 20 per cent. of wingspan for track, (vi) reasonable rigidity, (vii) accurate line-up.

Flying Boats

Somehow, the idea of a flying boat appeals to all modellers at some time or another—whether because it's different, or a tough nut to crack, or . . . what ? Certainly unique problems are presented, and probably a greater percentage of 'boats are abandoned as " never will fly " than any other class of model. The problems arise from the very definition of flying boat—" a machine in which the main hull or fuselage is also the main flotation member ", which means that, broadly speaking, the line of thrust simply cannot be placed so that it passes anywhere near the C.G. Consider Fig. 3 ; in the glide, to balance the aerodynamic forces the C.G. must be well behind the C.P., or a download must be created on the tail to balance the nose-down couple resulting from the centre of resistance being so far below the C.G. The C.G. cannot be lowered since the motor, the heaviest single unit, must be high enough to give adequate prop clearance. With power on, the thrust line is well above the C.G., resulting in a further nose-down couple calling for more download on the tail, unless we can incline the thrust line so that it has a vertical component great enough to cure the nose-down tendency. Inclination of the thrust line can also be used to produce a download on the tail, by the slipstream causing the tailplane to give negative lift. The high motor also introduces stability problems, notably in roll and pitch, due to its moment of inertia. It is interesting to note that these problems lessen with increase in size, in general, since a 1·5 c.c. motor frequently swings an airscrew of the same diameter, as that used on a ·75. Thus, the same clearance is required on a 48 in.



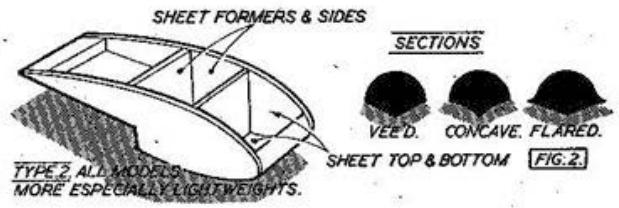


FIG. 2.

Aircraft weight	Total volume	Pontoon length	Type 1 Width	Type 1 Depth	Type 2 Width	Type 2 Depth
8 ozs.	40 cu. ins.	18 ins.	2 ins.	1⅛ ins.	1¾ ins.	1 ins.
12 ,,	60 ,, ,,	20 ,,	2¼ ,,	1¼ ,,	2 ,,	1⅛ ,,
16 ,,	80 ,, ,,	22 ,,	2½ ,,	1⅜ ,,	2¼ ,,	1¼ ,,
24 ,,	120 ,, ,,	27 ,,	3 ,,	1½ ,,	2½ ,,	1⅜ ,,

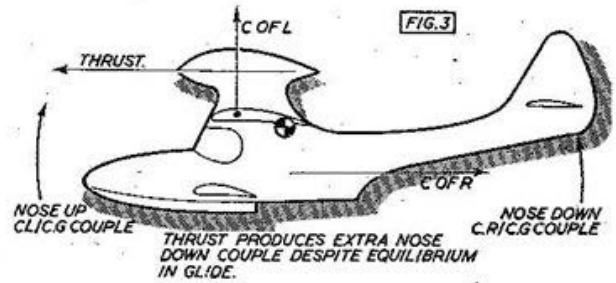
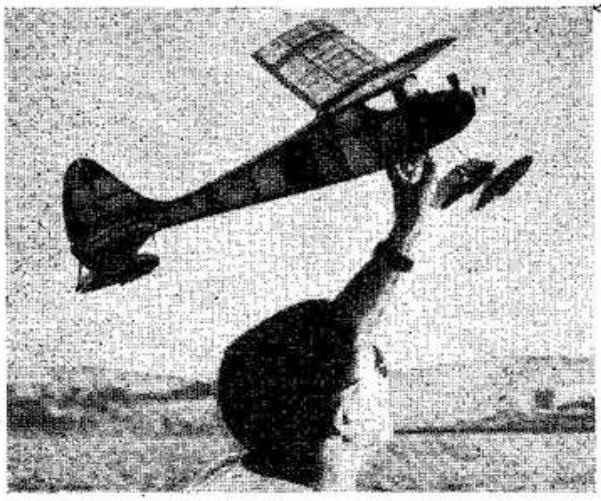


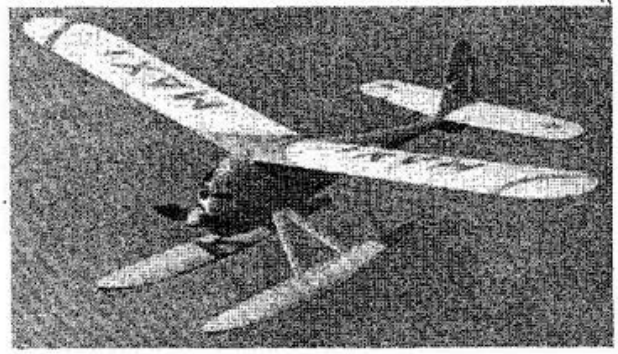
FIG. 3

model as must be used on a 36 in. job and the difficulties are little more than half as great. The safest procedure when designing a flying boat is to instal the motor at zero thrust, leaving provision for the introduction of a degree or two of upthrust as determined by flight tests.

Hull design is a fascinating business. Simplicity, lightness, appearance, strength, and efficiency have to be blended, and reconciliation of these five can



Left, one of the most successful floatplanes ever is the famous A.P.S. " Tomboy ". This version by reader J. Gauci of Malta, G.C., who has purchased a Seagull outboard motor for retrieving purposes on the open sea. Below, a sleek example of the Italian approach to twin pontoons. Steps appear to be further aft than is usual.



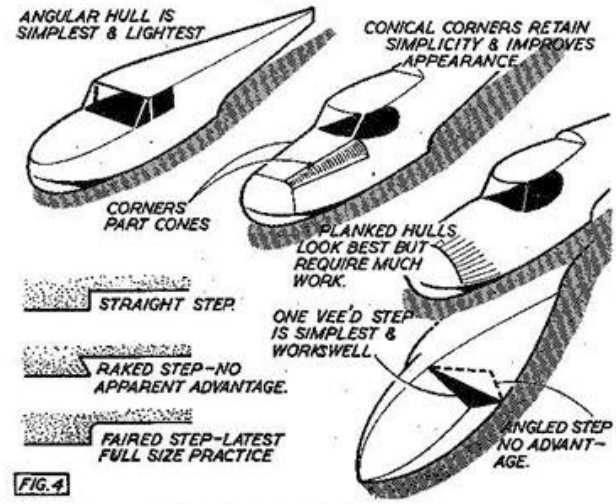
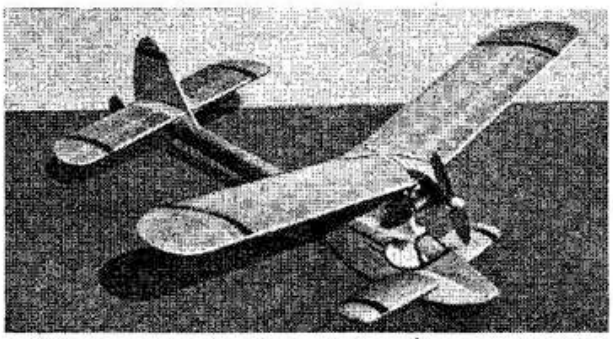
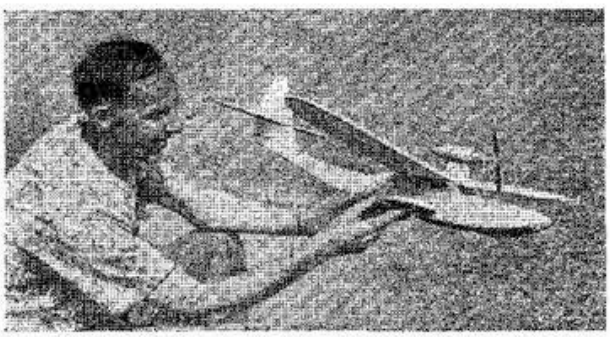
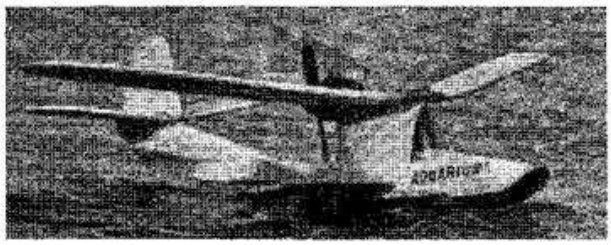


FIG.4



Above, "Sea Nymph", a Vic Smeed flying boat of 36 ins. span and simple construction, to be presented shortly in the A.P.S. Below, Bob Linn of California designed this very smooth ½A flying boat. One big advantage of small glowplug motors for these models is the very small diameter prop. Bottom, D. Harvey of Harwich sent this picture of his A.P.S. "Aquarius" which features a pusher prop and high mounted wing.





provide much food for thought. Sheet or planked construction is desirable, but really calls for an angular hull to avoid the tedious planking of a complicated shape, unless a hull form involving flats and part cones can be designed (Fig. 4). A simple vee bottom, flat aft of the step, gives excellent results; in fact, a recent U.S. design employs a flat bottom throughout. The deadrise angle forward of the step should not exceed three or four degrees, or the keel can if desired be parallel to the datum line, rising in a curve to well above water level. Ideal beam is 1 in. for every 3½ ozs. total weight, being widest at the step, which should occur about 10 per cent. of the beam ahead of the C.G. One-step hulls have proved quite adequate in practice—that is, one vee'd step, with the afterbody tapering off to a knife-edge, which is sometimes referred to as a second step. The step depth seems about right if 8 per cent. of the beam, and the afterbody keel may rise gently at up to 7 degrees. The vee of the forebody should be approximately 15 degrees (deadrise angle) or a little more. Total hull plan area should be such that the load water line occurs at a maximum of ½ in. up from the chine (aircraft weight in ounces $\times 1{\cdot}8 \times 2$ = minimum area of hull bottom in square inches). The forebody volume should be roughly equal to that of the afterbody. Hull depth seems unimportant and can lie between half the beam and equal to the beam.

Sponsons are infinitely preferable to tip floats, being less vulnerable to damage and less likely to induce water turns. A sponson area of 5 per cent. wing area (each stub) covers most models; incidence should be from 3 to 5 degrees (tangential to lower surface) with the trailing edge on the L.W.L. above the step. Swept-back leading edges appear to give best results, and thickened Clark Y or similar sections are usually employed. If tip floats are used, a fairly wide and shallow shape seems best, set at about 8 degrees.

Better aerodynamic characteristics are evident if the wing is mounted on a level with the motor, thus raising the C. of R. and increasing the C. of L./C.G. couple. Appearance and water stability rather favour a shoulder-mounted wing with a power-egg rising from the centre-section, which means considerably more dihedral and really needs larger tailplane area. The high wing mounting is safest for general flight and ease of trimming. A long moment and fin area of up to 20 per cent. aid directional stability in the take-off. Construction should be as warp-free and strong as possible commensurate with lightness; a light model is much less trouble to get off the water than a heavyweight. The parts taking the most wear are the hull bottom, the bow, and the sponsons, and steps should be taken to reinforce these items.

Flying procedure with 'boats is much the same as usual. Adjust over long grass for glide—the centre of lift is a little elusive due to sponson lift and interference, so start by balancing at mid-chord. Once glide is steady and satisfactory, try low power flights, adjusting motor upthrust as

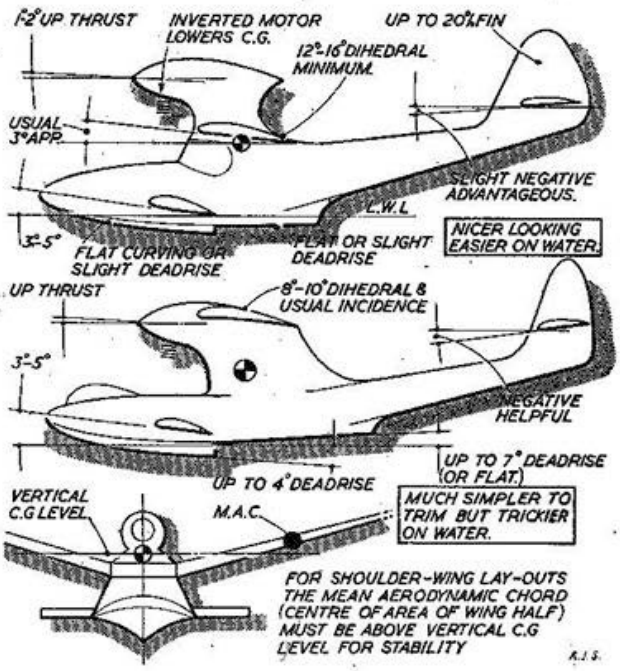
required. With zero thrust, most flying boats will fly gently into the ground in the same way as will any model with too much downthrust, so all tests should be conducted over soft grass. When power flight is stable and consistent, take-offs may be attempted—not before.

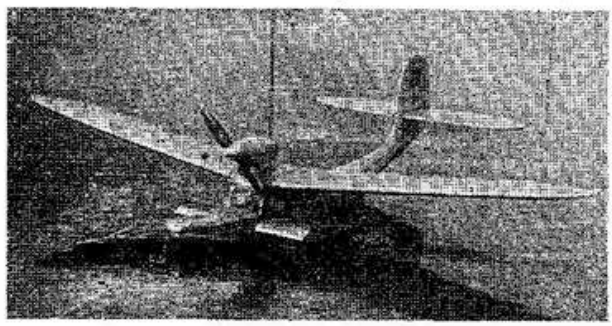
Scale Models

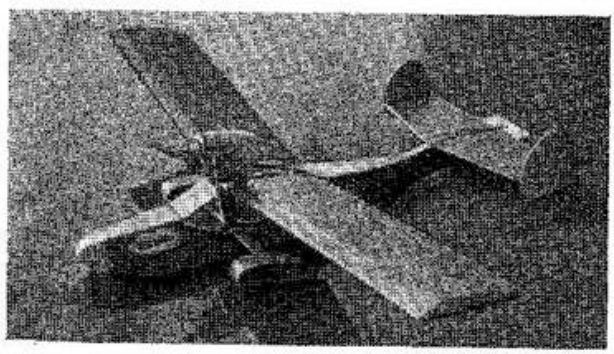
Many hopes have been blighted when scale enthusiasts have first air-tested replicas of full-size flying boats. Few indeed are suitable prototypes, and the only successful models we can call to mind are H. J. Towner's "Seabee" and "Seagull". Even if a scale 'boat can be trimmed for both power and gliding flight, it will seldom be able to cope in the air with the high power required to unstick it.

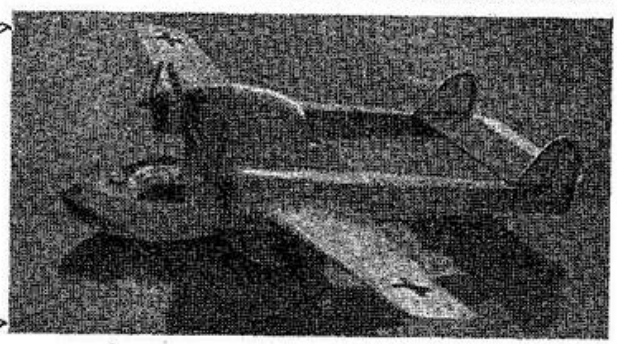
On the twin or single pontoon lay-out, the outlook is much brighter. Many light planes are converted to floatplanes, and there is every reason to believe that trimming such a scale model would actually prove easier than a landplane version. Single pontoon machines—the Loening, Curtis SOC-3, etc., have only the minor snag of outrigged tip floats. Going well back, the Brandenberg of World War I lends itself to scaling down, and the Sopwith Baby and most of the 1914–18 Short types all had three ultra-simple floats and would appear ideal subjects for scale waterplanes. If you really must try a flying boat, the Supermarine Baby is typical of several single-seat 'boats produced in those days. Possibly pendulum controls would overcome the trimming snags of such models, in which case, well, the sky's the limit for the scale-builder looking for something different.

Before concluding this short series on contemporary hydromodel practice, we should like to say that, judging from personal contacts with modellers and the reaction to the first parts of this series, there is a tremendous potential of waterplane concontest enthusiasts in Great Britain as well as internally. There is, in fact, every indication that contests arranged purely for R.O.W. jobs, whether for duration or otherwise, could grow into some of the big features of the model calendar. Possibly the first attempts would attract a relatively small number of entrants, but we feel certain that, with encouragement and scope, floatplanes and flying boats could supply a much-needed transfusion of new blood in the contest world. How about it, S.M.A.E. ?





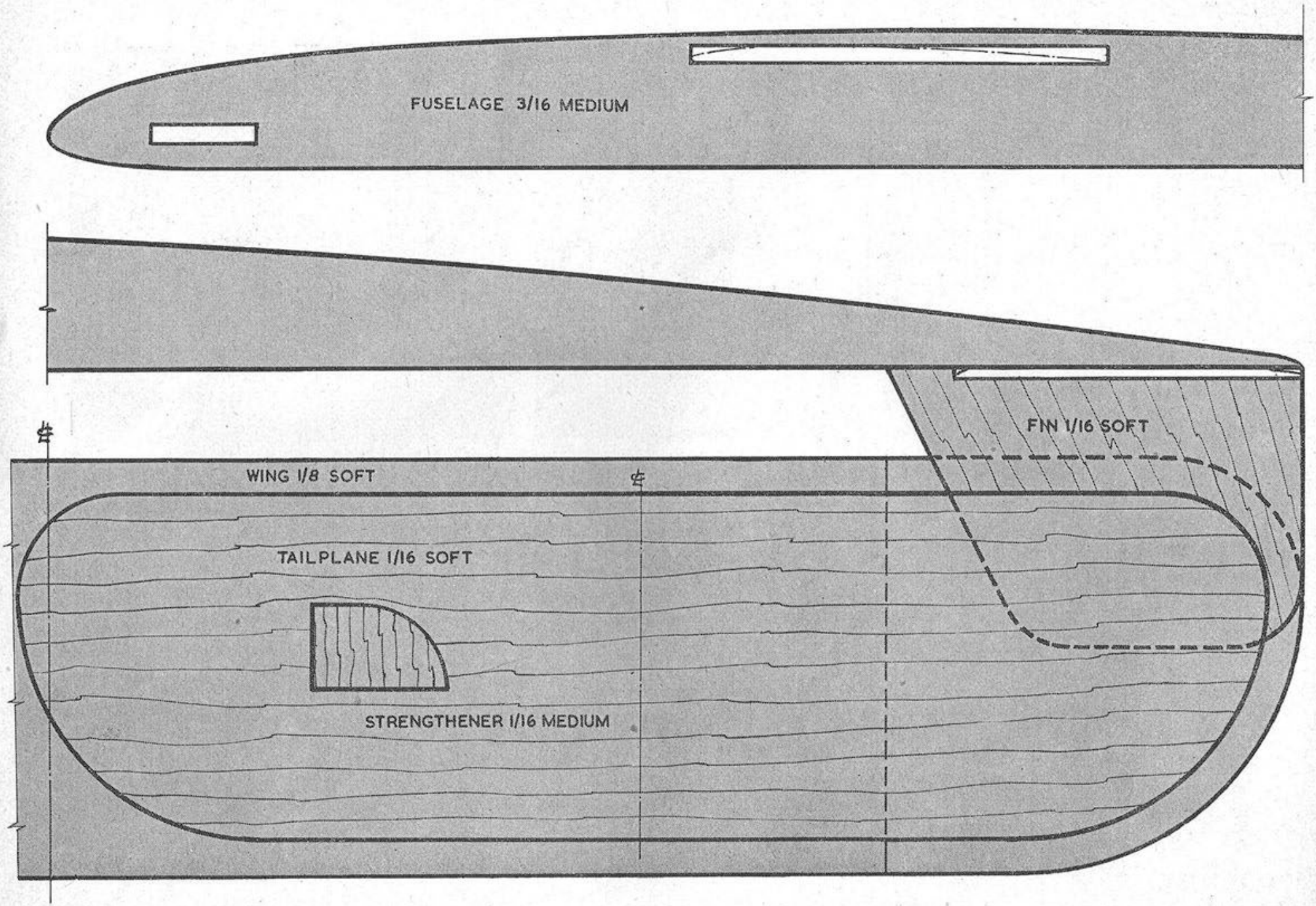


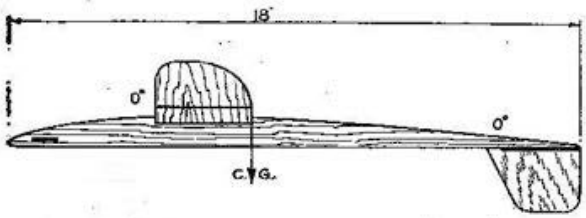


Photos top to bottom: Lt. Colonel J. Larcombe of Kolar Gold Fields, India, built this Radio Controlled version of Doc Forster's "Mermaid". Motor is a Frog 500, radio uses an X.F.G.1 valve and the boat is modified by using Stentorian wings and tail surface.

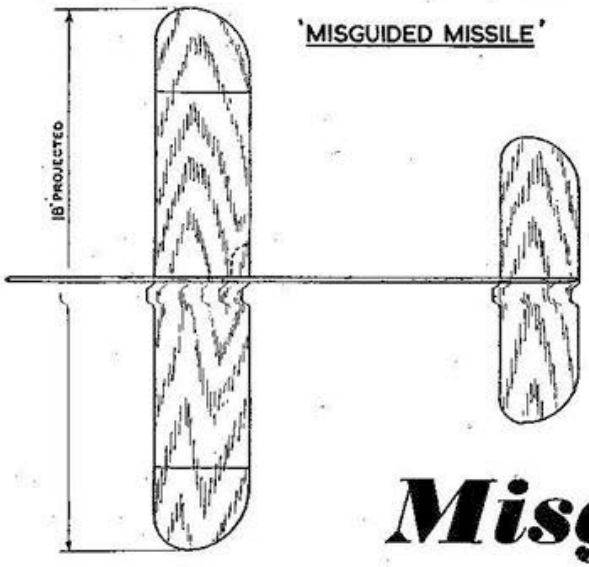
Small prop means less C.G. and thrust line trouble on this Torp powered baby flying boat designed by Bob Linn. Note the "Spontoons".

A convincing Blohm and Voss 138b built by E. Grimmette of Oxford. Span is 42 ins. and the power unit, housed in the centre nacelle, a Frog 1·75. Outboard props freewheel, and taxi-ing tests so far indicate satisfactory performance.

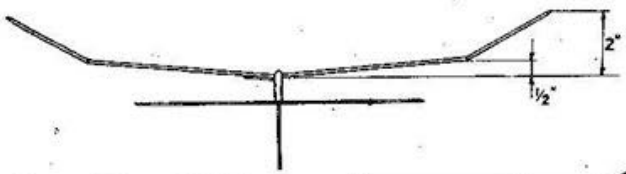

FUSELAGE 3/16 MEDIUM
FIN 1/16 SOFT
WING 1/8 SOFT
TAILPLANE 1/16 SOFT
STRENGTHENER 1/16 MEDIUM



'MISGUIDED MISSILE'



Misguided Missile



John Barker introduces you to contest chuck gliders by way of this high performance 18 inch model.

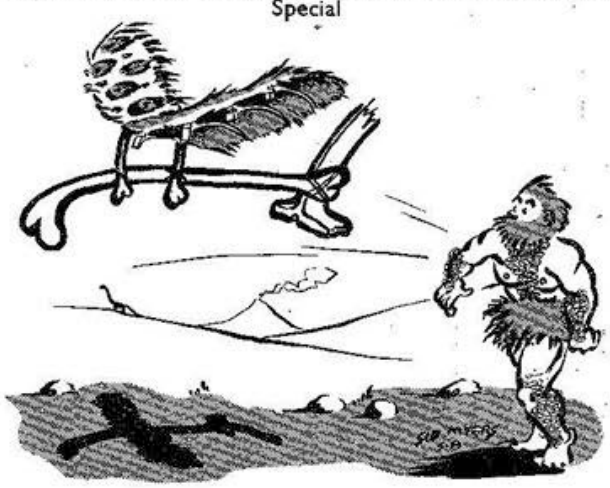
THERE are, generally speaking, two types of chuck glider, firstly the sports type, usually found in kits, which possess a reasonable glide but rarely the high climb needed for contest work, and the contest type where the glide is often not much improved but more altitude is gained on the climb. This model is of the latter type.

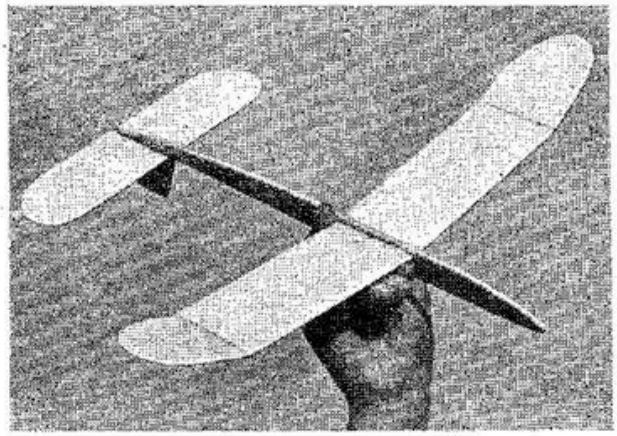
Design follows aerodynamically on power duration lines. To stop looping under power (of the launch) the C.G. is moved as far aft as possible without the model diving in if it gets its nose down. Polyhedral is used to give a rapid roll out of the end of the climb. The fin is placed underneath for aerodynamic reasons and also to raise the C.G. slightly in the inverted position. From the structural point of view the fuselage shape and wing position will be noted as unusual, the shape being adopted to remove three inherent weak points on normal chuck glider fuselages. These points are under the wing, just aft of the trailing edge, and just ahead of the tailplane. The wing position gives a vast and necessary increase in the strength of the wing seat.

Construction. This follows normal practice but the following points may be helpful. First note that selection of good (not hard) wood is essential. I put the dihedral breaks in as follows. The wing is scored on the top surface with a hard pencil and then cut half-way through from the bottom. A straight edge is next placed on top of the wing level with the break on the plan. The free end of the wing is then pulled up to the dihedral. The crack thus formed is liberally smeared top and bottom with Britfix. The dihedral should be checked during drying as the cement will draw as it dries.

Several coats of cement should be applied to all joints. The straight leading edge is maintained almost out to the tip to allow a cellulose tape leading edge to be affixed if desired. I do not think that the super finishes often recommended for chuck gliders are worth while and only add weight.

CHUCK GLIDING IN B.C. 2·49. Ogg tests his Leopard-skin Special





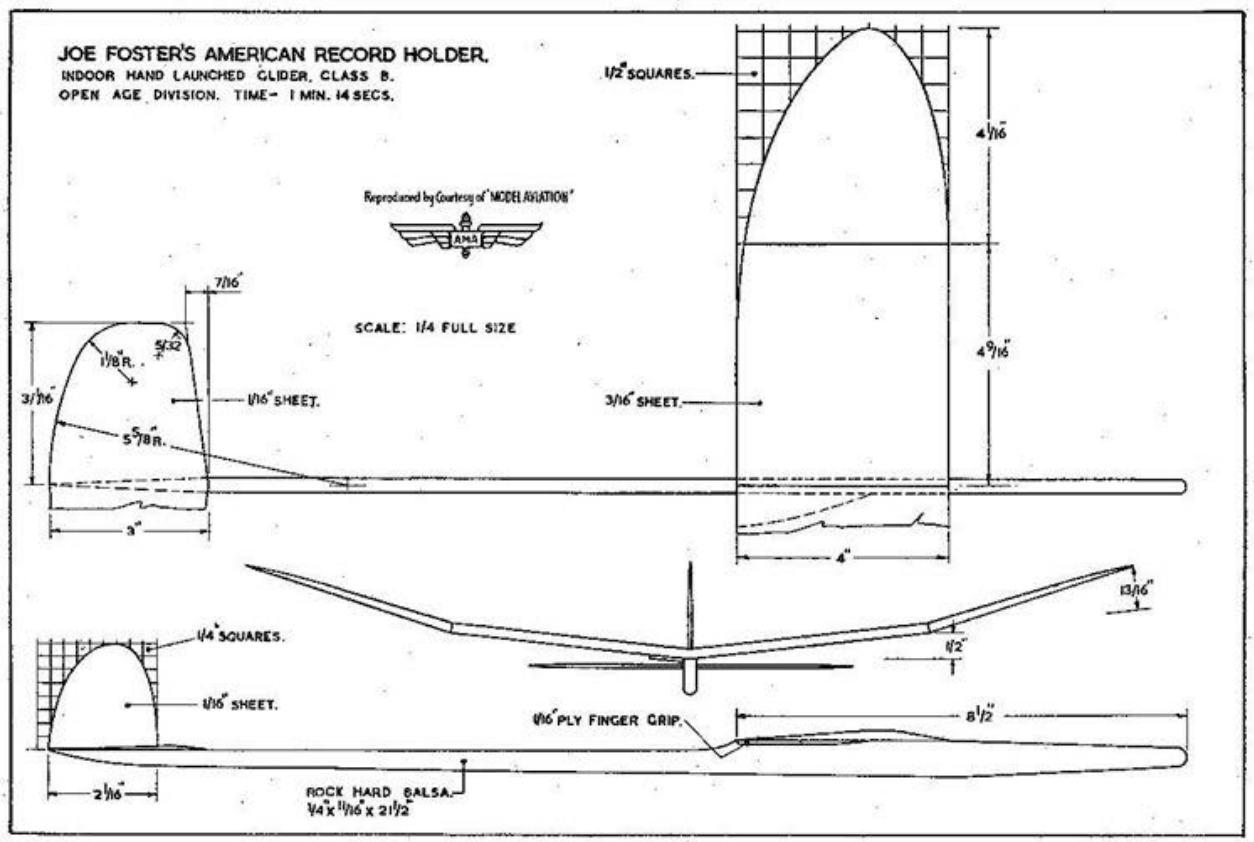
However, if your wood is very soft a thin coat of dope will harden the surface, sanding afterwards of course.

Please do not stick lumps of clay round the nose or rivet chunks of lead in holes for the nose weight! It is nearly as easy to fit it in flush with the fuselage, is neater, and doesn't knock off and spoil the trim.

Trimming and Flying. Note! Instructions given are for right hand chuckers; left hand throwers should alter the finger grip to the other wing and follow instructions looking in a mirror! Trim for glide with the C.G. between the position shewn and half inch in front. If possible, trim for turn with left rudder only for a start. This one control will cause less confusion and allow you to reach a reliable trim sooner. From this point, reaching optimum trim usually consists of tightening the glide circle while still maintaining a rapid climb without too much turn. At this point you can try all the warping techniques you know. However, do not forget that warping a big tailplane like this on one side only can give a strong aileron effect, e.g., if you warp down the trailing edge of the tailplane on one side to stop a stall and if it happens to be on the inside of the turn, you may find that it merely decreases the turn and stalls the model further.

There are several different flight patterns which can be tried, but the two most used are:—First, a launch in a steep right bank is followed by a right spiral climb; the spiral widens as the power dies until the model is circling left on its downward glide. Second, the model is thrown almost straight ahead and upwards with a slight right bank; the model climbs almost straight and flick rolls at the end into its gliding attitude. This is the method I favour at the moment.

For launching I recommend the grip shewn in the photograph, although the grip with a finger behind each trailing edge can also be used. In the latter case another finger grip strengthener will be required. The old method of merely grasping the fuselage between finger and thumb does not give such powerful or consistent results.



F.A.I. News

The President of the International Models' Commission reports on a meeting of vital importance to all Aeromodellers.

THIS Meeting, held at Paris on December 6th and 7th, 1952, was the best attended of the series so far, representatives from the following countries being present: France, Great Britain, Switzerland, Belgium, Holland, Denmark, Sweden, Spain and Yugoslavia.

The Director General of the F.A.I., Mr. H. R. Gillman, and the Secretary of the Committee, M. Guillemard, were also present.

The first business of the Meeting was to discuss the International Calendar for 1953 and decide on the contests to be sanctioned which are as follows:

World Championships :

End of April or beginning of May.	**CONTROL-LINE Championship for 2·5 c.c., 5 c.c. and 10 c.c. Italy—Milan.**
August 1st, 2nd, 3rd.	**Wakefield Cup RUBBER Model Championship and F.N.A. Cup. Also POWER Model Championship, 2·5 c.c. Great Britain—Cranfield.**
Aug. 21st, 22nd, 23rd	**Swedish Cup GLIDER Championship. Yugoslavia—Lesce Bled.**

International Contests :

End of April or beginning of May	**Control-line Aerobatics. Italy—Milan.**
July 3rd–6th	**Control-line Speed (5 c.c.). Aerobatics and Team Racing. (Fifth Criterion of Europe). Belgium—Knokke.**
July 19th	**Tailless Gliders (Duration 50 metre line). Germany—Bremen.**
August 15th, 16th	**Slope Gliding (Star of Italy Cup). Italy—Trento.**
September 6th	**Radio Control—Power and Gliders. Belgium—Brussels.**
September 20th	**Team Racing, 2·5 c.c. and 5 c.c. Holland.**
October 17th–20th	**Gliders, 2·5 c.c. Power Models, Control-line. Spain—Madrid.**

In addition an application has since been lodged by the International Radio Controlled Society for a Radio Control contest for Power and Glider models to be held in England on July 26th, probably at Southend.

The proposition of Great Britain to limit the teams in all international contests to four and one team manager followed, and was carried unanimously.

The following items which had been placed on the Agenda by various countries were then discussed.

Alterations to the Code Sportif

(*a*) The limitation of the weight of rubber (lubricated) on models to "Championship of the World" formula to 80 grammes (2·82 ozs.) maximum proposed by Belgium was carried for application in 1954. To facilitate control, the weight of the airframe complete with rubber is limited to a minimum of 230 grammes (8·113 ozs.).

(*b*) The limitation of the length of the launching cable for gliders to "World Championship" formula to a maximum of 50 metres proposed by Belgium was carried for application in 1954.

A discussion on the question of cable material resulted in passing of a resolution that cables must not stretch more than 15 per cent.

(*c*) A proposition of Holland to adopt a rule to determine the maximum cross section in exceptional cases was defeated on the grounds that the present rule had not been found to be inadequate.

(*d*) A proposition by Holland to study the advantages of retaining the maximum loading of 200 grammes per cubic centimetre for free flight power models ended in a decision to leave the rule as it stands.

(*e*) The proposition by Belgium to permit the use of engines up to 20 c.c., and models of a total weight up to 7 kgs. for Telecontrolled models only, received no support.

(*f*) A proposition by Belgium that all flights of less than 20 seconds should be considered as attempts was approved by a majority.

(*g*) A proposition tabled by Belgium to limit the power run of the engine on power-driven models to 5–10 seconds instead of the present 10–20 seconds was rejected when put to the vote on the grounds that timers of sufficient accuracy were not at present available.

(*h*) The proposition by Belgium that it should be stipulated that in the case of a tie the fly-off must take place within one hour of the advertised closing time and that there must not be more than three minutes between the starting times of the models was approved.

(*i*) To increase the number of points allotted to landing manœuvres in aerobatic control line contests was also proposed by Belgium, and was defeated.

(*j*) Belgium also proposed that the radio control rules should be regularised. As a result of the discussion it was agreed that Belgium should prepare a draft set of rules for consideration at the next meeting.

(*k*) In view of the difficulty of judging the square loop manœuvres in aerobatic contests Belgium proposed that this figure should be eliminated from the international schedule. This was carried.

The following items were tabled by the Secretariat.

(1) To decide if the limitation of engines to 5 c.c. maximum capacity, which was raised at Madrid, should be applied in 1954.

The Meeting was of the general opinion that the time was not yet ripe for this limitation.

(2) The question of the allocation of individual and team trophies for the World Championship events was raised. A list of allocations was prepared and it was agreed that the Secretariat should write to the donors of the trophies for their permission to re-allocation.

Samples of the standard F.A.I. Diploma to be awarded were circulated at the meeting.

(3) The Bureau proposed that the list of World Records be reviewed in view of their large number. The Director General's proposals were accepted in principle and a new list is to be prepared by the Bureau for circulation to the National Aero Clubs in good time for the next meeting in May.

(4) The question of rules for team racing contests was raised and it was agreed that a set of rules should be drafted as a result of the experience which will be gained at the Dutch and Belgian contests this year.

(5) The Academy of Model Aeronautics of U.S.A. submitted several propositions concerning control-line speed contests as follows:—

(*a*) that the diameter of the cables for control-line models should be specified.

This was rejected on the grounds that it does not take into account the specification of the material. It was the opinion of the Meeting that a test load of 20 times the weight of the model applied to the lines was the only safe method.

(*b*) that the maximum cross section rule be eliminated. This was rejected.

(*c*) that the minimum and maximum loadings at present specified should be deleted.

The Committee considered the rules satisfactory as they stand and no change is contemplated.

(*d*) to modify the rule that the model must always remain above the horizontal plane and substitute a maximum flying height of 15 ft. (4·672 m.) for Class I and 20 ft. (6·096 m.) for Classes II and III was defeated.

(*e*) for timekeeping the Academy proposed the use of three timekeepers with 1/10th second watches and that timing should commence after the model has completed three laps. It also proposed a maximum variation of 2/10 second.

This was considered less satisfactory than the existing rules and that the existing regulations were much better, *i.e.*, timing to commence one lap after the competitor had placed his wrist in the pylon fork, and this has therefore been retained.

1/10 second watches are already specified in the regulations, as is also the 2/10 seconds maximum variations between the time registered by the watches.

(*f*) the Academy expressed the opinion that second class watches are an imposition and unnecessary. This was considered together with their proposition that the watches should be given a check over a three hour period before and after the contest, with a maximum error of 6 seconds, but the Committee felt that the Academy was confusing record rules with contest rules and that the two conditions are adequately covered in the present regulations.

(6) Belgium proposed that F.A.I. diplomas should be awarded to all merit certificate classes. This was defeated, and only "C" class certificates will qualify for the diploma, as before.

(7) The question of the delegation of duties in applying the contest rules at international contests raised by Holland was clarified in the discussion which followed.

(8) The proposition from New Zealand regarding the conditions of participation in international contests was considered and it was revealed that there were faults on both sides. It was decided that organising clubs should specify that all entries should be received one month before the date of the contest together with full details of the number of persons arriving and the number of proxies required. It was also agreed that the contests should be run by the organising club on the most economical lines possible.

(9) The question of the proposed Guild of Aeromodellers was given consideration and it was the general opinion that it was not a practical proposition, and that it would not receive adequate support.

(10) It was agreed that the date and place of the next meeting of the Committee should coincide with the General Conference of the F.A.I. in May at Monaco.

(11) Any other business:

The question of the next interim meeting of the Committee was considered and it was decided to adhere to the December date. Invitations were received from Yugoslavia to hold it in Belgrade, and from Italy to hold it in Rome. A final decision will be made at the May Meeting.

A. F. HOULBERG, *Chairman, S.M.A.E.*

Readers' Letters

Flappery—and Slots

DEAR SIR,

I know that the December issue of the AERO-MODELLER is the enlarged Christmas issue but surely even this does not allow for a four-page humorous article with the title " Slots and related devices ". But probably the article wasn't meant to be humorous, in which case . . .

Mr. Bowden has, like so many writers before him, tried to apply full-size aircraft design procedure to models. Look at his quoted authorities : two full-size aircraft designers, the library of the R.Ae.S. (obviously dealing with full-scale matters) and a smoke tunnel. Oh ! and don't forget the boat—never a mention of a model enthusiast as a source of information.

The whole point of the matter is this : at certain times in the flight of a full-size aircraft the pilot desires to increase the lift, as at landing, for instance. To do this he increases the angle of attack of the wing by *moving the elevator* and possibly changing the engine speed. The slats are useful in that at this increased angle of attack the wing has no tendency to stall and C.L. max. is considerably increased. Now on a model the surfaces are fixed before flight (except in certain rare cases) and the intention is for the model to fly at one angle of attack throughout the flight (or at least one angle under power and another on the glide). If the model deviates from this angle it should return to it as soon as possible ; that is the meaning of inherent stability. If a model is in a nose high attitude and is fitted with slots, the wing tries to retain its lift, thus giving the tail more work to do to get the nose down again.

Mr. Bowden also thinks that it is bad for a model to drop a wing at the stall just because it is bad for many full-size aircraft which are designed with little spiral stability. In actual fact a model which drops a wing at the stall is usually very stable for it almost immediately settles into a stable turn. Models which stall straight ahead usually keep stalling straight ahead for a long, long time.

Mr. Bowden drops a pile of masonry when he talks of increasing the lift of a power duration job during the climb by means of slots. If he had any remote conception of the aerodynamic set-up of a modern power job he would realise that one of the greatest difficulties is to *reduce* the wing lift to the minimum possible figure as in a near-vertical climb wing lift is a de-stabilising factor.

And by what reasoning does Mr. Bowden assume that loss of height in a turn with a radio job is unintentional. Surely one of the major points with a rudder-only job is that height can be gained or lost by varying the turn.

Coming now to this question of delta wings and tailplanes. Consider a model with a delta tailplane just on the point of stalling. The wing will be at about 12° and the tailplane rigged at a few degrees less than this. Taking downwash into account, possibly about 8°. Now as soon as the wing stalls the nose will start to drop, so what on earth is the use of fitting a tailplane that will not stall till it reaches 30–40 angle of attack if the whole layout prevents it reaching more than 8°. Much better to fit a normal type of tailplane which I am sure will give greater lift than a delta at the lower angles at which it will be working.

Addlestone. J. BARKER.

THE POWER MODELLER— "A case of Flick Finger"

DEAR SIR,

The article on " Slots and Related Devices " in your December number by Col. C. E. Bowden contains several misconceptions which I believe should not go uncorrected. It seems he has made most of his conclusions as a result of full-scale tests, without making any truly comparative tests of wings with and without slots, flaps, washout, etc. The reason why full-size tests are no indication of the value of slots for models is that model slots operate with *very* low Reynolds numbers (with the possible exception of the very largest models) with resultant inefficiency.

I suggest that washout can accomplish everything that slots can on a model, with the advantage of being easier to build, less vulnerable in a collision with obstacles, and giving a stronger or lighter wing structure. I am sorry to read that, in Col. Bowden's experience, models " often get into odd stalled attitudes in the air." It looks as though he could probably take a leaf out of the duration flyers book there, since it is usual for engines to cut with the nose pointing 80 degrees up in the air, yet regain

their gliding attitude without loss of height, and without slots !

If slots and flaps were to be fitted to a power duration model, they should certainly not be opened for rapid gaining of height. For the most efficient climb, lift approaches zero, whilst it should be a maximum for the glide. It might therefore be worth while to open flaps or even slots at the commencement of the glide.

I can find no evidence that a slot can make a stall less sudden or severe if covering the whole span, although the stall can be delayed up to a higher angle of attack, at the same time increasing drag. I would suggest that Col. Bowden's slots are acting mainly as turbulators, possibly slightly improving the characteristics of a wing section which is basically unsuited for model work.

And now Delta tailplanes ! They may be satisfactory for manœuvring jet fighters, but surely it is well known that for the best stability from a tailplane of given area, a high aspect ratio should be used. On a properly designed and trimmed model, the tailplane operates at a lower angle of attack than the wing. It can never stall, so a 40 degrees stalling angle is of no value.

I cannot understand what Col. Bowden is aiming at with his Bowden Contest Models. Add a couple of heavy wheels to a power duration model, throttle back the engine to tick-over, and you can beat a hundred staggered biplanes with delta tails in performance, stability or control. Judging by the photographs of his models he does not seem to be aiming at realism or even attractive appearances, since he has now dropped elliptical planforms, for the rectangular.

How about giving points to models for their silence, Col. Bowden, by the encouragement of the development of silencing systems, a service would be performed for modellers all over the country.

Surrey. M. M. GATES.

False Alarm ! !

DEAR SIR,

The item, appearing in February's AEROMODELLER and also in certain daily papers, and concerning the false alarm at the Alvaston R.A.F. Centre, caused a certain amount of mild surprise in this part of the woods. Perhaps, if you could use this reply in the next 'Modeller' it would counter any ideas that may arise that the Derby M.A.C. uses cotton for its control lines or more seriously, that we fly free flight models on this particular R.A.F. station.

Actually, Alvaston is a suburb of Derby, and the R.A.F. Station there is not an airfield but a depot. The Derby M.A.C. has permission to fly only control-line models there and pays insurance cover accordingly. On the Sunday in question we ran off a club control-line contest on circles well away from any fire point, and although it was dusk before we had finished operations, we were not aware of any undue fire fighting activity. It was not until the following day when this was reported in a daily paper that we learned of it. We assumed then that the model scoring the bull's eye was an interloper flown off from somewhere outside the Station.

Derby. R. ADAMSON, D.M.A.C.

MR. JILLIBAUM shows us his ½A Speed Job

Aeronautical Inspection Directorate

DEAR SIR,

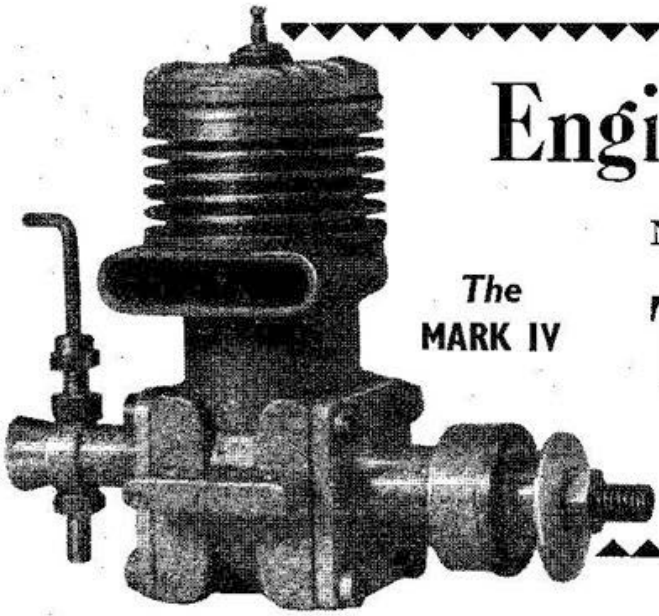
" Heard at the Hangar Doors " in the February issue prompts me to pen a few words on the mysterious initials A.I.D.

As a member of the A.I.D. and an inspector of some 30 years standing, may I say that an inspector is one who should take a pleasure in accepting good work and equally condemning bad work, when our sons may one day have to trust their lives to the products of our aircraft industry. As the accredited representatives of one of the biggest customers of our aircraft industry we of the A.I.D. are perhaps little known outside of the industry. We are responsible for the final acceptance of aircraft for the services and work quietly and conscientiously, and ours is never work wasted, whether on full-size aircraft or on models. As a reader of the AEROMODELLER from its first issue (shades of the " Skybirds " solids) I wonder how many members of the present A.I.D. are keen aeromodellers ?

Yeovil. J. W. HOLMES.

INTERPRETERS WANTED

The Committee responsible for the running of the International Meeting at Cranfield on August Holiday, appeal to aeromodellers who are fluent in any of the following languages : French, German, Italian, Danish, and Swedish, to act as Interpreters at this important event.



Engine Analysis

Number 8 (New Series)

The MARK IV TYPHOON

By Ron Warring

THIS 4·82 c.c. Dutch motor follows the accepted design practice for racing motors—square crankcase with detachable end plates, bulky castings, and so on. It gives the appearance, in fact, of a hand-built McCoy-type motor scaled down from a 10 c.c. model rather than designed as a 5 c.c. engine. In keeping with its appearance it is also a heavy motor—nearly 8½ ounces bare weight.

There are no particularly novel features on which to comment, except, perhaps, the rather peculiar arrangement of the front end of the crankshaft. The propeller backing disc screws onto the threaded portion of the crankshaft (instead of being a force fit on a taper cut on the crankshaft, or keyed to the crankshaft), and is actually locked in place against a shoulder at the end of the thread with a standard nut. To clear this assembly, propellers must be drilled out with a hub hole nearly one half an inch in diameter (7/16 in. clearance, precisely), which means that many designs of slim, racing propellers are considerably weakened. On test, in fact, one small diameter, high-pitch propeller shattered at some r.p.m. figure in excess of 14,000 due to there being insufficient wood left at the hub after drilling a clearance hole for the shaft. Rather than run the risk of ruining further propellers in the series of standard test airscrews by boring out to fit, most of the high speed runs were accomplished with an air-brake fitted. Thus we have not the same data to give on propeller speeds as in previous tests—and also avoided a repetition of the rather frightening seconds in close proximity to a propeller rotating at some fantastic speed which suddenly, without warning, " blows up ".

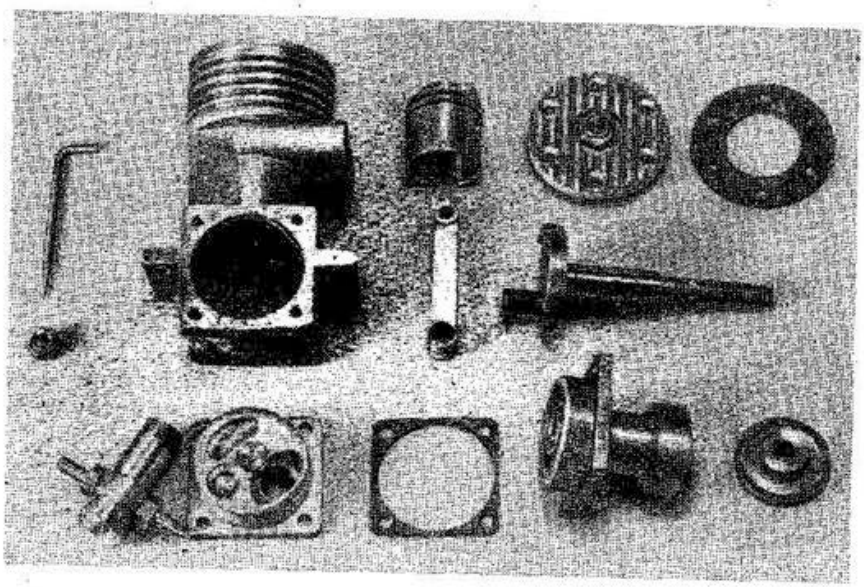
Large glow motors are usually ridiculously easy to start. The general method is to prime generously to the point of flooding, flick over a few times and off they start in a cloud of exhaust smoke and excess fuel thrown out of the ports. The " Typhoon " would have none of this treatment. Flooding immediately doused the glow plug and flicking over to clear resulted in nothing but an occasional lick of flame from the end of the exhaust pipe which had to be blown out quickly before it spread to the rest of the fuel dripping over the motor.

Priming by means of several chocked turns quickly flooded the crankcase and made starting difficult. Priming through the exhaust port—not all that easy with a domed piston which, in bottom dead centre position, still stands somewhat proud of the ports—again produced reluctant starting due to excess fuel. The best method arrived at was one choked turn, then a quick flick or two to start, with the needle valve left in its normal running position.

Once running the Typhoon was flexible enough. It would continue to two-stroke satisfactorily over a range of needle valve settings of one and a half turns. Further opening of the needle valve produced four-stroking, which would continue for another turn or two of the needle valve before the engine actually stopped. The needle valve, in other words, was far from critical. Provided it was somewhere near the optimum running position you had all the time in the world to find the best setting once the motor had started.

Starting was materially improved once we had appreciated that the engine did not like excessive priming and was still quite easy with the smallest diameter propellers used (8 and 9-inch diameter). A really smart flicking action usually spun the prop. over fast enough to set the engine running on the first or second flick, with the needle valve left strictly alone in the position corresponding to optimum running setting. A single choked turn was more than adequate for priming.

The " Typhoon " was run-in for some considerable time on a large diameter propeller at about



One excellent feature of this engine is the positive locking arrangement for the needle valve, obtained by means of the lock-nut shown beneath the needle in the photo. The carburettor is in two separate parts. The upper portion threaded to take the needle valve which impinges into the lower portion, this being a true car type jet.

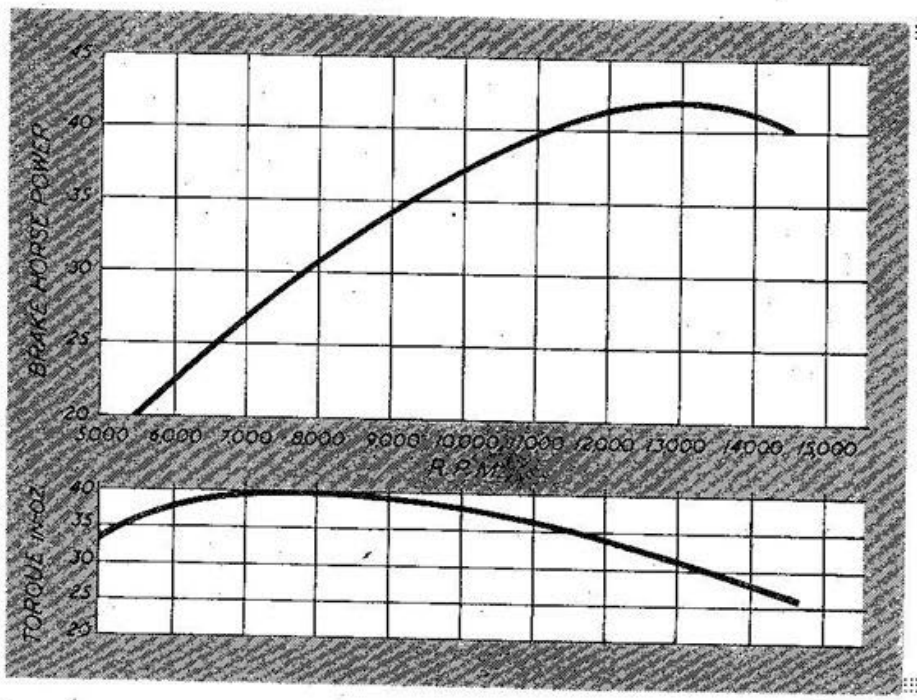
5 to 7,000 r.p.m. until all the moving parts appeared free. When hot, the engine was characterised by an almost complete lack of compression.

Some high speed runs (around 12,000 r.p.m.) were made directly afterwards with 9-inch diameter propellers and each of these runs terminated by the engine seizing up. Even after some more running-in at lower r.p.m. this same trouble was still apparent during the subsequent high speed tests—the engine running perfectly well for about a minute or so and then losing revs. and gradually showing signs of stiffening up.

It was decided, at this stage, to take the engine to pieces and look for possible causes. The piston is of the ringed type, which should have less tendency to seize than a " solid " piston, although the coefficient of expansion of most light alloys as used for ringed pistons is higher than that of the steel cylinder liner. Dissembled in fact, the piston did show signs of heavy rubbing contact around the skirt and at one or two places on the walls. The engine was assembled once more, run again and the test concluded.

On taking the engine to pieces again at the end of the tests the piston-cylinder fit seemed more free than before. Examining the other components in some detail, however, another considerable source of friction was found in the rotary disc valve mounted on the rear crankcase cover. This was definitely binding to a degree and must have caused a certain loss of power at high speeds.

The big end bearing also left a little to be



TYPHOON IV

Displacement : 4·82 c.c. (0·29 cu. in.).
Bore : 19 mm. (·748 in.).
Stroke : 17 mm. (·669 in.).
Bore/Stroke ratio : 1·12.
Bare weight : 8¾ ounces.
Mounting, beam : 1·2 by 0·6 in.

Material Specifications

Crankcase : aluminium alloy.

Crankcase bearing : two ball races.

Cylinder liner: steel sleeve pressed in place in die-cast light alloy casing.

Cylinder barrel : integral casting with crankcase.

Piston : light alloy, two rings.

Connecting rod : dural (machined).

Manufacturers

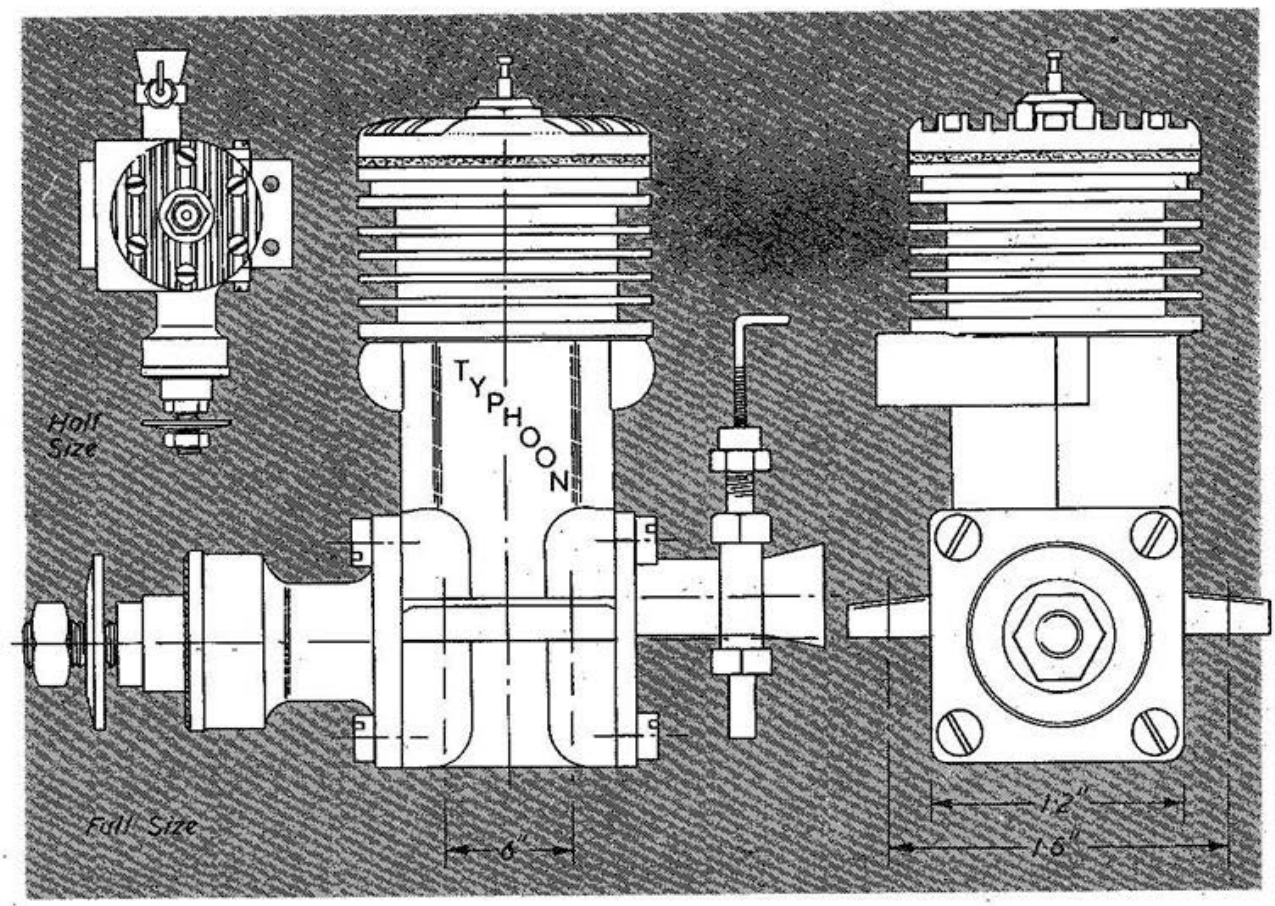
Miniatuur-Motorenfabriek, Amsterdam, C. Holland.
Retail price : British equivalent £6. 3s. 0d.

desired, although more prolonged running may have improved this running fit. The original set-up, however, did allow the crankshaft web to just foul the connecting rod and score it.

The workmanship, on the whole, was generally good. Tolerances had been held to very close limits and particular care appeared to have been taken in finishing the cylinder bore. Nor was there a great deal to quibble about in the performance, despite the fact that this might well be improved under more favourable conditions.

The "Typhoon" appeared happiest running at between 12 and 13,000 r.p.m. and could quite readily turn over high-pitch propellers at speeds in excess of 10,000 r.p.m. Maximum propeller thickness, incidentally, which can be accommodated on the propeller shaft without cutting back the prop. hub is equivalent to 9 inches pitch—and even that demands the use of a thin front washer instead of the thicker one supplied with the engine. The makers state that the "Typhoon" is a racing engine and the recommended propeller is 10 to 12 inches pitch and 7 inches in diameter. We had no chance to check up on speeds with such a propeller, but have some doubts that the r.p.m. with such a high-pitch propeller would be within two or three thousand of the r.p.m. at which the engine develops peak power. Our own choice would be a little more moderate—a propeller pitch of about 8 inches and then trimming the diameter down to operate at some 13,000 static r.p.m. Corresponding diameter would probably be about 7 inches, with thin blades.

The "Typhoon" undoubtedly has considerable potentialities in the racing field, for it is both fast and powerful, as well as rugged. It has much in common with many of the American racing motors, but perhaps lacking that little finesse in design detail and points of workmanship. Properly treated, however, it should give long and faithful service. If an ounce or so were cut off the total weight, and this could easily be done without unduly weakening any of the vital parts, it would also make an excellent free flight motor. As a point of interest, although it *is* a racing motor, we had it swinging a 14-inch diameter low pitch club of a propeller at some 5,000 r.p.m., when it ran consistently and well without a miss. The same consistency of running was maintained right throughout the speed range—even when sparks were occasionlly showered from the exhaust port at 14,000 r.p.m. plus! As we have mentioned before, our only difficulty with high speed running was a gradual tendency to tighten up after a minute or so's running. On balance, a good, likeable engine apart from this one major fault.



SCOTTISH PAGE

OUT come the snow shoes and jokes about brass monkeys as we visit the **LANARK M.F.C.** flying ground for the second winter friendly contest between this club and the **GLASGOW BARNSTORMERS.** The competition was for glider and power models, and although conditions were bitterly cold, quite an enjoyable time was had by all. The Barnstormers were the eventual winners, and flying standards varied from excellent to shocking.

Ian Cochrane of the Barnstormers flew a new pylon design, which he developed with clubmate Alec Clark. The general appearance of this model is fairly orthodox, except possibly for the extra long tail moment, and the power is supplied by an Elfin 1·8. In flight, the job spiral climbs dead stable and safe every time, and makes full use of its sailplane-like wing section on the glide. In fact I think this design will be one of the major threats in Scottish free flight power this contest season.

Also seen at Lanark was Jim Nicol doing great things with a little chuck glider of about 20 ins. span, getting most of the height available from his 328-ft. towline. The model flies so well that Jim is thinking of scaling it up to a fully fledged contest glider. On the other hand one modeller who should know better had his glider coming in off the line like an old hen from a farmyard haystack (with about that much wing flutter, too !). Maybe it was because of the severe cold—inverted thermals, or something like that. Barnstormer Gillespie had his own way of keeping warm, though, taking the wings off his Mills 1·3 powered " Frankenstein " he started up the motor and let the rest of the model bounce merrily over the snow-covered Lanark golf course. This continued until the model was out of fuel or Gillespie was out of breath chasing it.

On to some team racing news now, with the three top men of the Glasgow Barnstormers M.A.C. flying for their club's team race championship trophy. Walter McFarlane was first, with Joe Taylor as flight mech. for his Mercury Mk. II racer. Ian Cochrane was second home with Eric Perry in attendance to another Mercury Mk. II. Third was Dave Robb's own design job, which strictly speaking was the fastest model flying, but lost out on pit stop time, when the engine decided to go gluey. Bill Meechan, on loan from Glasgow M.A.C., flew the plane. All of the models were E.D. racer powered and in the 60 m.p.h. airspeed bracket. Although it was his first team race contest, winner Wat McFarlane was cooler than a North Polar cucumber, but this wasn't hard, as the temperature reading for the afternoon was fourteen degrees of frost ! To combat this January weather, Dave Rob had a monster size paraffin stove glowing in the back of his old Morris taxicab, which made it a very popular thawing-out centre. Arnold Bell, previous holder of the Barnstormer's Team Race Trophy, wasn't competing this session.

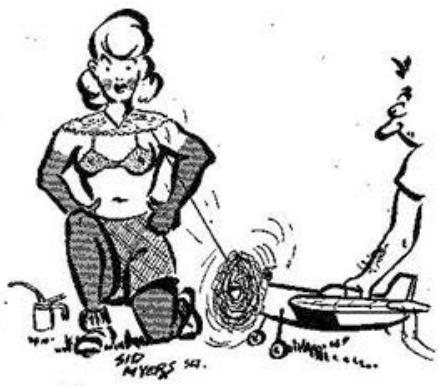
Other Barnstormer winter activities include indoor R.T.P. with rubber-driven flying scale models, principal ruling being a four shilling limit on the material or kit price of the models.

George O'Hara, **PAISLEY M.F.C.** Comp. Sec., reports on some of his club's January activities. In conjunction with the film " Thunder Across the Pacific ", the club organised a display of models in the vestibule of Paisley's Astoria Cinema. The selection consisted of a Mercury " Aeronca Sedan ", built by D. Cassells ; Gordon Fudge's " Nordic Faun ", which won the 1952 Scottish Aeromodellers Assn. A/2 Championships ; a Frog " Zephyr ", and representing the control line field, a " Skystreak " and a " Vandiver ". The display was instrumental in providing interest to the cinema patrons, and at the same time gave the Paisley club some good advertising.

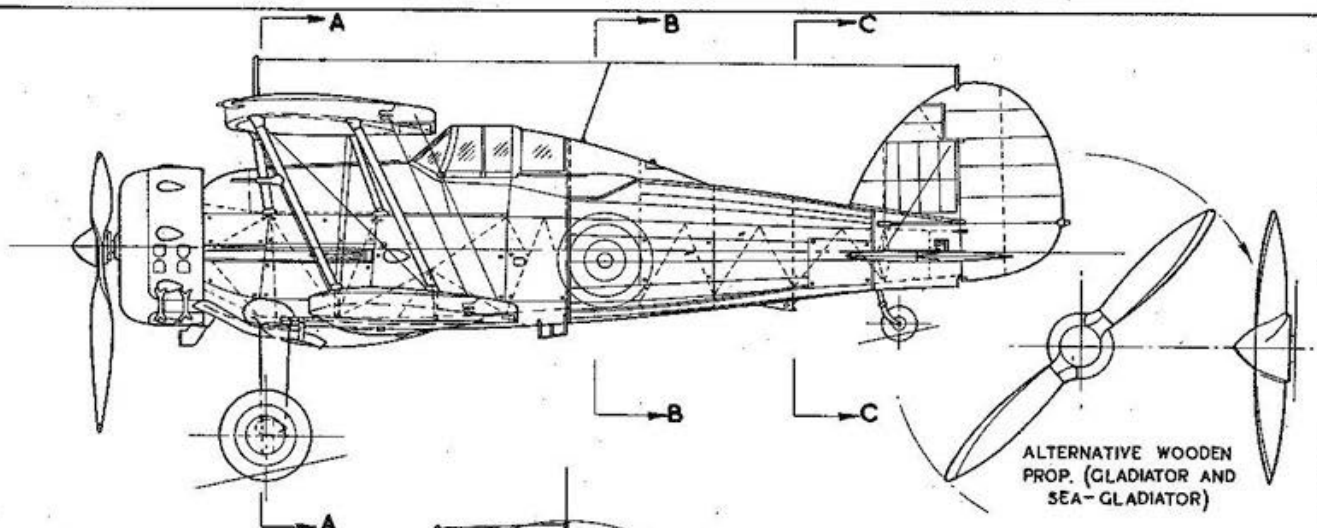
Some of the more enterprising members of the two Glasgow Clubs decided that the **WEST OF SCOTLAND AREA** could do with a Club Championship Trophy. Consequently, they got together on the subject, and the outcome was a magnificent five foot diameter propeller trophy, cut from solid teak, with a chrome plated hub inlay. Details of the points scoring system for it's award have been worked out, and I hope to have more information and pictures of the trophy shortly.

MAC.

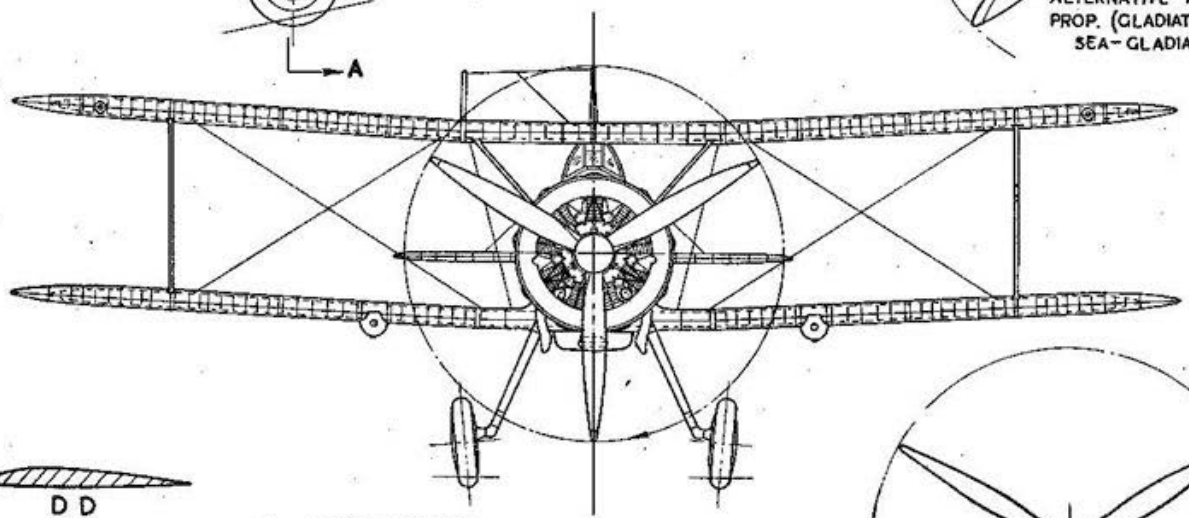
Scottish Clubs are reminded that reports on their activities and future events should be sent direct to J. C. McArthur, " Blairmore ", Seafield Drive, Ardrossan, Ayrshire, not later than the 10th of the month preceding date of publication.

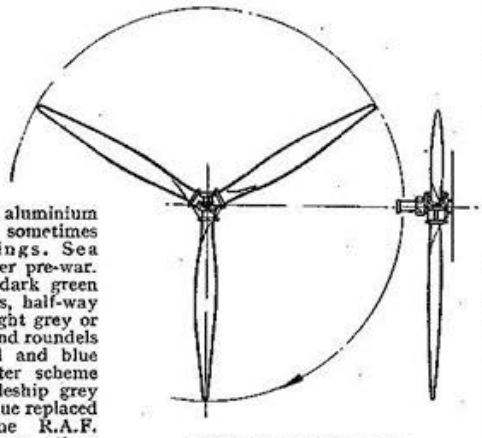


"What the heck are you laughing at ??"



ALTERNATIVE WOODEN PROP. (GLADIATOR AND SEA-GLADIATOR)





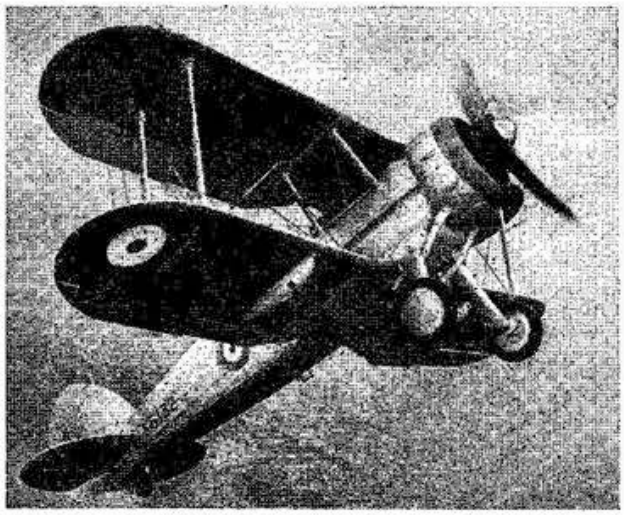
VARIABLE PITCH PROP FITTED TO THREE MALTA SEA-GLADIATORS ONLY.

Pre-war machines were doped aluminium with usual roundels and sometimes carried squadron markings. Sea Gladiators, aluminium all over pre-war. Wartime: dark earth and dark green camouflage on upper surfaces, half-way down fuselage sides. Rest light grey or aluminium. Usual fin-flash and roundels on side and below but red and blue roundels above wings. Later scheme changed camouflage to battleship grey and sea green and duck egg blue replaced aluminium or grey. Some R.A.F. machines as first F.A.A. scheme, others same but with camouflage extending right down fuselage sides and duck egg undersides. Communication machines were camouflaged as fighters but with yellow undersides.

FT.

GLOSTER SEA GLADIATOR

1/72nd scale 'J' type reprints and 1/48th scale 'A' type blueprints of this drawing are available price 6d. and 1/- respectively from the Aeromodeller Plans Service.



AIRCRAFT DESCRIBED No. 54

By G. A. CULL

THE Gloster GLADIATOR

Left, this Mk. I was still flying in 1944 ("Aeroplane" photo). Above, "Faith", most famous of Gladiators (Imperial War Museum photo). R.A.F. Gladiator, L 8032 flies to-day as a civilian, registered G-AMRK

IT is fitting that the end of the biplane era of R.A.F. fighters should be rich in fame, and this was won by the outdated Gladiator in a war belonging to the monoplane.

The Gladiator was evolved through a long line of H. P. Folland's designs, and in immediate line of descent were the Gauntlet, S.S.19b (Gauntlet proto.), S.S.19, S.S.18b and S.S.18, which arose from Spec. F.20/27. 1934 saw the G.37, which met Spec. F.7/30, and this was the prototype Gladiator. Numbered K5200, this machine lacked the enclosed cockpit and flaps of the production machine and sported a Gauntlet-type cowling and slatted tailwheel. Most outstanding was the neat single-leg undercarriage wherein all shocks were absorbed in the 6-inch travel of the ingenious Dowty internally sprung streamline wheels. In July '36 the first delivery was made to the R.A.F. under the Expansion Scheme, and these were Mk. I's with Bristol Mercury IX engines driving two-bladed wooden propellers. First squadrons to be equipped were Nos. 3, 56 and 72, to be followed by 17, 33, 54, 65, 73, 80, 87, 223, 247, 602 (City of Glasgow), 603 (City of Edinburgh), 607 (County of Durham) and 615 (County of Surrey). In 1939 the Sea Gladiator was introduced into the F.A.A. and differed from the R.A.F. machine in having a deck-arrester hook, dinghy and various internal naval mods.

At the outbreak of war many Mk. II's with 840 h.p. Mercury VIIIA's were in service and many of these had been fitted with three-bladed fixed pitch Fairey Reed metal props, but by this time most squadrons had been re-equipped with Hurricanes. Nos. 607 and 617 Sqdn.'s Gladiators went to France and one of the war's first air victories was that of a 603 Sqdn. Gladiator which shot a He.III into the Firth of Forth. In the Middle East, Gladiators of the R.A.F. and R.A.A.F. bore the brunt of fighting during 1940 with great success although outgunned by faster Axis types. One notable victory was on March 17th, '41, when two Gladiators encountered two Me.110's and shot down both without loss. The Norwegian campaign of 1940 saw the heroic struggle of 223 Sqdn., whose 18 aircraft flew off from H.M.S. Glorious to operate from frozen Lake Lesja. Flying continuously under constant bombing they shot down the best the enemy had and only five Gladiators left the lake to fight on from an airstrip until none remained airworthy.

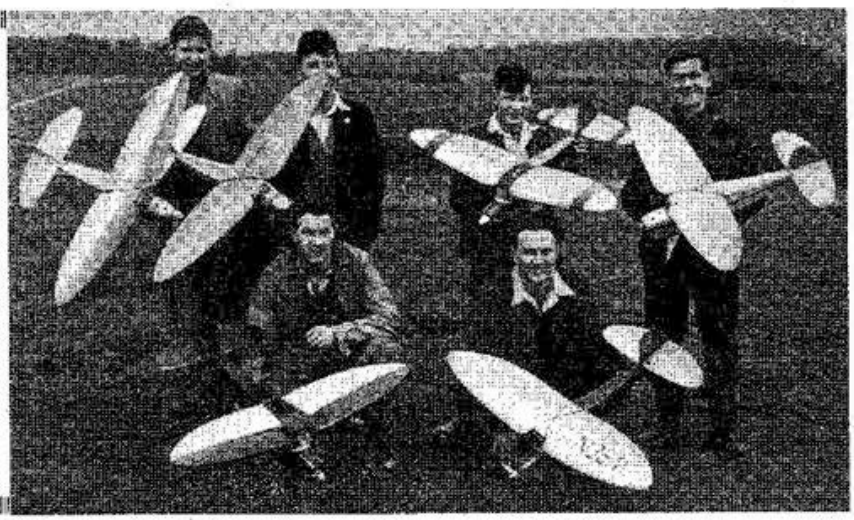
Most famous of all were the Sea Gladiators which in April, May and June, 1940, were Malta's only defence. Originally four in number, one was soon lost, leaving "Faith", "Hope" and "Charity". These could not catch the raiding S.M.79 bombers, and so were flown at max. boost with throttle gates removed to intercept the bombers which fell to their guns as well as escorting Macchi 200 fighters. However, the Mercury VIIIA's could not stand this for ever and eventually cracked up, whereupon Mercury's meant for Blenheims were installed complete with three-blade variable pitch props., making the trio unique among Gladiators! "Hope" and "Charity" were shot down on July 16th but "Faith" fought on until January, '41. Her skeleton fuselage is now in Malta's museum.

Gladiators were exported to Eire, Belgium, China, Portugal, Sweden, Norway, Latvia, Lithuania, Iraq, Greece and Finland whose machines often flew on skis against the Red Air Force. A total of 527 was built. Armament was four ·303 guns, two fuselage-mounted firing between prop. blades and two below lower wing outside of prop. arc.

Construction: All metal. Fuselage of Warren-girder type with steel tubes and internal wire bracing. Wings have two spars from steel strip with steel compression ribs and dural lattice ribs. Each wing has hydraulically operated split flap. Tail unit as wings. Whole fabric covered.

Specification: Span: 32 ft. 3 ins. Length: 27 ft. 5 ins. Height: 10 ft. 3 ins. Empty weight: 3,285 lbs. Loaded: 4,750 lbs. Wing loading 14·7 lbs. per sq. ft. Mk. II Max. speed: 255 m.p.h. at 15,500 ft. Cruising speed: 210 m.p.h. Landing speed: 59 m.p.h. Climb: 2,300 ft. per min. Ceiling: 32,800 ft.

CLUB NEWS



Six members of the Shipton (Hants.) M.A.C. competed in their Boxing Day 'one-design' contest. Keen eyes will note that they selected the popular A.P.S. Wren as the subject for this event.

REACTION to the new S.M.A.E. Affiliation fees ranges from the ultra violent to the completely disinterested, and seems obviously dictated by either total club finance or the proportion of members actually interested in contest work.

It is obvious that many clubs are introducing a separate class of membership, whereby the contest-minded section will pay Affiliation fees in addition to their normal club dues. Though this is probably the easiest method of dealing with the situation where sufficient funds are not available for total Affiliation, there is a danger that such practices will lead eventually to the complete division of a club—especially when it comes to budgeting normal club finances between the requirements of the sport and contest sections.

Another snag is presented when part of a club enters a National contest. Unless the Society is supplied with a list of names of Affiliated members from each club working on a "divided" principle, how is the poor S.M.A.E. Comp. Sec. going to know who is eligible for competition at the special fee? It would seem that now is the time to introduce a special Competitor's Licence to all who pay the new fee, this to be renewed annually. Such a system would be far easier for the officials to check than a list of names. Any views on the subject?

South Eastern Area

Oh where, oh where is our little (Sea) DOG gone? Much as we disagreed from time to time with the former editors of the S.E. Area news-sheet, at least duff gen was better than no gen at all! Finger trouble, someone?

Apart from Vic Smeed, members of the **CANTERBURY PILGRIMS M.F.C.** have fared badly in National comps. during the past season, mainly due to foot and mouth restrictions on the club flying field. Now that these are lifted, a considerable amount of test flying is being carried out. Don Powell still gets a good performance out of his jobs, though we are told he hasn't learnt to build properly yet! (Some P.R.O. is going to get axed.) On the other hand, Charlie Ashby's beautifully finished efforts consistently refuse to put up contest times. Woodruffe is hard at work on his latest "Ultimate" A/2 job, which, judging from previous efforts, should turn in a regular 2 minutes—off 500 ft. of line! The club trophies have now found their resting places, Eric Rigden having no trouble in cleaning up the Power Trophy. Woodruffe managed to win the Rubber, Sailplane and Individual Trophies—though we hasten to assure Evans, Gorham and Co. that this was only because there were two entries in rubber, and no-one else flew in all three glider rounds.

SOUTHERN CROSS A.C. put on a very enjoyable Annual Dinner recently, the only snag as far as I am concerned being that it took place on the week-end of the Big Fog. Hence, I was only just able to scoff my meal before dashing off to make the return trip—a journey which ended at 3 a.m. on a Sunday morning, trudging through thick fog, snow and ice. Excelsior! Still, the little I was able to participate in the proceedings was very worthwhile, and here's hoping a

1953 CONTEST CALENDAR

April	11	**Irish Open Control-Line Championships.** College Park, Dublin.
April/May		**WORLD CHAMPIONSHIPS (C/Line).** **Daumerie Cup.** Milan, Italy.
July	3–6	**INTERNATIONAL CONTROL LINE MEETING.** Knokke, Belgium.
	12	**Northern Heights Gala.** Langley Aerodrome.
	19	**INTERNATIONAL TAILLESS GLIDER.** Bremen, Germany.
	26	**INTERNATIONAL RADIO CONTROL MEETING.** Southend Airport.
August	1–3	**WORLD CHAMPIONSHIPS:** (Rubber) **WAKEFIELD CUP** (Power) **F.N.A. CUP** } Cranfield.
	15–16	**INTERNATIONAL SLOPE SOARING MEETING.** Trento, Italy.
	21–23	**WORLD CHAMPIONSHIP (Gliders)** **SWEDISH CUP.** Lesce Bled, Yugoslavia.
	23	**1st All British Model Aircraft Rally.** Radlett, Aerodrome.
Sept.	6	**INTERNATIONAL RADIO CONTROL MEETING.** Brussels, Belgium.
	6	**Yorkshire Evening News Rally.** Sherburn.
	20	**INTERNATIONAL TEAM RACE MEETING.** Holland.
Oct.	17–20	**INTERNATIONAL CONTESTS.** Spain.

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

future visit will be blessed with better thermals. Current news-sheet from the Southern Crossers deplores the lateness of the National Calendar, but in extenuation it should be pointed out that though a provisional list was ready weeks ago, it had to await the International list before finalisation. In the event it was as well that the first list was not promulgated, as considerable re-shuffling had to be undertaken to meet the International commitments.

Midland Area

FLASH ! Strange epidemic hits Midland Area . . . Writer's Cramp seizes 99 per cent. of P.R.O's. . . . Rumour says Increased Fees knock 'em dead—or at least dumb. All of which means, what has happened to this once strong and active Area ? No news-sheet, no club reports except one from Brum, and a quick-change of officers hiding their lights under airtight bushels. All of which makes dismal reading to yours truly, one-time can-carrier to this Area.

S.M.A.E. 1953 CONTEST PROGRAMME

Mar.	8th	**Gamage Cup.** Unr. Rubber. (Decentralised.) **Pilcher Cup.** Unr. Glider. (Decentralised.)	
	15th	**C/L SPEED TRIALS.** F.A.I. Class 1, 2, 3. (Cent.)	
	22nd	**S.M.A.E. Cup.** 1953 A/2 Eliminator **Farrow Shield** (P). Team Rubber. **Women's Cup.** Unr. Rubber/Glider.	(Area Cent.)
Apr.	5th	**Flight Cup.** Unr. Rubber. (Decentralised.) **Hamley Trophy.** Unr. Power. (Decentralised.)	
	19th	**WESTON CUP** (P). 1953 Wakefield Eliminator. **ASTRAL TROPHY** (P). 1953 F.A.I. Eliminator.	(Area Cent.)
May	3rd	**A/2 GLIDER.** 1953 Trials. (Centralised.) **Aeromodeller.** R/C Trophy. (Centralised).	
	10th	**Lady Shelley.** Tailless. (Decentralised.) **Jetex Cup.** Jetex. (Decentralised.)	
	24th	**Thurston Cup.** Unr. Glider. **M.A. Trophy.** Unr. Rubber. **Gold Trophy.** C/L Stunt. **Speed.** C/L Speed. **S.M.A.E. Trophy.** R/C. **Sir John Shelley.** Unr. Power. **Team Race.** C/L Class "A" & "B". **PAA Load.**	British Nationals.
June	7th	**WAKEFIELD TRIALS.** 1953 Trials. (Centralised.) **POWER TRIALS.** 1953 Trials. (Centralised.)	
	21st	**Keil Trophy.** Unr. Power. (Decentralised.) **Frog Junior.** Unr. Rubber/Glider. (Decentralised.)	
July	5th	**Super Scale Trophy.** Power Driven Scale. (Cent.) **Bowden Trophy.** Precision Power. (Centralised.)	
	19th	**C.M.A. Cup.** Unr. Glider. (Decentralised.) **Frog Senior.** 1·5 Power. (Decentralised.)	
Aug.	1/2/3	**WAKEFIELD & F.N.A.** World Championship. (Centralised.) **POWER.** World Championship. (Centralised.)	
	30th	**Area Championship.** Rubber, Glider, Power. (Centralised.) **Taplin Trophy.** R/C. (Centralised.)	
Sept.	13th	**GUTTERIDGE.** 1954 Wakefield Eliminator. **M.E. Cup** (P). Team Glider.	(Area Cent.)
	27th	**K. & M.A.A.** 1954 A/2 Eliminator. **HALFAX.** 1954 Power Eliminator.	(Area Cent.)
Oct.	11th	**U.K. Challenge.** Rubber/Glider/Power. (Ireland.)	
	18th	**Davies Cups.** Team Race Class "A" & "B". **Ripmax.** R/C. **C/L Speed.** Speed.	(Centralised.)

(P) *Plugge Cup Events.*

The 1952 A.G.M. of the **BIRMINGHAM M.A.C.** was ill-attended, and the scene of a terrific controversy over club fees. The new Affiliation fee was responsible for much of this, members stating that S.M.A.E. membership would drop considerably as a result, leaving only a hardcore of contest fliers. It was finally decided to have two classes of membership on lines indicated in my opening remarks. Interest is being shown in geodetic construction, several members incorporating this in models for the 1953 season. An intense campaign is under way to attract new members, and all interested are notified that club meetings take place on Friday nights (8.30 p.m.) at Birchfield Road Schools, Perry Barr. The club is confident in another successful season, and expect to persuade Croydon to once again relinquish the Plugge Cup.

London Area

At the A.G.M. of the Area held at the " Horseshoe ", all retiring officials reported on their activities, and it is regrettable that all were not standing for re-election. Malcolm Young has been a most hard-working Secretary, and Mr. Martin as his successor has much to live up to. New Comp. Sec. is Mr. White, other officials being : Chairman, Mr. Brett ; Treasurer, Mr. MacDonald ; P.R.O. : Mr. J. B. Knight ; and Eddie Cosh remains as Area Delegate. Hayes won the L.D.I.C.C.C. Trophy, Croydon the Keil and T.M.A.C. post, and D. H. Rumley took the Junior Trophy.

The **BARKING M.A.C.** held their annual Winter All-in Contest on December 28th, when, as a trial, the new proposed rules were used, i.e., 150-ft. line and 10-second motor run. Rubber jobs used half turns, but the S.M.A.E. is hardly likely to adopt this rule ! Times were not high, but the models certainly landed within reasonable distance. Top man T. Cavanagh flew a glider for a total of 2 : 29, next came a rubber job flown by J. Holt for 2 : 18, and third was another glider with 2 : 03, flown by D. Headley.

The 1953 season started with a win for the **CROYDON & D.M.A.C.** (for the 3rd time) in the Blackheath Glider Cup, those responsible being Des Yeabsley, flying his 10-ft. span " Silent Knight ". Ed. Bennett came 4th in the Bill White Cup with a lightweight. Sunday after Xmas saw several of the " more crazy " members shivering in the icy blasts of Fairlop where the West Essex staged (!) a team race meet. The Class B final was a sight for sore eyes and cold feet, producing a magnificent triple stackup, and the Class A proved a walkover (or should it be a flyover) for Cameron's " Blockbuster "—being the sole survivor of the quartette. H. W. Hills, recently elected President of the club, has been suffering from the effects of fog, and his clubmates wish him a speedy recovery—they need him for timing !

Membership in the **BUSHY PARK M.F.C.** has suffered a steady decline, but the acquisition of a new clubroom should help to remedy the situation. Winter activities have mainly been confined to hydroplanes and a radio-controlled boat, which performs unprecedented manœuvres—so far without radio installed! A very welcome new member is Roland Carlson, ex-clubmate of Sune Stark, whose presence may stimulate the competitive spirit. Meetings are held every second Tuesday at the R.A.F.A., 71, Grove Road, Hounslow.

Sunday, August 23rd, is the date scheduled for the 1st All-Britain Model Aircraft Rally "—otherwise well known as the All Herts. Rally. This year sees the incorporation of the hitherto separately run Jetex International contest, and this, together with the many

other events that are connected with the Rally, will make this a must for the travelling aeromodellers of Great Britain.

North Western Area

Area news sheet indicates a satisfactory ending to the postponed D.D. Rally, so all's well that ends well. Preliminary date of the 1953 " do " is given as Whitsun, but in view of the necessity to change the National programme, this may have to be revised.

AINTREE M.A.C. are taking a breather, and paper and pencils are out and designs for new models are the order of the day. Indoor flying comes in for some attention, and new members or anyone interested will find a warm welcome every Friday evening at the Aintree Institute, 7 p.m. onwards.

Activities have continued throughout the winter months in the **WHITEFIELD M.A.C.,** with several members hard at work developing jobs for the coming season. If Wakefield performances increase in relation to prop. diameter, results should be wonderful ! Best recent flight under " still " air conditions is 7 : 47. A better indication of progress, however, is the aim for a 6-minute still-air Wakefield. Interest in c/l flying has developed to the team-race stage, with emphasis on the ·5 c.c. models. The recent sight of the tallest and shortest c/l enthusiasts flying two-in-a-circle was well worth seeing !

Western Area

The delta wing shape seems to have bitten several members of the **PHOENIX (Bristol) M.F.C.,** and this season should see some interesting models in the air. N. Blagg has a ducted fan " Gloster Javelin ", and G. Elliott has a 64-in. span radio " Avro 707 ", a half-scale version of which has flown successfully.

Gale force winds prevented all other than gliders taking place in the **SOUTH BRISTOL M.A.C.** winter contest on Dec. 28th, Johnny Down's "Quickie" finishing 1·5 seconds ahead of Colin Smith's "Jader 60", with another " Quickie " placing third. Harry Hopkins, now unable to fly his jet models, is concentrating on several other speed classes.

East Anglian Area

Members braved the snow on the 4th January to inaugurate the new season, event being the Hooper Trophy at Ipswich. Winner was Johnny Gorham of Ipswich, who made three very good flights with the geared Wakefield he flew at last year's trials. Once again A/2 Team member King was beaten into third place by his fiancee, who flew a glider design. Leading power flier was N. Willis of the Central Essex Club. Results :—

Gorham, J. A.	**(Ipswich)**	**Wakefield**	**9 : 53**
Healey, Miss P.	**(Belfairs)**	**Glider**	**8 : 13**
King, M. A.	**(Belfairs)**	**Glider**	**8 : 03**
Willis, N.	**(Central SX)**	**Power**	**7 : 51**

1952 proved to be highly successful for the **CAMBRIDGE M.A.C.,** not the least factor being the generous space devoted in the local newspaper, no less than twenty write-ups appearing during the year, with six photographs. Local cinema managers were also most co-operative, two highly interesting exhibitions being held. The club are, of course, very fortunate in having two fine flying grounds, a large common in the City precincts, and Waterbeach Aerodrome. (Any chance of getting one transferred to the London district ?) Chief activity at present lies with r.t.p. flying, small Jetex 50 jobs being the most popular, though we learn that r/c expert Sallis is sparking away strongly, and expects to have a whole fleet ready for the 1953 comps. Scale models are also popular. Michael Gates putting the finishing touches to his magnificent 64-in. span Tipsy Junior. Powered by an Elfin 2·49, the job weighs close on two pounds.

The **BRENTWOOD & D.M.S.** meets every Friday, and a club glider is under construction, in which it is hoped to instal radio at a later date. This club has its own clubroom, built entirely by the members ; subs. are 20/– p.a., Junior 5/–, new members are welcomed.

Northern Area

Several members of the **HALFAX M.A.C.** are building Wheeler's " Eliminator ", and some good flying has been witnessed in the " poor months ", notable being Mrs. North's 3½-minute flight with a new A/2 out for the first time, and hubby Eric's average of 4 : 10 with his 1952 A/2, best flight 5 : 20. A contest for the Chamber's Trophy had to be abandoned after the first round due to the sudden clamping down of a dense fog. Maurice Childs, flying a brand new " Lil Aud ", had to wait until the d/t worked to bring the job back into sight.

The newly formed **REDCAR M.A.C.** held a winter rally on the 4th January, visitors being the Stockton club. C. Plant, Stockton Hon. Sec., won both the power and glider events, W. Pitchford maintaining local honour by placing a close second. The scale event went to Redcar member D. Beales.

South Midland Area

Second winter comp. of the **LUTON & D.M.A.S.** was won by D. Bateman with his Amco-powered " Desperado ". F. Chapman was declared the 1952 club champ. at the club dinner and social, where a number of members and friends had a thoroughly good time. Highlights of the evening were recorded on cine-film, and will be screened later on. G. Moss is now at Loughborough College, and his ability should stand him in good stead with his new colleagues.

The **HENLEY M.C.** Power/Ratio contest was won by c/l enthusiast D. C. Painter with a three-flight aggregate of 17·48 to 1, J. Sargent placing second with 16·3. The event was held in cold, windy conditions, and several entrants pranged whilst testing before the contest. Painter flew a Frog 150-powered " Lil Aud ", Sargent's entry being a Mills 1·3 powered " Snorky ", the model being stored for two years whilst he did his National Service bash in Egypt. A real galaxy of models are ready for the new season, J. Waldron alone having three modified " Contenders " ready with three A/2's, a 10-ft. glider and a Wakefield.

And that, with the exception of names and addresses of two overseas readers who want correspondents, is the lot for this month. So, till we see a little more sunshine than we have during the past weeks of fog, fog, and more fog, adios. What ? Oh yes, the chaps are : Hans Pfiel, of 15, Brunnenstrasse, (21a), Bad Pyrmont, British Zone, Germany ; and Jim Witte (16 years), 1115 12th Ave., St. Clud, Minnesota, U.S.A.

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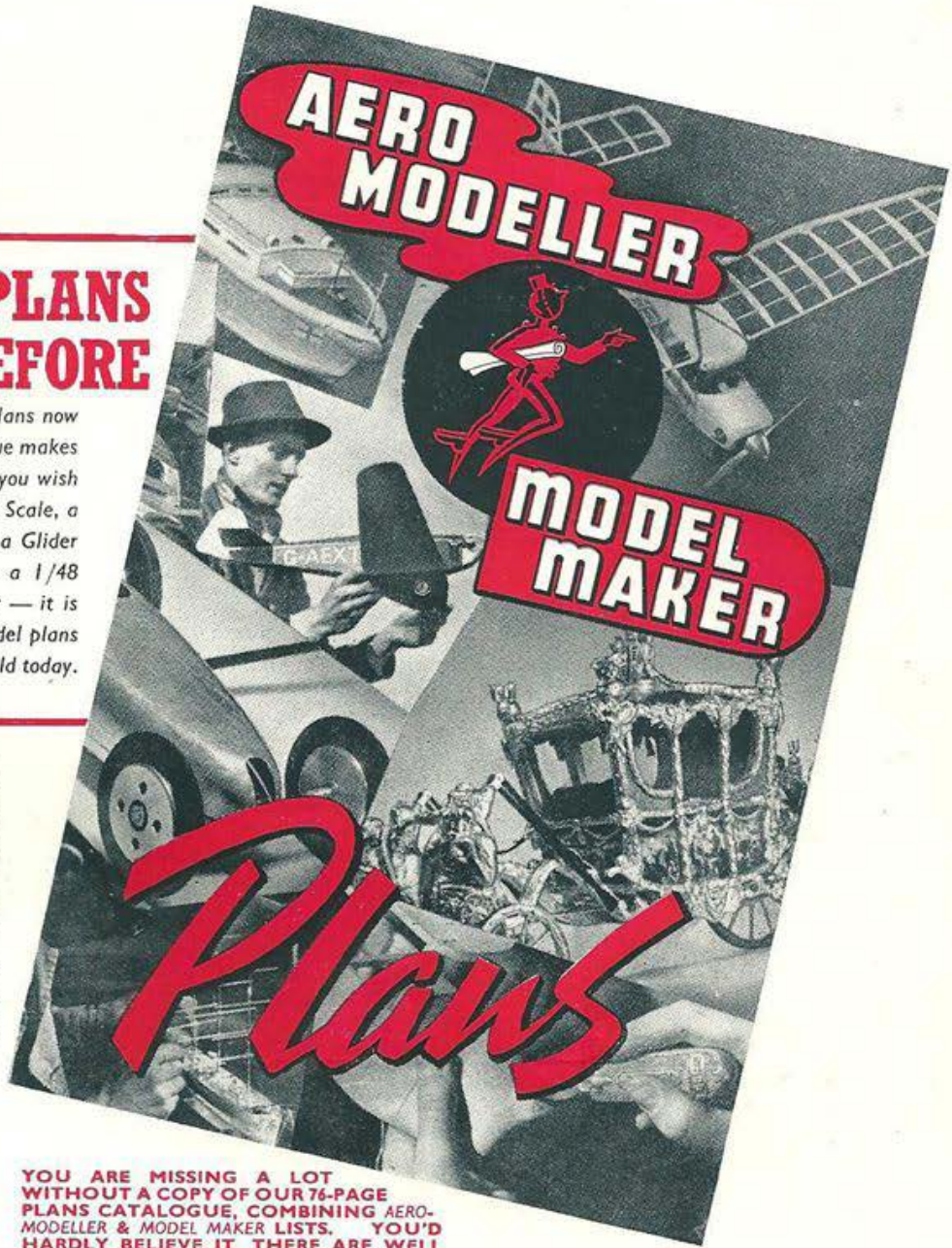

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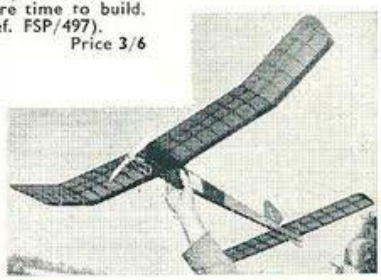

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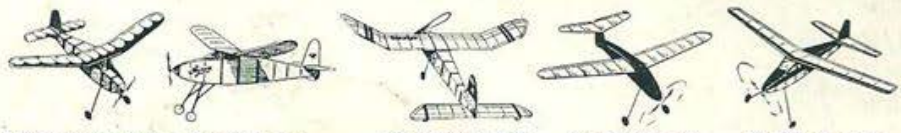
40" Gipsy 12/10 | 32" Competitor 8/7 | 23" Pixie 4/11 | 16" Elf 3/8 | 17½" Gremlin 4/7



24" Achilles 4/11 | 30" Ajax 7/4 | 32" Senator 6/9 | 23" Orion 4/3 | 20" Playboy 4/–

★ *We have done our best to show you the whole K.K. range of kits, but just cannot get them all into this advertisement. Read all about the entire range of kits and accessories in the K.K. Handbook. Price 1/3. At any model shop.*

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