MODEL Aircraft

In this issue

FEBRUARY 1952

1'6

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The plans and the articles that exist within, you can find published at full dimensions to build a model at the following websites.

All Plans and Articles can be found here:

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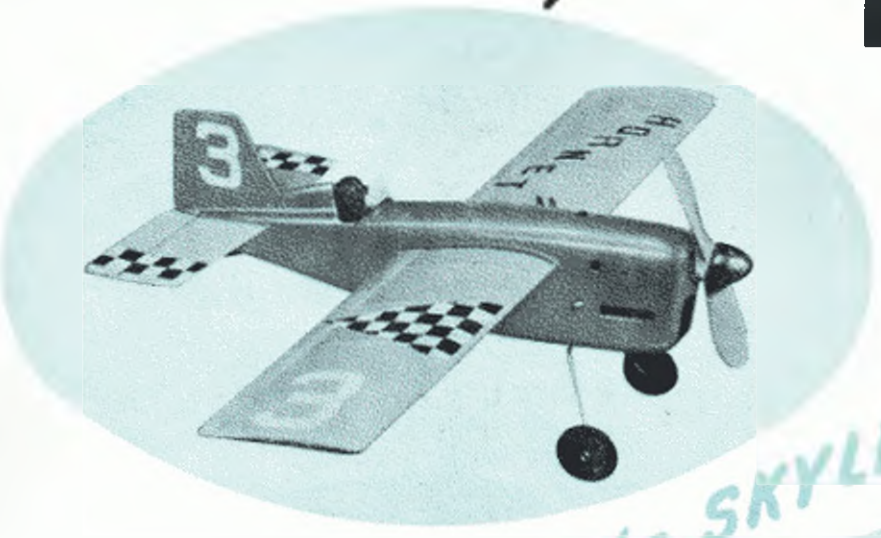

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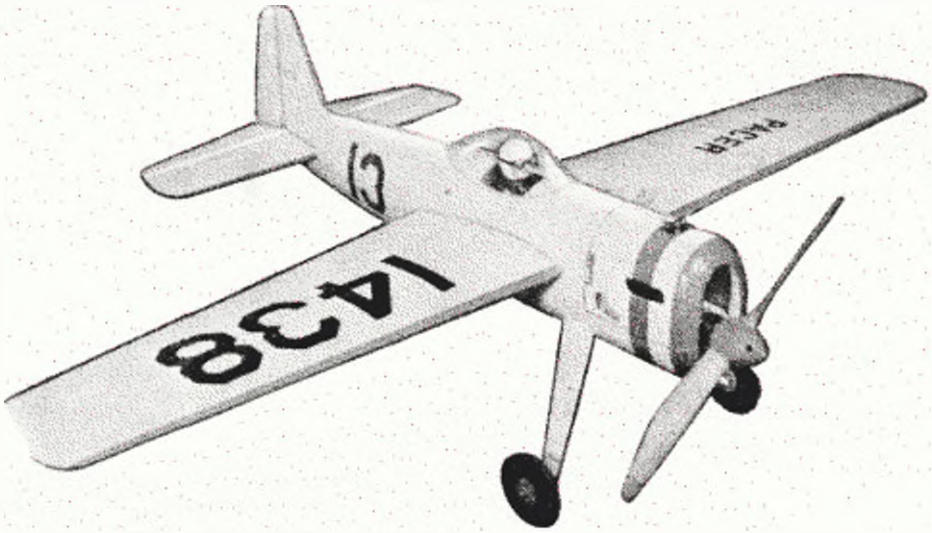

Designed by Bill Dean

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Model builders everywhere have long since acclaimed the Keilkraft Ranger as the top commercial design for Class A Team Racing. Its simple construction, easy handling characteristics, and " real aircraft " appearance became a byword in T R circles, and repeated requests have been reaching us for a Class B racer of the same calibre. The result is the PACER, a rugged, easy-to-build design that is destined to win fresh honours for Keilkraft on the flying field.

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- ETA 29
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- D.C. 350
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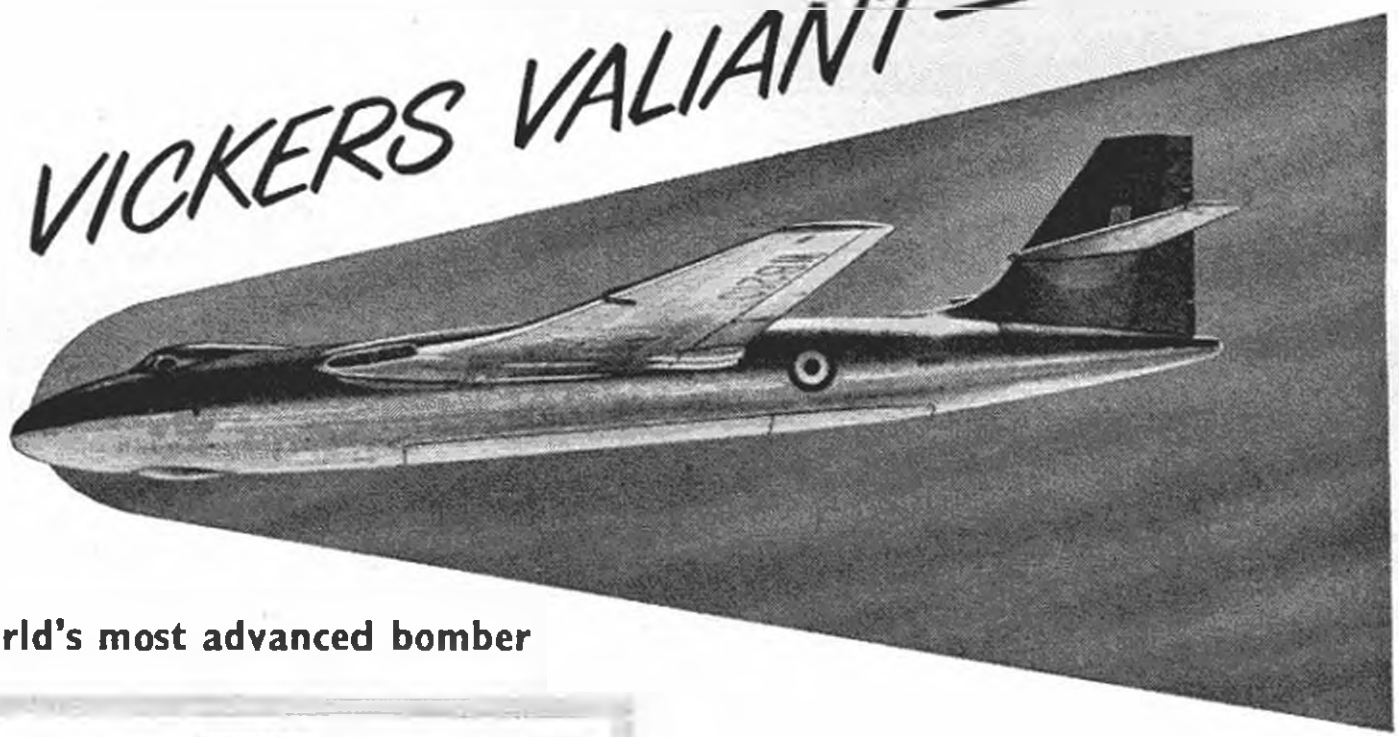

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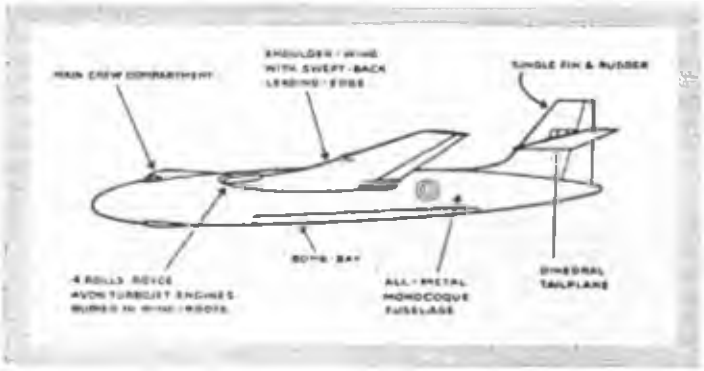

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Total Area : 524 sq. in.
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Simple, sturdy beginner's model with pod-and-boom type fuselage. This model is suitable for hand, catapult or tow-line launching, and was specially designed for keen young modellers. Kit contains all necessary pre-cut and printed Solarbo balsa, tissue, wire, full size plan and easy to follow building and flying instructions.

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For hand, catapult or tow-line launch

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SPECIFICATION—Thrust 1 oz. Motor run 20 sec. Weight 10 drams. Length 2½". Diameter 1". Weight of fuel charge 4½ drams. Price inc. tax **27/5**

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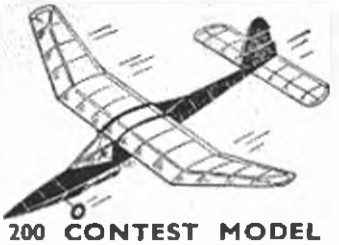

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Vampire 100. *For Jetex 100 ...* 10/7
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PLASTIC MODELS

complete with Jetex 50 motor fuel, wick, etc.

Racecar 18/11

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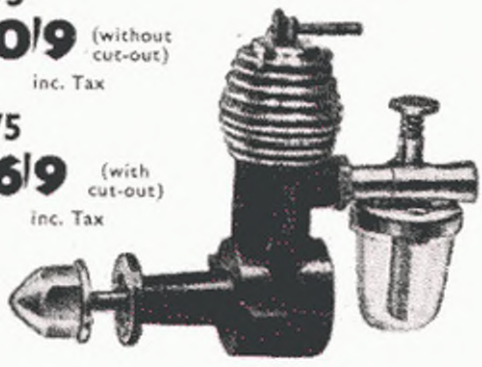

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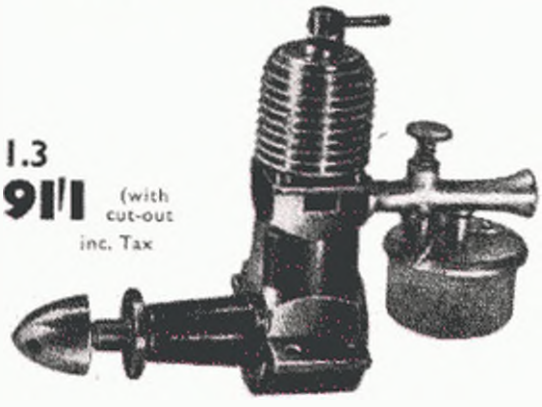

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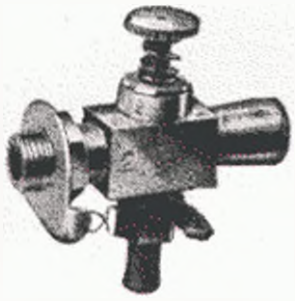

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FEBRUARY 1952 VOL. II No. 2

Contents

EDITORIAL

It would seem from the correspondence we have received on the subject, that the decision made at the Annual General Meeting of the S.M.A.E. to impose a levy of one guinea on all affiliated clubs has aroused a considerable amount of strong feeling.

The criticism is apparently mainly directed against (a) insufficient information being given to the clubs concerning the necessity for the levy, and (b) what was referred to by one correspondent as " the peremptory demand for payment of the levy *forthwith*."

It was indeed unfortunate that the affiliated clubs were not given the full facts concerning the present state of the Society's finances *before* being asked to pay the levy. This information was given to those present at the A.G.M. and they learned that the excess of expenditure over income had been nearly £450, due in the main to a big decrease in the Society's income from affiliation fees, etc. It was obvious to everyone present that if the Society was to be made financially solvent, steps had to be taken to increase its income either by increasing the affiliation fees or by some other means. The clubs represented at the A.G.M. decided by 68 ballot votes to 1 to adopt the " stop-gap " levy proposal and to review the situation again at the next A.G.M. The levy is therefore essentially an emergency measure, and there is no doubt at all in our minds that an increase in the club affiliation fees will eventually be found to be inevitable.

On the question of the manner in which the request for payment of the levy was made, we must say that we agree with those who point out that the levy can only constitutionally be claimed when the affiliation fees become due, and we were under the impression that that was the intention of the movers of the proposition at the A.G.M.

We hope that the side issues which have been introduced into this controversial matter will not be allowed to obscure the main fact, which is that the clubs will have to contribute more to the S.M.A.E. funds in the future if the Society's work is to continue unimpaired. We feel sure that the majority of the responsible affiliated clubs appreciate this, and will give the Council their full support in their efforts to deal with the Society's present unsatisfactory financial position.

Cover Story

Gracing our cover this month we have a photograph of Joy O'Nell (Mrs. Max Coote). She is seen with the McCoy 49-powered Sir John Shelley Cup entry of Northern Heights Club member Ron Mead, at the 1951 British Nationals at Fairwood Common Aerodrome, Swansea.

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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Here and There

THE EDITOR COMMENTS ON CURRENT TOPICS

AN INTERNATIONAL PROBLEM

It seems that this is not the only country where the banning of model flying in parks and open spaces by some local authorities has created a serious problem for model aircraft enthusiasts. The following leader which appeared in a recent issue of the American *Hobby-Model Merchandising News*, in our opinion, contains so much sound sense that we are publishing it in full.

Model Aviation is in Danger!

"That isn't a scare head—it is a fact! In spite of the acknowledged advantage of having our youth trained in the aeronautical sciences, in spite of the fact that a high percentage of our aviation leaders, engineers, designers and flyers began their careers as model airplane builders, there are those whose personal desires come before everything else.

"Today in Charlotte, N.C., model airplanes have been banned from being flown in city parks, because a few nearby residents say they make 'too much noise.' The Charlotte Park Commission has turned a deaf ear to all appeals. Two local newspapers, the *Charlotte News* and the *Charlotte Observer*, the local Junior Chamber of Commerce, alert citizens, all have protested to no avail.

"If this were an isolated situation, it would be serious enough, but the fact is that Charlotte is not the only city in which this has happened. Others have done the same thing or are threatening to do it. In every case it involves just a few people who say that they do not like the noise of model airplanes. They are not in the least interested in why the boys are flying models or what it means to future aviation developments. They are not concerned that every boy who is busy building and flying model planes is too busy to become a delinquent. They don't care that such boys are assets to their community. No, they 'make too much noise.' But these objectors scream just as loudly about the youth of our nation 'going to the dogs.' Model airplane builders are not dope addicts; they are not picked up for stealing cars, but this doesn't seem to count.

"Aside from the obvious points, there is the matter of national defense. In Russia model airplane building is 'required' of boys and girls . . . and not to improve their minds from a cultural standpoint. Russians know that a trained youth is a reserve fighting force. In the last war model airplane builders were actually employed by our Government to help in secret aviation experiments. Their knowledge and natural inclination to experiment has evolved some of the most advanced, practical applications of the aeronautical sciences.

"These are facts and important ones. Important to the point that they far outweigh 'noise' that actually isn't disturbing. Every group of model airplane flyers has agreed to confine its activities to certain hours that do not conflict with anyone's sleep. Jets, in some instances, have been banned by the model pilots themselves. They are eager to make every possible concession. But still the park boards say No!

"Such is the case in Charlotte, N.C. Your assistance is needed. If you have suggestions on how the matter has been handled in your community, write the *Charlotte News* or *Charlotte Observer* and give details. Or write to John Vogler, Charlotte Hobby Centre, 131, W. 4th St., Charlotte, N.C. He is leading the fight and needs your support. Write today and add your protest to those of alert Charlotte citizens. It is a national issue—it has a direct bearing on national defense—it will go far toward curbing one of the most terrible problems of our society, juvenile delinquency. Join in the fight today! Write those letters!"

Substitute, say, Birmingham for Charlotte, N.C., and the foregoing would apply with equal force to the situation existing here.

WAKEFIELD WITHOUT ELLILA

In a letter we received recently from Aarne Ellila, winner of the 1949 and 1950 Wakefield Trophy Contests, he informs us that he will not be competing in this year's event.

Aarne lives in Helsinki, which, as our readers will know, is to be the venue of the 1952 Olympic Games, and work in connection with them will prevent him from making the trip to Sweden this summer.

FACTS AND FIGURES

A total of 5,306 entries in 1951 S.M.A.E. competitions represents an improvement of over fifty per cent. on 1950 figures—a clear answer, we imagine, to the question of whether or not competition flying is losing its popularity. Last year's entry figures are all the more remarkable since the weather, on the whole, was poor and the summer one of the dullest and wettest for many years.

Gliders were far and away the most popular competition type, with a total of nearly two thousand entries, or nearly thirty seven per cent. of all entries. Full figures were :—

Glider comp. entries	...	1,972 (average 330 per comp.)
Power ,, ,,	...	1,232 (average 230 per comp.)
Rubber ,, ,,	...	1,252 (average 172 per comp.)
C/L Speed comp. entries...		average 40 per comp.*
C/L Team Racing ,,	...	average 26 per comp.
C/L Stunt ,, ,,	...	average 23 per comp.
Radio Control ,,	...	average 18 per comp.

* This includes entries in all speed classes.

It is interesting to draw a comparison between British figures and typical American entries in similar classes. The American annual competition programme is so much more scattered than our own that the only American figures which are likely to give a fair basis for comparison are those of the Nationals. These possibly flatter the power duration class unduly since there are a multiplicity of classes in this category and one flier may, and generally does, enter several different classes (often with the same model, simply interchanging the engine !).

The respective popularity of the free flight classes can then be summed up as follows :—

Glider—first in Britain (42.5 per cent. rating) ; second in U.S.A. (19.2 per cent. rating).

Rubber—third in Britain (22.3 per cent. rating) ; fourth in U.S.A. (12.2 per cent. rating).

Power—second in Britain (29.8 per cent. rating) ; first in U.S.A. (53 per cent. rating).

Paa-Load—fourth in Britain (3.1 per cent. rating) ; third in U.S.A. (13.9 per cent. rating).

Radio control—fifth in Britain (2.3 per cent. rating) ; fifth in U.S.A. (1.7 per cent. rating).

If figures mean anything, gliders are twice as popular as rubber models in this country. In the United States, power models are nearly three times as popular as any other type, with gliders a surprising second. Paa-Load, it will be noticed, also rates high in America.

As a further point of interest, on a basis of the number of entries per competition, and grouping *all* C/L categories and classes, C/L accounts for an average of 21.3 per cent. of all entries in America. In this country the corresponding figure is just less than one half of this—10.3 per cent. of the total.

THOSE WERE THE DAYS ! Fifteen years ago the competition movement really got on its feet, with a record entry for the 1936 Wakefield trials and a team of six journeying to America for the first time. It is common knowledge that A. A. Judge won the trophy that year, but it is also regrettable that so many of the leading names of that era no longer appear in the news. We often wonder what has happened to some of those stalwarts, especially since aeromodelling admits of no retiring age.

1936 was Bob Copland's first contest season, and he, of course, is still flying Wakefields. But C. B. Allman, C. Gibson, W. and J. Worden, R. T. Howse, R. N. Bullock, S. R. Crow, W. L. Henerey and many other fine fliers are relatively unheard of these days, more's the pity.

Three years before the war, rubber duration held the field. Glider competitions were few and infrequent and power contests even rarer. The present day modeller is perhaps spoilt by having so many diverse types and classes of models from which to choose. That, as we see it, is one of the basic faults of model flying as a sport today. It is not a single integrated sport like football or cricket, but one composed of divergent classes and interests. Strictly speaking, C/L and free-flight are poles apart. As a result, with so many different classes to cater for it is virtually impossible to give adequate attention to each and unfortunately there does not appear to be any simple solution.

PEOPLE IN GLASS HOUSES . . . In our Club News pages in this issue we have published a report of the S.M.A.E. South Eastern Area Committee's A.G.M. Whilst reading this we noted with some surprise that the secretary, Mr. H. Rewell, is quoted as saying that "He thought that the Council's lack of foresight was largely responsible for the present financial position of the Society, and that the Area would benefit from economies made at top level."

If Mr. Rewell has been reported correctly by the Area P.R.O., we can only assume that he must have an amazingly short memory. Perhaps we shall be excused for mentioning that last year the Society were compelled to meet debts amounting to no less than £160 which had been incurred by the S.E. Area in connection with their S.E. C/L Championships. This sum we would add represents almost half of the Society's total excess expenditure in 1951.

Bearing in mind the fact that the S.E. Area Committee were responsible in no small measure for the Society's present poor financial position, Mr. Rewell's remarks are, in our opinion, to say the very least, in extremely bad taste.

THANKS PAL ! Whilst there have been one or two experimental radio control units produced in this country operating on the high frequency band, no commercial sets of this type have yet appeared. In America the position is different, with the MacNabb unit or " Citizen " set rapidly gaining in popularity. Operating details are reduced to a minimum and the user is, in fact, prohibited from further " adjusting " either receiver or transmitter. Each is tuned to a fixed frequency and stays tuned, unless a component fails.

This means, of course, that any " Citizen " transmitter will operate any " Citizen " receiver, without re-adjustment. H. A. Thomas, well-known American modeller-draughtsman has come to bless this fact. He lost control of his radio model after putting it into a spin from a considerable height. A friend quickly switched on *his* " Citizen " transmitter and regained control, bringing the model down safely. A faulty switch was the cause of the original trouble.

There will be an American entry in most of the S.M.A.E. glider contests for 1952, only this time the modeller will not be represented personally. Dick Everett, prominent Californian flier (and runner-up at the 1951 American Nationals), has sent over his Nordic to be proxy flown in various events in this country.

J. A. Gorham's CONTENDER

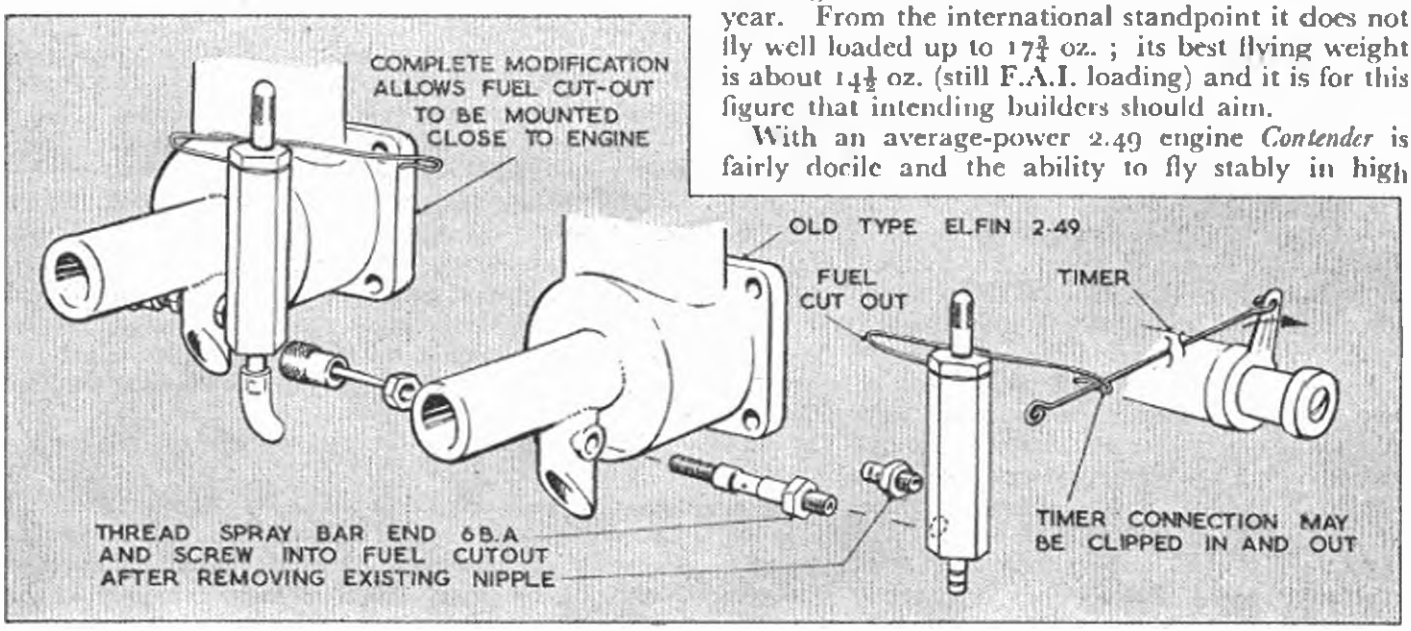
CONTEST SUCCESSES

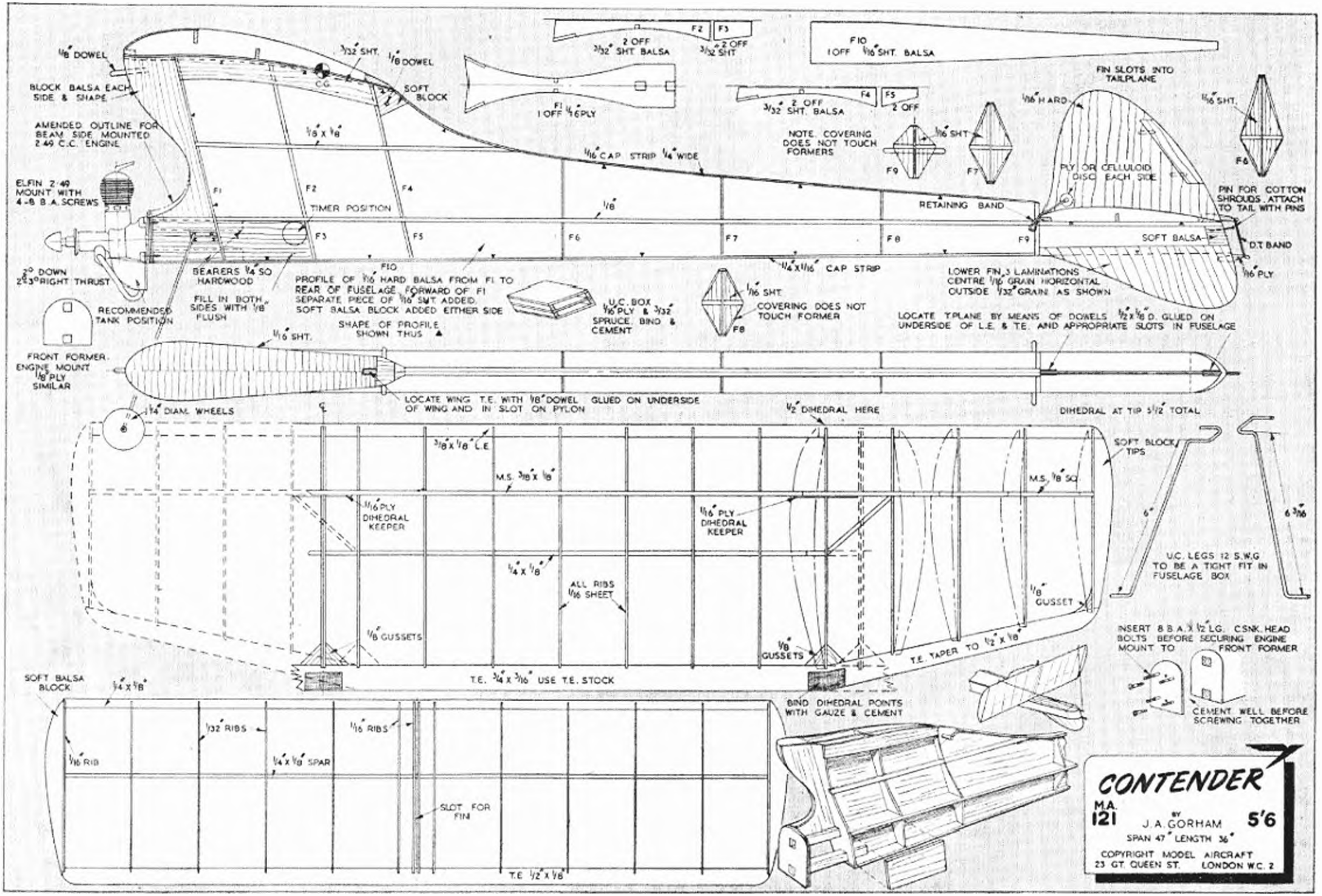
1st Sir John Shelley Cup, 1950.
1st International Power Contest, 1950.
4th " " " "
1st All-Herts Rally, 1950.
2nd East Anglian Rally, 1950
1st Ipswich Power Cup, 1949 and 1950.
2nd Keil Trophy, 1950.
4th Astral Trophy, 1950.
2nd Halfax Trophy, 1951.
3rd " " "

The above list does not include the many top placings obtained by members of the Ipswich Club with "Contenders" at various gala days and rallies.

CONTENDER was first flown in the 1949 season with very moderate success, but it was decided to continue with the layout for 1950 as it obviously had possibilities. Unlike some of the writer's other designs, *Contender* did not begin on the drawing board—it just "growed," and was influenced to some degree by contemporary designs at the time—notably Marcus's *Firecracker*. Altogether the writer has built ten or twelve *Contenders* and the number built by the Ipswich club amounts to well over twenty. Up to the time of writing, however, the design has not been allowed to go further. Although conceived nearly two years ago, it is still quite capable of winning a national contest and in fact did so last year. From the international standpoint it does not fly well loaded up to 17¾ oz.; its best flying weight is about 14½ oz. (still F.A.I. loading) and it is for this figure that intending builders should aim.

With an average-power 2.49 engine *Contender* is fairly docile and the ability to fly stably in high





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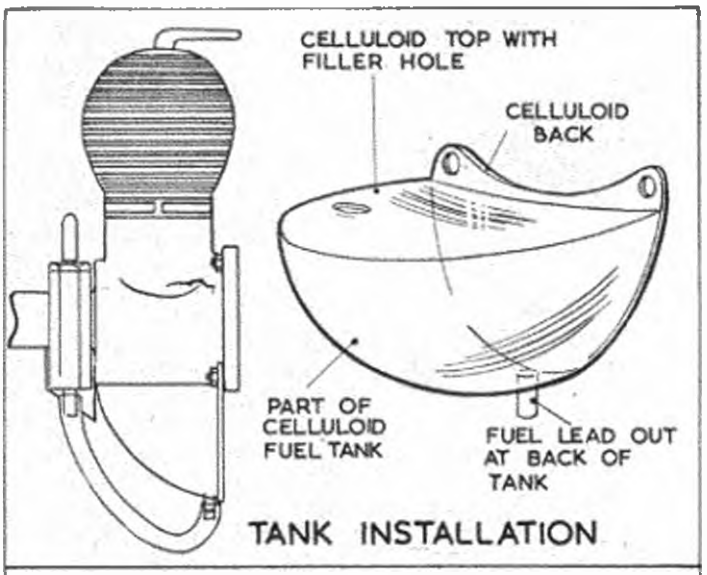
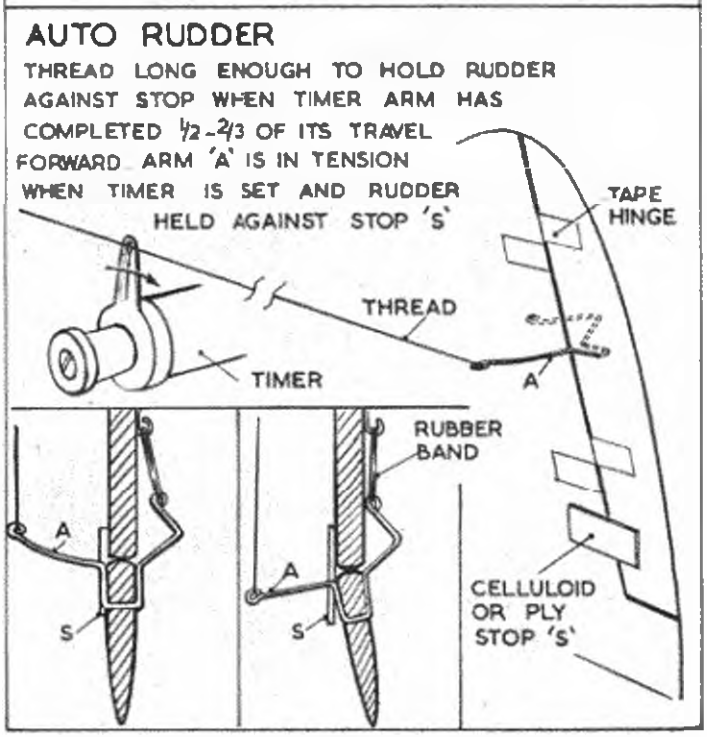
winds is its outstanding feature. In fact as a rough weather contest machine it is hard to beat. However, with a high-powered 2.49 motor it does become a little tricky, and some of the ten machines mentioned have been accounted for by spinning in. Details of an experimental auto-rudder which has been tried out with this design are given. Although producing a slightly higher performance the device was removed as it appeared likely to affect reliability, which is regarded by the writer to be all-important for successful contest flying. C.g position will vary with power, for if power is increased, then to maintain a straight trim the c.g. will have to be moved aft. It is suggested that the model be tried with straight trim and short engine runs *over long grass*, moving the c.g. aft (with consequent positive adjustments to tailplane to maintain glide trim) until the model just does not loop. It is important not to have the c.g. further back than this point, and also to note carefully whether indications of insufficient fin area show up if extreme power is used. If this occurs (weaving climb) add a few sq. in. of fin area.

Building is fairly straightforward, the fuselage being of the usual X construction with the added refinement of capping strips—these were added after noticing that X-type fuselages only broke through the backbone buckling. These capping strips considerably strengthen the backbone where strength so needed—on the edges. If a bearer-type engine is used, make sure the bearers are at the correct spacing, as those on the plan are designed purely to add strength to the ply former on which the engine is bolted. A KK 10 × 8 plastic prop. is used by the writer, with the tips chopped off to bring it to about 9½ in. diameter. The best place for the cutout is as near the throttle as possible, preferably mounted directly onto it. The best tank position is below carburettor level and as far forward as possible.

Wing and tail construction is normal and should present no difficulty to the average builder. Cover wings and tail with lightweight Modelspan ; give two coats of full-strength dope and one of fuel proofer.



TANK INSTALLATION



At this point the writer would stress again that *Contender* is intended to climb straight or only slightly right or left. In a high wind this results in the model continuing to plough its way up while others are looping and spinning. Readers might also note that with the undercarriage box idea the possibility of using various types of undercarriage is opened up.

Interest in power duration contest flying has grown considerably during the past season, and no doubt there will be very keen competition amongst power fans for the top placings in the 1952 events. However, successful power contest designs very seldom fly "straight off the drawing board," but only win after many months of development and contest flying experience. *Contender* is a result of this kind of development work, and has been thoroughly tested under all conditions. Power contest enthusiasts who want to avoid having to start a design from scratch will find that if well constructed and carefully trimmed, *Contender* will prove to be a potential winner in any contest.

1951 ITALIAN NATIONALS

Reported by
CARLO TIONE

THE Italian Nationals were held at Bresso Field, near Milan, on October 25th-28th, 1951. The weather on the first day for the beginners' glider and A/2 contests was very unfavourable, and due to the high wind the jury decided to limit the tow-line length to 50 metres in order to avoid o.o.s. flights if possible. In spite of this several flights of over 3 minutes' duration were made. The winner of the A/2 event was C. Pisani, of Pisa, with an aggregate for two flights of 391 secs., and in the beginners' event G. F. Vincenzi, of Bologna, with an aggregate of 148 secs.

On the second day for the "Wakefield" event the weather conditions were ideal and many flights of over 5 mins. were made. The winner was A. Leardi, of Milan, with a three-flight aggregate of 843 secs.

The weather held good for the third day for the power event which was won by C. Bragaglia, of Genoa. Aggregate of three flights 663 secs.

The C/L stunt event was held on the final day and was won by P. Gnesi (Pisa) with 305 points. Ing. Petoni, of Pisa, also made some demonstration flights with his rubber driven helicopter. The average duration of these was over 2 mins.

British modellers may be interested to know that the Giornate Aeromodellistiche Ambrosiane (International C/L speed and stunt contest) will be held in Milan in June, 1952, and the F.N.A. Cup will be held in Rome on September 14th.

Top right.—An unusual design of power duration model is sent on its way.

Centre.—P. Gnesi of Pisa, who won the stunt C/L event, seen with his radio-controlled model

Right.—The helper breaks into a trot as he launches Cucumazzo's A/2 glider.

Below.—G. Cellini and the model with which he placed third in the C/L stunt contest.

I'm going to fly in . . .

Part two of a preview of the 1952 contest season

IN the glider field we have a much more open picture. In 1950 we would have had no hesitation in naming the top six glider men—they selected themselves. But not one of these have had any outstanding success during 1951, even although the majority were flying very similar models. The luck element does appear to play a very important role in glider contests. The flight time is often a reflection on whether the air is rising, sinking or substantially staying level when the model is launched. Hence, over a season's results we find individual performances usually consist of a mixture of good and bad flights rather than consistent flight times. A model which does five minutes on one flight turns in less than two minutes on the next, with identical trim—and there is very little you can do about it.

Main glider interest, of course, has been around the A/2 specification. Many modellers now claim that the A/2 is as good a contest proposition as any other type. We still feel, however, that size gives the edge to the really large models, provided they are properly trimmed, in open or F.A.I. contests. The main trouble is that these huge models take so long to build, consume a lot of materials and are so difficult to cart around. Just having a large glider, too, does not automatically guarantee contest success. To have any "edge" over its smaller counterpart it will have to be trimmed at least equally as well.

Since the A/2 glider will cover all types of contests and is basically a good duration model, many fliers are content to concentrate on this specification. This is, probably, the best plan for the contest modeller. If he takes competitions seriously he will want to fly in the A/2 contests and by specialising on the A/2 model he will be concentrating his efforts and should improve his overall performance.

At first sight, however, there does not appear to be much scope for further development of the A/2 layout. Many and varied are the *Nordics* flying, apparently with equal success. Trends might be summarised as short nose - short tail moment; short nose - long tail moment; moderate to long nose, moderate tail moment. These combinations with medium to high aspect ratios; polyhedral wings in preference to straight dihedral, with the modern tendency to use tip dihedral only; and a whole variety of aerofoil sections.

Overall streamlining does not seem to be all that important in that the "box" type of fuselage appears to have no more drag than a fully streamlined shape of circular or elliptic section. Quite a number of good "streamlined" models have nullified any possible drag-saving by coming out overweight.

Even the Swedish Cup contest itself in Yugoslavia did not emphasise any outstanding trends—except for the winner. Had it not been for the fact that a "stick" model of most unorthodox layout won this would have been very much like any other glider event—the model which found the most favourable air winning. Czepa's model was so much different, however, that every glider designer will study it with interest.

The universal reaction amongst the experts to Czepa's design is that it is quite impracticable for British weather. This, perhaps, is very true, but there are undoubtedly a number of very interesting features incorporated in the "Toothpick" which have undoubtedly contributed towards its very fine performance. The two most important features, we would say, are the tiny tailplane area permitting more area to be concentrated in the wing, and the very thin aerofoil section.

We took up this with Ron Warring who had the opportunity of observing this model first-hand and he produced what was, in effect, a "freak" model incorporating what he considered the "desirable" features of Czepa's design amended to suit British conditions. The same wing section is retained and an almost similar (but not quite so large) wing area. To make this very thin wing strong enough to stand up to British winds it is strut-braced to the fuselage, using V-struts so that the torsional strength of the assembly is also increased. The tiny tailplane necessitated a moment arm of nearly thirty inches,

and so a stick fuselage was used to cut down weight and wetted area (similar to Czepa's principle again). This stick was made of balsa, however, and quite light. The projecting stick nose was almost entirely eliminated, balance being obtained with some seven ounces of lead in the extreme nose just in front of the " pod." This pod gives the required cross-sectional areas, a parasol mounting to the wing and sufficient depth for the strut attachment. Altogether a most interesting example of how Czepa's principles might be adapted.

Ron himself confessed that he has no great interest in glider contests but was definitely intrigued by Czepa's model. It was built to answer some of the " Whys " introduced by the 1951 Swedish Cup.

Unfortunately, we did not have an opportunity to get around to a representative selection of top line glider fliers for their various opinions on the possible influence of Czepa's design. Roy Yeabsley expressed interest, but not to the point of introducing any startling changes in his design. His 1952 model will still be based on the *Revenge*, although changes to be noticed are the longer fuselage and a somewhat higher aspect ratio wing. This formula, including the completely underslung fin, has given good results for Roy over the past two years and can, he thinks, be still further developed.

Most glider successes during the 1951 season have been registered by Midland and Northern modellers and whether there is any lesson to be learnt here or not, we do not know. The majority of these models employ simple box fuselages, usually sheet covered, with parallel chord wings. The general tendency is towards using thinner wing sections where again the possible advantages of strut-braced wings might well be investigated. Ray Monks used a strut-braced wing on his '51 *Nordic*, which was so nearly successful in Yugoslavia and this model would appear to be as good an example as any of a " typical " British design. Ipswich glider flier P. S. Jacobs is one of the few of the top men to depart more from the orthodox, using an aerofoil section fuselage and a moderately dihedralled, high-set tailplane.

One of the big disappointments of the '51 season was the lack of success of Pete Gilbert of the Pharos club. Seen earlier in the season his model impressed as one of considerable possibilities. Using a very high aspect ratio wing and a " banana " shaped fuselage, it placed high in the first of the A/2 Trials but failed to live up to its early promise. Nevertheless, it is a type of model other designers might well study with the 1952 season in view.

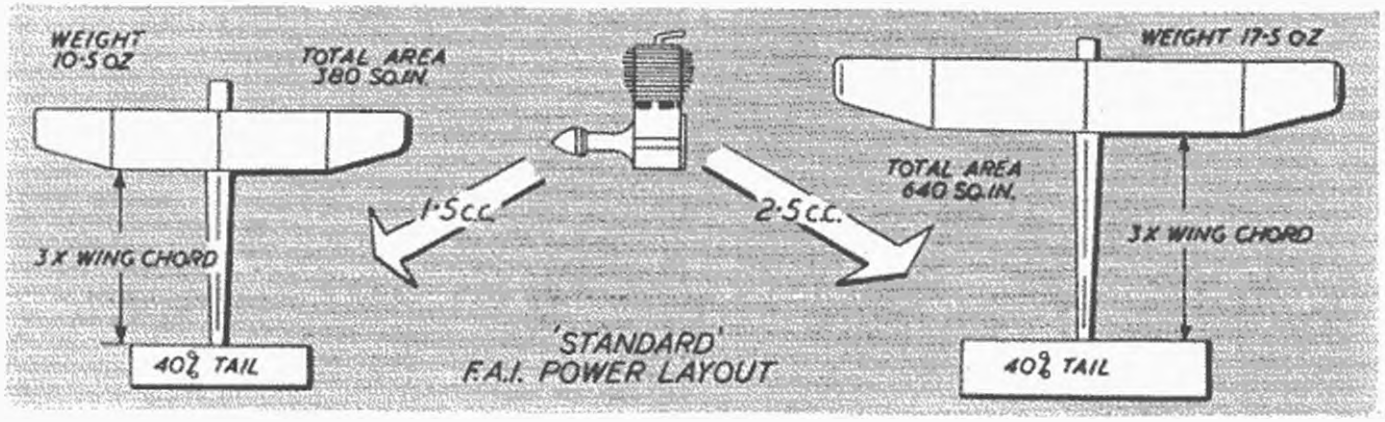
The semi-scale glider as such is definitely in the minority. One of the few designers to persist with this type of model is R. F. L. Gosling who, with more experience than any of his contemporaries, usually manages some very good performances during the year, but levelled out by a tendency to be inconsistent. Most designers rate appearance as a secondary consideration, judging by a picture of the '51 season, with a marked tendency towards simplicity. Simplicity of construction and simplicity of outline has produced almost a uniformity of pattern. In spite of the fact that there are so many different design layouts, all have seemed " much of a muchness," unmistakable *Nordic*.

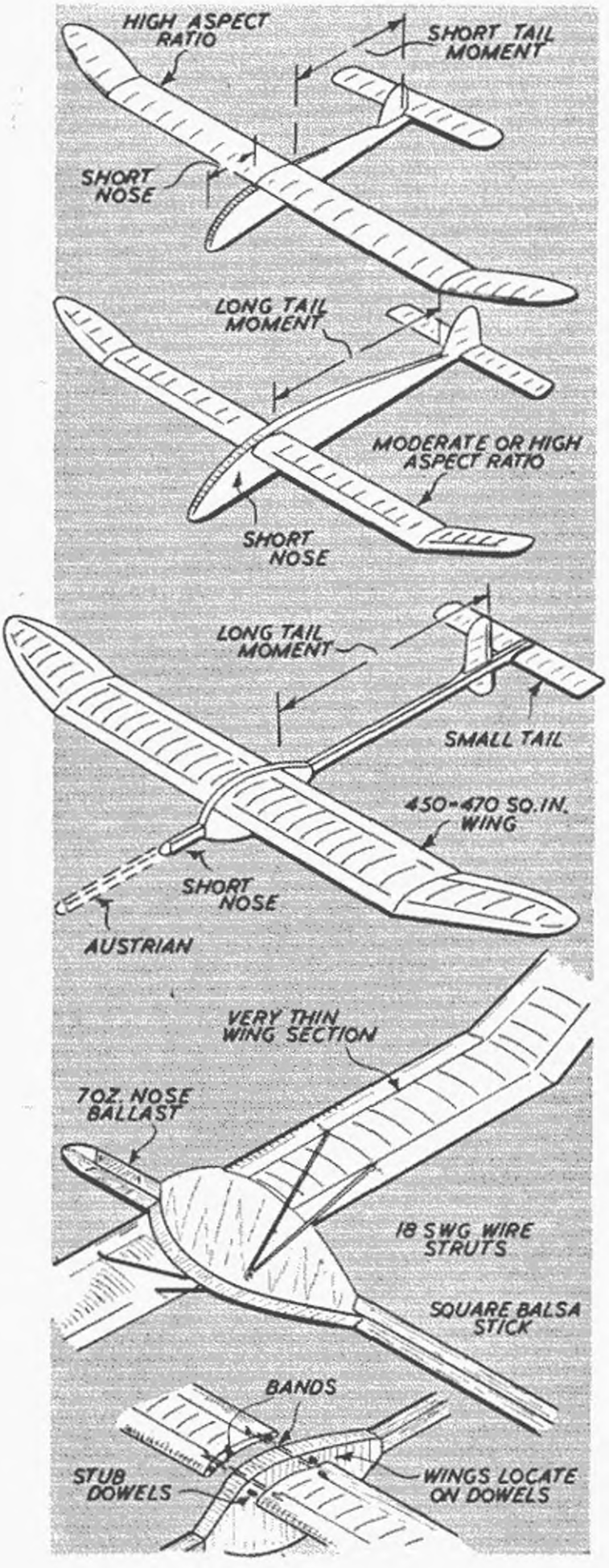
We said earlier on that nothing could be done about " sinking air " spoiling flight times. This is not quite true. The model with the lowest sinking speed will, or should, still have the best flight time under adverse conditions. With the " standard " A/2 model based around a wing area of about 390-400 sq. in. and the remainder tailplane area, the same remarks as for Wakefields apply. Improvements in aerodynamic outline will probably have little effect. An immediate increase in wing area to 450 sq. in., however, for the same total weight, *should* show a difference. Czepa's figure of a 465 sq. in. wing would appear to be the upper limit if the model is still to remain stable longitudinally. New wing sections may then decrease drag without affecting lift for still further benefits.

Power Duration

To comment on power duration trends puts us into something of a quandary. With every good intention we asked Norman Marcus what type of power models he would be building for 1952 and he told us, " Balsa and tissue ones." Nor could many of the other power fliers give us a definite lead on possible trends. Possibly, power model design has stagnated. The pylon model has virtually ruled the contest field since the war and every new pylon model now looks very much like the last. Original design or not, it is impossible greatly to alter such a " standard " layout.

The streamlined pylon type of model, where the top of the pylon was faired off into the lines of the





fuselage, has virtually disappeared from the contest field. The modern version is often a cross between this and the pure pylon type, but with a moderate pylon height only. These, and the pure pylon types, still form the majority of the serious competition entries.

The bulkier streamlined pylon model has mainly disappeared on account of the total weight question. Minimum loading called for under F.A.I. rules is quite low and it is obviously an advantage to use as low a wing loading as possible. This is particularly true of the models employing the smaller sizes of motor. In spite of their potential aerodynamic superiority, large power models have never become popular for contest work. Ray Monks, again, is one who definitely prefers the larger sizes. Norman Marcus is another expert who has tried boosting wing area, although with smaller motors. At a time when larger motors were beginning to appear in any quantity, however, an F.A.I. ruling limiting motor size to a maximum of 2.5 c.c. for International power contests came into being. The serious competition modeller could not really afford to dabble in both classes, and so naturally plumped for the smaller size.

It seemed logical, until the end of the 1951 season, that potentially the best power duration contest model was one designed to match the best 2.5 c.c. motor available. Overall sizes were so readily determined that the process of design more or less resolved itself into a number of simple arithmetical calculations. F.A.I. rules give a minimum total weight for the motor size. Working to this weight, the required total area for minimum F.A.I. loading is readily calculated. Proportioning this to give a 40 per cent. tail gives the main data of the model.

In the power contest field we would say that the Croydon and Ipswich clubs led in 1951, with supreme honours going to Ipswich on account of their greater number of individual wins. The class of model the Ipswich club fly is essentially the Gorham type, developed from his successful 1950 models, and taking this up with the designer we were rather surprised to find that he backed the 1.5 c.c. F.A.I. design to beat the 2.5 c.c. model. Of the two he considered the smaller model to have the superior all-round performance. The majority of the other top men in power, we would say, have concentrated more on the 2.5 c.c. model. Take your choice. The question seems very open.

What of modern power model performance? Like gliders it is less consistent—good flights and poor ones. Top still air performance would appear to be a flight ratio in the neighbourhood of 15 : 1, which should mean a five-minute flight every time off a 20-second motor run, without thermals. Under unfavourable conditions, however, these five-minute flights get pulled down to around the two minute mark.

The "still air standard" to be established with any new design would therefore appear to be a 15 : 1 flight ratio. Anything less than that and you are not likely to place *consistently* in the top of the

competition results. The optimum size of model will resolve itself naturally from the F.A.I. specification, consistent with sensible structural strength : weight ratios.

If this gives the impression that power model design has completely stagnated, then that is not so. Design as affecting *performance* probably has, to a great extent, tapered off at a common level. Most of these models are still very " touchy " to handle, however. Erroneously, many people claim that power models are more difficult to trim than other types on account of this. What they really mean is that it is trickier to trim a model with a tendency towards violent instability rather than a stable type. The high-powered duration model has a tendency towards instability and it is in this field that considerable developments could be made. The power model would seem asking for improvements as regards *stability* in making it less sensitive, without detracting from the high performance it has now achieved. It would then also be more consistent and less dependent on whether or not the motor is running absolutely at peak.

To conclude, we conducted a poll amongst our " experts " as to the top men in the respective competition fields. In other words, we asked the men who fly in competitions who they thought provided the strongest and most consistent opposition. The various lists we collected were surprising, in several ways. Everyone had a ready answer for the top six in Wakefield and the same names were listed time and time again. Only eight names in all were ventured out of some twenty lists. In the power and glider fields, however, many of the fliers were hard put to suggest more than three or four names in each and only one or two of the names cropped up in each list. The placings obtained as a result of this poll are somewhat different to what would have been arrived at if the figures had been based on an analysis of the 1951 contest results. Final results were, together with percentage voting :

Wakefield		*Glider*		*Power*	
Warring	(100)	R. Yeabsley	(90)	Wyatt	(100)
Gorham	(87.5)	Hanson	(90)	Gorham	(90)
Knight	(72.5)	Monks	(90)	Marcus	(85)
Evans	(70)	Geesing	(50)	Jacobs	(65)
Copland	(70)	Jacobs	(40)	Buskell	(45)
E. Smith	(60)	Wheeler	(30)	Ward	(40)

The figures in brackets represent the percentage of possible votes polled for each individual. E.g., 100 per cent. means that every voter included that name on his list.

Remember, this poll was conducted on a very restricted scale. It would be interesting to see if the bulk of our readership agrees or disagrees with it. Send in your own lists, marking your envelope MODEL AIRCRAFT CONTEST POLL, and we will summarise the results in a future issue. It will be interesting then, later on, to look back over the 1952 contest season and see how many of these names justified their inclusion !

GORHAM—less active in power this year, Gorham designs have done better in the hands of other fliers, but that did not stop him winning the " under 1.5 c.c. " event. He favours this size of model for power contests.

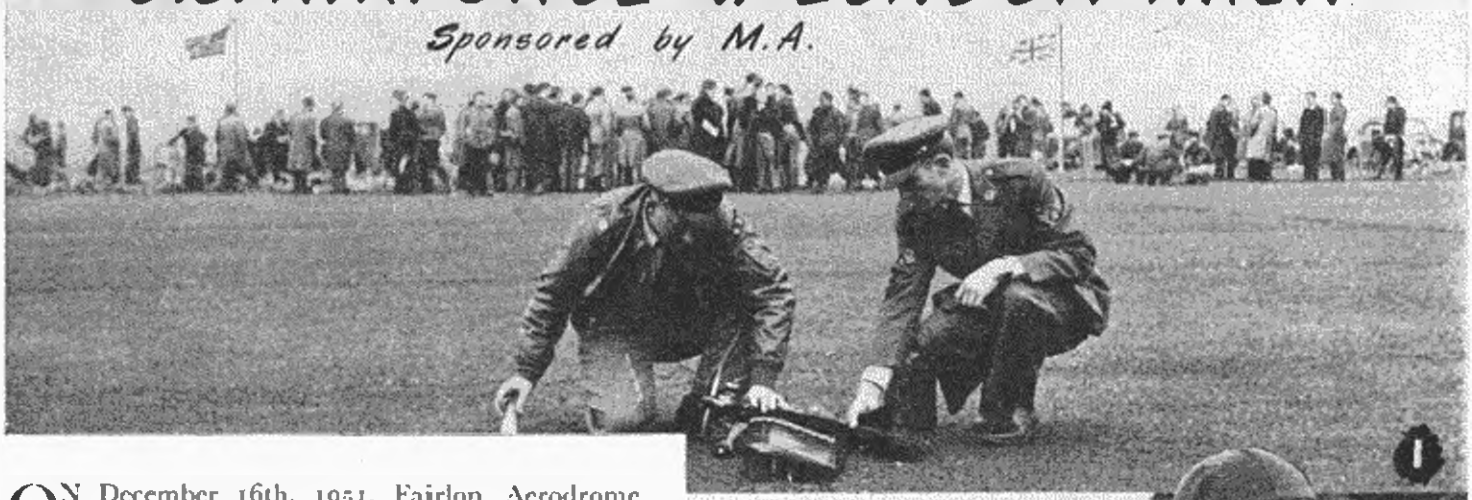
MARCUS—has largely concentrated on power duration during the past two years, gaining many successes. His pylon-type model has been well developed and is a consistent performer.

YEABSLEY—in spite of his lack of success in the 1951 season Roy (on left of photo. with twin brother Des.) is still undoubtedly at the top of the glider list. Has adopted the underslung fin exclusively for his Nordic layout.

MONKS—rubber, glider and power flier. His '51 Nordic was certainly one of the best British designs. Well experienced in contest flying, he favours large models for power duration.

U.S. AIRFORCE v. LONDON AREA

Sponsored by M.A.



ON December 16th, 1951, Fairlop Aerodrome was the scene of a challenge match between teams representing the U.S. Air Force (Germany) and the S.M.A.E. London Area, which resulted in a win for the "home" team by 103 pts. to 33 pts.

Although the challenge was accepted with enthusiasm by the London Area Clubs, the organising committee which they appointed were faced with the difficult problem of financing the meeting—the Area funds being at present in a none too healthy state. MODEL AIRCRAFT came to their rescue by offering to meet any expenses incurred.

The American party numbering over 40 flew from Germany to Bovington in two Dakota aircraft and were conveyed from there by coach to their hotels in London. On the Saturday evening prior to the contest a "get together" dinner was held at the Horse Shoe Hotel, London, and the following morning the American team were taken by coach to Fairlop. The events were keenly contested in fine weather and it is hoped to organise a return match early in the New Year.

Results

FREE FLIGHT POWER			Ratio	Points
N. Marcus	...	Croydon	41.0	10
M. Glynn	...	St. Albans	29.4	7
J. Prahl	...	U.S.A.F. ...	24.6	5
C. Mayes	...	West Essex	22.8	2

STUNT CONTROL LINE			Score	Points
Capt Hauser	...	U.S.A.F. ...	318½	10
K. Muscutt	...	West Essex	296¼	7
C. Taylor	...	West Essex	292½	5
C. Reininger	...	U.S.A.F.	275	2

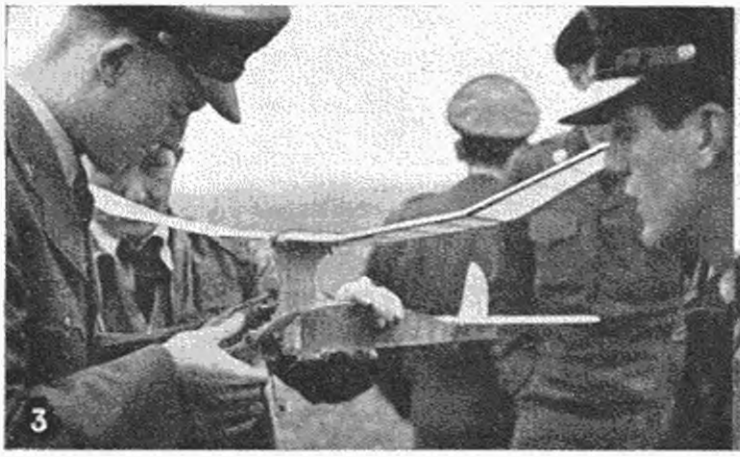
SPEED CONTROL LINE				
Class I			Speed	Points
P. Wright	...	St. Albans	89.56	10
Class II				
P. Wright	...	St. Albans	120.0	10

Speed Control Line—contd. (*Class II*)			Speed	Points
K. Muscutt	...	West Essex	90	7
Class III			Speed	Points
Capt. Glasgow	...	U.S.A.F. ...	134.3	10
R. Gibbs	...	East London	126.8	7
P. Davenport	...		117.7	5

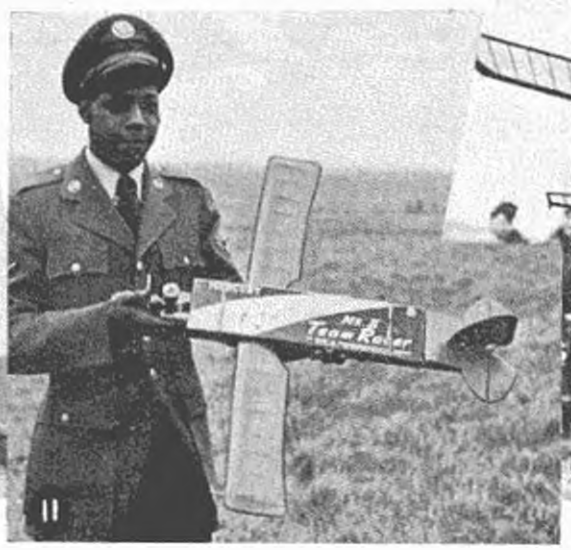
RADIO CONTROL			Score	Points
S. Allen	...	West Essex	220	10
D. Baldwin	...	U.S.A.F. ...	185	6
S. Sutherland	...	West Essex	185	6

TEAM RACE				
K. Marsh	...	West Essex	—	10
R. Morley	...		—	

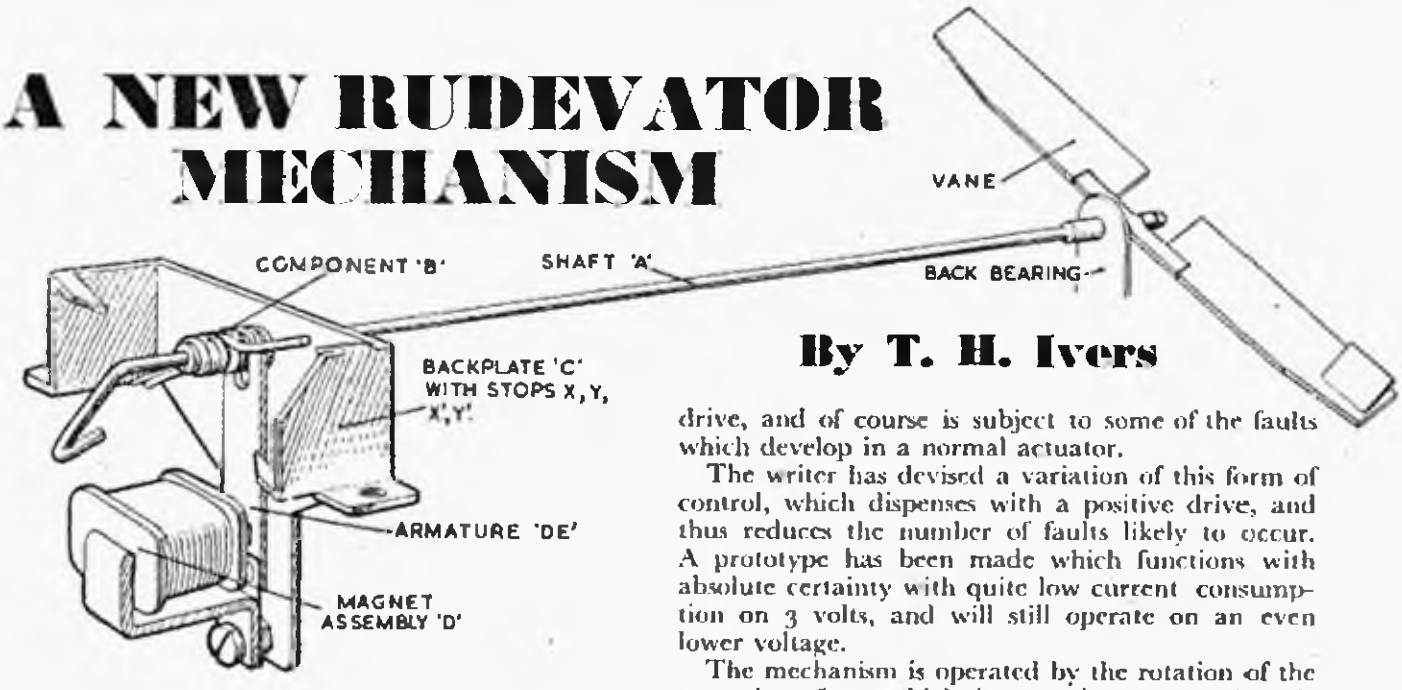
TOTAL POINTS	
London Area ...	103
United States Air Force—Germany	33



1. The American and British flags fly over the scene at Fairlop as two American fliers prepare their model.
2. S/Sgt. W. J. Prahl of Neubiburg, who placed third in the Power Duration contest, tends his model.
3. Cpl. Jones keeps a steadying hand on the fuselage as Capt. H. E. Walker starts his ½A-powered duration entry.
4. Capt. M. Glasgow, Henry J. Nicholls and Capt. J. A. Hauser watching the flying. Note Capt. Glasgow's fur cap.
5. Eddie Keil entered his " Falcon " in the radio-control event.
6. Also competing in the radio-control contest was Capt. Leland with this neat semi-scale cabin job.
7. S/Sgt. Stallings coaxes peak revs out of Capt. H. E. Walker's model before sending it off in the Class III speed contest.
8. Capt. Walker, of Firsten Felbruck, gets down to a spot of priming.
9. Pete Wright of St. Albans, who won both Class I and Class II speed events, bends over his diminutive model.
10. With " Old Glory " flying overhead Capt. Glasgow, who won the Class III speed contest, poses with stunt model and cigar.
11. PFC Al. West with the American team's joke model—a Mercury Team Racer kit box fitted with wings from the " trash can." It actually flew.
12. A tense expression on the face of 1st./Lt. O. W. Tromberg of Rhein Main, as he launches his power entry.



A NEW RUDEVATOR MECHANISM



By T. H. Ivers

EXPERIENCE has shown that a large proportion of the troubles encountered in control of models by radio is due to actuator trouble. It is not necessarily due to faults in the actuator itself, but is more often caused by the use of unsuitable motive power for the drive, or by a faulty battery failing to move the armature against the pressure of the rotor arm.

A 4½ volt battery is usually used in this most important position, although quite a number of people use 3 volts, and the writer has heard of 1½ volts being used. With the lower voltages the actuator must be accurately made and adjusted if trouble free operation is to result. Miniature electric motors are used by some, and have a low current consumption, but motors have their faults. For simplicity, light weight, and ease of adjustment, the 2-arm self-neutralising actuator has much to recommend it.

It has two minor drawbacks however, which can give trouble if not attended to. The first is the possibility of the pressure of the rubber motor preventing the release of the rotor on receipt of the signal. The second is the possible failure of the rubber motor, or the failure of the operator to wind it when necessary. However, there is a type of control, not very much used in this country, which has many advantages without attendant snags, and that is the Rudevator. In the form in which it is used on the American continent, it has a rubber drive, and of course is subject to some of the faults which develop in a normal actuator.

The writer has devised a variation of this form of control, which dispenses with a positive drive, and thus reduces the number of faults likely to occur. A prototype has been made which functions with absolute certainty with quite low current consumption on 3 volts, and will still operate on an even lower voltage.

The mechanism is operated by the rotation of the control surface, which is caused to rotate by air pressure due to the forward speed of the aircraft. There is no presssure on the magnet armature when in the off position, and it is free to move on receipt of a signal. The return spring which restores the arm to the off position need not be strong as the catch which holds the vane in position is subject to very little pressure transmitted from the vane itself.

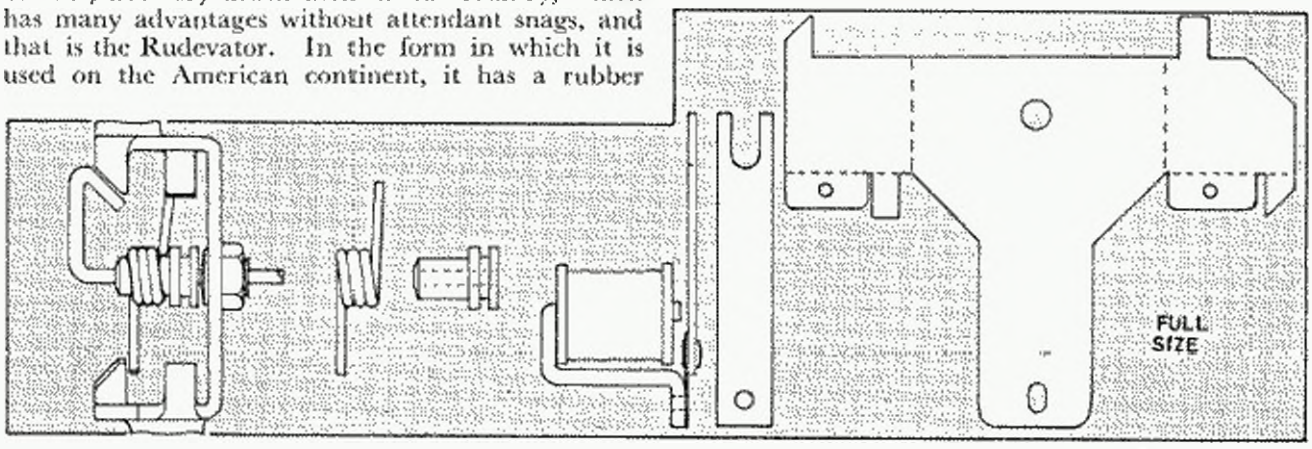
It will be noticed that the mechanism is very simple, having few parts, thus reducing the number of points at which faults can develop.

A is the Rudevator shaft and vane. It will be seen that the inner end of the shaft is bent at right-angles and has a further bend at the extreme tip.

B is the sliding member in the shaft A. It has two arms which engage with Y or Y' and X or X'. To function at all this member must be a smooth fit on the shaft and must be allowed to rotate on the shaft without too much friction. It must also be balanced exactly. The writer has balanced this component by means of a temporary shaft placed through the hole and supported on two knife edges. Razor blades are ideal for this purpose.

C is the main bearing plate and incorporates the necessary stops.

D is the magnet assembly and DE the armature with the forked end.



The following details, although not complete, should enable the constructor to make a satisfactory unit. For the shaft A use 18-G or 20-G spring steel wire. The length will be determined by the requirements of the model. Bend one end at right-angles and make a further bend at the extreme tip of the part already bent. The dimensions are not critical but a suggested size for the bent part is ½ in.

Prepare a collar for soldering to the other end of the shaft. This is a thrust member and prevents movement of the shaft in the bearings.

The vane is of the normal Rudevator type, and should be constructed to suit the size and requirements of the model. As the vane is offset to one side to turn the model, it is essential to have sufficient blade area at the tips, set at the right-angle, to ensure certain rotation. This may be done in one of two ways, either tabs of balsa are added to the vane (as shown in the diagrams), or a further extension of the blade is made in the normal propeller fashion. The vane should not be fixed until the unit is made and assembled.

The sliding member (B) may be constructed from 20-G wire wound round a short length of brass tube. It is most important that the tube is a correct fit on the shaft. It must be free to slide easily without impeding the action of the magnet armature, and at the same time must have sufficient friction to be carried round with the shaft to the next position when the signal ceases. If no lathe is available two washers may be fixed in position to form the part where the forked end of the armature bears, and the whole part soldered up to make a complete unit.

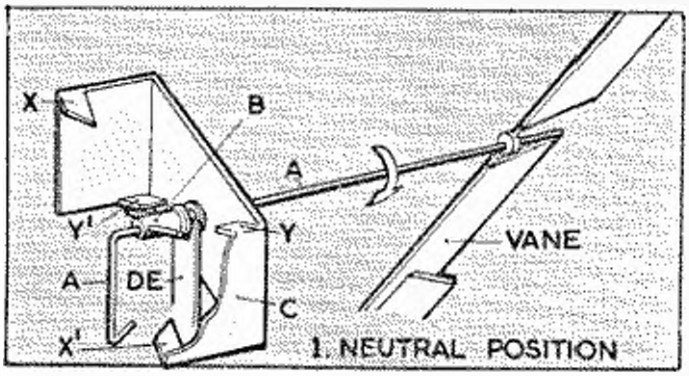
The bearing plate (C), incorporating the stops may be constructed from stiff brass of 22-G aluminium (or dural). If either of the latter are used a brass bearing is advisable as the shaft should be a good fit for efficient operation.

The bearing plate at the other end of the shaft is not so important and may be constructed to suit requirements.

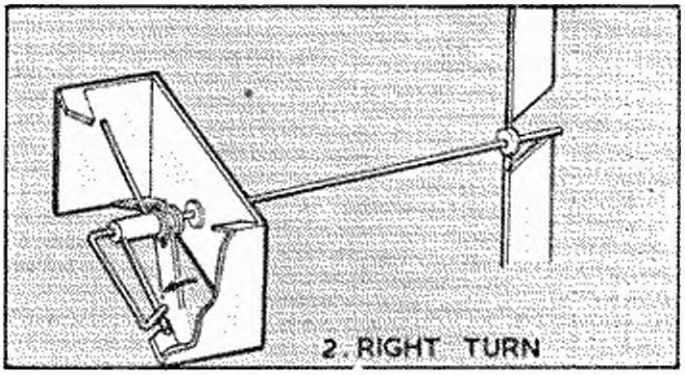
The magnet assembly (D) is constructed on normal lines, but it is not considered essential for the armature to be mounted on a pivot. The writer used some very fine gauge spring steel and riveted it to the armature and magnet. If a pivot is used it will be necessary to fix a coil spring to pull off the armature when the signal ceases. The fork should be completely free in the collar, so that rotation of component B is not restricted.

If the magnet is constructed to the size shown, a suitable winding for a 1.5 volt operation would be 500 turns of 36-g. enamelled wire, or for 3-volt operation 1,000 turns of 38- or 40-g. wire. This may be varied to suit conditions of operation, and for the assembly which is accurately made, a larger number of turns and/or finer gauge wire may be used with a corresponding saving of battery current.

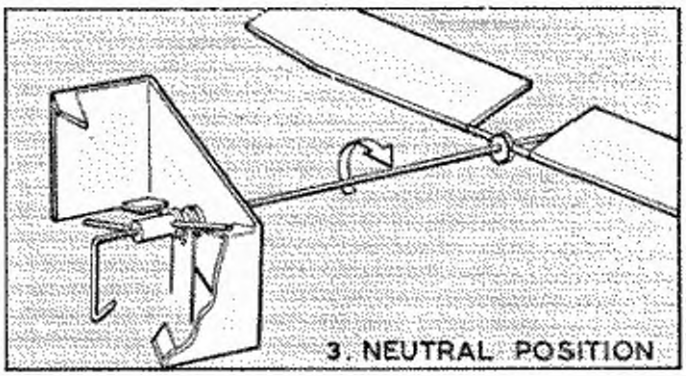
The assembly described will give two positions (e.g. R. or L. turns) and a neutral position, but if required, a bearing plate giving four positions may be constructed. No other alterations would be required.



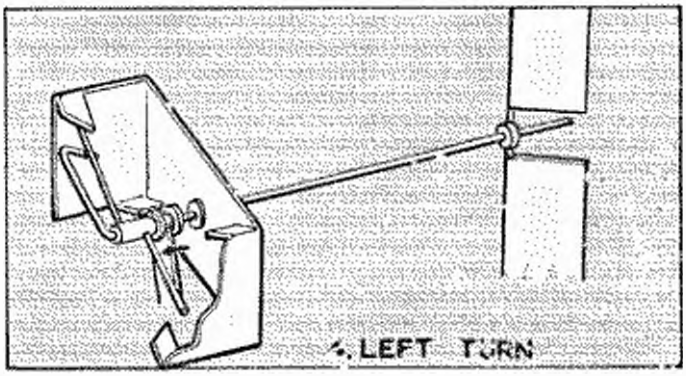
1. *Vane spinning freely. Component (B) in rest position, with arm held by shaft friction against stop (Y').*



2. *Current on. Armature (DE) pulled forward. Component (B) clears stop (Y') and carried round by friction rests on stop (X') where it halts shaft (A) with the vane in the right turn position.*



3. *Current off. Armature (DE) moves component (B) back in to rest position, where it is carried round by shaft friction to rest against stop (Y). Vane spinning freely.*



4. *Current on. Armature (DE) pulls component (B) forward, arm then clears stop (Y) and carries on to stop (X) where it halts the vane in the left turn position.*

Heading photo.—A/C Ian Dowsett (St. Athan), member of the 1951 British Wakefield Team, launching his winning model at the R.A.F. Championships.

● ALTHOUGH 1951 has drawn to a close, the next flying season still seems a long way off to most of us—but look around and you'll find that the old hands are already well into their 1952 building programme. Whether you build for contest work or just for fun, this is the time to take stock of your models, materials and tools, so that the first fine Sunday finds you all ready to go flying. Don't be like old Joe (every club has one!), who hibernates during the winter months and then spends most of the summer shut up in his workshop trying to make up for lost building time.

Start by looking over your surviving models—if any! One or two may be worth repairing or even recovering, but others will be just so much junk littering up the workshop. So unless you can honestly say "I'll be able to get that one into the air again," rip out anything worth salvaging (bellcrank, wheels, bushes, dowels, etc.) and deposit the remains in the dustbin. Next, check over your balsa strip and sheet, throwing away any useless pieces and sorting the remainder into bundles. Even the smallest pieces will come in useful for spacers, ribs and gussets, so don't despise those odd lengths of $\frac{1}{8}$ in. sq. and $\frac{1}{16}$ in. sheet. Make a list of the standard sizes you need and keep this handy in your wallet, as the smart way to buy balsa is to snap up good wood when you see it and not wait until you actually need some for a particular model. Replenish your stock of such items as dowel ($\frac{1}{16}$ in. and $\frac{1}{8}$ in. dia.), nuts, bolts and washers (6 and 8 B.A.), small wood screws, piano wire, ply ($\frac{1}{16}$ in., $3/32$ in. and $\frac{1}{8}$ in.), engine bearer wood, tissue, cement, clear dope, thinners, celluloid and rubber bands. Roll out any used cement tubes and save them for glider weights. Replace old sets of control lines, towlines and rubber motors.

There's no disputing the fact that it's possible to build models with just a few old razor blades and pins, but construction is speeded up and becomes more fun if you invest in a few carefully chosen tools. Here's our idea of the absolute minimum required. First, get a box of those modelling pins with the plastic heads and a small hammer with which to knock them into the building board. Next on the list comes a sturdy modelling knife (with interchangeable blades) and both "small" and "round" nose pliers. A small hand drill and a few drills ($\frac{1}{16}$ in., $3/32$ in. and $\frac{1}{8}$ in. dia. to start with) are essential. A metal ruler is useful for measuring sheet and using as a guide when cutting out parts. Eyebrow tweezers are just the thing for handling small pieces of balsa.

Cheap dope brushes are a false economy—so insist on the best quality as these will last for years if you always clean them with thinners immediately after use. Get in a few sheets of fine and medium sandpaper and make up sanding blocks of various shapes and sizes (round, square and flat)—cementing the sandpaper to dowel and pieces of balsa. "G" clamps are handy things to have around the workshop, but wooden (spring loaded) clothes pegs are a good substitute. Cellulose tape has many uses, such as holding sheeting in position while cement sets. A small mouth spray is a "must" for water doping. If you build power models, add a fretsaw, 6 and 8 B.A. box spanners and a small screwdriver to the list. Don't forget all the usual odds and ends like drawing pins, greaseproof paper, single-edged and double-edged razor blades. That just about covers the essentials for the average modeller, but later on try to add a pair of wirecutters, small vice, electric soldering iron, a few files and a chisel or two.

★ ★ ★

● CLIVE BATES sent in a postscript to the letter which appeared in last month's "Model Talk." Clive is now in Paris (with SHAPE) and tells us that as a power modeller, he is leading a rather lone wolf sort of existence. His main problem has been in getting supplies of fuel, the first bottle being tracked down—believe it or not—at a grocers! It appears that in comparison with French modellers, our own enthusiasts are really pampered when it comes to the supply of balsa, kits and other accessories.

Apparently there are two main clubs in Paris—one being devoted to free flight and the other to controline. Team racing has caught on fairly well and we hear that the start of a French heat is a lot more colourful than our own method—their procedure being to huddle all the teams in the centre

of the circle and at the crack of the starter's pistol, it's every man for himself! In free flight, the man of the moment is Jacques Morrisset—who won the power duration event at Lesce Bled, Jugoslavia, in 1951. Even after customs duty has been paid, Jetex units are still reasonably priced in comparison with other model supplies—and this form of propulsion is becoming popular with French modellers. While most of us in Britain were huddling over the fire and dreaming of next year's flying, the hardy Frenchmen held a December slope soaring contest in the Hills of Vincenne. Conditions for sailplane flying are good, but the prospect of landing in the nearby Seine is ever present!

★ ★ ★

● AS PROMISED in a previous "Model Talk," here are a few details of Mr. L. W. Harrison's beautiful non-flying model of a naval attack aircraft —which was exhibited at the last *Model Engineer* Exhibition. We admired the same builder's semi-scale seaplane which won a silver medal at the 1950 "M.E." show, but his latest effort is one of the finest pieces of craftsmanship we have ever seen. It has recently been on show in the windows of the "M.A." Editorial Office in Gt. Queen Street, London, and has attracted large crowds of onlookers. But we'll let Mr. Harrison tell you about this model in his own words. He writes :—

"This is not a model of any particular type—just a mixture of British and American aircraft which I have rolled into one, so to speak. It's interesting to note that if this particular design was actually produced, complete with full equipment, the weight would work out at around the 28,000 lb. mark—which puts it into the American heavyweight class. The folding wings are sharply swept back, the span is slightly over 5 ft. and the overall length is 6 ft., if you include the barrier piercing point.

"The model is built entirely of balsa ($\frac{1}{16}$ in sheet covered—over a scale framework) with the exception of cannons, undercarriage, tail hooks and similar components. The rocket boost pipes (for take-off) are located round the outside of the jet pipe—a scheme that is still experimental, but may be seen on full-size aircraft in the near future. Armament consists of four large cannons in the wings, two smaller rearward firing cannons and a battery of six large calibre machine guns in the nose. Drop tanks are fitted to the wing tips and underside of the fuselage. A complete dummy jet engine is installed—also full cockpit equipment, including an ejector seat. Twenty months' work have gone into this model so far and a few small details have still to be added."

★ ★ ★

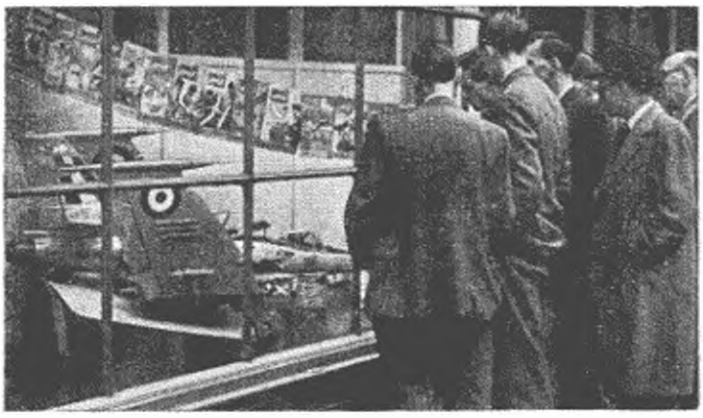
● SOME MONTHS ago, we criticised the design requirement rules for the first S.M.A.E. Scale Power Duration Contest on the grounds that the "true to scale in all dimensions" clause would prevent this new event ever attaining widespread popularity. Peter Gray, of the Luton and District M.A.S., is with us as far as allowing deviations from scale in the case of wing sections, incidence settings and other minor details, but he draws the line when it comes to enlarging tail-surfaces and boosting up dihedral. If a concession is made on these last two (and similar) points, he recommends an "out of proportion" rule, by which such a model could be docked of points.

Or better still, Pete would like to see the existing contest divided into three sections—"A" for unorthodox, "B" for biplanes and "C" for monoplanes—with badges and certificates being awarded to the first three in each section. This would encourage the modellers who go in for unusual types to enter contests, knowing that they will be competing against similar types. In actual practice, the contest would be run as before, with the "A," "B" or "C" category marked on each entry form, so that three sets of results could be worked out at the end. Pete goes on to say that such an arrangement would please all scale fans, with some building such unconventional types as the *Miles Libellula* or *Cierva C30*—and others still sticking to the favourite *Auster* or *Fokker D-8* layouts. Well, it's not a bad idea—any other readers with any comments to make on the subject?

In Brief . . .

● FRANK ZAIC tells us that before the last war he was able to make an annual trip to Europe for *Year Book* material on something like 350 dollars. On his last trip in '49, it set him back over 1,500 dollars . . . Looking for a likely scale design for a Jetex powered helicopter? How about the Westland W-85, a proposed 104 ft. rotor dia. jet transport—or the smaller W.81. Drawings of both appeared in the October 5th, 1951, issue of the *Aeroplane*.

It looks like Wilmot Mansour really started something when they brought out their *Zyra* model some months back, as a certain Jetex kit (no prizes for guessing this one!) has now been renamed "Gort Space Ship." For those who have taken root by the TV screen, we'll remind them that this is the name of yet another interplanetary roller-coaster, which features in the new 20th Century Fox film—"The Day the Earth Stood Still."



L. W. Harrison's model, referred to on this page on show at the "M.A." Editorial Offices in London.

HOW IT WORKS

If you have studied the first article which explained the two-stroke principle in detail, diesel operation will be quite simple to understand. The main difference between the diesel and the spark-ignition motor is that the former generally has an adjustment screw on top of the cylinder, where the plug comes on the spark motor. The purpose of this screw is to adjust the position of a small sub-piston or *contra-piston* inside the cylinder. This contra-piston is really like a false head to the cylinder which can be raised or lowered to vary the space between the piston at top dead centre position (T.D.C.) and the head. Screwing down the adjustment forces the contra-piston down and decreases this gap ; unscrewing it allows the contra-piston to be forced up to a new higher position under the compression generated in the top of the cylinder when the engine is turned over.

The interior volume of the cylinder can be divided into two parts—one between the piston and the bottom of the contra-piston when the piston itself is at T.D.C. (called volume v); and the additional volume or space when the piston is at the opposite end of its stroke of bottom dead centre (B.D.C.) which, of course, is mathematically equal to area of bore × stroke. This larger volume (V) is known as the *displacement* and is the calculated figure usually meant when people speak of engine "capacity." The true capacity or total internal volume is really V plus v.

Now one of the major factors affecting engine performance is the *compression ratio* of the engine. This, as the first drawings show, is the ratio of the total capacity to the small volume v. Compression ratio is critical in the case of model diesels.

If we look at the next two diagrams we can see what goes on inside the cylinder during the working cycle. As the mixture is compressed in the top of the cylinder by the up stroke of the piston its volume naturally diminishes and at the same time its *temperature* rises. If the right sort of fuel is used the temperature rise will be sufficient to ignite the fuel mixture at just that part of the cycle where ignition is required. We have two forms of control or "timing"—the fuel itself and the variable compression ratio (governing the temperature rise) given by contra-piston adjustment varying volume v. After the mixture has been self ignited it expands, pushing the piston down, and so on following the normal two-stroke cycle. Gas volume increases again and the cylinder temperature drops.

All fuels have a certain self-ignition temperature at which the fuel-air mixture will ignite without the application of a flame or spark, provided the mixture is within the explosive limits of that fuel. By explosive limit is meant that for every fuel there is a range of proportions of fuel and air over which the resulting mixture is "explosive" or will ignite. Some fuels are non critical—i.e. the explosive limits are widely spaced—whilst others are quite critical and fuel-air proportions must be closely adjusted.

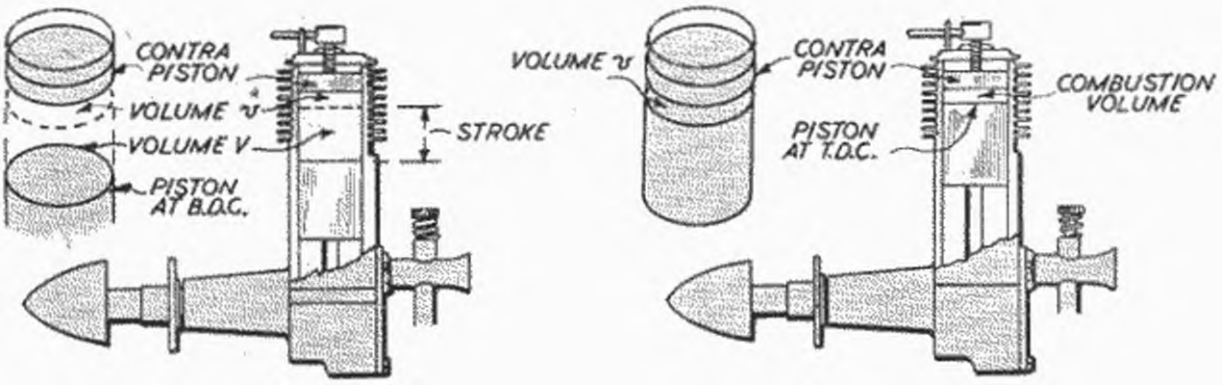
As far as self-ignition temperatures are concerned, almost all the fuels which have satisfactory "power" do not reach self-ignition point within the range of compression ratios possible with model engines. On the other hand, fuels with a low self-ignition temperature generally have a poor power output. Paraffin and diesel oil are examples of the former and ether a typical example of the latter.

The solution adopted, of course, is to mix the two —a fuel oil for power and ether, or its equivalent, for a low overall self-ignition temperature. Besides igniting readily under the heat generated by moderate compression ratios, ether fuels also have the property of being relatively non-critical since ether itself has a very wide explosive limit. This explains partly why such a wide range of fuels can be used quite successfully for model diesel operation.

Ether on its own is a bad diesel fuel. It self-ignites readily—almost too readily, in fact—but has low power. Diesel oil or paraffin has the power, but a higher self-ignition temperature. A mixture of the two provides a satisfactory fuel over a wide range of proportions—but for one thing. Ether has virtually no lubricating properties and the lubricating properties of the fuel oils is also relatively low. Thus the normal diesel fuel usually has a third constituent—lubricating oil. Much of this lubricating oil in the final mixture is thrown out unburnt, which is why diesels are notoriously "dirty" running.

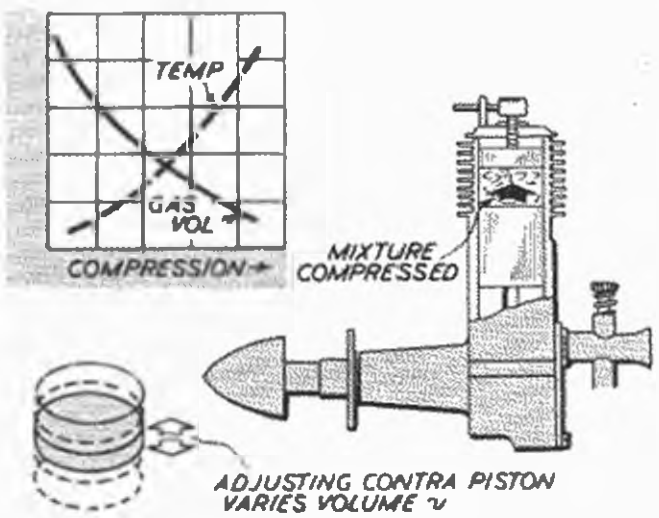
Balanced fuel mixture usually contain about equal proportions of ether (or equivalent), fuel oil and lubricating oil, often with the addition of relatively small proportions of other substances like amyl nitrite or nitrate which tend to promote sharper self-ignition and thus smoother and more powerful running. The overall proportions of the main constituents may vary considerably for different engines for, even with similar compression ratios, the internal proportions and porting will considerably modify running conditions. Fuels have been the subject of considerable research by experts and the various commercial fuels available have been developed to a stage where "improvement" by the amateur is likely to do more harm than good.

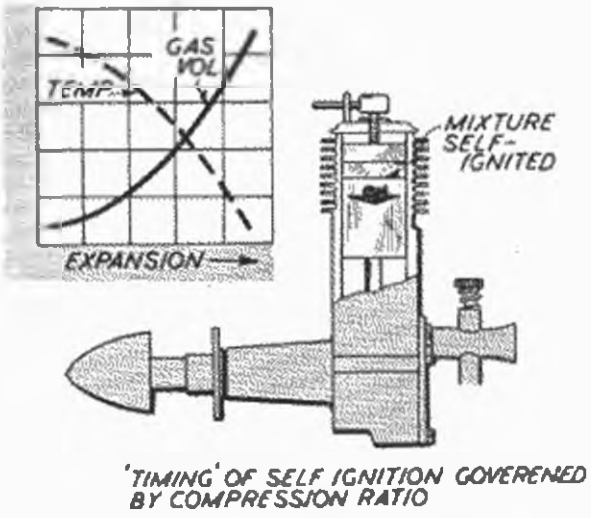
Some diesels run best on one kind of fuel, some on another. As with all miniature motors, the answer is to "get to know your engine." Follow the makers' recommendations as regards fuel and thoroughly familiarise yourself with operating technique. With a given fuel there are only two controls to worry about—the compression setting and the mixture control or needle valve. The third control—the mixture—can be subject for more research when you have learnt all about the other two.



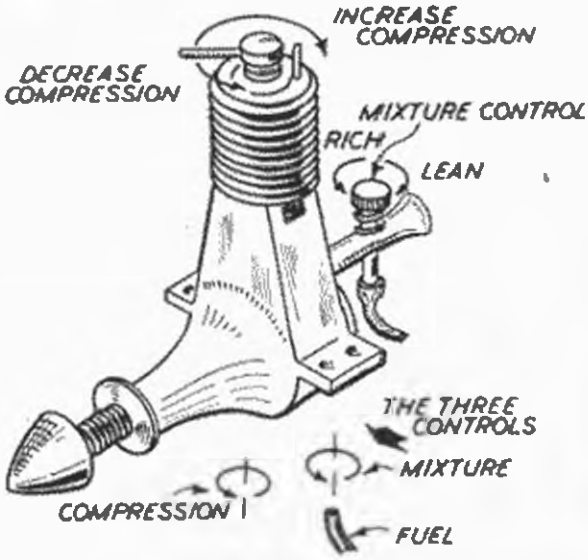
COMPRESSION RATIO

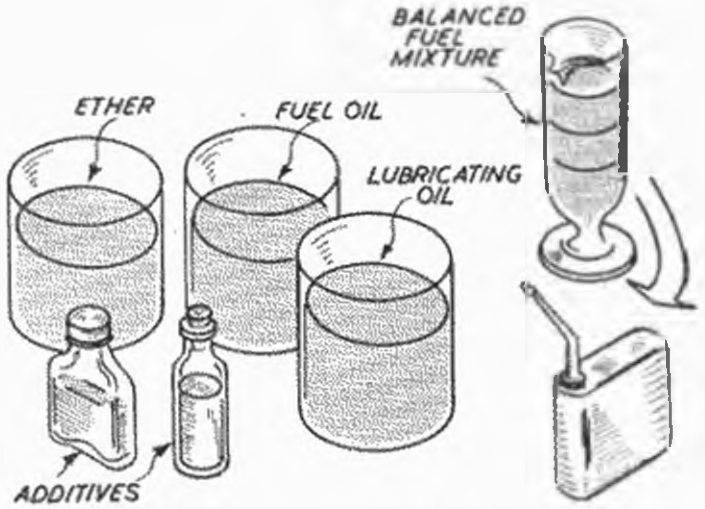
SWEPT VOLUME OR DISPLACEMENT = AREA OF BORE X STROKE = V
COMBUSTION VOLUME = v TOTAL VOLUME OR CAPACITY = V + v
COMPRESSION RATIO = $\frac{V+v}{v}$





'TIMING' OF SELF IGNITION GOVERNED BY COMPRESSION RATIO





THE DIESEL MOTOR

MODEL Aircraft

ENGINE TESTS

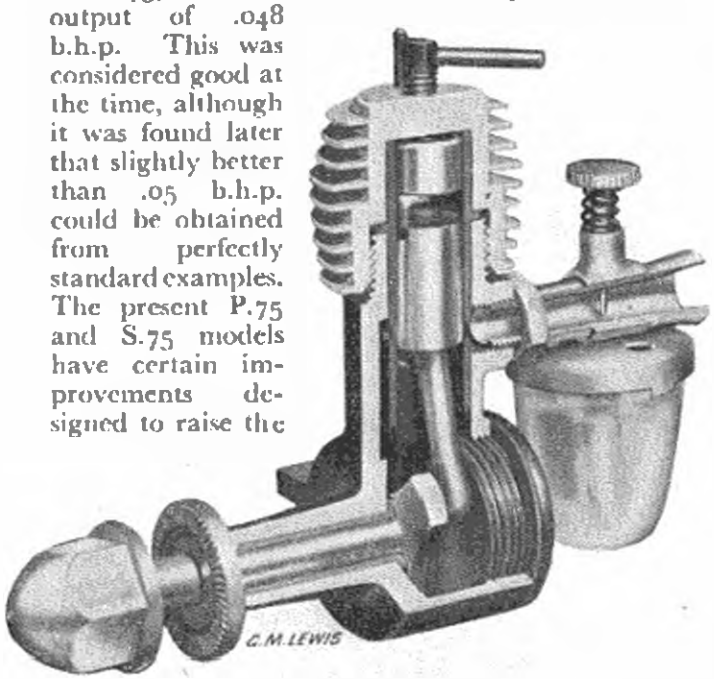
No. 32. THE MILLS P. 75

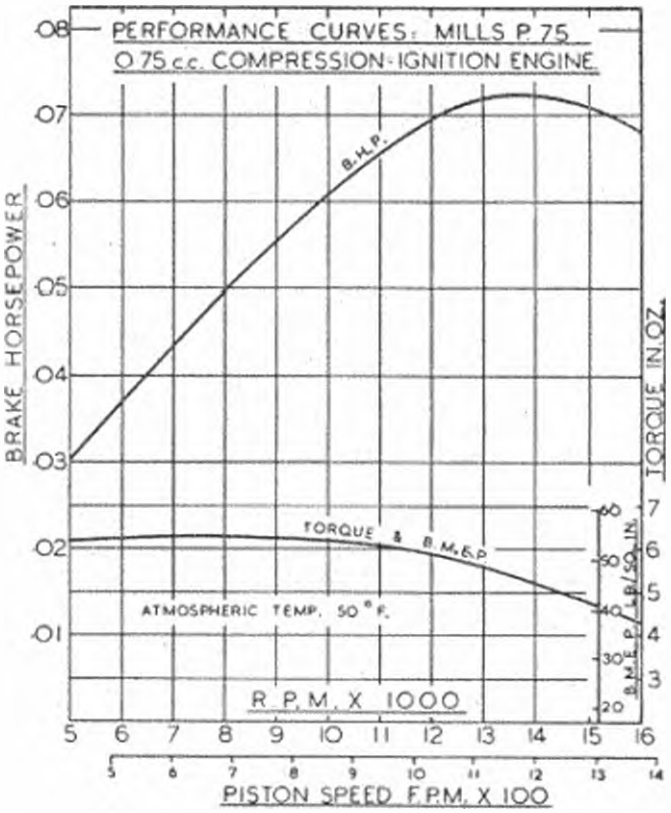
IT is highly probable that the first thing which the average model enthusiast looks for, in these reports, is the maximum output figure as indicated by the performance graph and the speed at which it is reached.

Furthermore, a sufficient number of these tests has now been published to enable students of model engine design to form some idea of the technical features associated with a particular type of performance, and, vice-versa, the performance to be expected of a unit, having regard to its general design.

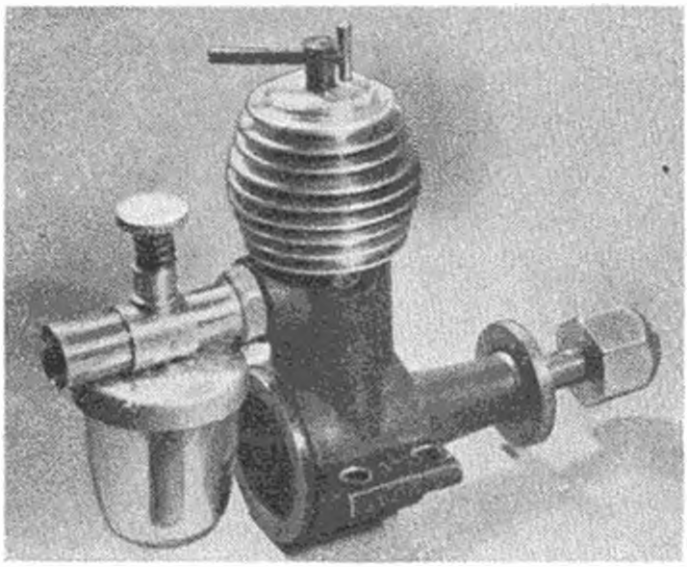
This being the case, it is not unlikely that the results of the present test, that of the Mills P.75, may cause some surprise at the high level of performance shown. Here is an engine which makes few concessions to popular notions of high performance design, inasmuch as it retains the long-stroke layout, characteristic of early model compression-ignition engines, and still employs the simple piston controlled induction port, as opposed to the now almost universal adopted short-stroke, rotary-valve design. How, then, can this performance be accounted for?

Firstly, it may be recalled that the original Mk. I Mills 75, tested in this series in 1949, delivered an output of .048 b.h.p. This was considered good at the time, although it was found later that slightly better than .05 b.h.p. could be obtained from perfectly standard examples. The present P.75 and S.75 models have certain improvements designed to raise the peak r.p.m. and output, these consisting mainly of a longer induction period and the use of supplementary air induction via the exhaust ports. We would estimate that these modifications are responsible for an improvement of around 25 per cent. in b.h.p. at the critical r.p.m.





This suggests an output approaching .065 b.h.p. for standard off-the-shelf engines following a nominal period of running-in. In actual fact, the test engine substantially exceeded this estimate. Adhering to the more conservative figure, we may assume that this further increase is due to usual variations in the performance of production engines (particularly apparent in small displacement diesels) and that the test engine can be regarded as a "good one." Added to this, some extra running-in time had been given prior to the test. However, all this in no way detracts from the excellent performance recorded which is interesting in that it gives ample proof of the very high standard of performance which it is



possible to extract from this simple design.

Needless to say, the P.75, and its cut-out equipped companion, the S.75, are to the usual Mills standard of high-quality production, particularly in respect of the all-important working surfaces. The engine is lighter and simpler in construction than the Mk. I 75, but loses none of the earlier engine's easy handling qualities which made it such an admirable choice for the beginner.

One of the modifications made to the design concern the bore and stroke, which, now converted to round figures of .33 in. and .52 in. respectively, give a very slightly high stroke/bore ratio than the 1.54/1 of the Mk. I engine, and also reduce the swept volume somewhat below the .75 c.c. from which the P.75 takes its designation.

Specification

Type : Single-cylinder, air-cooled, three-port, two-cycle, compression ignition. Two exhaust ports, one induction port and single channel twin-port transfer. Flat-top piston with step type deflector. Supplementary sub-piston air induction.

Swept volume : 0.731 c.c. (0.0446 cu. in.).

Bore : 0.33 in. Stroke : 0.52 in.

Compression ratio : variable.

Stroke/bore ratio : 1.576 : 1.

Weight : 1⅜ oz. including tank.

General structural data : Gravity die-cast magnesium alloy crankcase, chromate treated with honed phosphor-bronze main bearing. Nitra-steel cylinder, hardened, ground and lapped. Piston of tool steel, hardened, ground and lapped. Connecting-rod of high-duty duralumin with plain bearings. 3 per cent. nickel-steel crankshaft, hardened, ground and lapped. Fully machined venturi intake with open type jet and transparent free-flight fuel tank. Assembly may be rotated and locked in any position for inverted or side-mounted running. Beam type mounting lugs. Self-resetting cut-out fitted to S.75 model only.

Test Engine Data

Total time logged : 2 hours (approx.).

Fuel used : "Record" Competition Diesel Blend.

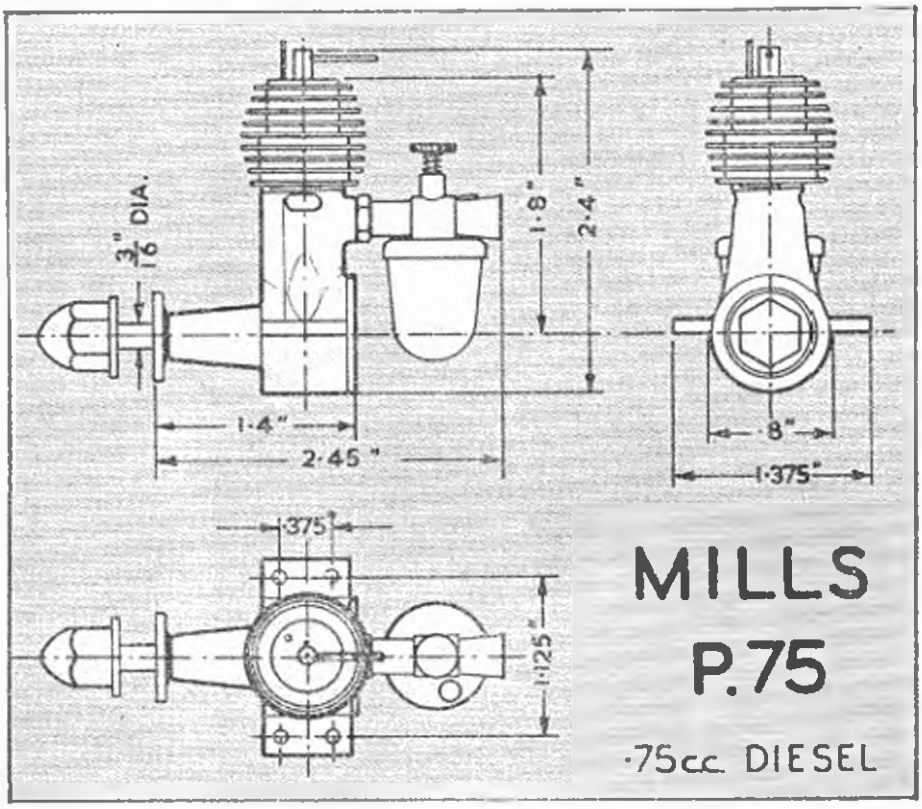
Performance

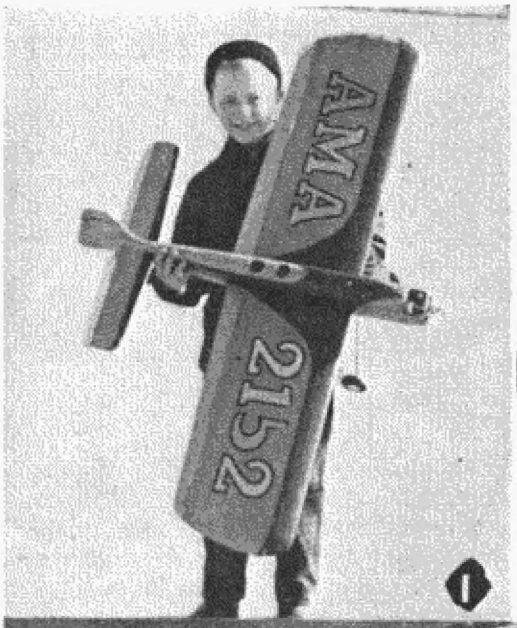
The easy starting qualities of all the Mills engines are so well known that it is not necessary to dwell upon the fact : suffice it to say that the P.75 continues the tradition and that not the slightest trouble was experienced in this direction during the tests.

A remarkable feature of the P.75 is its very wide speed range. The minimum speed at which the engine was run under full load was 4,000 r.p.m. and, although it is probable that this figure could have been almost halved without loss of even running, the maximum speed tested, and at which the unit ran perfectly smoothly and without outward sign of stress, was some 17,500 r.p.m. The speed range possible, therefore, may be regarded as exceeding 15,000 r.p.m., although the actual range usable in various types of model is not likely to exceed 10,000 r.p.m. at the most.

Starting at 4,000 r.p.m. and progressively reducing load, the maximum torque recorded was 6.3 in. oz. which, equal to approximately 55 lb./sq. in. b.m.e.p. is, of course, a very good figure. The decline in torque was well delayed, as load was reduced, with the result that the peak b.h.p. was reached at very

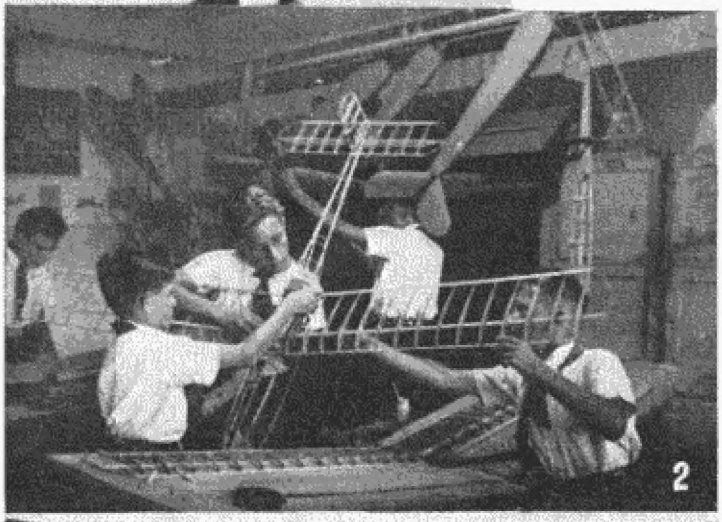
(*Continued on page* 88)





MODEL *Aircraft*

photonews



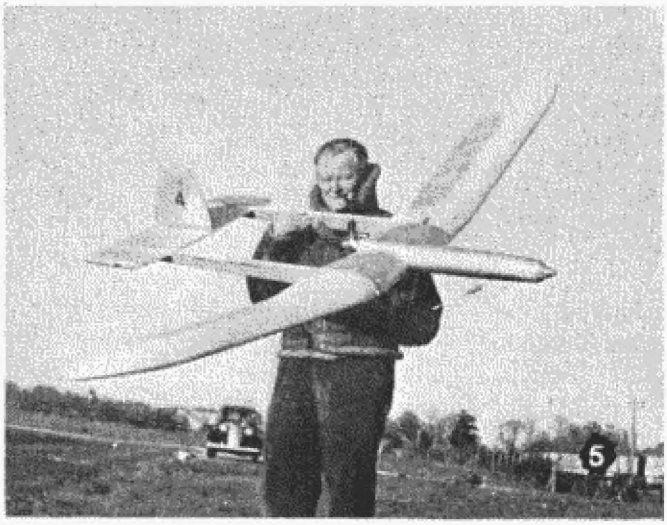
Here we are again, PHOTONEWS fans, and leading off this month we have a little man with a big model. This large-size creation was built by Chuck Borneman, chairman of the Peru Flying Tigers M.F.C., of Indiana, U.S.A., and he describes it as "the best stunt job I've ever flown." It is a Fox 35-powered *Chief*, and hiding behind it is 13-year-old Johnny Wold. The photo was sent us by reader K. R. Waddington.

Pictures of aeromodelling behind the Iron Curtain are all too rare, but the busy scene in Photo 2 came to us from Hungary. The modellers are members of the Pioneers, a kind of Boy Scout movement, and certainly seem to go in for ambitious designs.

Picture 3 is a fine action shot by Ed. Stoffel and shows Don Hellings, of Ilford, hand-launching his Nordic. Based on Ed. Catten's *Zephyr* it has a 64½ in. span wing with a Davis section.

Ol' Black Magic in No. 4 is a very neat Grumman *Panther* controliner, photographed by Gordon Rae at the Midland Area Rally at Pershore. The model was turned out by Donald Deely, of Birmingham, and circulates under the influence of two E.D. Comp. Specials. We hear it will still keep going with only the *outboard* motor running. There must be some rudder offset somewhere!

The rather weird flying machine in Photo 5 is, believe it or not, a free-flight job! It was built by W. E. Trevitwick, of Ruislip, Middlesex, and L. Disney, who sent us the photo, assures us that it has flown very well in its two or three years of life.



Power is a 9 c.c. Brown Junior, and wingspan is around 10 ft.

This month's Star Model is the work of R. G. Grimes, of Ealing. It is a 40 in. span Bücker *Jungmeister*, powered by an Elfin 1.8, and we are informed that for some unexplained reason the pilot's name is Wilbur. Perhaps he is in the American Forces of Occupation? A pendulum rudder control is incorporated, and the model is very well finished in silver and olive green.

Our next hop is to Kuala Lumpur, where the Third All-Malayan Nationals were held in the summer—a two-day meeting with temperatures around 95! Oh, for some weather like that here and now. S/Ldr. R. B. Lord sent us this picture of 17-year-old Kitson Leong, of Perak, who won the power duration contest, with his E.D. 3.46 Korda *Powerhouse*.

S/Ldr. Lord may be remembered as one-time secretary of the R.A.F. M.A.A. He recently gave a series of short talks on aeromodelling over Radio Malaya.

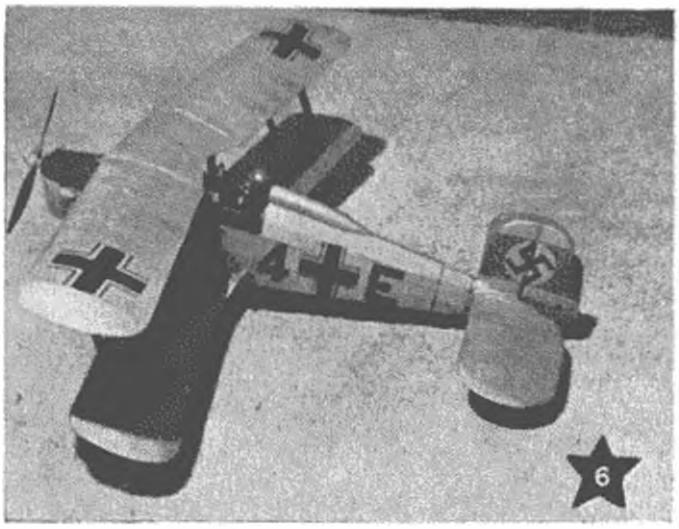
The tense moment just before a flight has been caught by J. B. Stewart, of Salisbury, at a recent rally, as a helper moved smartly out of the way of a stunt job being prepared by P. Glover, of Portsmouth. We should imagine that the photographer had to step pretty lively too, after taking the photo!

George Curmi, with the R.A.F. in Malta, often sends us pictures from that sunny island, and No. 9 is of his sister Rita with one of his models. It is a modified Frog Radius powered by a Frog 180, and finished all-silver.

To wind up this month's bunch we have a shot from Ken Brookes, taken at Fairlop during the shooting of the Shell film "Model Flight." The star of the scene is John Appi, R/C enthusiast and proprietor of the Horse-shoe Hotel, London, where the S.M.A.E. dinner was held in November.

The Horse-shoe has become a regular meeting place for those concerned in model aviation. A radio-control circle meets there, as well as the S.M.A.E. Council, the London Area Committee and the Federation of Model Aeronautical Manufacturers and Wholesalers (F.M.A.M.W.).

With all the intensive building that we are sure has been in steady progress during the past weeks, the next PHOTONEWS ought to be full of all the coming season's contest winners, and with the photo fiends busy in the darkrooms the pictures should be brighter and more beautiful than ever. It's up to you! Send them in!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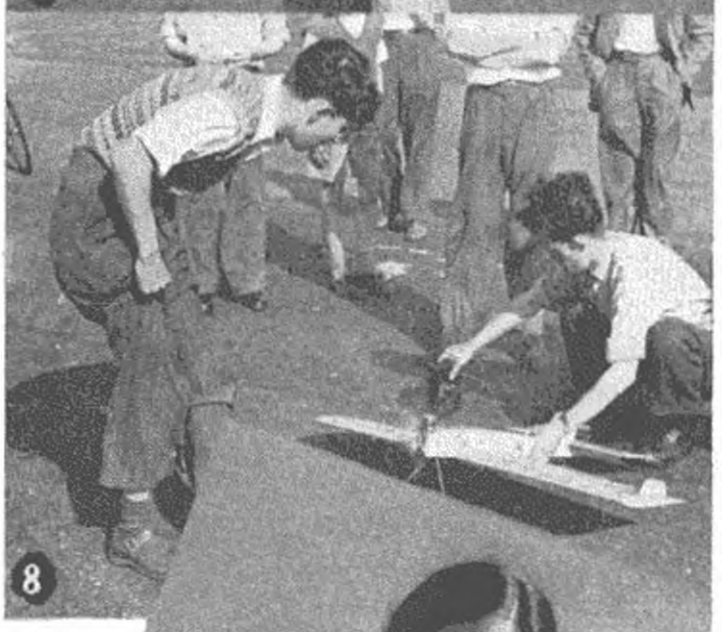
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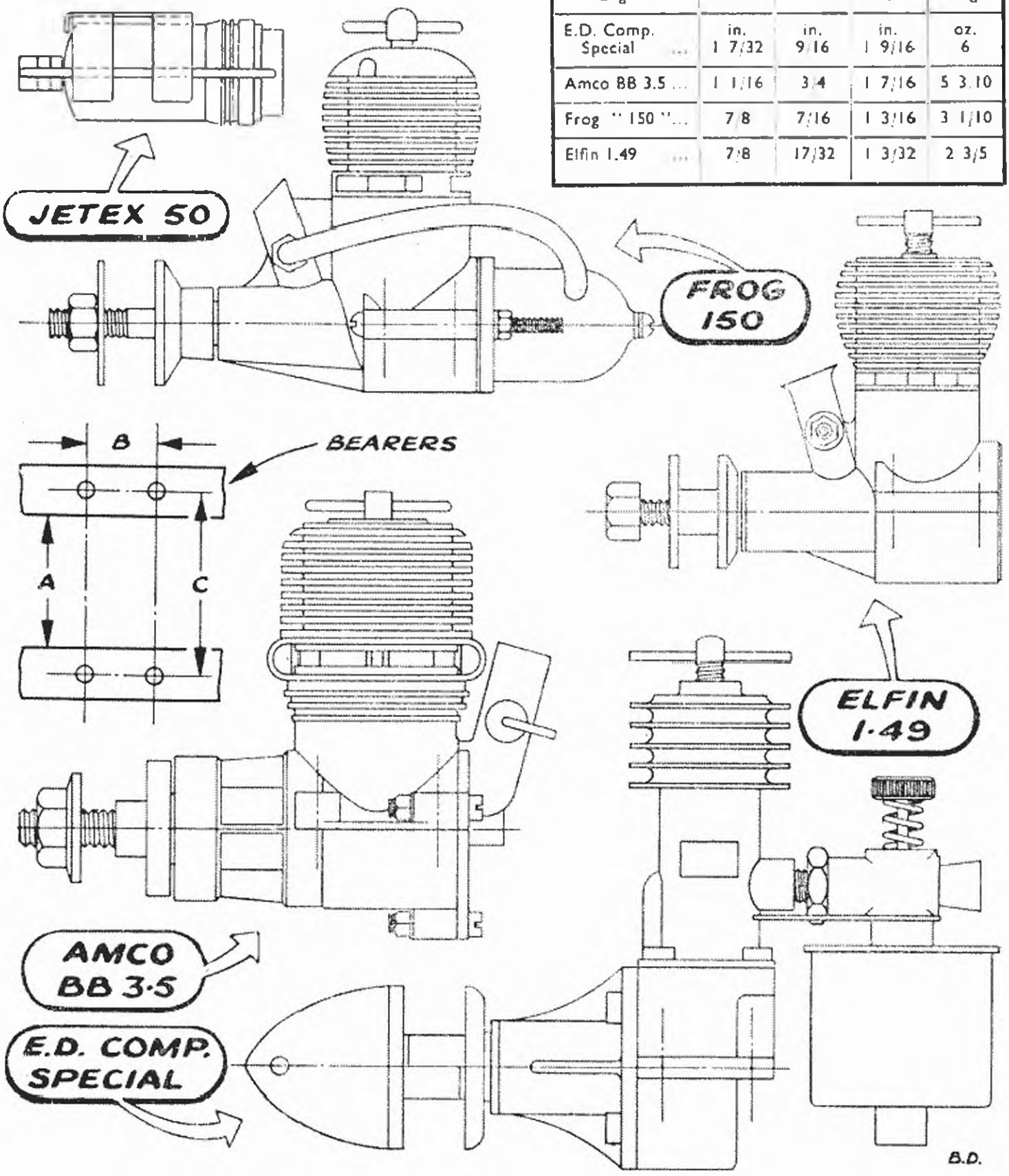
10

WILL THESE FIT ?

By popular request we present yet another batch of engine side-views—with one of the Jetex " 50 " ($\frac{1}{4}$ oz.) thrown in for good measure. Trace or cut out the required sideview and paste in position on your plan to simplify power-plant installation.

Engine	A	B	C	Weight
E.D. Comp. Special ...	in. 1 7/32	in. 9/16	in. 1 9/16	oz. 6
Amco BB 3.5 ...	1 1/16	3/4	1 7/16	5 3/10
Frog " 150 "...	7/8	7/16	1 3/16	3 1/10
Elfin 1.49 ...	7/8	17/32	1 3/32	2 3/5



40 LAPS AT 90

Ken Muscutt (*right*) with Ken Marsh and "*The Saint.*"

By Ken Muscutt

THESE words are written in the hope that they may provide assistance to those who contemplate taking up team-racing seriously, and encouragement to those who have been discouraged by their earlier efforts. I wish to set out briefly the story of the attempts of Ken Marsh, of West Essex Aeromodellers, and myself to produce team racers better than the rest and to operate them to the fullest advantage. We had numerous troubles but perhaps this article will enable others to avoid the snags that beset us.

We set as our objective "40 laps at 90," which we considered would be fast enough to beat any of the models then flying. Our first models were powered by a Frog 500 and an old Redhead McCoy 29. Both would do 75 m.p.h. on straight methanol/castor oil fuel but this speed could not be maintained for a whole tankful, and the number of laps was about thirty-five. One thing soon came to light, and that was that the racing engine would restart very easily every time on the same needle-valve setting, but the lapped piston motor could not be relied upon to do this. This model was therefore put aside and we concentrated on persuading the other one to give 40 laps by altering the fuel. By adding 2 per cent. nitro-benzine it was possible to close the needle valve appreciably, and although peak power was not available forty to fifty laps could be covered at about 70 m.p.h.

An Eta "29" in the same model gave a slightly better performance, but on this fuel restarting was not particularly good and half a dozen flicks were usually necessary. As we were looking for more speed and good pit stops, the nitro-benzine was omitted and on straight fuel two flicks were enough to restart the Eta. The peak speed was 85 m.p.h. and although the number of laps per tankful fell to just below forty, the certainty of restarting made this arrangement a better proposition. This combination of model, fuel and motor was kept for some time and taught us a number of things :—

1. To gain any advantage with a fastish model, quick pit stops are essential. A non-polarised booster plug fitted just in front of the tailplane and wired to the glow plug avoided a confusion of hands around the engine during a stop. The use of a "blow-bottle" rather than a Wesco for refuelling prevented the fuel from frothing, and made quick restarts a certainty rather than a chance. By getting an idea of how far the model glides the pit men could start running as soon as the engine cut, and be reasonably near when the model stopped rolling.

2. A glow-plug motor can easily be over-cooled. Our early model had a large cooling aperture and on cold days a good two minutes run-up was needed before the needle valve could be closed to the flying position, much to the annoyance of the other competitors! By reducing the aperture this warming up period was reduced to about fifteen seconds. With the engine at its correct temperature a leaner setting gives more laps at a higher speed.

3. When deciding C/L thickness, do not forget that other models may run into them. A sharp bend in a very thin line may put you out of a race and ruin a good motor. But do not, of course, use extremely thick wire as the extra drag will reduce both speed and distance tremendously. We have found that 30 s.w.g. (.0125 in.) wire is safe for the heaviest of team-racers and will withstand a fair amount of maltreatment.

4. Foreign bodies in the fuel almost invariably end up by blocking the jet and causing erratic motor runs. After losing one race because of a microscopic sliver of balsa in the fuel line, I made a fuel filter for future use. Petrol filter gauze, obtainable from a motor accessory shop, is very suitable.

The next model, *The Saint*, was considerably lighter and was for the Eta again. Owing to lack of space in the fuselage it was necessary to extend the top of the tank above the carburettor in order to accommodate the full 30 c.c. of fuel. As was to be expected, this lay-out accentuated the difficulty in obtaining a constant engine run throughout the tankful, and on "straight" fuel the difference in the head of fuel made it impossible. In order to ensure that the whole tankful was used, it was necessary to fly the first few laps with the engine running rich, and this wastage of fuel brought down the number of laps. After several experiments with the fuel it was found that by including 5 per cent. nitro-methane sufficient flexibility was gained to enable the motor to two-stroke throughout the tankful, and this put up the number of laps and the speed, which on this model was a constant 85 m.p.h. So if you have a tricky tank a drop of nitro-methane will definitely help. This model has been flying for nearly twelve months now, and although rather dilapidated it is still capable of 43-45 laps at over 80 m.p.h., and will start every time in two flicks.

An 8 in. × 9 in. prop, whilst not permitting the engine to reach its peak revs., gives a good performance and enables the necessary number of laps to be covered.

It should be realised, of course, that an increase in pitch beyond a certain point will cause a racing engine to run at an inefficient speed, and it merely uses up a lot of fuel and produces very little power. The best way of selecting your prop is to commence with one that will enable the motor to give maximum power—an 8 × 7 or 8 × 8 for the average .29 motor. If it is not possible to get in the forty laps by trying different fuels, a slightly higher pitch may do the trick. But if this results in a worse performance it means that your engine cannot turn over the higher pitch prop at sufficiently high revs. to enable it to operate efficiently. A reduction in diameter will, of course, put up the revs., but unless your model is extremely clean and small the reduced thrust from the smaller blades will not be enough to carry the model round at a speed at which the higher pitch prop becomes efficient. Moreover, if the model is on the large side, even an 8 × 8 may not produce sufficient thrust to accelerate the model to a speed where both engine and prop work efficiently, and a larger diameter, lower pitch prop—say a 9 × 6—may show a startling improvement, both in speed and range. Such a prop will definitely improve acceleration and shorten the take-off run, although this is of little importance under present rules.

The main point to remember is that it does not matter how long the motor will run on 30 c.c. of fuel on a certain prop, so much as how far the model will fly on that amount of fuel, and how fast.

Our next effort featured the old McCoy "29" inverted. The tank in this model was so placed that the top of it was level with the jet, and I personally think that this is the ideal position. The motor run is very consistent and as this engine too, can be relied upon to start in a couple of flicks when warm, without altering the needle valve setting, it is very pleasant to operate. The biggest snag is that the engine is on its last legs and the model is rather heavy. Consequently, the speed is less than 80 m.p.h. and the model is used as a standby only, although it has done good work as a flying test-bed.

In the Davies Trophy at Fairlop, J. Fox of the Hastings club used a blow-bottle. He is seen, waiting for the starting signal while keeping the tank full.

Four different motors have been fitted at various times—the McCoy, two Eta's and a Dooling—and no trouble at all has been experienced in restarting. With a warm engine the small amount of fuel ejected past the needle valve by the action of refilling the tank has been found to be ample priming and no sucking in or exhaust priming is necessary. When starting an inverted motor from cold on a warm day we have found that a couple of chokes and a prime against the side of the piston is sufficient. If the usual exhaust priming is resorted to, be very careful as a good solid "hydraulic" easily results.

On a cold day, when the engine is rather stiff, our procedure is to leave the tank empty, invert the model so that the engine is upright and give a good prime right across the piston so that the majority of the fuel goes down the by-pass. A fair burst can be obtained in this way which will warm the motor slightly and free the disc valve. Then fill the tank (with the model right way up, of course), give a prime on to the side of the piston and warm up the motor thoroughly. This should be done shortly before your race and the engine covered with a piece of rag to keep it warm, so that it will start when called upon merely by topping up the tank and flicking.

We now had two models capable of the 40 laps but we could not get our 90 m.p.h. Then the wealthy member of our partnership bought a Dooling "29" and built a new model, similar to *The Saint* to take it. After being run-in, the motor was put to work, but insisted on running rich whilst in the air. Eventually, we had to close the needle valve so much that the engine was missing terribly on the ground and the model took half a lap or more to get off. Once in the air centrifugal force supplied more fuel and bursts of ten to twelve laps were timed at 90 m.p.h. But this speed was not maintained, and the model would land with fuel in the tank. No amount of fiddling with fuel or needle valve could overcome this, so the motor was put into the inverted installation on the previous model.

Immediately a smoother run was obtained, due to the jet being moved towards the inside of the circle by inverting the engine, and thus reducing the effects of centrifugal force, and we settled down to find a combination to give us our 40 laps. The Dooling was found to be rather particular with regard to needle valve setting and many tanksful of good fuel were burnt up before we got the right one, which proved to be as lean as possible without the engine "missing." But the extra power over the other motors we then had was worth the trouble and on an 8 × 6 prop it towed our old heavy model round for 40 laps in exactly 1 minute 40 seconds (90 m.p.h.).

Despite our satisfaction with this result the model has been used in very few races, as our first experience was with a group of three considerably slower models and the pilot found difficulty in getting down to

land safely. With the engine running he was overtaking two models every lap and when it cut, which it did without warning, he had to dive down in the first vacant space, most likely overtaking another model as he did so. All this was very disconcerting and as we did not wish to damage the motor in a crash the Dooling has not been used in team racing since. However, now that speeds are creeping up and pilots becoming more experienced, no doubt it will be called into service again.

Nothing has been said so far about the layout of this class of model but a few notes on our findings may be of assistance.

Fuselage

As with all C/L models this is the most important part. Good solid bearers are essential to withstand the rough-and-tumble of team-racing, and on a model with an upright engine it may be possible to bolt the undercarriage, and perhaps the wing, to these. As much room as possible should be left for the tank and provision made for access to this so that it may be changed for a better one if trouble is experienced. It is such a pity to have to carve up a beautiful model to get out the tank. But try to keep down the size of the fuselage. A big fuselage means more weight, and weight is an important factor, although strength should not be completely sacrificed for lightness.

Tank

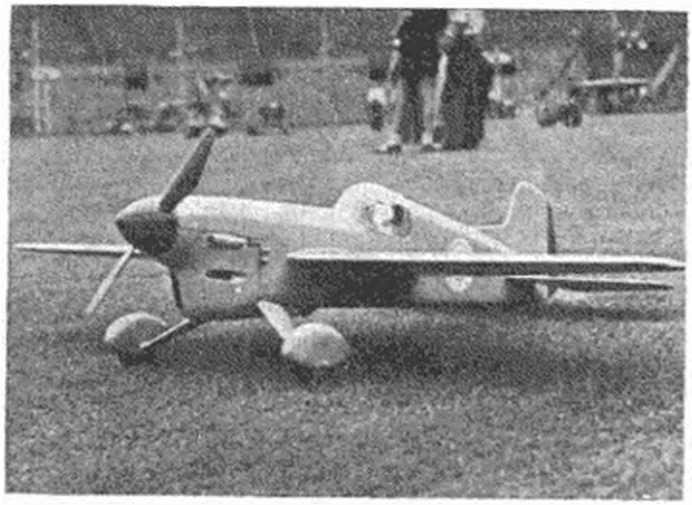
Less trouble with fuel feed will be experienced if as much as possible of the tank is kept outboard of the jet and just below it. And be sure that it is firmly fixed—a loose tank may cause the fuel to "boil" under the vibration from the engine, and so cause the engine to run lean by supplying it with fuel and air mixed.

Undercarriage

The position of the undercarriage seems to be a matter of compromise. It should, of course, be of sufficient length to enable the prop to clear any odd stones when the tail is up, but its location fore and aft is difficult to decide. The further back it is, so will the line tension at take-off be increased, with better control in upwind or crosswind take-offs, and if the model is inadvertently pointed in somewhat when being released it will correct itself. But with the wheels well back the model tends to nose over on landing with the risk of a broken prop. This nosing-over tendency will also become apparent at take-off, and in fact *The Saint* has lost two races through the tail coming up too high when the pilot's attention has been distracted, and causing the prop to hit the ground.

With the wheels well forward, however, this tendency is eliminated and the model shown can be landed and taken off without much concentration, and even the miniature mountain ranges on the runways at Fairlop have failed so far to turn it over.

The tailskid takes a much larger share of the landing shocks and needs to be well secured. Also care needs to be taken to point the model in the right direction when launching as otherwise the model may run right across the circle!



Johnny Nunn's McCoy 20-powered T.R. seen at the Wembley C/L meeting. Note the sturdy wide-track undercarriage.

Wing

The position of the wing and the size of the tailplane will decide how well your model handles. What is essential, of course, is a model which will fly steadily with no movement of the controls whilst the pilot has a look round, and show no tendency to stall or dive when the engine cuts out. By locating the wing so that the c.g. comes (on a class "B" model) about one inch behind the leading edge, this stability can be obtained, and if the pivot point is half to one inch behind the c.g. there will be sufficient line tension on a fast moving model to overcome the efforts of any cross-wind short of a gale. With the pivot point too far back, unnecessary line tension and strain on the pilot results, and the yaw on the model will reduce its speed.

Tailplane

The situation of the tailplane and elevator does not appear to be particularly critical, but it should be remembered that the nearer it is to the c.g. the larger should be the area of the elevator. If in doubt, it is safer to err on the large side. Arrange the sizes of your bellcrank and control horn so that the full range of movement on the bellcrank will give about 20 deg. up and 10 deg. down on the elevator. Only a fraction of this movement will be needed in flight but the extra amount will be useful in case another team, refuelling close in front, demands a prop-hanging climb and recovery to clear them.

For smooth, easy flying, perfect freedom of the controls is a big asset, and they should be checked frequently during the assembly of the model to avoid any friction. And be sure to use a push rod of sufficient rigidity, as the strain caused by a flapping elevator due to the push rod bowing may bring about the disintegration of the model.

With that happy thought I will close, and study the shadowy writing on the wall above the building board, which looks very much like . . . .

"40 laps at 100 . . . . . "!

Mantis

A NINE-FOOT SPAN GLIDER

By
G. J. Lefever

EARLY in 1950 the need was felt for a large F.A.I. glider that would turn in good flights in any weather, and *Mantis* was designed to this end. Test flights were carried out in April, 1950, and all through the summer the model averaged flights of 4 : 45 in cool evening air. Since then it has consistently made maximums in a wide variety of conditions.

Building

The construction is perfectly orthodox on the whole, the only points requiring more than usual care are the centre-section of the wing and the correct rigging of the tailplane assembly.

The two fuselage sides are built in the normal manner one on top of the other. The $\frac{3}{16}$ sq. longerons may have to be spliced to make up the required length but this will not matter in the least. The $\frac{1}{16}$ in. × $\frac{1}{8}$ in. diagonals are added to ensure that the rear of the fuselage does not straighten out when lifted from the plan. Join the two sides with spacers and hold the fuselage together with plenty of rubber bands until dry. Add the nose former and bind the 14 S.W.G. towhooks in place with silk. At this stage the entire fuselage is sheeted with $\frac{1}{16}$ in. med. hard balsa : sides first, then the top bottom. This may sound expensive, but it is definitely worth while and a fuselage results which will stand up to almost anything. Pour 9½ oz. of molten lead into the box formed by the nose sheeting and the nose former. When the lead has cooled down squeeze cement into the front of the box and then cement the laminated noseblock in place. A piece of silk is stretched out and cemented to the fuselage from the front towhook to the noseblock. This prevents the sheeting from being torn up when runway landings are made. The fuselage is now completely sandpapered, the holes made for the wing dowels, the ply tailplane mount and underfin are added. The fuselage is covered, wing dowels fitted and finally are added the address label and a piece of tinfoil on the underfin where the D.T. fuse burns through the small rubber band.

Wing

The two wing panels are laid down on a board in the normal manner. Eight inches of dihedral are installed under each wingtip and the hard balsa dihedral braces are cemented in position. Join the centre sections together and pin down as one unit for the purpose of sheeting the leading edge—with a piece of 4 ft. balsa if possible. After the cement is dry the wing is again cut apart. By using this method a perfect join is obtained.

The fin outline and spar are pinned down and cemented, then the section is added after the outline has been removed from the plan. The $\frac{1}{16}$ in. sheet trim-tab is fitted to the port side of the fin and is cemented at the correct angle after the fin has been covered.

The tailplane is conventional except for the undercambered section. The paper tube in the tailplane should be made a fairly tight fit with the dowel in the fin.

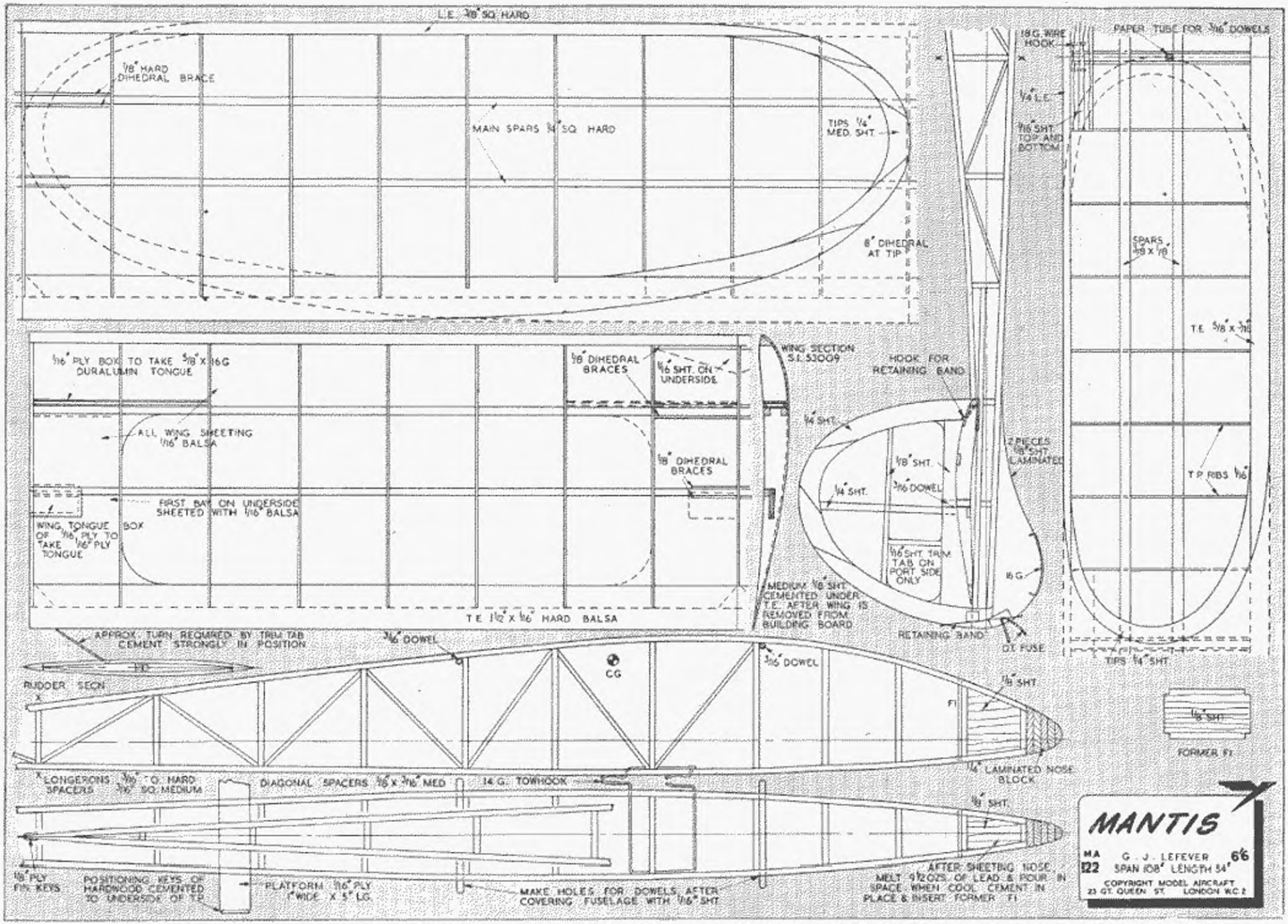
Covering

The writer recommends a red and black colour scheme for good visibility. In the original model the fuselage and wing tips were double covered in black Jap tissue and the fin covered with a single layer. The centre section of the wing and the tailplane were covered with white Jap tissue and then given a second layer of red. Heavy grade Modelspan should provide quite a good substitute for double covering. Tissue is "doped on" to the sheeted fuselage and is then smoothed out with a soft rag. The dope seeps through the tissue and is soaked up by the rag leaving the covering perfectly smooth. Three or four coats of clear dope then give the required finish.

Trimming

The c.g. position will be fixed at 50-60 per cent. wing chord and the leading edge of the wing will probably have to be packed up $\frac{3}{16}$ in. before a satisfactory trim is reached.

Mantis glides in tight circles to the left. Once the builder has got used to the offset towhooks no trouble at all will be encountered and a straight tow is ensured practically every time. The model will not turn off to the left until the line is slackened and the model is at full line height.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 23, GREAT QUEEN ST., LONDON, W.C.2., 6s. 6d. POST FREE.

OVER THE COUNTER

● AN EXCLUSIVE M.A. FEATURE WHICH GIVES YOU UP-TO-DATE NEWS OF THE LATEST PRODUCTS FROM HOME AND OVERSEAS.

Gear blanks, suitable for return-gear systems in Wakefields, will shortly be available from East Anglian Model Supplies of Ipswich. The gears, in dural, and also dural tube for pillars, are to the specification of J. A. Gorham. Price will be about 2s. per gear.

* * *

The American model aircraft trade have recently concluded a competition open to customers of specified kits, dopes, motor and accessories (four separate manufacturers contributing towards a finished model). Prizes to the value of $3,600 (approximately £1,250) are being awarded.

* * *

Mercury Models have always been interested in the F.A.I. A2 glider specification. Their *Norseman* kit model, it will be remembered, gained a place on both the 1950 and 1951 British "Nordic" teams. Further kits to this specification are promised in time for the 1952 competition season.

* * *

Model flying saucers, American style, are four-foot diameter kites built from reed and balsa strips and covered with aluminium foil or paper. Heights of up to fifteen hundred feet are possible. Man behind the production is test pilot for a famous American aircraft manufacturer.

* * *

A new (American) Forster motor is promised with front rotary induction (i.e. hollow crankshaft instead of rotary disc), but production has been held up by Government contract work again.

* * *

Harold de Bolt's latest contribution to C/L design is "asymmetric stability." Instead of weighting down the outboard wing tip the whole fuselage is located outboard of centre (the pivot point). This duplicates the effect of wing tip weight and increased area on the inner wing panel. This feature is included on the new de Bolt kit models

* * *

A report from America, as yet unconfirmed, states that the Duromatic plant has been destroyed by fire. Duromatic, of course, are manufacturers of the McCoy range of motors.

Simplification is to be the keynote of many of the 1952 kits. Many of the new Keilkraft kits will aim at minimum construction time—models for flying rather than models for building.

* * *

British automobile manufacturers with a worldwide reputation have recently shown themselves interested in the model motor market. They have developed a new lightweight alloy which they think may have considerable possibilities for small scale work. Nor will diesels present any new problems to them for they have had considerable experience with fuel injection equipment.

* * *

Solid kits are once again on the market and we prophesy that more will follow. Many of these, we imagine, will be somewhat larger than the wartime standard of 1/72nd scale. The fact that interest in full size aviation is growing considerably is perhaps reflected by the fact that one national daily paper is running an aircraft recognition "strip" and another evening paper carries a similar weekly feature.

* * *

The Keilkraft *Skylon* power model kit is to be manufactured in America, under agreement. It will be marketed by Polks Model Craft Hobbies, of New York. The British kit will be available shortly and will contain pre-cut wing ribs, etc.

E. L. S. MODEL SUPPLIES

272-4, HIGH STREET, SUTTON, SURREY

The original business of E. Law & Son was founded in 1920 and taken over by the present managing director, Mr. Ian Davis, in 1945 after the death of his father. Started in 1937, the model aircraft section developed rapidly until the outbreak of the war when more important work was undertaken, such as the production of life-saving rockets, ammunition containers, and similar wartime essentials.

Until June, 1951, the retail model shop had to share premises with the timber side of the business, then a new shop was opened and this is now well known as E. L. S. Model Supplies. Specialising in the requirements of model aircraft, railway and boat enthusiasts, and offering a by-return postal service, the shop is managed by Norman Butcher—seen in the heading photograph with Croydon Club members Harry Hills and Norman Marcus.

KIT REVIEW

THE FROG "ZEPHYR"

Manufacturers : International Model Aircraft, Ltd.

This model is the first of a series by C. T. Buffery designed around the new Frog "50" half-c.c. diesel motor. By side-mounting, it is possible to enclose it completely in the cowling of the model, leaving just the compression lever protruding from the starboard side. The needle valve projects through the top of the cowling and the air intake can be reached (by a very small finger) through the cowling starboard intake hole.

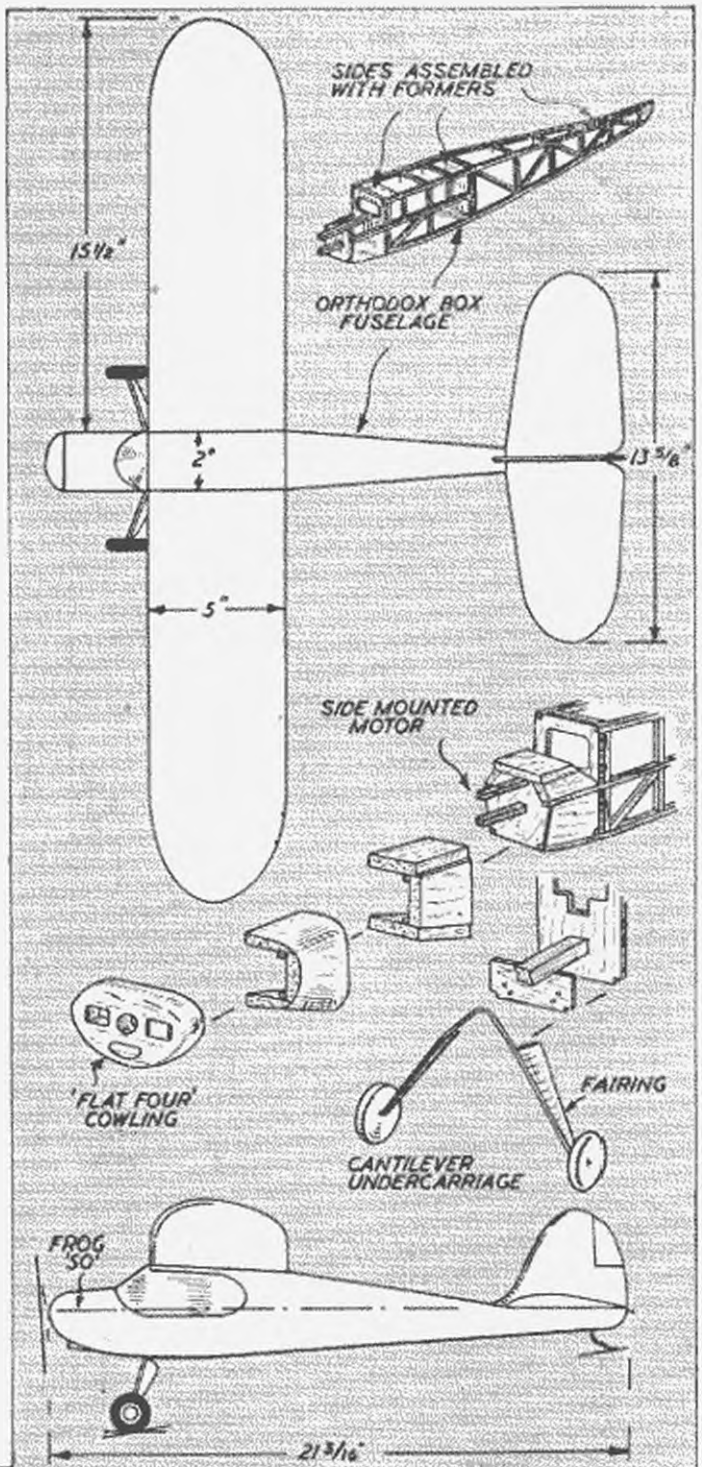
Constructionally the *Zephyr* is very much simpler than the majority of Frog power models. The fuselage is built up in the orthodox way from two side frames of square strip and then joined with cross spacers. Three formers are used at this stage, however, which greatly simplify assembly and make for accuracy. This is a particularly good feature.

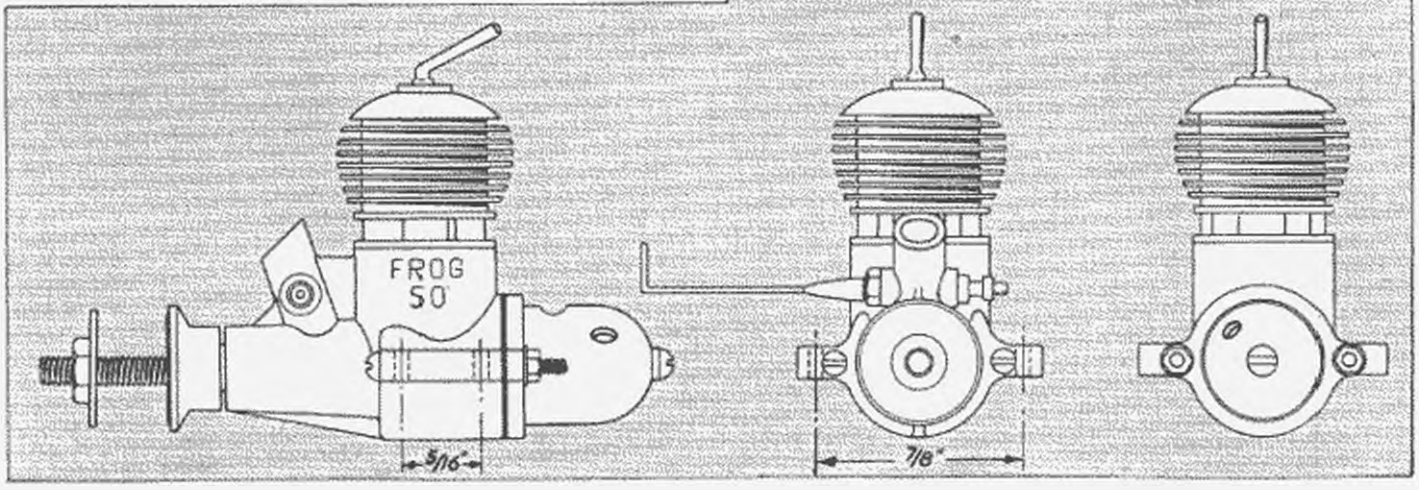
Wing and tail spar sizes are generous and, with the mainspar let into the tops of the ribs, no warping troubles should be experienced. The fin is made from three pieces of sheet cemented together.

Both the undercarriage and the wing fixing are neat. The former is the simple wire cantilever type with an added fairing, correctly locked against twisting round the wire. The wing is held in place with internal rubber bands from hooks in the centre section passing down and through a hole in the bottom of the fuselage, where they are locked by a pin. In contrast the tail unit is held by an external band in the conventional manner. In view of the trouble which has been taken to clean up the wing fixing we wonder why similar attention was not given to the tail band.

Summarising, this is a delightful little model, nicely stable in flight and very pleasing in appearance. For the modeller who likes sport flying and scale appearance, this is just the job for him. As with all Frog products, kit parts are extensively pre-fabricated so that all the awkward cutting and shaping is already done. The kit is very complete.

Supplies of this kit should be reaching the shops very shortly. Price has not yet been announced, but it will be quite low.





Designing Aerofoils

By Ron Warring

BASIS of many of the mathematically derived aerofoil sections is the principle that if we superimpose a purely circular airflow on a purely straight airflow we get a resulting flow pattern which is identical to that produced by a stream of air flowing past an aerofoil section—Fig. 1. Now taking this the other way round, this means, simply, that if we take a standard flow pattern around an

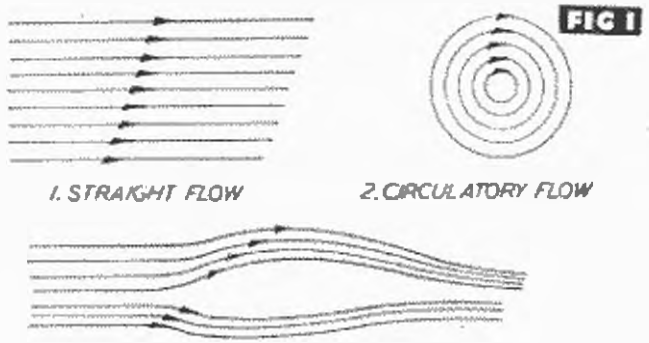


FIG 1

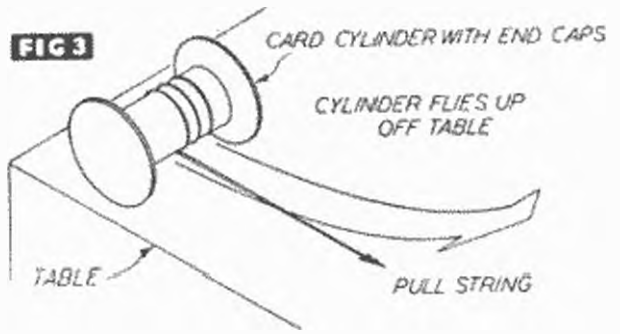
aerofoil, we can resolve or analyse this mathematically by considering it as two separate motions, one a straight or translatory flow of air, and the other a purely circulatory flow, so that aerofoil lift and drag forces can be calculated mathematically, or given these forces, aerofoil sections can be designed by mathematics to produce the required results. Agreement between theory and practice on these points is very close, although theoretical treatment of this nature does not give a full picture. Theory, for example, does not give stall conditions.

The method by which this is done is called the *Circulation* theory, which was originated at the beginning of this century by Kutta and Joukowski. It states simply that we can get a lift force generated by superimposing a clockwise circulatory flow on a purely straight flow—Fig. 2—and experiments have proved that such a circulatory flow does, in fact, take place around any aerofoil that *is* generating a lifting force.

A very simple experiment will also demonstrate the principle of the theory. If a light cylinder is taken and wrapped around with a length of string as in Fig. 3, a sharp tug on the string will pull it free and at the same time give the cylinder a spinning motion. If only this spinning force were generated the cylinder would then simply skid along to the edge of the table and fall off, whereas in fact the cylinder will actually fly *upwards* and forwards. The forward motion imparted by the pull on the string gives the straight or translatory airflow past the cylinder, on which is imposed a circulatory flow as the spinning cylinder drags air round with it. The two together produce the lift force which makes the cylinder jump upwards off the table. An even simpler example is if a match is flicked firewards with a spinning motion it will either fly upwards or downwards, depending on whether it is spun clockwise or anti-clockwise, respectively, relative to its forward motion.

This demonstration of the principle of circulation is known as the Magnus effect, and has been appreciated for some considerable time, as far back as 1852, in fact. Attempts have been made to use it by employing rotating cylinders to generate lift instead of dragging a conventional aerofoil through the air, but with very little practical success. Projected designs of this nature have taken the form of Fig. 4, where the wings are entirely replaced by motor-driven cylinders which, by rotating fast enough, should theoretically produce enough lift to support the whole aircraft. A similar method has been tried as a propulsive unit for ships, where the cylinders or rotors are mounted vertically. Tests of the Flettner rotor ship using such a method did show that a ship could be propelled in this manner, but it was not a commercial proposition and the idea was dropped.

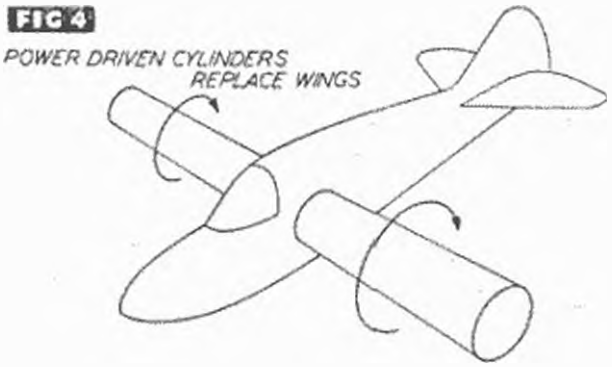
FIG 2 CIRCULATION AROUND AN AEROFOIL



But to return to the circulation theory of aerofoils. Joukowski, as one of the originators of this theory, did proceed to design aerofoils on this basis. The principle of design was virtually that of turning a circle into an aerofoil with pre-determined characteristics and the Joukowski aerofoil section, now widely used on models, is part proof, at least, of the soundness of the scheme. Whilst very similar in appearance to a number of other sections of a similar type it is, theoretically at least, superior to one derived by more cut-and-try methods. Unfortunately, the mathematical processes involved in this method of transformation are far too complex for the average model designer to wish to attempt. Suffice it to say that the shape of the aerofoil section resulting depends upon the mathematical details of the transformation, and by varying the numerical details, an infinite number of different shapes can be obtained. The standard Joukowski section as published is about one of the best for model work, where, like other sections of this type, the centre line of the section is a circular arc.

There is, however, also another series of aerofoils, again derived by similar mathematical means which have been regarded with favour by many modellers —the Davis series. Details of a few typical Davis sections have been published from time to time, but again the basic process can give rise to an infinite number of different aerofoils, where the major factors affecting performance, namely camber and thickness, can be adjusted to suit a particular type of model or need.

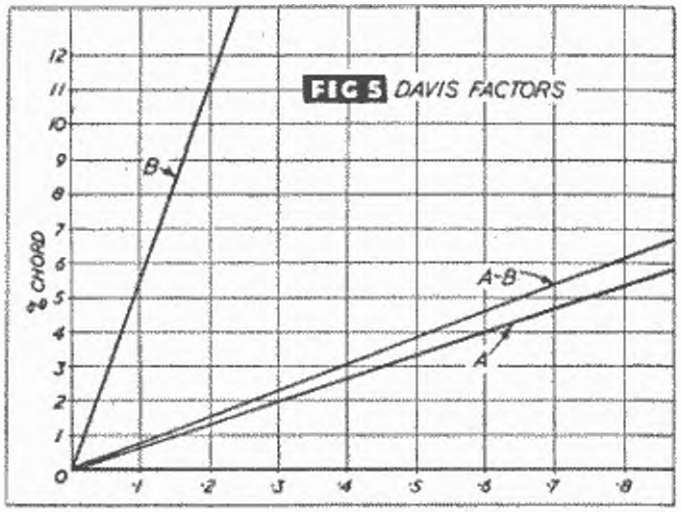
Readers may possibly remember that the Davis sections—which are American in origin—first came into the public news with the B-24 Liberator. This huge aircraft with its high aspect ratio wing exhibited an amazingly high aerodynamic efficiency, which paid off, of course, in excellent performance. As soon as some details of this particular aerofoil



family were known, various sections of the type were tried out for modelwork, and have proved at least as good as, and possibly better than, conventional sections in almost every category. Copland has, and still is, using a Davis section on his Wakefields, for example. Barr and Gilbert use a Davis section on their giant Thermalist glider. Other Davis sections have shown up well in power duration work.

Since, however, the Davis is again a mathematically derived aerofoil the process of calculating any aerofoil from the original formulae is a little complicated and somewhat lengthy. The average need is more or less covered by the published sections—for indoor, ultra-lightweight, medium-weight and heavyweight models—but for those readers who may care to calculate further Davis sections for their own particular needs, the process is as follows.

The variables are expressed as two factors, governing the amount of camber and thickness. The camber factor is designated A and the thickness factor B. These vary with their relationship to the chord length according to the following formulae :
$A = 0.148\ x$ camber (per cent. chord)



$A - B = 0.13\ x$ camber (per cent. chord)
$B = 0.018\ x$ thickness (per cent. chord)
These formulae may be expressed graphically for simple solution as in Fig. 5, and for convenience in working out the final section it is advisable to keep both A and B to simple numbers.

Starting from scratch, there are two possible ways of going about designing the particular Davis aerofoil required. Based on the facts given in the previous articles on aerofoil design one can fix the camber and thickness figures, calculate the factors from there and proceed to calculate the final aerofoil. Alternatively, one can design a Davis " replacement " of any existing section, by finding the camber and thickness characteristics of that section and using these data to calculate the Davis equivalent. For example, a Davis " replacement " of NACA 6412 has a maximum camber of 6 per cent. of the chord and 12 per cent. thickness, so that the Davis figures are : $A = 1.025$ $B = 0.225$.

The basic Davis formulae as just given by Henry

(*Continued on page* 83)

Letters to the Editor

● *The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters*

SPEED C/L TIMING

DEAR SIR,—I note that in the Editorial columns of the current issue of MODEL AIRCRAFT you give considerable prominence to the errors involved in stop-watch timing caused by the "reaction interval" on clicking off. What you seem to forget, however, is that there is also a "reaction interval" when clicking *on*. In a normal individual this reaction time is remarkably constant, so that in practice this source of error is largely cancelled out. The inherent possible error is then little greater than that of the stop-watch, usually ± 0.1 sec. That this is so is shown by the fact that, although reaction times of different observers vary widely, the three stop-watches used to time speed record attempts usually show the same time or differ only slightly.

Whilst on the subject of speed records, I should like to make a personal protest against what has become almost a disease, one from which even the S.M.A.E. Handbook is not immune. I refer to the prevalent practice of recording speeds to as many as three decimal places. This is well illustrated by your December "Cover Story," where you give Claydon's *Dynajet* speed as 214.926 k.p.h. The implication there is that timing was carried out with an accuracy better than 0.0001 sec. and that the position of the model at the end of the measured kilometre was measured to within less than 5 mm.! Even this assumes that the kilometre was itself accurate to 1 mm.!!!

Comment is surely unnecessary. Under present conditions speeds cannot be judged to better than 1 k.p.h. and it is ridiculous for tables and published records to pretend otherwise.

Yours faithfully,

P.R.O., S.M.A.E. KEN BROOKES.

DOES THE BEST MAN WIN?

DEAR SIR,—A study of the history of the Wakefield event reveals a continual struggle between the rule makers and model designers, with the result that at present, the latter are well on top. The present rules leave the way wide open for the development of the 5 min. model, and in the writer's opinion, such performance is excessive for outdoor competition. In a 12 m.p.h. wind, these long range machines will cover a mile on each of their three flights, and even in this country, we have few fields which can cater for this sort of flying, not to mention the time-keepers' eyestrain or the condition of the retriever after 6 miles of cross country work.

While I do not wish the following remarks to be regarded as reflecting in any way on Stark's magnificent fighting performance, it can and does happen at times that the winner of a Wakefield type event is some mediocrity who puts in his full three flights, while the owners of the good models are out scouring the fields, or back-streets in search of their entries. How often do we read such items as "Smith was leading at the end of the second round, but his model was not retrieved in time for its last flight"?

To prevent this sort of thing, there is an urgent need for a stiffening up of the rules to bring performance down to a more reasonable limit. This does not mean entirely cutting out the good luck element, which will continue as long as thermals bubble upwards, but it will reduce the hard luck stories. The question now is: "How to stiffen the rules"? Raising the weight to, say, 10 ozs. would simply result in more rubber being carried, and performance would be as high as ever. Restricting rubber/weight ratio has been tried and found wanting, as it is difficult to process, and gives no incentive for light construction.

After long consideration, the writer has come to the conclusion that the best way out is to maintain existing areas and cross section, and to require that a payload of two, or possibly three ounces be carried, with no stipulation on all-up weight. The weight would have to be readily removable for checking, which could be done before each flight if necessary. Perhaps some of your aerodynamicists could calculate the precise effect of this impost on duration, my guess is that flights would come down to about three minutes, and if they did not, then the weight could readily be increased next year.

Such a move would give designers more latitude, giving them the choice between the lightest possible model, or a heavier job with more rubber, and the quest for aerodynamic and structural efficiency would be encouraged. Also, model designers would be confronted with the major problem of full-sized aircraft design, the carrying of a payload. Under these conditions, we could say with reasonable certainty that the best man really did win.

With a revision of the rules due in 1952, let us hope that the powers-that-be will show some of that boldness and forward vision which led to the introduction of the 8 oz. loading in 1937, and give us rules that will be really worthy of the world's No. One model flying event.

Yours faithfully,

Victoria, Australia. J. M. FULLERTON.

● **Jim Fullerton's model was proxy flown by J. Royle of Derby in the 1951 Wakefield Contest in Finland and placed 17th.—The Editor.**

A MILLION CHUCK GLIDERS

DEAR SIR,—Under this heading in the July issue of MODEL AIRCRAFT, Mr. Dubery suggested the organisation by the S.M.A.E. of a Chuck Glider Contest for schoolboys and this was followed by the letter from Mr. Rippon ("Rip") in the September issue, suggesting that 1952 be made a recovery year, the object being to introduce early-teenagers to the joys (and trials!) of aeromodelling. As mentioned by Mr. Rippon, the right sponsor must be found with as little delay as possible.

The suggestion of a National Contest for *elementary* models is no new thing and, in fact, the right sponsor appeared in early 1937—I refer to the *Daily Dispatch* (one of the "northern" daily newspapers) which organised the *Daily Dispatch* Model Aeroplane Club. The idea

seems to owe its origin to Mr. Terence Horsley who, as a "D.D." reporter visiting a rally held by the then Lancs. Model Aircraft Society, "saw the light" and then helped the fire along. The club was formed and, for the sum of 1s. and a number of tokens cut from the newspaper, members were supplied with the kit and full instructions to enable them to build a very simple stick model. (A most essential part of the equipment was a small gilt lapel badge!)

I was 16 at the time and had been modelling in a small way for some five or six years, but this club really set me (and probably many others) on my modelling career. Rallies and small contests were organised by the "paper" and more advanced kits were given as prizes. The "finals" were held at Heaton Park, Manchester, and the prizes included air trips to Paris and over Northern Europe—quite a good return on such a small capital outlay.

The model itself was a simple rubber driven stick model of all balsa construction, 13 in. span and 10½ in. long with a thin wire undercarriage and bakelite wheels; the "urger" was a very efficient bentwood prop. 4⅝ in. diameter (I've still got one in my "scrapbox"!). The kit was designed and produced, I believe, by International Model Aircraft Ltd. (for the *Daily Dispatch*) but I'm not quite sure about this.

Would it be possible to suggest to the S.M.A.E. that an approach to the *Daily Dispatch* might lead to the "recovery" of the aeromodelling hobby or that International Model Aircraft Ltd. might be approached for the production of this or a similar simple stick model in kit form? This latter suggestion may be impossible should copyrights or patents agreements be involved.

As a result of the "airing" this matter has now had, it may not be too much to hope that a National Chuck Glider or Stick Model Contest could be organised and result in an influx of youngsters into the aeromodelling world.

Yours faithfully,

Rochdale, Lancs. R. Fielding.

WAKEFIELD AS A TEAM EVENT?

Dear Sir,—In your Editorial in the November issue of Model Aircraft you raise the interesting question whether the Wakefield should be put on a team basis.

Like many others I have considered this question and find that it is the right time to do something about it:—not only regarding the Wakefield contest, but also in connection with the three other world championships sponsored by the F.A.I.

Obviously the element of luck does play too big a role when a contest is decided on individuals. Even in team contests luck is not unimportant, but there is better chance of arriving at a reliable result with teams.

On the other hand there is much, both pro and con, to be said. As you especially mention the Scandinavian countries (you might have mentioned many other countries, small, poor or far away from a certain contest) I should like to inform you, that the special Nordic contest, which has taken place annually between the four Nordic countries, have been flown with 4-man teams, the results of the best three counting.

I should like to suggest that the F.A.I. world championships and contests of the same kind are put *both* on an individual *and* a team basis. Whether you will give a certain cup to the individual or to the team is of minor importance—we can get some more cups perhaps with time. But in this way both a country able to send only one outstanding entrant and the countries with a wider basis (or a more fat purse) can have their chance.

Where this year's contests should be held could, as now, be decided by the F.A.I. model commission, who should see that in this way the different championships should circulate and be spread as much as possible over the world. Last year all four championships were placed in Europe and the same may be the result for 1952, and if this continues they will not be world but European championships.

In your editorial you give the post-war Wakefield results if they had been on a team basis. Here is the same for the two A/2 contest (Trollhättan, 1950, Lesce-Bled, 1951):

1950: 1st Sweden, 2nd Finland, 3rd Denmark, 4th Norway, 5th Yugoslavia.

1951: 1st Denmark, 2nd Yugoslavia, 3rd Great Britain, 4th Holland, 5th Sweden.

Obviously other countries have now caught up the Nordic countries in the Nordic A/2 class!

Yours sincerely,

Denmark. Per Weishaupt.

Designing Aerofoils

(*Continued from page* 81)

Cole are related to the diagram shown in Fig. 6. They are:

(i) $x = \sin O \left[2\pi (A - B) + B\right] - \tan O \left[(1 - 2\pi O)(1 - A)\right]$

(ii) $Yu = \cos O \left[2\pi (A - B) + B\right] - A \left[1 - 2\pi O\right]$

(iii) $Yl = \cos O \left[2\pi (A - B) - B\right] - (A - 2B \left[1 - 2\pi O\right]$

where O ranges from 0 to $\pi 2$ radius (0 to 90 degrees), O being expressed in radians for the purpose of substituting in the formulae. Unless calculus is used, however, it is impossible to calculate the y

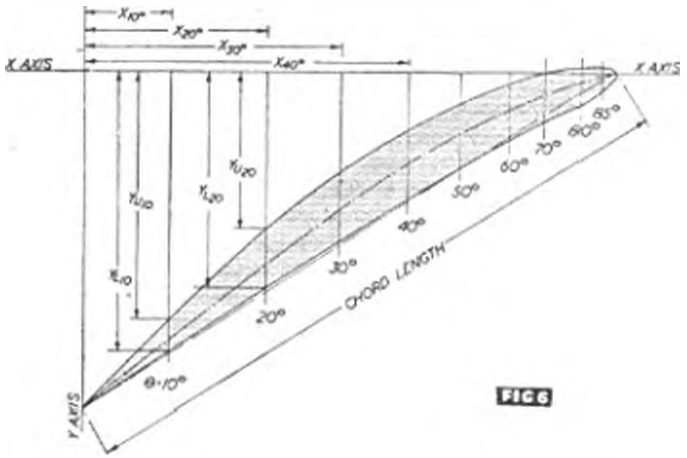


FIG 6

ordinates at $O = 90$ degrees, i.e. the extreme nose station and the simplest way to avoid this is to calculate the ordinates down to, say, the $O = 85$ degrees station and add the extreme nose section by eye. Any error involved will be negligible, and well within the limits of ordinary practical construction. To plot the section to the right chord length, of course, just calculate x at $O = \pi 2$ (90 degrees) (or $O = 55$ degrees, and approximate) and find the correct factor to apply to the x and y values as calculated.

Topical Twists

Vetanvindee

Upon hearing that the appointed venue for this year's Wakefield is known as the Manchester of Sweden I at first feared that the sinister implications of such a comparison might well "damp" the ardour of our rain-weary contest types. However, I am now reassured to learn that the similarity is of an industrial rather than a climatic nature. Thus, it seems, that while the chances are that our team will enjoy a dry sojourn in Sweden (externally at least), there remains, alas, the certain prospect of our Wakefield Funds receiving yet another good soaking.

● ● ●

Junior Genius

Why is it that on club nights the meeting room resounds to the piping treble of a horde of chattering teenagers while on Sunday the flying field is deserted save for a few rather senile specimens striving to uphold the traditions of active model flying as best their dimming vision and tottering old pins will allow? Recent comment on this vexed question would seem to suggest that the answer lies in our out-dated methods of approaching the teenage problem.

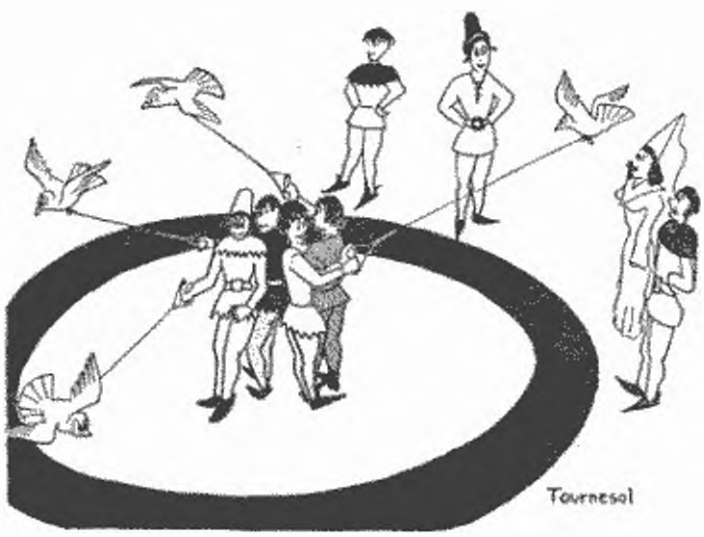
Well, I freely admit that I have always been a staunch advocate of the more old fashioned method of approaching the difficult junior member, that is from the rear with a hefty boot, but in the light of this new suggestion I have lost no time in making a closer investigation of the modern club-room adolescent.

What I have found is most revealing. Hitherto I had regarded all junior members as both lazy and stupid. Now I know differently. Lazy? Yes, but stupid? Far from it. In fact the little beasts have been so devilishly ingenious as to devise a scheme whereby to establish a reputation as an expert aeromodeller without so much as squeezing a cement tube.

The idea is first to acquire a kit. Not just an ordinary kit, mark you, but one of those super, colossal American scale affairs. Which masterpiece of commercial ingenuity is then paraded before one's friends, relatives and acquaintances, and the magnificent plan and all the twiddly bits of shaped balsa and wire held up to their admiring gaze. Truly, they think, only a veritable genius would contemplate the undertaking of a work of such incredible intricacy.

Ultimately, the kit is borne ceremoniously to the club-room, where its proud owner preens before the astonished eyes of the older members, who, wise as they might be in all the subtle ways of balsa butchery, quail at the thought of building such a diabolically involved monstrosity.

Cunning, eh? An accepted modelling expert without any of the fag of building or the bore of flying. Only snag is the initial outlay, and even this could be brought down to a reasonable level were some enterprising model business to introduce a service whereby such kits could be hired for a modest fee.



"Of course, my dear, ye idea will never catch on!"

● ● ●

Notice

With regard to the International Meeting held recently at Fairlop between representative teams from American Forces and the London Area, I am asked to state that the gentleman in the fur cap, who was seen to indulge in such a fearful orgy of model pranging, was not, as was generally supposed, a Russian saboteur.

● ● ●

A Sorry Mesh

Those thankless Wakefield types who are currently giving vent to that soul-scaring cry: "Where can we get gears?" don't really know how fortunate they are to be in their present gearless state.

Quite apart from the fatigue of winding two rubber motors, and the even greater fatigue of explaining to dim types why both motors have to be wound up the same way, there are those delightful occasions when the upper motor, overcome by a sudden fit of generosity, decides to slip its lower berth companion an extra strand. The resulting furious tangle is grand fun for one and all, the spectators absolutely rolling up at the sight of the stricken expression of the gear enthusiast when faced with the shocked realisation that he is left with no alternative but to rip the fuzz apart.

But all this is nothing compared with the initial fun of assembling the gear-box, a procedure involving the mutilation of several hundred feet of piano wire and about six fingers. And, no matter what cunning economies might be practised in its construction, the ultimate weight is ever the same: ½ oz.

This, of course, means extra load, which in turn calls for extra strength, which leads again to extra weight, and so on in a vicious upward spiral—which is more than can be expected from the resulting elephantine model.

● ● ●

Spellbound

Prominence given to the Epsom M.F.C., on the front cover of a model magazine, may seem to suggest that whereas this enterprising club "can make it" they certainly "can't spell it." Still, their particular spelling lapse (leaving the middle "i" out of Exhibition) does, at least, hint at the presence of a gracious modesty. I couldn't, for example, imagine many of the "Exhibition" types, to be seen on our local flying field, overlooking the "I" in the centre.

Pylonius

Accent on POWER

A typical modern power-duration type is this clean-looking model by V. Theobalds.

By

P. G. F. Chinn

THE S.M.A.E.'S competition programme for 1952 lists only one ratio type power/duration contest—the Keil Trophy.

The F.A.I. Model Commission have decided not to introduce ratio contests into the international competition calendar.

It is evident that the ratio event does not find favour with top level official opinion. Why is this?

The reason usually advanced for official lack of enthusiasm, is that the margin of error possible in this type of contests is too great, due to the serious effect on final results which small errors in timing short engines runs may have. This, of course, is perfectly true, especially at the present time when leading exponents of this type of model are using engine runs of around the ten seconds minimum allowed.

For example, two models returning flight times of 3 min. on 10.2 sec. should have a ratio of 17.65 each. A mere 1/5th second error in timing the engine run, either side of the 10.2 sec., however, could mean one contestant being credited with an 18/1 ratio while the other obtained only 17.3. It is also conceivable that true results could actually be reversed, given the twin handicaps of inaccurate watches and unreliable timekeepers.

This sounds serious enough. But what of the hazards and inconsistencies in the timing of all duration flights? Are they not often just as disastrous?

In a normal duration type power contest, one is usually allowed 20 seconds engine run, and in one contest, 25 seconds, for a mere 25 seconds penalty on the flight time—a power flight which should encourage the entry of even the most sluggish types.

Under our usual weather conditions, i.e. wind and/or poor visibility which take models out of sight in three to four minutes, the result will depend a good deal on the timekeepers' ability to keep a machine in sight for a few extra seconds—or on their interpretation of the effort to be put into keeping it in sight as long as possible. Should conditions be worse, with models going o.o.s. in well under 3 min. (not infrequent) almost everything depends on the timekeepers, since practically any power/duration model worthy of the name should be able to do 3 min. on a 20-second engine run.

It would be extremely interesting to compare recorded (o.o.s) times with actual times (up to 5 min. max.) as noted by following observers, under such conditions, for the top dozen in any one contest. Our guess is that not more than one-half would be related to their true performances.

Viewed in the light of this, a fractional error in a ratio contest looks less formidable. True, models in ratio contests will also go o.o.s. in unfavourable conditions, but a model which gets sufficient height to go o.o.s. on 10 seconds, as opposed to one which uses a 20-second run to do the same thing, surely deserves the better placing with which it is automatically credited in a ratio event.

Under conditions of little or no wind with intermittent areas of lift, the luck element may still be the decisive factor in selecting the winner, of course, but in a ratio contest, it may not play as great a part in this respect as is possible in a normal duration contest. Under such conditions, a good model might be expected to make a maximum on a ten-second run and thus gain the maximum possible ratio of 30. If it should fail to connect with any lift and return a normal flight of around 2½ min. (15/1), it is quite likely to be beaten by some lesser, though more fortunate, rival, which hooks a thermal and returns a maximum, *but not by such a large margin*, since the lesser model will probably have needed 15 seconds or more to reach the same altitude.

Under such conditions, of course, the owner of the "hot" model may elect to forgo the chance of a maximum ratio, play for safety, and use 12-15 seconds in the expectation of contacting a thermal during the extra glide time.

Alternatively, he can tackle the problem at its source and set about building a model which will give him all the altitude he wants, irrespective of conditions, on a 10-second run.

Which brings us to our main argument in favour of ratio contests. This is simply that the ratio event breeds the most efficient type of power/duration model, if, by "efficient," is meant a model which

goes up as quickly as possible and comes down as slowly as possible. We already have models which will do a maximum flight on the 20 seconds allowed in duration contests. We have yet to see a model which will give a maximum ratio (i.e. five minutes on a 10-second run) in a contest without the assistance of thermal currents.

Presumably, the nearest approach to such a model is the ultra-lightweight swept-forward-wing layout as developed by the L.S.A.R.A. and described in recent issues of MODEL AIRCRAFT. Admittedly, performance claims for these models have mentioned ratios of 15/1 and upwards, which may not, at first glance, seem very phenomenal, but it should be remembered that these are for very small models, where the glide is markedly inferior. The suggestion of a larger (44 in. span) Dooling 29 powered version, weighing only 15 oz. and which would climb at something like 6,000 ft. per minute, obviously implies a machine able to exceed, comfortably, the maximum ratio of 30.

A model capable of being flown consistently with such a performance would, quite obviously, be a very worthy achievement. Yet such a machine has no place in present duration type contests. Its capabilities would be to no avail when in competition with sound existing designs using 20-second engine runs. In fact, under the usual conditions of limited visibility, the L.S.A.R.A. model would be at some disadvantage when compared with conventional class "B" models, due to its smaller size.

If we accept as inevitable the exclusion of ratio events from the majority of first-class competitions, what measures could be taken to ensure that the greatest possible encouragement is given for the development of power duration model performance?

An obvious and simple answer would be to reduce the permitted engine run. This, it is felt, would find favour with the experts who are currently flying models capable of maximum flights on the allotted 20 seconds. Fifteen seconds would seem to be a suitable figure and is already in effect in one contest, the Sir John Shelley Cup. Twelve, or even 10 seconds has been suggested. With the latter figures, obviously, duration contests would, in effect, be resolved into ratio events, since it is doubtful whether any contestant would wittingly use less than 10 seconds. With the engine run limit cut, the fast-climb model would again come into its own.

Alternatively, instead of altering flight rules, model specifications could be modified, i.e. a power loading rule imposed, which would tend to limit climb and curb the performance of the so-called "overpowered" power/duration model. Such a rule is, of course, already in force for the F.A.I. "International" class which limits engine capacity to 2.5 c.c. and specifies a minimum power loading of 7.06 oz./sq. ft., or 17.65 oz. for a 2.5 c.c. model. The U.S.A. also has the 100 oz./cu. in. rule which means a 15 oz. all up weight for such a capacity—although this is, in fact, rather more in line with current British trends.

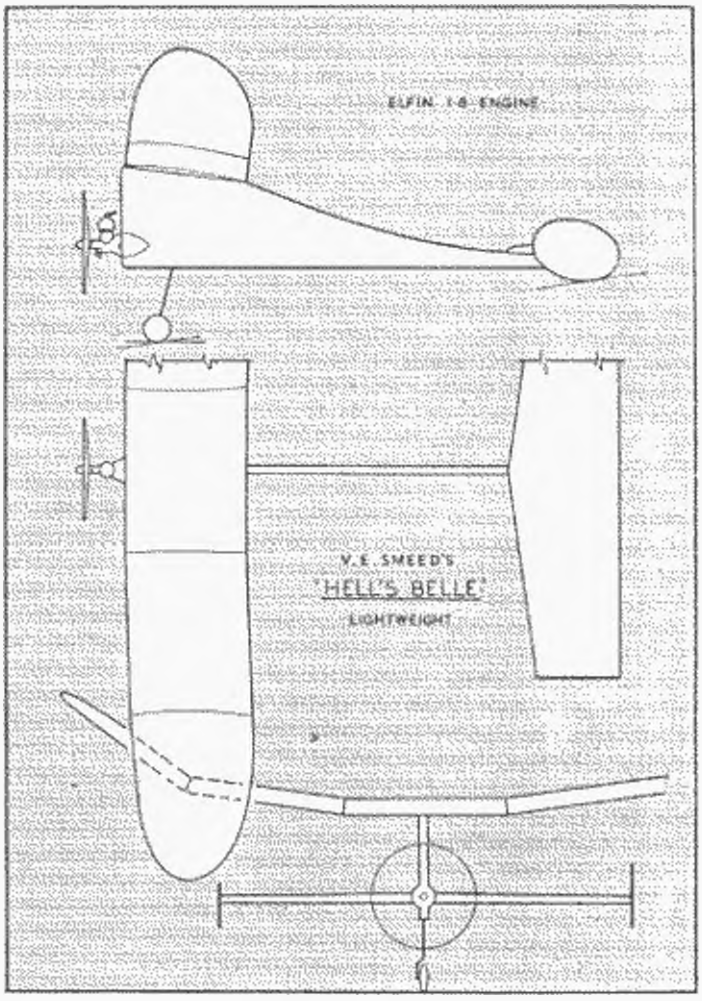
The whole question really depends on what is to be considered the desirable trend of competition free-flight power work. Are we to reward the hardy type who goes all out to get the added performance of a high climb power flight, surmounting the difficulties encountered on the way, or are we to make contests less selective, easier for the less experienced (and, perhaps, less harassing for all concerned!) by applying rules to restrict, or nullify, performance above a certain level?

Possibly the happiest solution would be to simply select a few contests to be run off on reduced engine runs to satisfy those keen to match their skill with the experts, the remaining events allowing 20 seconds as at present.

In addition, it would be interesting to see at least one reduced engine run power event with rounds run off (as has been done lately with the Wakefield) during late evening and early morning. Such an event should far more accurately reflect the capabilities of the models entered, and, under these conditions, an international contest, equal in status to the Wakefield, might eventually be developed.

Under present rules, by which models of widely differing specification compete on more or less equal terms, some interesting contrasts in design have been seen.

On the one hand are lightweight designs, moderately powered and generally of large area. Vic Smeed's *Hell's Belle* immediately comes to mind as an outstanding example of this approach, a 60 in. model, using only an Elfin 1.8 for power. At the



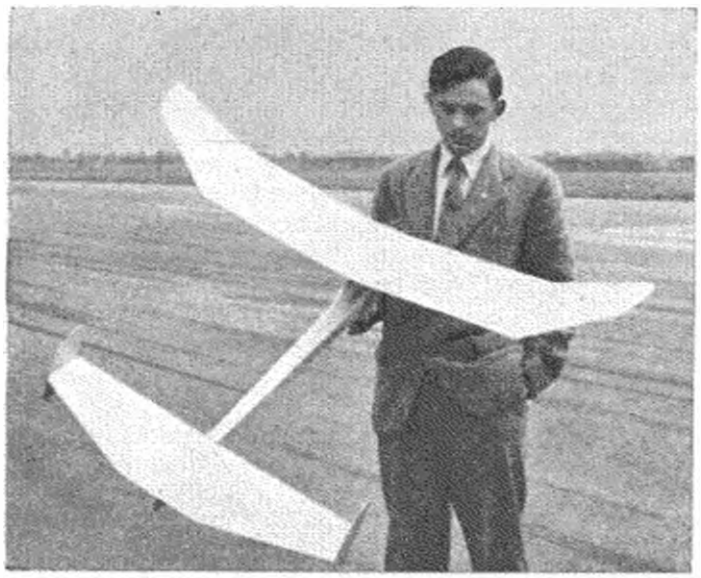
other end of the scale can be found more highly powered models, also generally of moderate wing loading, usually rather smaller, and, for want of a better-known design, I quote my brother's Halfax winning *Ascender* 52 in. span, 18 oz. and Amco 3.5 powered.

The specifications of the majority of present day power duration models, of course, fall somewhere between these two and include many well-known designs, among which may be found Norman Marcus's lightweight *Jaded Maid* and, nearer to the smaller, fast-climb layout, John Gorham's *Contender*, both highly successful contest winning designs.

These four models are conveniently comparable because, essentially, they may be regarded as variations on a basic theme—the theme being the large class "A" (2.5 c.c.) model.

Taking the ultra-lightweight low-powered design first, the advantages of this layout are to be found in relatively easy trimming, due to moderate flying speed under power. The rate of climb is bound to suffer, of course, but performance will be compensated to a certain extent by lower sinking speeds. Provided that the structure is not too flimsy and prone to warping, such a model may be a more consistent performer than the ultra high climb type, due to the fact that minor deviations from the critical trim are unlikely to have such a serious effect under power.

As an example of the foregoing, *Hell's Belle* is notable for its large surfaces, totalling some 5 sq. ft., with an engine of only 1.8 c.c. Three years ago, a model of these dimensions would not have been considered small for a 5 c.c. engine, although the total weight would have been at least double that of *Hell's Belle*. The model is reported to fly quite slowly under power and, illustrative of this is the suggestion that to trim for turn, the tail unit may require offsetting as much as 1 in. Needless to say, an adjustment of such magnitude on a model of more orthodox proportions would invariably prove fatal.



An example of a successful "ratio" type model, the "Ascender." Moderate dimensions and weight. Powerful engine.

Although moderately powered, *Hell's Belle* has most of the features associated with the stability requirements of more powerful models. The tailplane area is large—41 per cent.—the pylon height is appreciable, and there is no reduction in the dihedral angles which might be considered permissible with such a small power unit. In general, the aerodynamic design suggests a "safe" model which should give a good performance with a minimum of trouble.

With Norman Marcus's *Jaded Maid*, winner of many contests in 1950, the accent is again on light weight with a large wing area. The original, in fact, was stated to weigh only 12 oz. The engine in the case, however, is a 1949 type Elfin 2.49 which, of course, delivers substantially more power than the 1.8 and, despite its large size, the model therefore has quite a low power loading in terms of lb. per h.p. The designer admits, however, that, at its original weight, the airframe was decidedly weak and expresses the opinion that strengthening up to the required F.A.I. weight of 17¾ oz. would make a more consistent, as well as more serviceable, performer. It should be noted that even with this proportionately large increase in weight, the wing loading is still quite low, while 17¾ oz. is still quite a moderate weight for an Elfin 2.49 engine.

Winner of both the Halfax and Astral trophies in 1950, *Jaded Maid* had an average ratio of 13.75 over eight contests entered during that season. The design, for the most part, may be regarded as conventional. Wing aspect ratio is slightly above average but dihedral angles are normal. The design was one of the first to use a side-mounted engine.

Our third model, John Goreham's *Contender* has an equally impressive contest record. Winner of the 1950 Sir John Shelley Cup contest at the Nationals, flown by the designer, another model basically identical, won again this year in the hands of National champion, Peter Wyatt. Numerous other placings have also fallen to this design and the Ipswich power team during the past two years.

Here, as with the Marcus design, the Elfin 2.49 motor is used, but there are few other points of similarity between the two models. Spanning 46 in., with a wing area of 340 sq. in.—nearly 30 per cent. less—and a weight of 14 oz., it is several steps nearer to the opposite extreme of the ultra fast-climb model, depending on altitude rather than a floating glide and thermal catching, to prolong its flight.

An obvious threat in any contest, the *Contender* is nevertheless at its best in a ratio event and has been credited with "still air" ratios in the region of 18/1. It goes up, not in a lazy vertical attitude, but in a fast, steep, straight climb into wind. Unlike the previous two models mentioned, the *Contender* conforms to the F.A.I. rules, except for the International class, when it needs ballasting up to satisfy the power loading formula.

Typical of all Gorham designs, the model is neat, functional and serviceable and features the long tail moment desirable with high-powered designs. It is, Gorham says, sensitive to fin adjustment, although

NORTHERN NOTES

★ SOCIAL EVENTS in the North may be few and far between, but one always well worth attending is the Sheffield Club's Dinner and Prize Giving. Their organisation and time table are a model of efficiency and their hospitality first class. This year, in addition to their own members, guests from about ten or twelve other clubs in the Area were made more than comfortable and treated to a very succulent repast. Their Chairman, Mr. Slack, paid tribute to the enthusiasm of the members, and complimented the Area Officials upon the successful season enjoyed this year. The actual prize giving was in the most capable hands of "Lord" Gosling of Clwyd, who during his address paid tribute to the amount of work achieved by the Council of the Society, the willingness of the Officials and the not always well appreciated labours of the Area Delegates.

★ THE ANNUAL General Meeting of the Society was not exactly swamped by Northern members, in fact, as may well be expected in view of the high cost of attendance, the number of attenders from North of the Trent could be counted on one hand. Speaking entirely personally and without any official backing, I think it is time the Society made some different arrangements for voting at this very important meeting. As it stands, members in the North, unless they have club funds well above the average, have little chance of making their voice heard, and any proposition of National importance is always controlled by Southern opinion. I would remind the Council that there are a lot of members in the North, who pay quite a lot in affiliation fees, and it is only fair that they should be given a comparable chance of putting their viewpoints forward. The most controversial matter, of course, was finance, and whilst I was not surprised at the attitude taken by the people present, I was disappointed to think that we have so many short-sighted members. Quite frankly, the Society has always been running on a shoe string, and this year the red light has shone in earnest. The opportunity was there to place the Society's finances upon a really firm basis and the lead had been given at the Area Officer's Conference, but once again, a compromise and not a cure was effected. It is worth while noting that Areas who have in the past relied heavily upon the services of the Society were most reluctant to dip a little heavier into their own pockets. Another quick change round was the reversion from three semi-centralised contests back to five, again the result of much hullabaloo on the part of those whose travelling expenses to this type of meeting are lightest. Ah well! He who least often pays the piper, generally is able to call the tune.

★ WHILST ON the question of meetings, I hear the Western Area are getting more than a little fed up with the general apathy of the majority of the clubs in their Area, and have decided, in future, only to cater for those who maintain an intelligent interest in the doings of the Area and its Committee. Methinks a point well made, and one that could be copied to advantage by many other Areas in the country; like a rude joke, a rude shock might arouse interest in the minds of many.

★ THE RECENT Northern Area meeting enjoyed a fairly quiet session, but rumour has it that there may have been one or two points raised, of interest to the bods. I understand that pre-entry, accompanied by the appropriate fee, will be the rule in *all* Semi-Centralised events this year, but entries will be accepted on the day at a special late fee rate. I think fair-minded modellers will agree this is quite a reasonable rule; it will give the officials an advance notice of the entry to be expected, and yet at the same time allows for the bloke who can't make up his mind until the last minute to enter if the weather suits him. I understand also, that application has been made for the use of Rufforth for the whole of the five meetings, but club officials should take heed of the fact that all is not well at that venue, and unless the fliers become a little less nomadic and a little better behaved it may be another case of "gone for ever." The Area Subscription is still with us, in spite of the income from the *Evening News* Rally, which may or may not produce an equal amount each year in the future, but it was pointed out that 1950 produced an excess expenditure over income of some £19. Hence the tug on the lug this year, and you are requested to see that it is paid (cheerfully?) by March 31st—or else.

★ LATEST INFORMATION from the North West produces the news that Peter Foulkes of Cheadle is the new Area Chairman, Ray Musgrove of Oldham steps into the Secretary's shoes and Les Massey of Timperley collects the thankless and never appreciated job of Comp. Sec. Otherwise it is the mixture as before, with Messrs. Salloway, Holmes, and Barnes as Area Delegates, Treasurer and P.R.O. respectively. Officials in the Area take a very dim view of the suggestion by a Southerner that the Area scheme be scrapped, in view of their remarkable organisation and strong position. They now have two airfields available for the Area events, a solid record of achievement and more to the point a respectable bank balance, and it is worth while noting that prizes alone last year cost the Area over £80. A little different to the scrounged kits of some areas. The Northern Models Exhibition will again be held in March and as the Area officials are most anxious to see a full and representative entry, the loan of historic models (as my correspondent puts it, liquorice driven canards built from umbrella stays) would be more than appreciated. The N.W. records system means that the 1951 records are now scrapped and the chase begins anew. All 1951 record holders will receive handsomely engraved trophies as permanent awards, and the new records will be based upon a three-flight basis, with a five-minute maximum.

Apologising for the prod, may I ask what's happened to the lads away in the far North East, after a promising start last year, they appear to have faded in the back stretch. Let's be hearing from you up there!

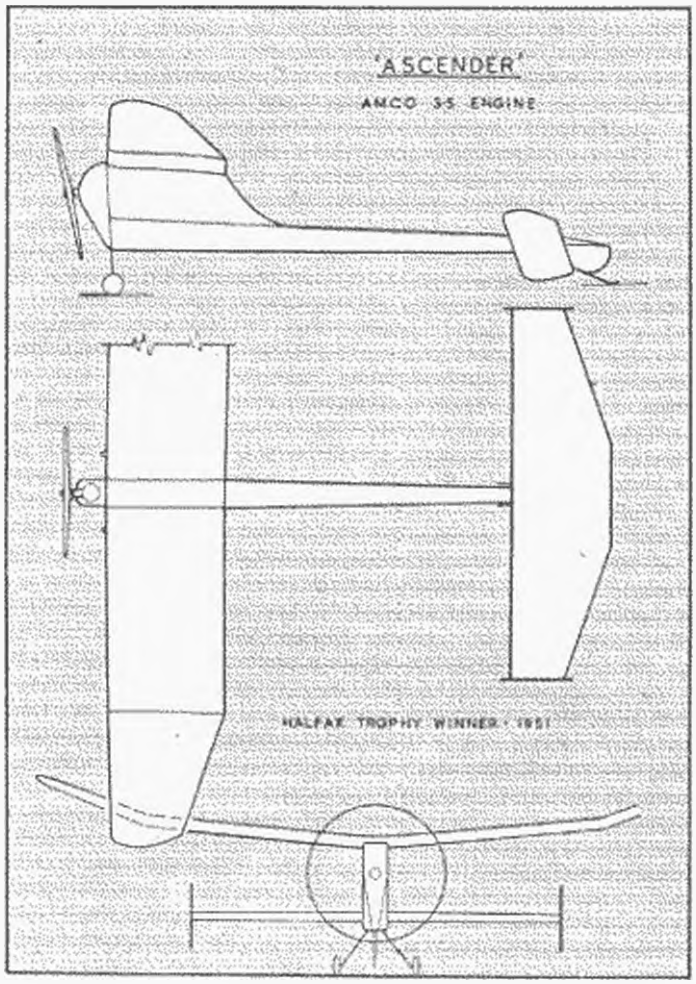
★ THINGS WE hear around and about.—Is it true that one laddie who lost his model during the summer found his engine a few weeks ago—in his best pal's model?

It is denied that the B.R.M. was recently seen in Sheffield, it was only George Wilkin taking a couple of pals to the station.

Nobody knows why, but the Huddersfield club have now emulated the famous Arab who folded his tent and stole silently away in the night.

The Lockwood club are proposing holding a rally on Davis Brown's Airfield on June 29th.

And so, once again my little chickadees, we bid a fond farewell to these romantic islands, and their waving palms (put a sock in it—ED.).



we have seen no evidence of this on the occasions of witnessing *Contenders* in competitions : the model has always impressed as being one of the most reliable of the fast climb type yet seen.

The fourth model, the *Ascender* differs from the others in that it uses the high thrust-line layout. The design was first described in the March, 1951, issue of MODEL AIRCRAFT, a prototype model, a 42 in. 1.49 c.c. version then having been built. This original model was taken to the area Astral Trophy event in April last, in which, despite a poor start, it succeeded in placing first. After witnessing the performance of the Ipswich Club *Contenders*, however, which, while having an " off " day, were, we thought, more than a match for our model under good conditions, it was decided that something slightly more potent was desirable for the next (Halfax) meeting due three weeks later.

Two larger versions had been drawn up and, in view of the limited time that was available in which to get the model built and tested, it was decided to build the medium size version of 52½ in. span. Intended for 2.5 c.c. engines with the possible alternative of 3.5 c.c., it was further resolved that performance would have to be all or nothing and the Amco 3.5 was therefore installed from the start. With little previous experience in trimming so much power, *Ascender* was got into some sort of trim the afternoon before the contest, and the following day managed to win with a record aggregate of 66.4 : 1.

In four contests entered during the season (Halfax, Keil, Hamley and British Championships) the average flight time was 3 min. 41 sec. and the average ratio 18.7. This included four thermal assisted maximums on engine runs not exceeding 12 seconds, but also includes two flights of under two minutes due to " pilot errors."

Two criticisms can be levelled against the design. Firstly, the very large downthrust angle now used (with the Amco) means that the centre section of the wing, which is in the slipstream, must, in effect, be operating in a stalled condition. Secondly, and again related to the thrust-line, the tailplane is well out of the slipstream and is thus deprived of the extra lift, normally available in conventional pylon designs, for controlling looping under power.

However, these features are inseparable from the Grant theory on which the layout may be said to be based. In this connection, it is worth recalling that Grant's C.L.A. theory, so often criticised, does not end with simply placing the thrustline high and adding forward side area by means of a deep fore-body. Briefly, Grant maintains that the " displacement axis "—located by the relative positions of the c.g. and c.l.a., determines the attitude of the model when deflected from its normal flight path under power and that when the inclination of this axis is positive (downthrust being an added stability factor in this case) a righting coupling tends to pull the model in the opposite direction to the bank.

Engine Tests

(*Continued from page* 69)

high revolutions—about 13,700 r.p.m., where an output of .072 b.h.p. was registered.

Using certain standard fuels, the maximum speed possible on the compression adjustment allowed was 12,500 r.p.m. A fuel which would fire at a somewhat lower compression was therefore chosen for the tests. This allowed speed to be increased to 14,500 r.p.m. Beyond this figure it was necessary to remove the compression stop pin to enable the ignition point to be sufficiently advanced to meet the reduced load. At these excessive speeds, however, normal vibration caused the compression lever to slacken off and reduce compression and although a simple locking arrangement could be devised to prevent this, there is no object in habitually operating the engine at such revolutions, which are well above those at which maximum power is realised.

The Mills ran evenly at all speeds tested and was responsive, yet not unduly critical, to both compression and needle-valve adjustment. Its willingness to do exactly what was asked of it made testing a pleasure.

Power weight ratio : (as tested) : .658 b.h.p./lb.

Power/displacement ratio : (as tested) : 98.5 b.h.p./litre.

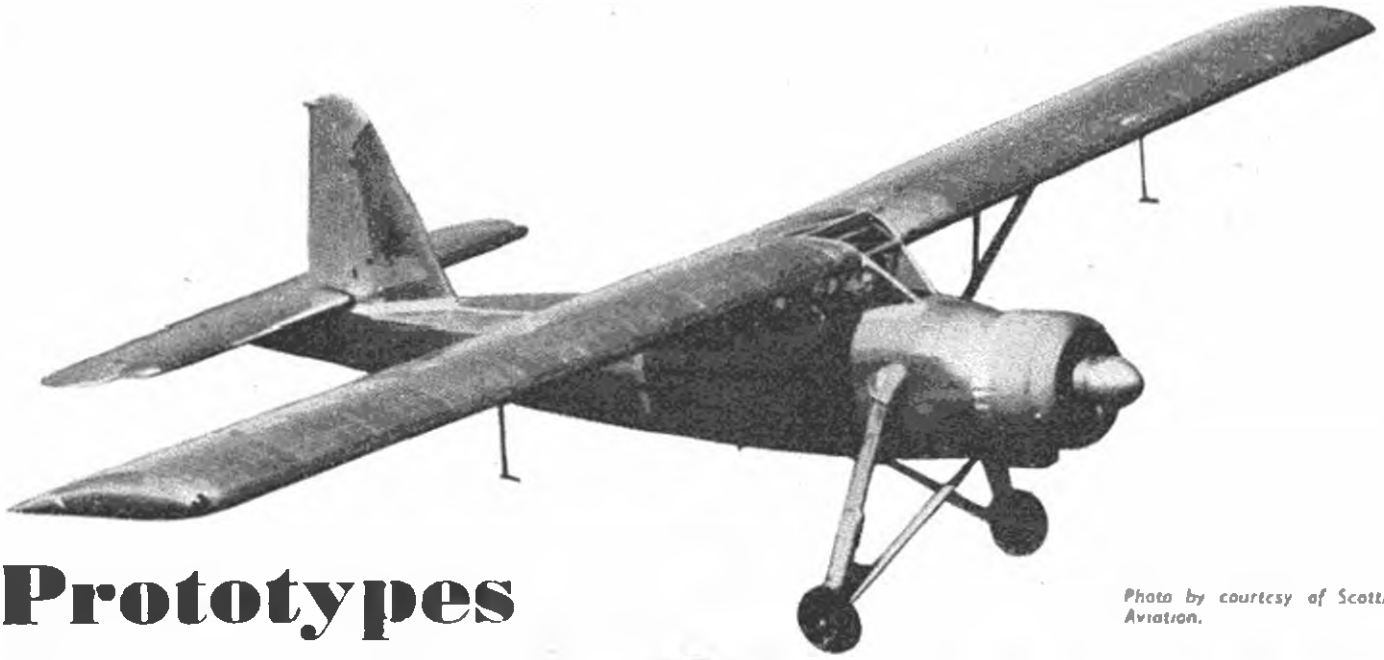


Photo by courtesy of Scottish Aviation.

Prototypes Worth Modelling

By C. B. Maycock

No. 18.—THE PRESTWICK PIONEER

THE Scottish Aviation *Prestwick Pioneer* can be justly claimed as another natural for R/C fans. It has everything to recommend it on this score, simplicity and ruggedness being the two chief advantages. There are two generous doors on either side of the fuselage and a large hatch mid-way along its length, just in the right place for access to controls.

The close cowled Alvis Leonides engine of the prototype can be easily represented and made to accommodate an upright, inverted or side mounted diesel.

Designed for use in rough country, the full size machine is an all metal aircraft which can be fitted as a four passenger plane, ambulance, aerial photographer, crop-duster, or as a dual control trainer. It can be fitted with alternative engines like the Armstrong Siddeley Cheetah 25, Pratt & Whitney Wasp Junior, or De Havilland Gipsy Queen 70 series. The airscrew is usually a Rotol, or De Havilland.

The seating arrangement for five up, places the pilot well forward centrally in the cabin and the passengers side by side in tandem. Full span controlled slats lie neatly along the leading edge of the main planes and Fowler type flaps extend from the wing roots to the ailerons.

Slats and flaps are actuated by one control. The tailplane has variable incidence and is fitted with powerful balanced elevators. Elevators, flaps and slats are interchangeable port to starboard and *vice versa*.

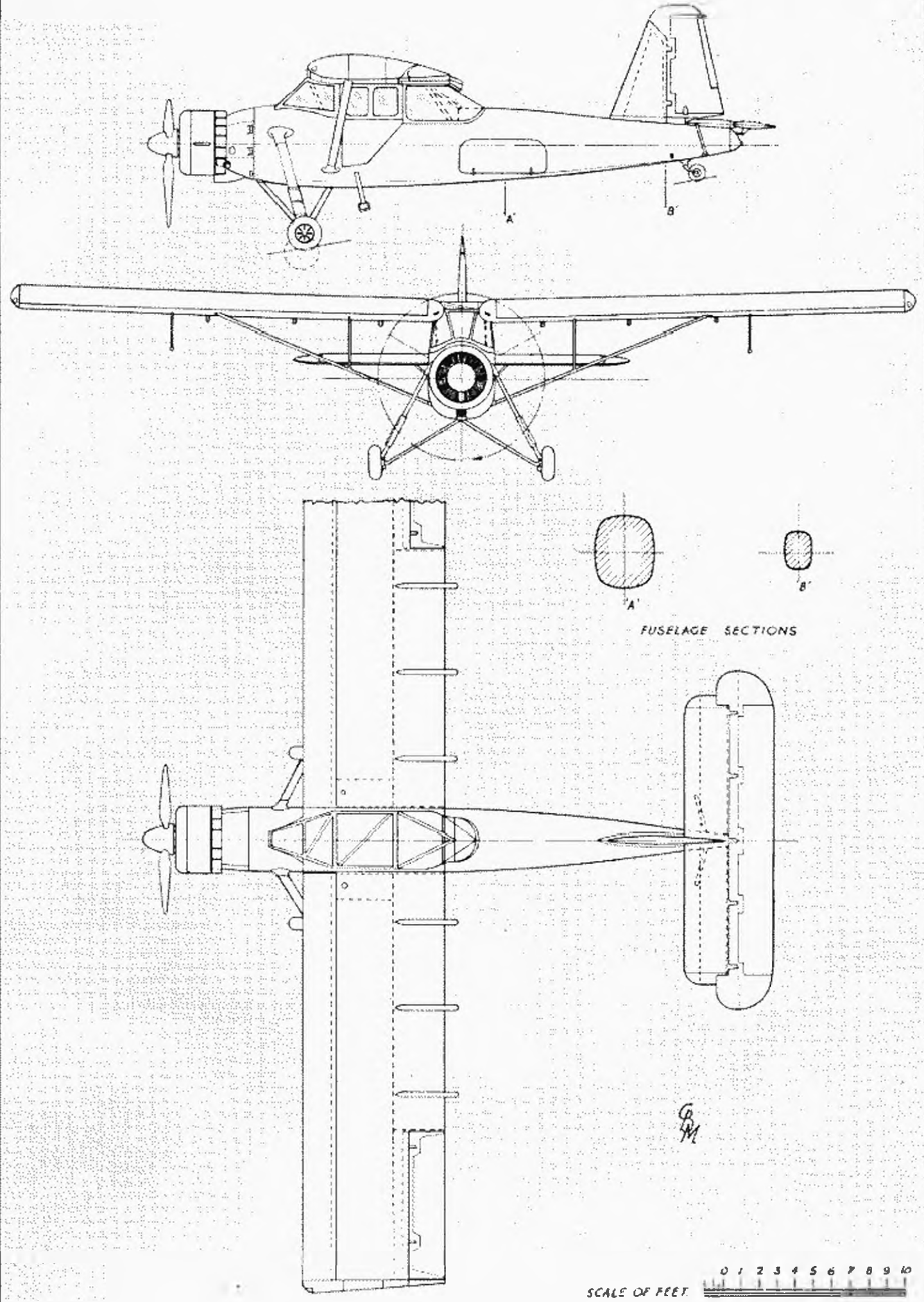
A split axle undercarriage has a track of 9 ft. 6 in., the wheels have Goodyear disc brakes. A fully castoring tail wheel is fitted to the fuselage by external bolts for ease of removal and maintenance.

The fuel tanks are situated in the wing roots and can be refuelled either by pump from beneath or by Jerrican from the upper surface. In the all metal airframe the only fabric covered components are the rudder, elevators and the ailerons. These are silver doped to blend with the metal covering.

Principal dimensions of the *Pioneer* are as follows: Span : 49 ft. 6½ in. Overall length : 34 ft. 7 in. Height tail up 13 ft. 5 in., tail down, 10 ft. 1 in. Tailplane span 18 ft. 8 in., tailplane chord 4 ft. 10½ in. Constant cruising speed with the Alvis 520 b.h.p. 9 cylinder "Leonides" model LE4M engine is 120 m.p.h. at 5,000 ft.

One Alvis engined *Pioneer* is registered G-AKBF and has an orange nose to the cowling and orange speed streak down both sides of the fuselage.

Photograph by courtesy "The Aeroplane" (London).



The PRESTWICK PIONEER

From the S.M.A.E. and the CLUBS

REPORT OF THE S.M.A.E. COUNCIL MEETING HELD AT THE HORSE SHOE HOTEL, LONDON, W.1, ON DECEMBER 2nd, 1951, AT 11 a.m.

The following were present :—Messrs. A. F. Houlberg (Chairman), R. F. L. Gosling, D. A. Gordon, H. W. Barker, S. D. Taylor, K. J. A. Brookes, E. F. H. Cosh (London), R. W. Bennett (Midland), R. Landymore (E. Anglian), R. L. Yates (Southern), N. F. Coulling (S. Eastern), B. A. Messom (Northern), H. G. Hundleby (S. Midland), D. Scoffham (Royal Aero Club).

Matters arising from the Minutes

The Treasurer drew attention to the reference in the Minutes of the meeting of October 14th, 1951, which stated that his accounts as presented were not "generally comprehensible." It was agreed that the minute of this item was inaccurate and it was accordingly altered to read : " that the financial statement was presented in an admirable and accurate form by the Treasurer, but it was highly desirable that statements should in future be accompanied by a simple statement etc."

1952 *" Model Engineer " Exhibition*

The Secretary read a letter from Messrs. Percival Marshall & Co. Ltd., stating they that regretted that they would be unable to continue the present arrangement whereby the Society received a sum of approxiately £170 for their assistance in connection with the organisation of the Model Aircraft Section of the Exhibition. The organisers offered to provide a suitable stand for the Society and to pay the cost of erecting same, which would be approximately £70. They would also provide trophies, medals and diplomas and defray the expenses incurred by Stewards.

The Secretary was requested to convey to the organisers the Council's thanks for their past assistance and to advise them that the Society would again co-operate with them in connection with the 1952 Exhibition.

Messrs. A. F. Houlberg, E. F. H. Cosh and R. F. L. Gosling were appointed Judges of the Model Aircraft Section.

1952 *Nationals*

In view of the South Eastern Area Committee's participation in the organisation of the 1952 Nationals, Mr. D. A. Gordon enquired whether any decision had been made at the Area A.G.M. concerning the loan of £160 which was recently made to the Area by the Society. The Area Delegate replied that the matter had not been fully discussed but that it seemed doubtful whether any repayment could be made at present.

The Secretary was instructed to write to the Officers Commanding Gosport and Ford R.N. Air Stations to enquire regarding their availability for the Nationals.

International R/C Meeting

Mr. A. F. Houlberg gave details of a contest which is to be organised by the International Radio Controlled Models Society at Woodford Aerodrome, provisional date for which is August 17th, 1952. He informed the Council that the Society had agreed to sanction the holding of this Contest.

Area Resolutions

Midland Area Committee. (a) " That the Council consider granting 10 per cent. rebate to Area funds from all sums collected for the purposes of Insurance-cum-Registration. Failing this that Area Committees be permitted to charge the Society with postal expenses incurred."

The proposition was defeated and an amendment proposed by Mr. E. F. H. Cosh and seconded by Mr. K. J. A. Brookes.

" That Area Committees be permitted to charge the Society with postal expenses incurred with Insurance and Registration " was carried.

Also Midland Area. (b) " That the Council apportion financial support to International Contests proportionate to the entries received for the various Eliminators."

This proposition was defeated.

Finance

The Council welcomed Mr. H. W. Barker, to the meeting after his recent illness.

The Treasurer gave details of the financial position of the Society and explained that he was having some difficulty in meeting present commitments. He also mentioned that he was still waiting to receive from the Western Area further details concerning the accounts relating to the 1951 Nationals. Mr. Barker stated that it appeared that despite the instructions recently issued to all Area Committees, the Western Area had incurred large items of expenditure without Council sanction.

Arising out of the discussion on this matter a proposal by Mr. B. A. Messom and seconded by Mr. D. A. Gordon " that the Society should not be involved in any further contingent liabilities without the approval of the Society's Treasurer " was carried.

Mr. E. F. H. Cosh raised the question of present method of payment of expenses incurred by the officers, and proposed that in future such expenses should not be paid from petty cash at Londonderry House but submitted to the Council by the Treasurer for approval before payment.

This proposition was carried.

1952 *Wakefield and International Contest Draw*

Mr. B. A. Messom agreed to organise the draw with Mr. Rushbrooke's assistance. It was decided that the tickets should be 6d. each and that the prizes should include three free trips to International Contests, supplemented by fifty other prizes.

Insurance

The Treasurer drew the Council's attention to a recent statement with regard to completion of Insurance Certificates by Area Insurance Officers. He stated that the date shown on the certificates must be 12 months from the *actual date of the receipt of the premium.*

Sub-Committees

The following sub-committees were appointed for 1952 :

Contest Rules. Captain S. D. Taylor and Messrs. H. G. Hundleby, E. F. H. Cosh and K. J. A. Brookes.

International Travel. Captain S. D. Taylor and Mr. H Hundleby.

Dinner and Prizegiving Organisation. Messrs. M. A. L. Coote, E. F. H. Cosh and D. A. Gordon.

Radio Control. Messrs. G. Honnest-Redlich, S. Allen, S. Sutherland and M. A. L. Coote.

Wakefield. Messrs. E. W. Evans, R. H. Warring, J. B. Knight and R. Copland.

Control line. Messrs. K. Muscutt, N. Butcher, J. McNess and C. West.

Contests at Butlin's Holiday Camps

The Competition Secretary mentioned that an offer had been made by Messrs. Butlin's Limited for the Society to organise a series of competitions at certain of their camps during the coming contest season. (Full details of the proposed contests were given in last month's MODEL AIRCRAFT.—EDITOR.) The Council decided to accept the offer and Captain Taylor was requested to confirm the arrangements with Butlin's. Before deciding to hold the Wakefield and A/2 Trials at Skegness, Captain Taylor agreed to inspect the venue and report back to the Council.

New Clubs

The Wrekin College M.C. (Midland), S.3, J.22. South London Scale M.F.C. (London), S.7. Strabane M.A. (C.), S.15. Haverhill & D.M.A.C. (E. Anglian), S.11, J.1. Harrow M.A.C. (London), S.10, J.3.

S.M.A.E. Special Prizewinners' Badges

It was agreed that these badges should be available to winners of S.M.A.E. contests prior to 1950 at the following prices : Silver Gilt £1 1s. Silver 17s. 6d. Bronze 5s.

The Meeting closed with a vote of thanks to the Chair at 6 p.m.

CAMBRIDGE M.A.C.

The club rubber comp., planned for August, was finally flown off on Nov. 11th, in good weather—blame "Pinnacle" and other R.A.F. activities for the delay. A new record of 3 min. 57 sec. was set up.

At the end of October the club put on a static and flying show at the Cambridge and District Model Engineers' Exhibition. Scale models were popular, a *Grumman Panther* putting up a very good show. One lad displayed the entire contents of a *Hawker* 1067 kit cut out and arranged on a board with a completed model. A sign "From this—to this" finished it off, and the display aroused considerable interest.

LONDON AREA COMMITTEE

The last L.A. Committee Meeting of 1951 was held on December 10th, at the Horseshoe Hotel. The atmosphere of humour and goodwill which is traditionally associated with this time of the year was not, alas, present at our meeting and it was impossible to suppress feelings of disappointment in this year's work.

Fairlop. The agreement between the Ministry of Civil Aviation and the S.M.A.E. for the use of the aerodrome has recently been concluded, but any additional clubs will be accepted for an initial rental of 25s., the extra 5s. covering the cost of the clerical work involved. New clubs or newly affiliated clubs will become a party to the agreement on payment of £1, but lists of extra clubs wishing to use Fairlop will only be submitted to the Ministry at three-monthly intervals.

Clubs are reminded that they must also possess third party insurance cover up to £25,000.

Jets. The Ministry of Civil Aviation has requested us to refrain from flying jet models on Fairlop. In the past complaints have usually been based on the noise emitted, which, it is generally agreed, is audible over several miles on a quiet day. Recently, however, local residents have alleged that cracks which have occurred in the walls of their houses can be attributed to the sound emanating from a model jet engine!

Finance. The London Area is at present in debt to the tune of about £15. It was pointed out that certain areas in the North of England have made considerable profits by organising large scale rallies, sponsored by well-known newspapers. Since every S.M.A.E. centralised event we have held at Fairlop has involved considerable loss it was agreed that sponsorship is essential before a large scale rally can be contemplated. A sub-committee, comprising clubs experienced in rally organisation, was formed to investigate the possibility of holding such a meeting near London. Clubs represented: St. Albans, Northern Heights, West Essex, Croydon.

S.M.A.E. Area Contests. The Croydon Club's offer to organise the area contests on April 6th was gratefully accepted.

SOUTH EASTERN AREA COMMITTEE

The A.G.M. was held at St. Leonards on Sea, on Sunday, November 25th, 1951. Present: Brighton, Canterbury Pilgrims, Eastbourne, Godalming, Hastings, Men of Kent, Sevenoaks, Southern Cross, Tunbridge Wells and Westfield Clubs. Apologies for absence were received from Mr. R. J. Bent and the Ashford and Folkestone clubs.

The meeting commenced at 2.15 p.m. with Mr. Towner in the chair.

Minutes. The minutes of the last A.G.M. were read and confirmed.

Matters arising therefrom. Several delegates requested further information relating to the finances of the 1950 C/L meeting. It was explained that due to the unfortunate indisposition of the Society's Treasurer it was not possible to supply this information.

Correspondence. The Secretary read a letter from the Sevenoaks & Dist. M.A.C. requesting repayment in part of their loan to the Area for the 1950 C/L Championships. This was agreed to in principle.

Officers' Reports. The Chairman in welcoming delegates, said that he was pleased to see the good attendance. As the Treasurer, Mr. Towner, presented a statement of accounts which showed that the Area had a balance of £8 8s. 6d., which will be largely required in defraying the expenses of Area Officers.

The Secretary thanked the officers for their assistance. He thought that the Council's lack of foresight was largely responsible for the present financial position of the Society, and that the Area would benefit from economies made at top level.

The Competition Secretary was pleased at the increase in the number of entries made, but said that venues continued to be his main difficulty. In the absence of full results of S.M.A.E. contests it was not possible to announce area champions for 1951. Arising from Mr. Couling's report a resolution was passed that clubs should receive from the S.M.A.E. on pre-payment at cost a full list of competition results.

The resolution from the Brighton Club to "wind up" the Area was withdrawn after some discussion.

Election of Officers. The following were elected:

Chairman: H. J. Towner. Vice Chairman: L. Dedderfield. Secretary: H. Rewell. Comp. Secretary: N. F. Couling. P.R.O.'s: K. Donald, R. Delves. Records Officer: G. K. Gates. Council Delegate: N. F. Couling. Insurance Officer: P. Holway.

Mr. H. W. Barker will continue as Treasurer, and it was agreed that the post of assistant secretary be established, the appointment to be made at a later date.

Finance. The motion to impose a levy of 6d. per member per annum for the purpose of financing the Area was carried.

S.M.A.E. Contest Programmes 1952 and 1953. The venues for the first three meetings in 1952 were agreed as follows: April 6th, Brighton. April 20th, somewhere in Kent. May 11th, Thursley Common, Godalming. It was unanimously decided that the Area would not be able to organise the other two semi-centralised events and proposed that these be de-centralised in view of the fact that these contests were unrestricted.

1952 *British Nationals.* The meeting agreed to accept the responsibility for organising the Nationals in conjunction with the Southern Area providing that a suitable venue can be found. Mr. Couling was instructed to obtain the co-operation of the S.M.A.E. Council in obtaining the use of Ford Aerodrome, nr. Littlehampton, for this event.

The meeting closed with a vote of thanks to the Chair.

WEST OF SCOTLAND AREA

The A.G.M. of the above area was held on December 7th and there was a particularly good turn out of members. The meeting got promptly under way and some very lively discussion followed.

A letter was read from the C.O. at Abbotsinch to the effect that trespassing over the newly laid runways would result in the immediate withdrawal of the use of the aerodrome for model flying. (Clubs please note.)

The Treasurer reported that the Area funds would have been in the red if it had not been for the U.K. Challenge Match. This state of affairs could be remedied by a larger number of contestants, so out of the club rooms and out to the flying fields if you want to keep the Area funds in the clear, you back room boys.

Quite a few clubs did not participate in the team racing league last year due to not having enough class B engines, so it was left to Mr. Taylor to consider the feasibility of running two leagues. (One for "A" models and one for "B" models.) Clubs who are interested should get in touch with Mr. J. Taylor, at 1173, Govan Road, Glasgow, S.W.1.

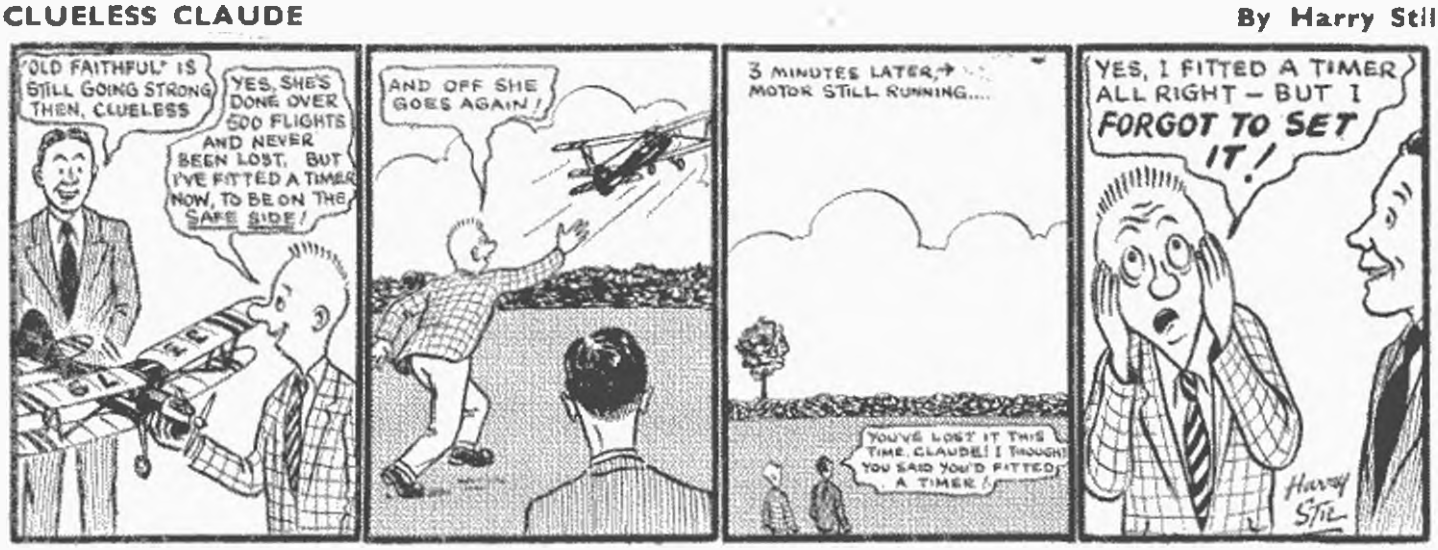
League Results for 1951

Glasgow Barnstormers	51	Pts.
Glasgow M.A.C.	47	,,
Prestwick M.A.C.	37	,,
Stewarton M.A.C.	34	,,
S.A.S. M.A.C.	0	,,

Come on, now, Ayrshire clubs, don't let Glasgow have it all their own way next year.

CLUELESS CLAUDE

By Harry Stil



CRYSTAL PALACE M.A.C.

The Annual Dinner of the Crystal Palace M.A.C. was held at Williamson's Restaurant, Upper Norwood on November 17th. All members were present with their guests. The chair was taken by Jack Vaile, who kindly deputised for the President, Mr. Cooley, who was unable to come.

The Advertizer Cup was won last year by George Lister for the second time. Ron Pledge and John Rogers tied for the team race and stunt C/L flying, and George Lister won the rubber duration and glider prizes. After presenting the prizes, Mr. Vaile, in his speech said how surprised and pleased he was to find the enthusiasm of members so high and although he was no modeller himself, he could still appreciate the work of the club.

There were about two dozen models on show. Mr. Vaile then thanked the Club for inviting him to preside at the dinner and offered to inaugurate a cup to be competed for annually.

Mr. Mender then proposed a vote of thanks to Mr. Vaile and asked Mrs. Vaile to accept a bouquet of chrysanthemums from the Club.

Mrs. Suters was presented with a tea service in appreciation of her efforts to make club members at home every Monday evening, which is, of course, club night.

The evening's proceedings finished with a film show put on by Mr. Hollingsworth. We saw "Model Flight" and several interesting films, and finally "The First of the Few." We finished the season with several new members, much better models, and much higher hopes of good flying in the coming season. The thanks of the Club go to all who, in any way, helped to make the evening such a great success.

SURBITON D.M.F.C.

Our annual glider gala will be held on Epsom Downs on March 30th, commencing at 11 a.m. The contest will be as in previous years, i.e. unrestricted gliders to S.M.A.E. contest rules.

In former years the event has just about paid for itself and entrance fees were purposely kept as low as possible. We have decided this year to increase the senior entrance fee to 1s. 6d. and the juniors' to 9d. Any profit we make will be forwarded to the S.M.A.E. towards the Wakefield and A2 fund. May we request all glider fans in the area to come and give us their support?

Looking back over the past year we can claim to have had quite a considerable amount of success, particularly in the glider sphere. Our glider successes include first places at the Lasham, Old Sarum, West Essex and N. Heights galas, and sixth in the A2 trials. Power—2nd in Old Sarum Rally and Hamley Trophy, 3rd British Championships, 4th Sir J. Shelley. Rubber—L. Area team and Individual events, 2nd Old Sarum and 3rd Lasham rallies.

If new models and plenty of them assure success, then we should do pretty well this year. D. Butler has designed five new gliders, and is now building the fourth. J. Hancock is following, one model behind. Lengths range from 3 ft. to infinity!

P. Burkell has two new power models nearly completed, a Wakefield and a lightweight rubber model awaiting trimming. P. Allaber is the black sheep of the club, having not yet cut even a wing rib. He can usually be found at night with a copy of *Reveille* open on the building board and a far away look in his eye!

THE LEAMINGTON & DISTRICT M.E.S.

The Society has emerged successfully from a period of the doldrums and the past season has been most promising. We started well by getting a permanent home at last, increasing our membership and "having a go" at the comps. Rubber, glider and scale have most devotees and Eddie Wiggins and Eric Harnacle led the way in rubber duration. Eddie raised the National lightweight record with a *Pinocchio* to 17 min. 46 sec. o.o.s. overhead, but Eric's *Trump Card* turned up trumps and raised him by 10 sec., landing back in the field. Eric also managed 3rd place at the Fairey Cup at Langley.

Our juniors are noisy and active. Tim Riddihough was top junior in the under 15 power at Pershore and the team rubber at Walsall. He also went one better than the four bods who got their "A" certificates and managed a "B" as well.

Brian Badger was top junior in A2 Trials at Pershore, and 2nd at Bramcote. Someone suggested that the Badger constant "hot air" gave him an unfair supply of thermals.

Snowy Neale ended up 6th in the Scale Power Contest with a dead scale (construction included) Elfin 1.49 *Stimson Sentinel* and would have placed higher if he had used a full 20 sec. motor run.

Secretary Kennaugh managed to wangle a first, three seconds, a third and a special award at Midland Exhibitions, with his scale C/L circus—*F.W. 190, Fokker Triplane, Sopwith Snipe* and *Gee Bee*. The latest effort, a *Fokker F3* F/F flew right off the board—wonders never cease.

A new threat to the Wakefield is just off the "hush" list. *Mambo* has taken the air and if it doesn't take enough E.B. and E.W. can try it r.t.p.

THE KILMARNOCK M.E.E. (AIRCRAFT SECTION)

Looking back over the 1951 competition season we think that we have every reason to be pleased with the club's high placing in the majority of the competitions. Principal placings include two 2nds and a 3rd in the Scottish Nationals; 1st and 3rd in the S.A.S. Gala Day; 1st in rubber, power, glider, at the Ayrshire Club's Gala Day, thus winning the MacIntyre Trophy for the second year in succession for the highest club. We also had two of our members, John Strachan and Ian Gilroy in the Scottish Team for the U.K. Challenge Match.

We are pleased to report that Mr. Jardine has accepted the President's position. Members of the West of Scotland Area know how hard he worked for the Area last year.

Will club secs., please note that all correspondence for the Aircraft section of the club should be addressed to W. McGirr, 37, Waterside Street, Kilmarnock.

SOUTHERN CROSS AERO CLUB

The Club Annual Dinner and Prizegiving

This was held at "Charlies' Restaurant" Brighton. Twenty-eight members and guests sat down to a four course dinner which was thoroughly enjoyed by all. The chairman, Mr. Delderfield, welcomed our guests, Mr. & Mrs. A. F. Houlberg, and Mr. Arthur Mullett. Mr. Houlberg said how pleased he was to be present and complimented the club on its achievement during the past year. Brighton always held a soft spot in his thoughts, he said, for it was there that he attended one of his first model aircraft contests. Turning to present day model-aeronautics, he said that approaches had been made to the new Government with the object of removing purchase tax from modelling goods. Mr. Houlberg concluded with a plea for more co-operation with the light aeroplane clubs in accordance with the Whitney Straight report.

Mr. Delderfield then recalled the club's successes through the year and asked Mrs. Houlberg to present the prizes and cups. Amid applause these were distributed amongst three people, Doug Lane, Bill Gravett and Grahame Gates who were congratulated upon their success.

WINCHESTER M.A.S.

November appears to have been a complete loss so far as model flying was concerned. The only remotely reasonable day produced a near-gale. In fact, the society did more flying indoors, on the Small Model Night, than in the rest of the month put together.

It was held at the Hall on November 21st and was a riot. No fewer than 15 models appeared, some completed with a fair amount of colour and detail. Movable control surfaces, airscrews and sprung wire undercarriages were featured. Some models, notably Jimmy Green's could perform remarkable loops with full *down* elevator! A complicated schedule of manoeuvres was called for and resulted in Johnny Ross being the winner with a *Tipsy Junior*. Bill Childs came second with an *Avro Athena* and Henry Wells third with a *Klemm L.25*. All entrants enjoyed themselves particularly the younger members who were initiated, they, and probably their seniors as well learnt a little trimming. We shall hold another contest in the new year. The type of model will be decided upon later.

We should like to commend this type of competition to other societies and clubs. The models this time were low-wing single-engine types with profile fuselage from 1/16th balsa sheet, wings of 2 in. span from the same material and tail surfaces of 1/32nd sheet. Cockpit details, etc., are added by ball-pen and the result is quite a realistic model.

HALIFAX M.A.C.

Flying in weather ranging from high wind through rain and sleet to snow, we met York M.A.S. in the Northern Area K.O. Cup final at Baildon Moor on October 21st. The result was a dead heat, so we had to fly again on October 28th, this time under foggy conditions. After each team had completed its nine flights we tied again at 19 min. 56 sec. each, so we picked one member from each team to fly off. Ron Firth, the York captain, did 2 min. 24 sec., only to be beaten by our junior member, David Haley, with 3 min. 25 sec. o.o.s. Thus we won the K.O. Cup by 1 min. 01 sec. after a very keen contest. Our team consisted of John Magson, Eric North, and David Haley.

The club A.G.M. was held on November 22nd, and the following officials elected: President, Len Stott; Chairman, H. Rowe: Vice-Chairman, J. Marsland; Secretary-Treasurer, H. Tattersall; Comp. Sec., E. North; Press Sec., D. Stollery; Committee Members: J. Magson, A. Nobbs.

The 1951 flying season has been the best since the club was reformed in 1947. Four members gained "A" Merit Certs., three gained "B" Certs., and one gained the "C" cum International Certificate. Congratulations to Eric North, who has at long last gained his International cert. The models used were his own design *Cranwellian A/2, Calderian* Wakefield, and a new E.D. 2.46 pylon power job. The club trophy results are as follows:—

Chairman's Trophy

E. North, 37 points; M. Regan, 27 points; J. Magson, 21 points.

Chamber's Trophy

E. North, K. Grant, Miss J. Slater.

EPSOM D.M.F.C.

The Epsom D.M.F.C. held a very interesting exhibition during the week November 5th to 10th at the Odeon Cinema, Epsom. Mr. Charles Gardner, the B.B.C. Air Correspondent, kindly performed the opening ceremony. In his opening speech Mr. Gardner recalled his early efforts as an aeromodeller and "Balsa Basher."

During the week over 16,000 people saw the exhibits. Among the 58 models shown were, a 78 in. span scale model of the *Westland Wizard*, built by a boy of fourteen, and a 4 in. span Jetex speed model which is capable of well over 100 m.p.h.

Other models of interest were the *Bleriot Monoplane, Avro 504K, S.E.5* and a *Fokker Triplane*. More modern aircraft included a varied selection of semi-scale airliners and one Canard airliner, several of these being in B.O.A.C. colours. Another interesting model was the fifth prototype of the *Flying Square* or *Greenhouse*, which caused a great deal of wonder and many rude remarks.

Also seen were many Cabin, Contest and Jetex helicopter models with other interesting projects, including R/C equipments. Some very fine poster work completed the exhibition.

WHITEFIELD M.A.C.

The Winter Club Comp. Programme has now been decided, and should include a sufficient number and variety of contests to satisfy anyone. There are 10 contests in all, including two open to the Bury and Bolton clubs; consisting of three rubber, three glider, two power, one chuck glider and a final rubber/glider comp. for those who fail to win any of the rest. In general, rules are three-flight aggregate with a 3 min. limit, with fly-offs if necessary.

The first of this intensive programme was the unrestricted glider contest for the Normac Cup, held on December 2nd. Weather conditions were peculiar—changing from flat calm to strong wind, from sun to pouring rain (and vice versa) in a matter of minutes. Winner was J. O'Donnell with three 3-min. maxs., flying the inevitable 9 ft. *Miolnir*—a design which is almost the standard club model. Very close behind was his young brother Hugh, who did 2 maxs., and 2 min. 53 sec. (flying the Nordic with which he won the Frog Junior); followed by A. Wrigley and A. D. Bennett with 6 min. 39 sec. and 6 min. 16 sec., flying a 9 ft. *Miolnir* and an Odenman Nordic respectively.

THE UPTON M.F.C.

The above club held their annual prizegiving and social on November 27th, 1951.

The prizes were presented by Dr. A. P. Thurston, M.B.E., D.Sc., M.I.Mech.E., F.R.Ae.S.

The champion of the club is J. Holt, who was presented with the club Champion Shield; runner up was P. Carpenter, presented with a silver medal.

Other results were:—

Evan's Senior Cup
Open Glider. 1st J. Holt; 2nd, S. Reynolds, silver medal; 3rd D. Pope, bronze medal.

Eves Cup
Open Rubber. 1st W. Smith; 2nd, G. Gosby, silver medal; 3rd, J. Holt, bronze model.

Freeman Trophy
Open Power. 1st, A. Kennedy; 2nd, J. Holt, silver medal; 3rd, R. Roberts, bronze medal.

Upton Challenge Trophy
Open Sailplane. 1st, J. Kennedy; 2nd, P. Carpenter, silver medal; 3rd, S. Reynolds, bronze medal.

Reynolds Trophy
Open Rubber. 1st, J. Holt; 2nd, W. Smith, silver medal; 3rd, A. Kennedy, bronze medal.

Mills Engine 2.4
Open Power. 1st, J. Holt; 2nd, C. Gosby, silver medal; 3rd, A. Kennedy, bronze medal.

Replicas of cups for 1950 winners were awarded to: S. Reynolds, J. Holt, Mrs. M. Eves, R. Roberts. Replica of club champion shield, 1950, to J. Holt.

After the presentation, Miss B. Smale presented Dr. A. P. Thurston with a bouquet of roses and carnations for Mrs. Thurston, who was unable to attend through illness.

Dancing throughout the evening was provided by Ron Purver's "Dixielanders," formed by members of the club.

Two musical numbers were given by R. Purver, P. Carpenter and R. Hermatage.

Brian Clark, a junior, gave a fine display of Punch & Judy—well done Brian.

It was a very successful evening, ending with "Auld Lang Syne." The club's outstanding achievements of the year were by J. Mace—British Lightweight Sailplane Record, 28 min. 17.2 sec.; and Mrs. J. Holt, 2nd in the Ladies' Challenge Cup; better luck next year, Joyce.

FORESTERS (NOTTS.) M.F.C.

The Foresters' annual winter C/L competitions are under way and Secretary Dick Noble leads the field in the first round of stunt. However, the result is based on the best flight in two rounds, so Dick may yet come unstuck. The speed is worked on a complex system of calculations to even up the classes and only our pet electronic "brain" can work out the result, so not unnaturally, he leads with his diminituve Elfin 1.49 flying machine. The team race has so far been blown out, but a spate of new class "B" jobs promises great sport to come.

The cups for these events are to be presented at the Club annual dinner, which is to be held this year at the Trent Bridge Hotel, on January 26th.

Hopes of obtaining a building hut to supplement the other many and varied Tollerton activities are fading as all buildings have been "frozen" temporarily until the powers that be decide who is to own the 'drome. However, the existing Eagle clubhouse more than makes up for this.

BRIGHTON M.F.C.

This has been the most successful post-war season so far. Club members have gained 1st in the Premier Shield, 2nd in the International Power, 4th in the "M.E." (Team Glider) Cup, 5th in the Thurston Cup and 1st in the S.E. Area Club Championship. Although Club membership has dwindled to 19 there remains a strong nucleus for next year's comps. A.2s and Wakefields are the most popular and F. Boxall has a new "longer and lighter" model already turning in a steady 3 min. 45 sec. in evening air.

P. Holloway won the Club Championship from S. Minshull with N. Neve third. The two Boxall brothers stood down this year.

Will any young aeromodellers in the Brighton District please contact A. Mursell, 38, Surrenden Road, Brighton, as some of the senior members are becoming a bit aged!

CHANGES OF SECRETARIES AND ADDRESSES

Bristol & West. K. Moon, 34, Florence Park, Westbury Park, Bristol, 6.

Colchester M.F.C. R. E. Mills, 56, Dilbridge Road, Colchester, Essex.

Zombies. R. H. Warring, 10a, Hayne Road, Beckenham, Kent.

Derby M.A. R. Adamson, 29, St. Albans Road, Derby.

Chichester & Dis. M.A.C. R. A. Polhill, 58, Cambrai Ave., Chichester, Sussex.

Evesham & Dis. Miss G. Drinkwater, 28, Lime St., Evesham, Worcs.

Park M.A.C. R. A. Mount, 127, Merton Mews, Raynes Park, S.W.20.

Bushy Park M.A.C. J. E. Simmons, 63, Shaftesbury Ave., Manor Estate, Feltham, Middx.

Headley & Dis. M.F.C. G. J. Smallbone, The Crown, Headley, Bordon, Hants.

Clacton M.A.C. H. Rutter, 31, Lake Walk, Clacton-on-Sea, Essex.

Hemsworth & Dis. M.A.C. R Richardson, 37, York St., Hemsworth, Nr. Pontefract, York.

St. Albans M.A.C. S. F. Savage, 21, Church St., St. Albans, Herts.

Newark & Dis. G. P. Walker, The Grove, Winsthorpe, Newark, Notts.

Boston & Dis. A.C. S. C. Marshall, 65, Norfolk St., Boston, Lincs.

Coventry & Dis. M.A.C. K. Hall, 30, Beresford Ave., Foleshill, Coventry.

Pontefract & Castleford M.F.C. K. Wadsworth, 16, Birkhill, Airedale, Castleford, Yorks.

North Western Area. R. Musgrove, "Mareka," North Gate, Garden Suburbs, Oldham, Lancs.

West of Scotland Area. W. D. Jardine, 56, Dundonald Road, Kilmarnock.

Blackpool and Filde M.A.S. C. T. Davey, 42, Portland Road, Blackpool.

Chorleywood Club. P. J. Holden, 102, Malvern Way, Croxley Green, Rickmansworth, Herts.

Hillingdon & Dist. M.F.C. R. M. Gibbons, 59, The Courtway, Carpenders Park, Watford, Herts.

Woodlands M.F.C. D. Threfall, 136, Bentley Road, Doncaster, Yorks.

Walsall M.A.C. H. Mitchell, 63, Miner Street, Walsall, Staffs.

West Essex A.M. D. A. Gordon, 42, Penrhyn Ave., Walthamstow, E.17.

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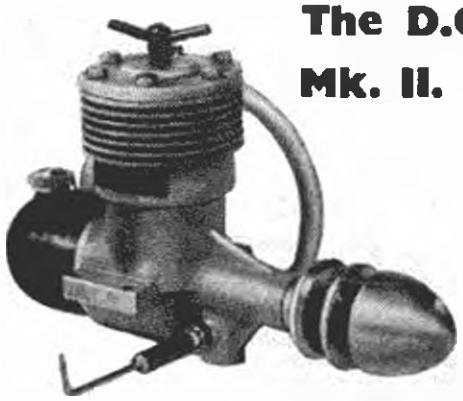

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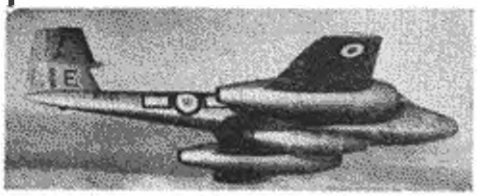

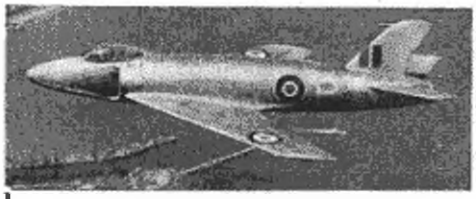

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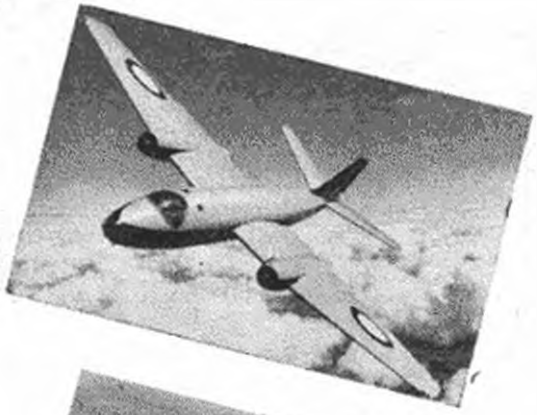

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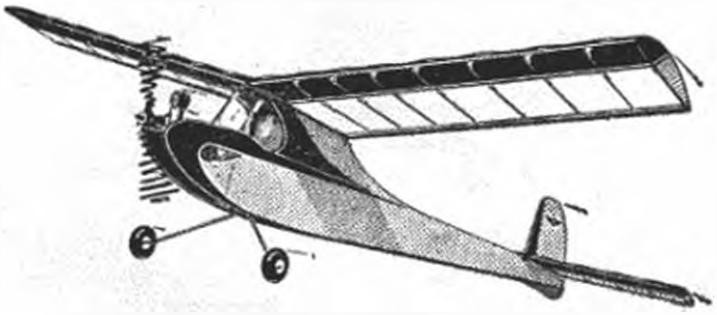

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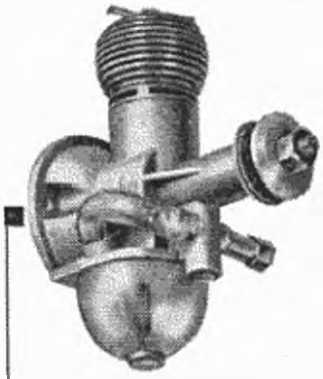

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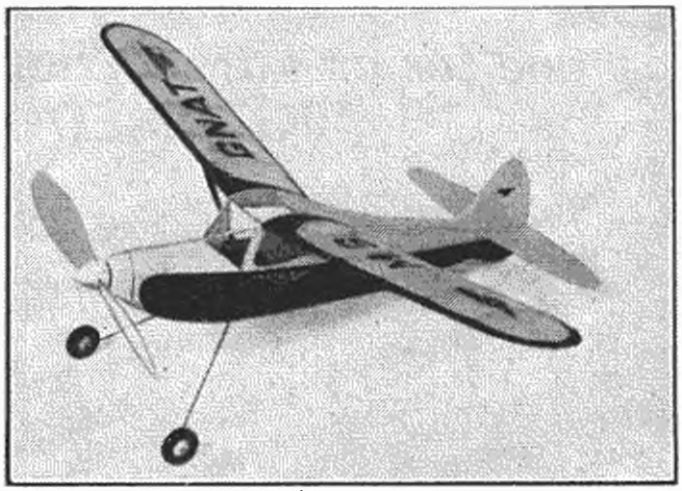

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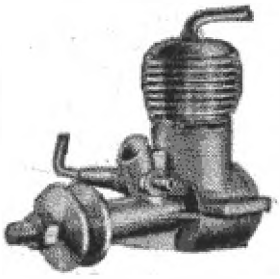

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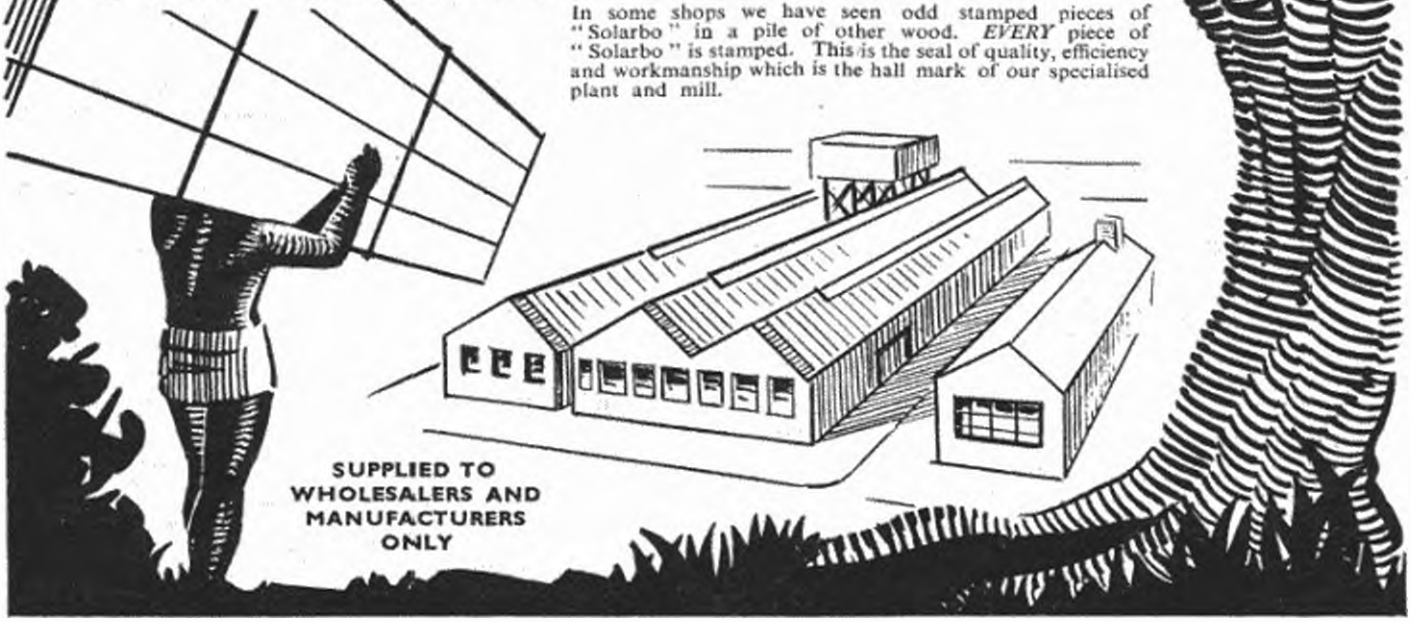

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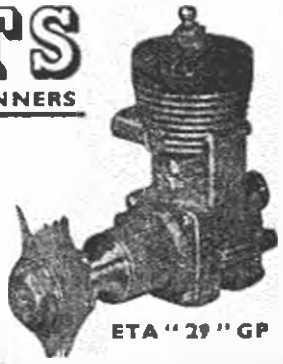
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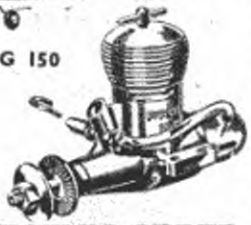

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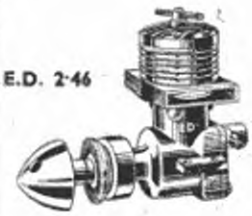

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MISS "EEDEE"

The Channel-conquering lady with a 2 ft. beam

Specially designed by our electronic designer George Honnest Redlich for the Channel project. *Miss Eedee* is 5 ft. long with 2 ft. beam and weighs 70 lb. After preliminary trials from Richmond to the South Bank Exhibition and at the International Model Boat Contest at Fleetwood the model was successfully radio controlled from Dover to Calais on September 6th in 9 hours.

. . who responds readily to Radio Control . .

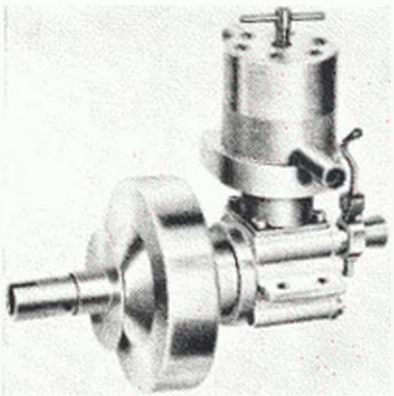
The Radio Control concerned was the Mk IV 3 channel, 3 reed Unit (also designed by G.H.R.) and consists of Transmitter, Control Box and Receiver incorporating reed unit giving output for three separate channels. The channels can operate either escapements and or electric motors. Hard valves with a life of over 3,000 hours are used. Illustration above left shows the model entering the open sea. On right approaching Calais harbour mouth.

and has made amazing advances with a 4·5 Diesel

Miss Eedee and our following launch tied up to the side of a French fishing boat in Calais harbour.

The 4.5 c.c. water-cooled new E.D. engine designed by our engine designer Basil Miles. Internal water-tank fitted, syphon system for cooling and direct drive. R.p.m. approximately 6,500.

Photographs supplied by the courtesy of Messrs. Percival Marshall & Co. Ltd.



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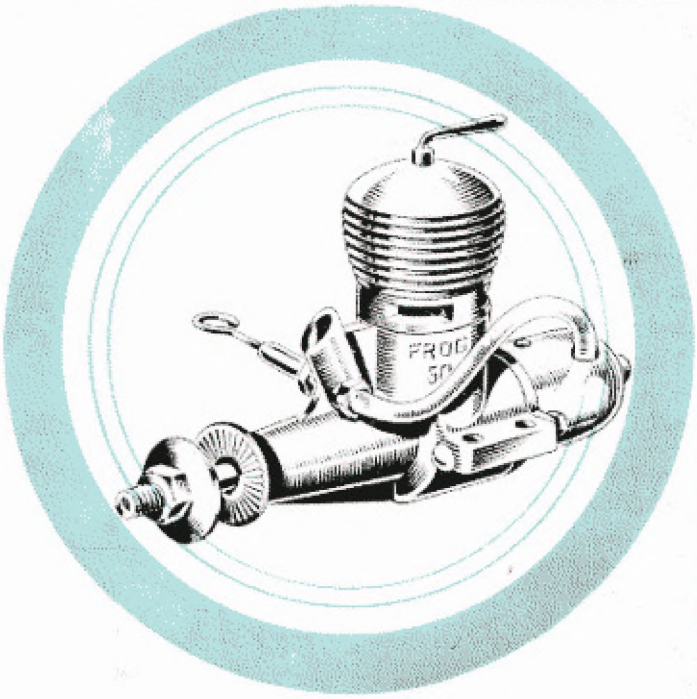

Britain's Finest Miniature Diesel

Proudly we announce the new FROG "50"—product of two years specialised development work by the I.M.A. Engine Experimental Dept. It is of similar basic design to the already famous FROG "150" but . only .499 c.c. capacity and is undoubtedly the neatest little motor ever made in Britain. The "50" measures only 1¾ in. high, has an overall length (including the integral die-cast tank) of 2¾ in. and weighs a little over 1 oz. The die-cast parts are of the highest quality, whilst the machining, both externally and internally is to watch-making standards.

Performance figures show a speed range which has never before been equalled in small motors—from a tick-over of 800 r.p.m. to a full power speed of 15,000 r.p.m. Typical practical example of the FROG "50" power is its speed of 11,000 r.p.m. when driving a 6 in. diameter x 4 in. pitch airscrew.

The "50" is suitable for use in every type of model—from lightweight R/C and F/F contest work to control-line stunt or speed. For C/L flying its smooth handling and lack of "fussiness" on throttle settings are especially useful.

By virtue of the wonderful production facilities at the I.M.A. works it is possible to produce the FROG "50" at a price within reach of all. The "50" is a motor you cannot miss—see your local dealer today!

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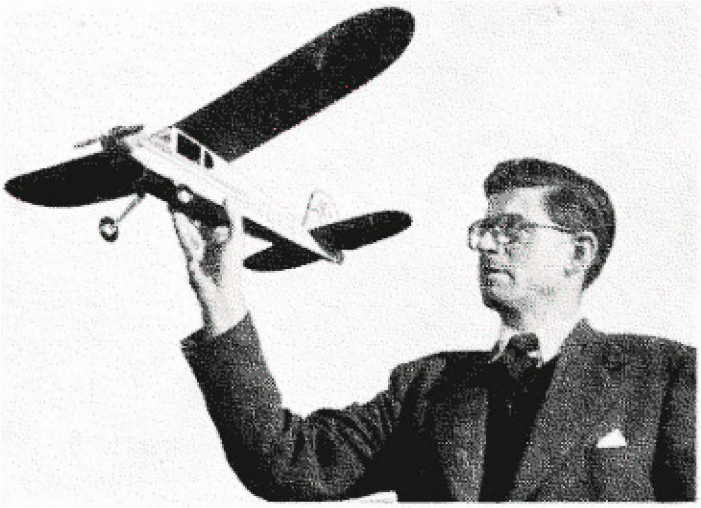
AND—The FROG "ZEPHYR" THE FIRST MODEL DESIGNED FOR THE "50"



And it's a lovely job—33 in. span and modelled on the latest type light aircraft. Shown here during test glides by designer C. T. Buffery, the *Zephyr* incorporates all the famous FROG features for easy, straightforward building, has a side-mounted engine (fully cowled), and has a fast, "soaring" flying performance with the "50" diesel.

Special alternative rigging details are given on the drawings, either for the model as shown or with reduced dihedral and strutted wings for scale appearance.

See the *Zephyr* at your dealers—it's a perfect match with the "50"—and the kit is amazing value!

12/6

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