MODEL Aircraft

IN THIS ISSUE

MAY 1950

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1/6

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

Digital Edition Magazines.

This issue magazine after the initial original scanning, has been digitally processing for better results and lower capacity Pdf file from me.

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:

Hlsat Blog Free Plans and Articles.

http://www.rcgroups.com/forums/member.php?u=107085

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AeroFred Gallery Free Plans.

http://aerofred.com/index.php

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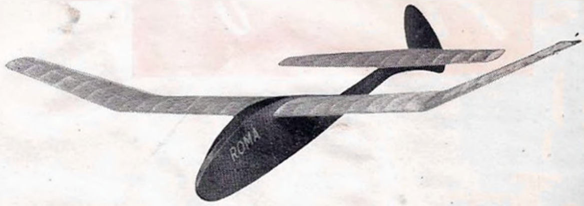

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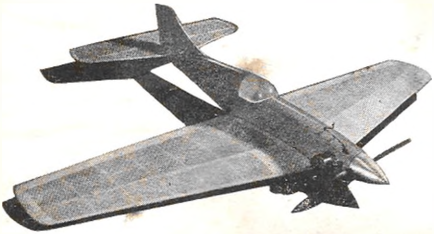

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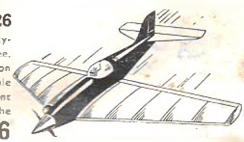

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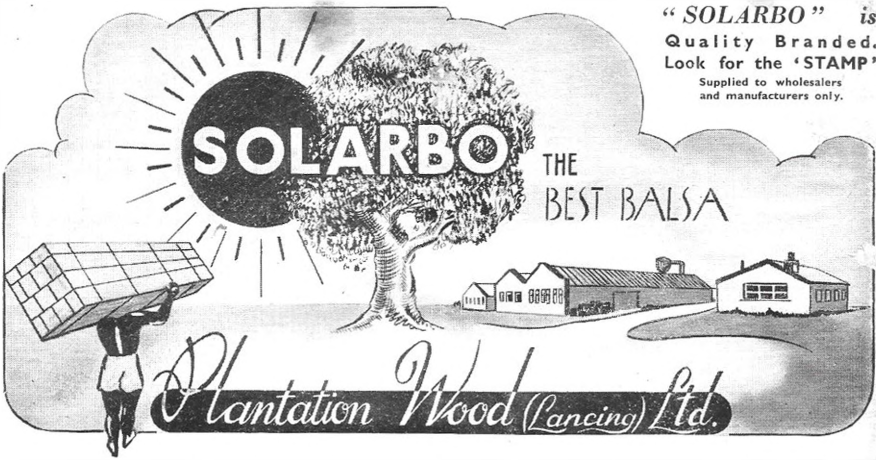

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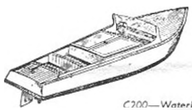

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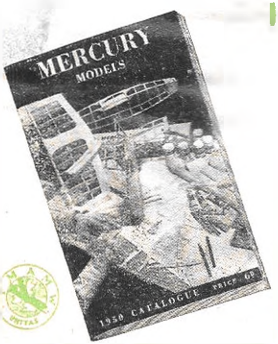

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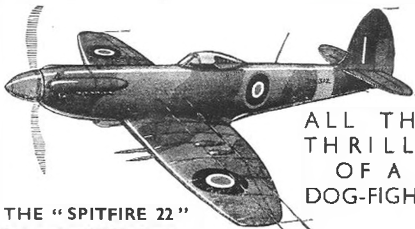

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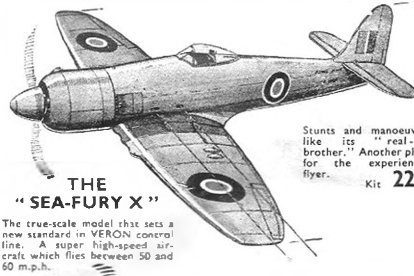

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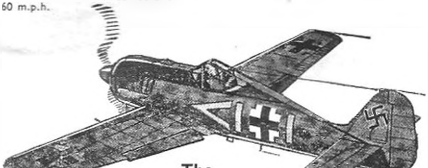

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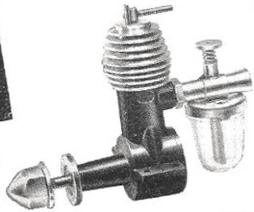

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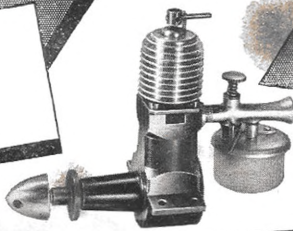

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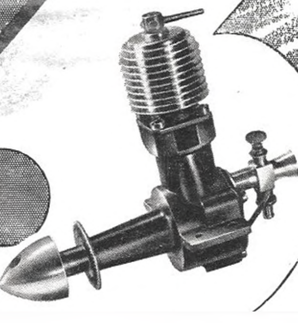

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MAY 1950 VOL. 9 No. 4

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E D I T O R I A L

THIS issue heralds two important events. First of all the new conditions relating to the supply of paper have enabled us to increase considerably the size and scope of this publication, and it now comes to you in a much enlarged form, containing no less than 68 pages. We need not stress the importance of this to you as a reader, or the additional scope which it provides us with on the editorial side. Our efforts will be devoted to making MODEL AIRCRAFT of interest and value to the expert: the beginner; the club and contest enthusiast; and last, but by no means least, the unattached model flyer.

The second item introduced by this issue is a change in the publishing date. We have felt for some time that the previous publishing date, the 10th of the month, was unsatisfactory, since the journal did not appear until the month of issue was well advanced, and this tended to give the impression that the issue was already somewhat out of date when it reached the reader.

It has, therefore, been decided that in future MODEL AIRCRAFT will appear for sale on the 20th of the month *preceding* the month of issue. To achieve this we have had to amalgamate the March and April issues and although this change will mean the technical loss of one issue in the current volume, this slight disadvantage is more than offset by the advantages gained by our readers and distributors.

With more reading matter there will be more to criticise, or praise as the case may be, and we would remind you that we are always glad to hear from our readers, particularly when they have some sound constructive criticism to make or useful suggestion to put forward for the improvement of this journal.

Cover Story

The subject of this month's cover photograph is Norman Butcher of Hastings and Competition Secretary of the South Eastern Area. He is holding the K. & B. Torpedo 29 powered Fokker D VII with which he gained first place in the scale stunt event at last year's S.E. Area C/L championships.

A PERCIVAL MARSHALL PUBLICATION

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HERE AND THERE

The Editor Comments on Current Topics

"THE MODEL ENGINEER" EXHIBITION This year *The Model Engineer* Exhibition will celebrate its 25th anniversary, and will be held at the New Royal Horticultural Hall, Westminster, from August 9th to the 19th.

Since the first post-war exhibition this event has become increasingly popular with model aeroplane enthusiasts, and each year has seen an improvement in both the number and the quality of the exhibits. In this year's exhibition the model aircraft section will take an even more prominent place than last year, and we look forward to seeing a still better range of exhibits than was displayed on that occasion.

Apart from going a long way to break down the ingrained belief, held by so many model engineers in the past, that model aircraft construction consisted of just tissue and paste, *The Model Engineer* Exhibition affords aero-modellers an opportunity to show other aero-modellers just how well a flying model can be made and the extent of their skill and ingenuity in manipulating the materials of construction peculiar to model aircraft; it also enables them to examine at leisure the excellent work done in other branches of model engineering.

The model aircraft classes will be the same as last year and again there will be a silver trophy to be won outright by the club showing the best three flying models. This trophy would make a fine addition to your club's collection of contest prizes; why not organise an entry now? Further details of the arrangements will be published later, but entry forms can be obtained *now* from the Exhibition Manager, 23, Great Queen Street, London, W.C.2. Remember, last minute efforts seldom win prizes, so get started on your exhibit right away.

NEWS FROM THE STATES The Academy of Model Aeronautics of America has just elected its new officers for the ensuing season and it is interesting to note that a fresh name appears in the office of president, namely, Kenneth H. Held, of Detroit.

Kenneth Held has been a consistent builder of models since 1918, and the Academy should benefit from his wide experience, both of modelling and general organisation, since he holds a responsible position with the General Motors Corporation. He two sons and his wife are also keen model builders and flyers so that he brings to the movement more than just his own personal interest in model aeronautics.

Other well-known names which figure in the list of vice-presidents and contest board members for 1950 are Frank Zaic, Henry Struck, William Fletcher, Chester Lanzo, Ed. Lidgard, R. E. Schumacher, and Andrew G. Peterson.

We also understand that, following the experience gained last year and the suggestions put forward by members of last year's American Wakefield team, the A.M.A. has decided that the selection of the team for 1950 should be made some two months before the actual date of the contest to give them sufficient time to prepare and test their models. They are, therefore, hoping to select their team by May 28th, on a district allocation basis something after the style of our area selection scheme.

Five areas have been selected as follows:—

West Coast—two members.
Chicago—one member.
Cleveland—Akron—one member.
New York—one member.
Hampton, Va—one member.

Preliminary meetings or eliminators will probably be held in the outlying districts of each area to give as many modellers as possible the chance to make the team. It would thus appear that the A.M.A. is making use of a similar scheme to the one which we used last year.

UP AND UP Two new American Class "B" C/L speed records have recently been established at record trials held at Los Angeles, California.

The first is a speed of 135.08 miles per hour, made by Richard Rigney (Senior), and the other is 129.35 miles per hour (open), by Charles Schuette.

We await details of the models and engines used.

RADIO CONTROL

It seems that the air at Fairlop Aerodrome is too crowded for the many London R/C fans who flock to this popular venue at weekends. Apparently, there have already been "incidents" through interference between transmitters, as a result of which models have been wrecked.

Two meetings have been held recently in London, in an endeavour to find an answer to this problem and the general feeling seems to be that the only immediate solution to the Fairlop situation is closer co-operation between those who fly R/C models there.

It has, however, been suggested in some quarters, that an approach should be made at once to the G.P.O. for additional wave-bands, but the majority of London R/C enthusiasts agree that this is a national matter and the first step should be the holding of joint discussions between the interested Societies. This is also the viewpoint of the Council of the S.M.A.E. and they are endeavouring to arrange a meeting between their own R/C sub-committee, the Radio Controlled Models Society and the Radio Society of Great Britain, to discuss this problem and to decide whether a joint approach should be made to the G.P.O.

A fact which is often overlooked, is that we are at present far better off in this country than our fellow R/C fans in the U.S.A. and most of the Continental countries, where it is necessary for operators to possess Amateur Transmitting Licences. Whatever may be our personal views on the present wave-band situation, we are in honour bound to adhere strictly to the bands which have been alotted to us and to resist any temptation to wander off them in order to avoid interference. Such action would be very likely to have adverse repercussions and would most certainly prejudice our case if an approach is made to the G.P.O. for wave band concessions.

MODEL BYELAWS

The Home Office have recently issued to all Local Authorities, details of the suggested byelaws for the control of model flying which they have drawn up after discussion with other bodies interested in Local Government. Copies of these byelaws have already been circulated to all affiliated clubs by the S.M.A.E. and further copies can be obtained from the Society's offices, or from Model Aircraft.

We would like to draw the attention of our readers to the following extracts from the Home Office Memorandum which they have also issued to local authorities for their guidance.

"*Local authorities will recognise that through the construction and flying of model aircraft a real contribution may be made to the science of aviation; that they help to stimulate interest in national aviation, and that, under suitable conditions, they offer to many young people a legitimate pastime and a good hobby. The byelaws are not intended for the restriction of flying, but to make it possible to permit flying in areas where permission for this pastime would otherwise have to be withheld. Any restrictions should be limited, therefore, to what is really necessary under local conditions to protect the community at large from danger or nuisance.*

"*The Secretary of State thinks it desirable that any proposal to make such byelaws should be brought to the notice of any local model aircraft clubs and their views considered, before the draft is submitted.*"

The above references and the reasonable nature of the suggested byelaws are the direct result of representations made by the chairman, Mr. A. F. Houlberg, on behalf of the Council of the S.M.A.E., and we owe to him our best thanks for his efforts.

The average aeromodeller is often unaware, or perhaps unappreciative, of the amount of work of this important nature which the S.M.A.E. undertakes every year—it certainly receives far less publicity than competition matters, for instance. It is this side of the S.M.A.E. activities that we should like to see presented in the form of an Annual Report, thus providing an answer to those who frequently ask, "What do we get out of affiliation?"

A WAKEFIELD STAMP

The Finnish Aeronautical Association are certainly getting on with the arrangements for the forthcoming Wakefield Cup Contest to be held on July 23rd, and we are assured that the organisation will be well up to the usual standard expected for this important International event. The latest news is that the venue will be Kauhava Aerodrome, the home of the Finnish Central Flying School. The nearest civil airport is at Vasa, some 50 miles away and Kauhava is approximately 250 miles from Helsinki.

We also understand that certain rules for the running of the contest have been submitted to the S.M.A.E. for their approval.

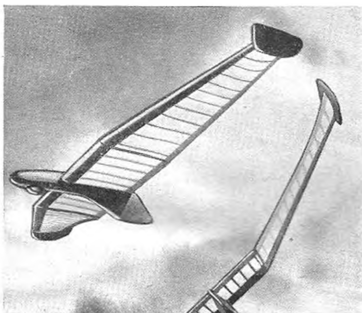
The Finnish authorities have been faced with the same problem as we had last year, i.e., raising sufficient funds to meet the expense of accommodating the teams and running the contest. As will be seen from the photograph below, one scheme which they have adopted is the sale of a special Wakefield stamp. Our correspondent calls these "Letter-closer-stamps," so presumably they are not normal postage stamps, but what we know as stickers.

D. R. Hughes'

ALPHERATZ

Sailplane

WINNER OF THE 1949 LADY SHELLEY CUP



THIS model is the third in a series of tailless models, and it appears to have the optimum performance for this particular layout. First flights were made, hand-launched, at Clwyd Hills in a strong breeze, when it clocked 72 sec. Its winning aggregate in the 1949 Lady Shelley Cup was 5 min. 41 sec. The first flight (2 min. 7 sec.) was only its *third* tow-launched flight. This speaks well for the model's towline stability, and the designer's decision to use a central underfin has been well rewarded—previous models having a fin atop the centre-section and being unwieldy on the line.

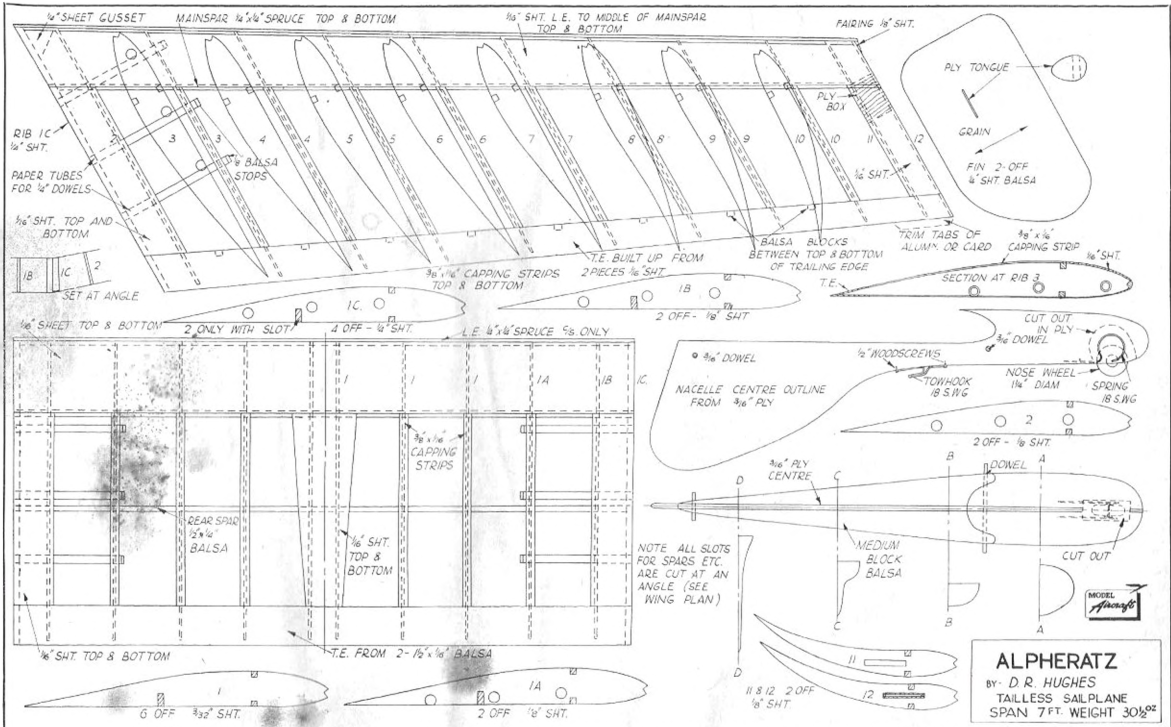
Now *Alpheratz* is as stable both on and off the tow-line as anyone could wish and has a performance equal to many "orthodox" sailplanes of similar size.

Nacelle.—This is built "sandwich" fashion, the centre being an outline of $\frac{3}{16}$ in. ply. To each side of this is cemented block balsa which is afterwards carved and sanded to the sections indicated. The use of an underfin necessitates a nose-wheel. This is a $1\frac{1}{4}$ in. diameter solid rubber tyre on a wooden hub with an 18-gauge bush. Make the sprung axle from 18-gauge wire, leaving long ends for pressing into the balsa as indicated on the plan. Drill through for the wing-fixing dowels and cement these in place. Make a tow-hook from 18-gauge wire and screw this in place, as shown.

Centre-section.—Pin the lower spar in position, rear spar and *lower* part of trailing edge (which is built up from a "vee" of $\frac{1}{16}$ in. sheet). Now add the ribs, leading edge and top spar. Remove from board and fit dowel tubes. Sheet the leading edge up to the middle of the mainspar with $\frac{1}{16}$ in. sheet, top and bottom. The top half of the trailing edge and the rib capping is now added and the whole well rubbed-down with fine glasspaper.

Wings.—As with the centre-section, the mainspar and lower half of trailing edge should be pinned in position first. Cement the ribs in place—making sure that the root rib is at the correct angle for dihedral and that the leading edges line up properly. Now fit leading edge and top spar. When set, gently bend the trailing edge up to meet the ends of

(*Continued on page* 96)



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 23, GREAT QUEEN STREET, LONDON, W.C.2, 5s. 0d., POST FREE.

Aeromodelling *in* Finland

by

Aarne Ellilä

THE history of aeromodelling in Finland goes almost as far back as in other European countries, although the movement was not organised and clubs founded until the beginning of the 1930s. At that time there was an equal enthusiasm for both the American type of balsa construction models and the German pine and plywood types.

The beginning seemed promising. Newspapers became interested and with them the general public ; clubs were founded, but still there was no central organisation, and therefore after a few years, the early enthusiasm began to diminish.

In the middle 'thirties, however, the then Finnish Air Defence League added aeromodelling to their programme. Proper instruction and guidance were given, and financial aid was arranged. Connections were established with foreign aeromodellers, and the movement gained new impetus. The National Aero Club in Finland, the Finnish Aeronautical Association, has since the war been the central organisation for the model aircraft movement and is a member of the F.A.I.

The highest body controlling the sport within the organisation is the Model Aviation Central Committee, whose members represent various spheres of interest, and it is directly responsible to the board of directors of the association. The secretary of the committee is a paid chief instructor of aeromodelling, whose duty it is to put the committee's decisions into effect.

This model is a typical Finnish slow-flying type of glider

There are at present some sixty model flying clubs in Finland ; they are either independent or affiliated to the local flying club. Each club has to arrange its own finances, but the F.A.A. does its best to assist the clubs by supplying their constructional courses with material at reduced prices, subsidising the travelling expenses of contest participants, and otherwise supporting them as effectively as possible.

Considerable attention has been paid to instructional courses. These are arranged by the clubs themselves, but of particular importance are those arranged by the association at the soaring school at Jamijarvi. During the summer a variety of model aircraft courses, now totalling almost a hundred, have been held, and thus the F.A.A.'s soaring school has become an important seat of learning for our aeromodellers.

In order to encourage and popularise aeromodelling, special emphasis has been put on getting primary school teachers interested in the sport, as they are conveniently able to urge and guide the youngsters at their schools to attempt model aircraft building.

Another important annual summer event at Jamijarvi is the aeromodelling camp, to which about a hundred participants arrive each year ; in addition, there have often been competitors from abroad.

There is a grave shortage of suitable sites, but as many competitions as possible are nevertheless arranged. The most notable event is the annual aeromodelling camp mentioned, in connection with which there is a championship contest. Furthermore, a large number of county and club contests are held from time to time.

Prior to the war balsa was almost exclusively used as material, but during the war it naturally ceased to be imported and our own materials had to be resorted to. They could, however, be used only for gliders, which naturally tended to make building somewhat monotonous. As a consequence, interest in model aircraft began to slacken and has at the moment probably reached an all-time low.

However, good results have been achieved in spite of all difficulties. Before the war a number of indoor championship contests were held in an exhibition hall in Helsinki in connection with model aircraft shows. In comparatively small spaces flights of 7 min. and 8 min. were gained. It may further be claimed that the Finnish model glider builders have in many cases influenced the trends in the other Scandinavian countries, and that Finnish model glider types are widely used in Denmark, Norway and Sweden. The elementary gliders developed in Finland have been particularly popular. A Finnish team has taken part in inter-Scandinavian championship contests four times, having won once and placed second twice. And, of course, last year I won the Wakefield Cup for Finland.

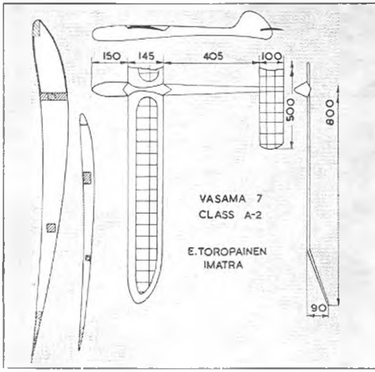
Before the war, there were several manufacturers of model aircraft accessories, and competition between them was keen. Now the only producer and sales organisation is the F.A.A. whose model aircraft factory last year produced and delivered some 40,000 kits—a good indication of the popularity of the sport.

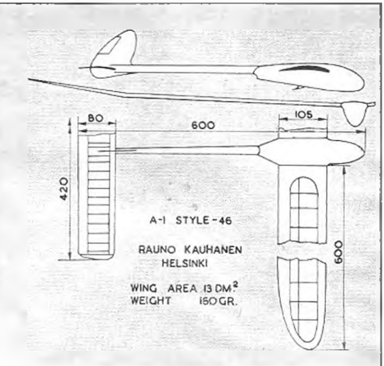
Finnish aeromodellers co-operate closely with their Scandinavian neighbours ; this co-operation is by no means limited to the inter-Scandinavian contests referred to above. Before the war an annual Scandinavian " Wakefield " contest was held with participation from this country. These contests were the first international events in which Finnish aeromodellers took part, and a great deal was learned as a result, the fruits of which are being reaped even today. In order to facilitate co-operation, common rules have been agreed upon between the Scandinavian countries, and this illustrates the feeling of solidarity existing between these four northern countries.

A. Tahkafoa with his Nordic A2 glider which is one of the best Finnish models in this class

Geographical conditions are clearly evident in Finnish aeromodelling. The country is large and sparsely populated, largely covered with forests and lakes, and slightly undulating. Therefore it is difficult to find good flying sites, and the relatively scattered aerodromes cannot remedy this drawback. The

The Finnish team, runners-up in the inter-Scandinavian championship held in Helsinki last summer





short summer also places its limitations. On the other hand, when the lakes freeze in winter they provide fairly good glider sites, for our lakes make admirable flying grounds. Unfortunately, however, the cold prevents the flying of any other types.

Aeromodelling in Finland has many difficulties to overcome. The aftermath of the war, both material and mental, can still be felt, but even so, much has been achieved in this sphere of aviation. There are hopes that we shall be able to get balsa and rubber soon : the economy of the country is improving almost visibly ; Finnish aeromodellers have met with success abroad, and the general postwar mental depression which has been evident in our youth is giving way. All these are signs that we may look ahead with confidence. We may be certain that in a few years time more Finnish models than ever will be in the air, achieving better results, urging newcomers on, and spreading air-mindedness among people from all walks of life.

Alpheratz

(Continued from page 92)

the ribs. This will occur from approximately halfway along the wing. Coat the lower edges of the ribs with cement where they will join the trailing edge and pack it up so that it touches all the ribs evenly, without holding. If necessary, pin the trailing edge to the ribs while gluing, and leave to set well. With packing blocks still in place, add the top half of the trailing edge, well cementing and holding in place by means of several spring clips until dry. Remove from board; add dowel-tubes and boxes in wing tips for fin-tongues. Finally, sheet leading edge and add rib cappings.

Tip fins.—These are made from $\frac{1}{4}$ in. sheet balsa, sanded to streamline section. Tongues are $\frac{1}{16}$ in. ply, and go right through the fins. Cover with tissue.

Covering.—The original is covered with yellow parachute silk, applied wet, with photo paste. Allow 24 hours to dry out, and give three coats of full strength glider dope. Make certain the silk adheres to the top of the outboard ribs where the reflex occurs.

Trimming.—Owing to the relatively short moment arm for'ard, considerable ballast is required, and it was found more convenient to use *external* weights for trimming. When the correct trim has been found, a portion of the balsa nacelle is removed and the weight—in as compact a form as possible—stowed inside permanently.

Getting the longitudinal trim for *Alpheratz* is very easy, since it is only required to add weight to the nose until the model shows no sign of stalling from a hand launch. Now try a tow-launch on about 100 ft. of line. It will probably be found that more weight is now required, because it is difficult to hand-launch a model of this type at its correct gliding speed and angle.

Having achieved the optimum trim, remove the external ballast and stow inside, as mentioned earlier. (The nacelle may now be coloured and polished.)

The model will almost certainly have an inherent turn, but if it is desired to increase or counteract this, a very small tab may be added, as indicated, on the opposite wing, (i.e., left wing, right turn, right wing, left turn), in the " up " position. Only very slight adjustments will be required.

Use a strong line and don't be afraid to pull—the secret of a good launch is to get the model going up at a good angle, fast to start with, decreasing speed until model is ready to come off the line.

MODEL REPORT

By Ron Warring

RADIO CONTROL

A LOT of people seem prepared to write or tell you just how to go about radio control work but the number of modellers who do fly radio models consistently and regularly is still disappointingly small. The fact is, therefore, that to write anything of a practical nature on the subject must still be largely confined to individual experiences, and it is extremely difficult at times to know whether such experiences are typical or not. For instance, even with the same model design, different modellers get different results—and here the Rudder Bug is a good example.

The Rudder Bug—subject of Model Report No. 12—incorporates a number of features which threaten to become standard, yet of the considerable number of these designs built, no two appear exactly alike in all respects. Furthermore, the writer's own experience as the result of continued flying of this design, appears to indicate that it will not be particularly useful for contest work.

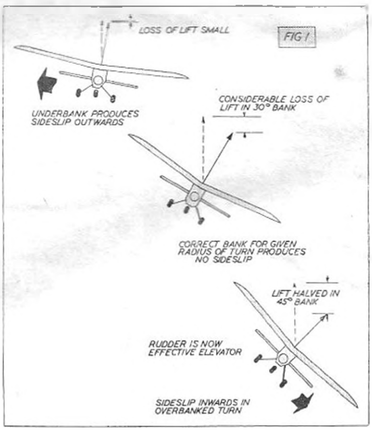
The original Rudder Bug report said that the model had no particular tendency to spin when rudder was held on, but did not make it clear that this referred to use of a rudder movement limited to the Good brothers (maximum) figure of ¼ in. Properly trimmed, and with only this amount of rudder movement, the model turns slightly nose up and does not lose very much altitude in two or three turns. *Any* "spin-proof" design will spin if sufficiently upset, such as by using more rudder power unless compensatory elevator is applied, and the Rudder Bug is no exception.

The fact is, the design is too docile with the small amount of rudder movement and increasing it does not produce particularly desirable control characteristics. But first let us get a clear idea of why an aircraft *does* lose height in a turn, if rudder is held on.

Fig. 1 shows that it is not so much the fact that the model is *turning* that matters so much as the angle of bank induced by that turn. Once the wings are banked the amount of vertical lift is reduced—and the greater the angle of bank, the more pronounced this loss of lift. To remain level in turning flight, therefore, the wings must generate more lift, either by increasing flying speed, increasing the angle of attack of the wings, or both.

The latter can be achieved by having the design just right, and then trimmed out exactly, so that when rolling into a banked turn the nose comes up, increasing the angle of attack of the wings. Correct disposition of side areas will give this, but since this is a matter of considerable controversy, it will not be discussed in any detail here. One way of approaching the problem is to aim for the very minimum angle of bank associated with turn, so that the model is not properly banked for the turning radius involved and is, actually, skidding outwards all the time. With a deep or bellied fuselage there is then a tendency for the angle of bank to be held off still more and, provided the nose does not drop, a flat, skidding turn can be made with little or no loss of height.

The performance of the average radio model is quite the contrary. Rudder power is generally excessive, so that when a turn is started the inboard wing drops quite violently and the model wheels over into a diving turn. The only way to get a flat turn in such instances is to apply up elevator at the same time, so that the angle of attack is increased to maintain vertical lift and limit the amount of rudder power to that necessary to give a reasonable turn without inducing such an extreme angle of bank that the rudder has pronounced (down) elevator effect, making conditions even worse. An over-banked turn is dangerous in that the machine sideslips inwards, generally tending to increase its angle of bank.



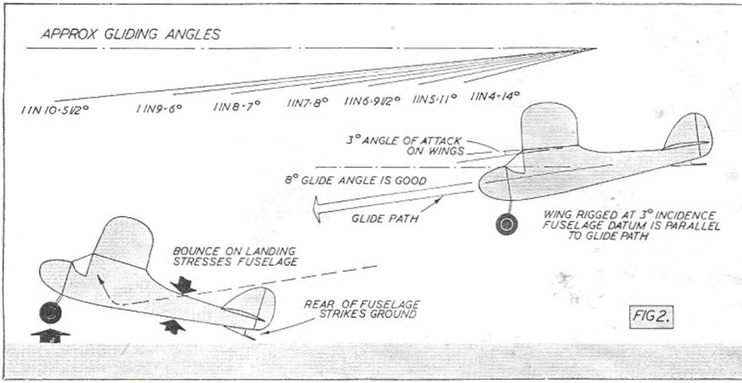


FIG 2.

Without such elevator effect, and moderate rudder power, it seems that it is going to be difficult to get smooth turns coupled with a reasonable degree of manoeuvrability. It is not possible to trim the model initially for a stable level or climbing circular flight, as when flying straight it will then be over-elevated.

On a design like the Rudder Bug it is possible to keep the nose up during turns with very small rudder movement, but under power this has not produced the desired results. Power flight is a very much nose-up climb, with the wings quite near the stalling angle, so that trimming for a rising nose and increasing angle of attack in turns to maintain height results in a stall instead of a smooth circle. Here, in fact, seems to be one point on which a modeller with a duration complex can go wrong. He is so used to trimming his models to fly as efficiently as possible, i.e., with the wings at a high angle of attack, that he can run into unexpected troubles with a controlled model, *where it seems necessary to trim the model to fly slightly under-elevated* all the time. This not only minimises any tendency to stall off a sloppy manoeuvre, but also flattens out the zoom following a dive (whether straight or spiral) *and makes the model fly faster.*

The importance of the latter cannot be over-emphasised. Whenever the writer's Rudder Bug has an outing it is invariably in the company of one of the Hook brothers machines, which are very heavily loaded by comparison and fly considerably faster. Estimated gliding speeds are 20 m.p.h. for the Rudder Bug and 30 m.p.h. for the Hook machines. Under power the Rudder Bug tends to fly even slower, with reference to the ground, since it is climbing upwards at quite a considerable angle.

Hence, with a wind drift of around 10 m.p.h., or slightly more, manoeuvres on the power flight with the Rudder Bug are strictly limited in case it gets too far downwind, as it takes about a minute and a half to beat back from a quarter of a mile downwind to overhead again—this quarter-mile limit being about the maximum acceptable since beyond that it is impossible to distinguish whether the model is going away from you or towards you and a wrong control movement may take the model even farther downwind before the error is realised.

Forgetting contest flight patterns entirely for the moment, the first requirement of any R/C model should be that it is under control all the while and, at the end of the flight, can be brought down very nearly at the same place as its launching point. To have to chase the model like any free flight job is an admission of failure; either of the control where the radio has packed up or the " pilot " has boobed, or of the model itself. The fact that the control may still be working when the model disappears completely downwind is not particularly useful.

Unless designers realise that they have got to fly radio models relatively fast, then satisfactory results are going to be ruled out in winds of anything over 10 m.p.h. or more. The occasions when wind drift is less than this are not very numerous in any one month, or year, and so the radio flier has *got* to be prepared to fly in wind. When the next contest comes along we do not want a repetition of last National's fiasco, when not one single model which got airborne had the slightest chance of remaining within bounds on any long flight.

There are three possible ways of increasing the flying speed. The first is obvious—increase the wing loading. And here it seems that a good motor is more than capable of taking on 20 oz. or more of model weight per c.c. capacity and a wing loading of up to 16 oz. per 100 sq. in. wing area is still acceptable. Once the model is airborne, and provided it has enough power, wing loading matters very little. The most serious effect of high wing loading is in landing where the high weight with an excessive rate of sink is suddenly brought to a stop, imposing severe loads on the structure.

The wings and fuselage can be strengthened up to take almost any reasonable landing shock. It is really the undercarriage unit which comes in for the battering in such cases. If too rigid it will transmit this shock load direct to the fuselage frame and possibly cause failure there, or even tear the whole unit out. So it must be reasonably flexible. At the same time, bounce must be eliminated as far as possible.

A typical landing with a heavily loaded model is depicted in Fig. 2. The less streamlined the model, the steeper the gliding angle, which tends to aggravate conditions. Actual vertical velocity at the moment of impact is generally quite high, so that airwheels or a springy undercarriage tend to bounce the model straight off again. Generally, with this bounce, the rear of the fuselage strikes the ground smartly and often with a swing imparted, so that there is a danger of both breaking the fuselage in half and wiping off the tailskid or rear wheel assembly. Reducing the landing shock by reducing the gliding speed is *not* the answer, for here we are back to the slow-flying model again.

No doubt a practical, shock-absorbing undercarriage could be produced with a little careful thought, but a more immediate and proven scheme appears to be the tricycle undercart. Properly designed, this really does work well and virtually limits the landing shock to the front wheel and leg. For example, 3/32 diameter single wire legs are more than adequate for rear legs on the Rudder Bug loaded up to $4\frac{1}{2}$ lb. or more.

Now just fitting a tricycle undercart is no solution in itself. The design requirements are shown in Fig. 3, where it is seen that the ground angle of the model should be roughly the same as the gliding angle of the model so that, following a normal glide approach, all three wheels touch down at the same moment under ideal landing conditions. This means that the model has a most definite nose-down attitude on the ground, so much so that the wings will almost certainly have a negative angle of attack when rolling on all three wheels. This will result in a long take-off run but, if properly trimmed, the model *will* still take off.

Lift when rolling on all three wheels may be zero, but the wing drag will be correspondingly low and so the model will accelerate readily. As soon as sufficient airspeed is built up the tail will be depressed, raising the nosewheel and allowing the wings to assume a positive angle of attack. A characteristic take-off for a model of this type is to roll for some considerable distance accelerating all the time, when the nosewheel rises off the ground and the machine is airborne, quite suddenly, with quite a reserve of lift for a steep climb immediately from take-off.

The common error is to rig a tricycle undercarriage with a nose-up ground angle. This means that, in any landing, the nosewheel strikes the ground first and takes the whole shock of the landing. The model will then bounce, just like any other job, but generally this bounce is not too vicious. The main danger lies in the fact that the nosewheel leg is highly stressed and even twin $\frac{1}{8}$ in. diameter wire legs bend with ease.

The best glide ratio any model is likely to achieve is around 10 : 1. Most models have a much steeper angle of descent. The less streamlined the model, the steeper the gliding angle. Of course, gliding angle also depends to a considerable extent on trimming. The slowest sinking speed is arrived at with a rather coarse gliding *angle*, with the wings at an angle of attack somewhat near the stall. The *flattest* gliding angle is obtained at some lower angle of attack, hence it is advisable to trim the model to glide at its best gliding *angle*, irrespective of sinking speeds.

Not only will this give the best approach as far as undercarriage design is concerned, but it will also

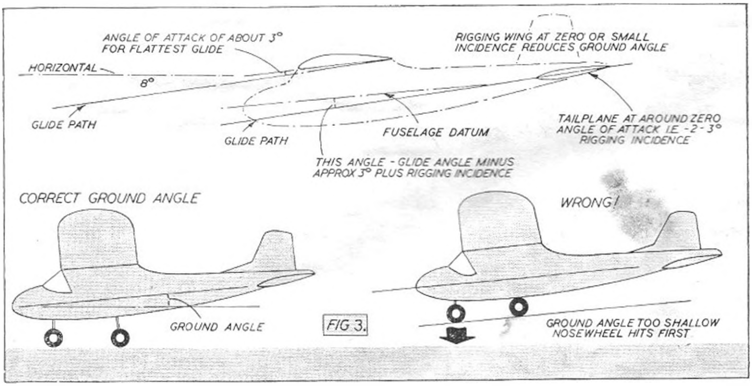
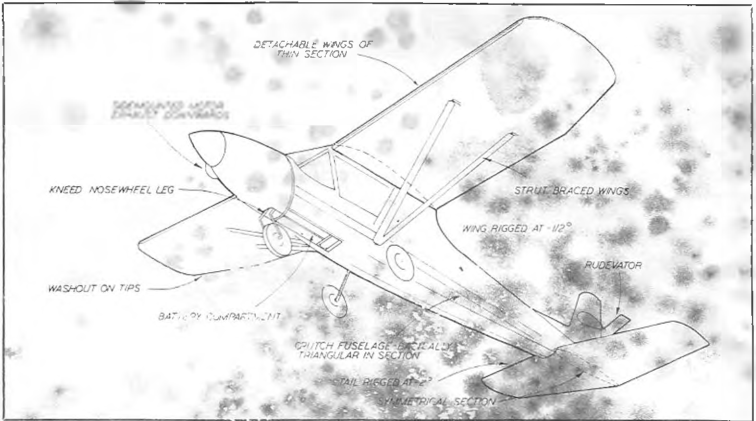


FIG 3.



result in a higher gliding speed, which is just what we want. And when gliding at a trim corresponding to the best gliding angle, a machine will cover the greatest distance from any height, which is again desirable as giving better prevention in case the model has to be brought back upwind for a landing.

The ground angle of a tricycle undercart layout should therefore be at least 18 : 1, and possibly even coarser, if the nosewheel is not to strike the ground first. This will tend to give a rather awkward ground appearance to a conventional model, as well as demanding long rear legs for adequate propeller clearance, but juggling with rigging incidences can make the model glide nose-up and thus lessen the apparent ground angle—see Fig. 3. This must not be overdone, however.

The ground angle of a model tricycle undercart job must, of necessity, be greater than that of a corresponding full size aircraft. For one thing, the model has a lower aerodynamic efficiency and, therefore, a coarser best gliding angle, and for another the model flies into the ground whereas the nose of the full size job can be pulled up by the application of elevator.

It seems, indeed, that to get really foolproof landings with heavily-loaded—or fast flying—R/C models, some form of elevator control is essential to flare out the landing approach at the last possible moment. Limited to one control system, in the light of present experience, rudder control is the one which gives most scope. Some form of steering control is, in any case, absolutely imperative. To combine both elevator and rudder can be done mechanically (from sequence movement of a suitable actuator); or a more complex radio system. The latter is not necessarily the best approach, for the more complex the radio the more the likelihood of trouble and the development work demands skilled radio knowledge. It can be done, but it has to be paid for, mainly in weight on account of the extra batteries needed.

Ideally, from the radio side, fully proportional rudder and elevator control would be the complete answer. But in the light of present development this would call for a most complex array of radio gear and be outside the scope of all but the expert to even operate satisfactorily let alone keep serviced. Proportional control limited to one control is simpler. The Hook brothers have already done this at a total weight of roughly 2 lb. for the radio gear, and found it possible to use a further on-off signal over the same radio channel. This, indeed, would seem about as far as it is necessary to go on the radio side for some time yet, for if used to give proportional elevator control available whenever required, with normal right, left and neutral rudder positions, that would be more than enough for most modellers.

About the only system which has proved satisfactory with single-channel on-off signals is the very clever *rudevator* designed by Owbridge, which utilises a spinning vane rotating behind the model and capable of being stopped, in sequence, in positions corresponding to elevator up or down, and rudder *plus* any amount of pre-determined (by adjustment) elevator. This, although about the simplest multi-control system is, again, certainly not the ideal. The chief point in its favour is that it *is* simple—and *sound* simplicity pays time and time again.

Returning to flying speed once again, a better method than increased wing loadings seems to be using a thin wing section which has to fly fast to produce enough lift. Loading and total weight figures can then be kept reasonably light, so that the

(*Continued on page* 113)

Surbiton Glider Gala

The contest season in the South got well under way on March 26th when the Surbiton & District M.F.C. held their Annual Glider Gala on Epsom Downs. 252 entrants braved the elements and despite windy conditions many fine flights were made.

The winner was A. G. Russell of the new Kentish Nomads Club with an average of 751.6. One of the Croydon Yeabsley twins came second, Desmond this time, with two 5 min. max. flights. A. Cripps of Apsley M.F.C. was third with 599.4. The Junior prize went to E. Hilton (North Downs), and Park M.A.L. won the Club Event, Croydon & District, M.A.C. being second. Congratulations Surbiton on a well organised and enjoyable meeting.

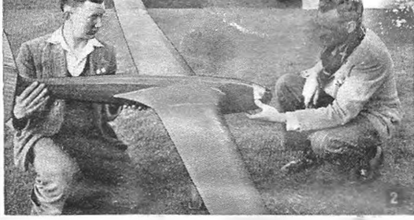
(1) W. H. Manuel, S.M.A.E Country Member, whose 10 ft. span own design flying wing performed well.

(2) K. Perrelli (right) of the Brighton District M.A.C. with his Fillon "Champion."

(3) Members of the Kentish Nomads with A. G. Russell, the winner of the contest, and his model on the right.

(4) Northern Heights members Bob Copland, Les Ryde (owner of the model), and Val Turner.

(5) The Geddies Bros. of the Zombies Club prepare "[illegible]," their 12 ft. 6 in. span glider for a flight.



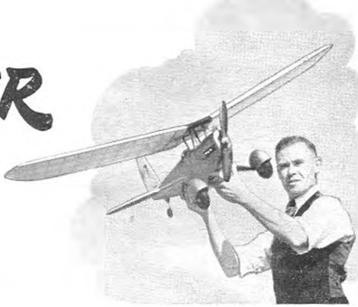
Reginald Denny Visits St. Albans Club

Members of the St. Albans M.A.C. had a visit on Sunday, March 26th, 1950, from Reginald Denny, the stage and screen actor. Mr. Denny, is also renowned in aero-modelling circles as one of the pioneers in the United States of radio-control for model aircraft, and he also designed, the "Dennymite" engine. The object of his visit was to give a talk on radio-control, and it was arranged after some astute tracking-down by Ken Brookes, the Club's P.R.O. Mr. Denny was concerned during the war with the development of radio-controlled target models for A.A. gunnery training. He recounted their evolution from the days when the military authorities first became interested in his ideas up to recent times when, he said, model targets are flown at speeds "in excess of 500 m.p.h." He explained that these targets had given invaluable training to the American Army and Navy gunners. Details of the very latest developments he could not divulge for security reasons.

A recent radio control development was "Giro-stabilisation," by means of which, once a model had been set on a course, it would hold it without continual correction—rather on the lines of the automatic pilot used in full-size practice. Mr. Denny compared the earliest days of R C with the present, and gave a highly amusing account of the first military demonstration, when the model performed the most fantastic evolutions to the profound admiration of the large crowd of "brass-hats" and "V.I.P's." who did not realise that the model was completely out of control for most of the flight!

At the end of his talk, Mr. Denny answered a number of questions and the Club members showed their great appreciation of an extremely interesting talk by according him a hearty vote of thanks.

CHALLENGER



AN ATTRACTIVE SEMI-SCALE POWER MODEL

By J. A. Newton

"CHALLENGER" will appeal to those who like their models to look something like the real thing and yet have a good flight performance. It is a good all-the-year-round model and will stand up well to the inevitable hard knocks from all-weather flying. The construction is quite straightforward and is unlikely to present any difficulties to the average aeromodeller.

The Fuselage. Build two sides on the plan in the usual manner. When dry remove and cover with $\frac{1}{16}$ in. sheet. Remember to make a right and left side—it is easy to boob here, I know, I've done it! Join the two sides by means of the cross pieces. The next job is to fix the centre-section struts in place, this must be done securely—using plenty of cement and plastic wood. Add the semi-circular top decking formers and sheet the top and bottom. Now cement the undercarriage tubes in place, again using plastic wood for strengthening purposes. Cement a piece of $\frac{1}{4}$ in. balsa sheet between the tubes and face with $\frac{1}{16}$ in. ply to provide a secure fixing for the bolt which holds the undercarriage springs. The knock-off engine mounting is of the usual type and requires no explanation here.

A 2 c.c. E.D. Competition Special was used on the original model and it provided ample power. Any other motor of similar capacity could be used instead and the design permits of either upright or inverted mounting. The sides and bottom of the engine cowling are shaped from $\frac{1}{2}$ in. sheet and rounded to shape after assembly. The top cowling is carved from soft block, hollowed out to suit engine and fixed with dress snap fasteners. The centre-section should now be completed, making sure to get the angle of incidence correct. The wheel spats are an optional fitting.

"Challenger" is an interesting out-of-the-rut design with very attractive semi-scale lines

The Wing. The construction of the two wing halves is quite straightforward. Before cementing the tongue into position, incline the first rib to give 3 in. dihedral at the wing tips. Be sure to select *hard* balsa for the leading and trailing edges and the spars. The tailplane and fin require no special mention.

Finish. Sand the fuselage smooth, rounding the corners and applying two coats of dope or banana oil between sanding. The fuselage on the original model was finished in blue transluscent paint, applied over an undercoat. This increased the weight quite a bit, but made no apparent difference to the flight performance. A saving in weight could be effected by covering the fuselage with Modelspan or heavy rag tissue instead of balsa sheet, but this is not recommended.

The wing halves, tailplane, and fin, are covered with Modelspan or heavy rag tissue and given two coats of dope. Weight the wing and tailplane down whilst drying to avoid warps.

Flying

The prototype "Challenger" flew "straight off the board," it proved to have no vices and was easy to trim. To obtain the best glide before attempting a power flight, it may be necessary to pack up the trailing edge of the tailplane with a piece of 3/32 in. balsa. The all-up weight of the original model was 2 lb., but nevertheless it had a very satisfactory performance—climbing in wide left-hand circles and gliding far flatter than many contest gliders!

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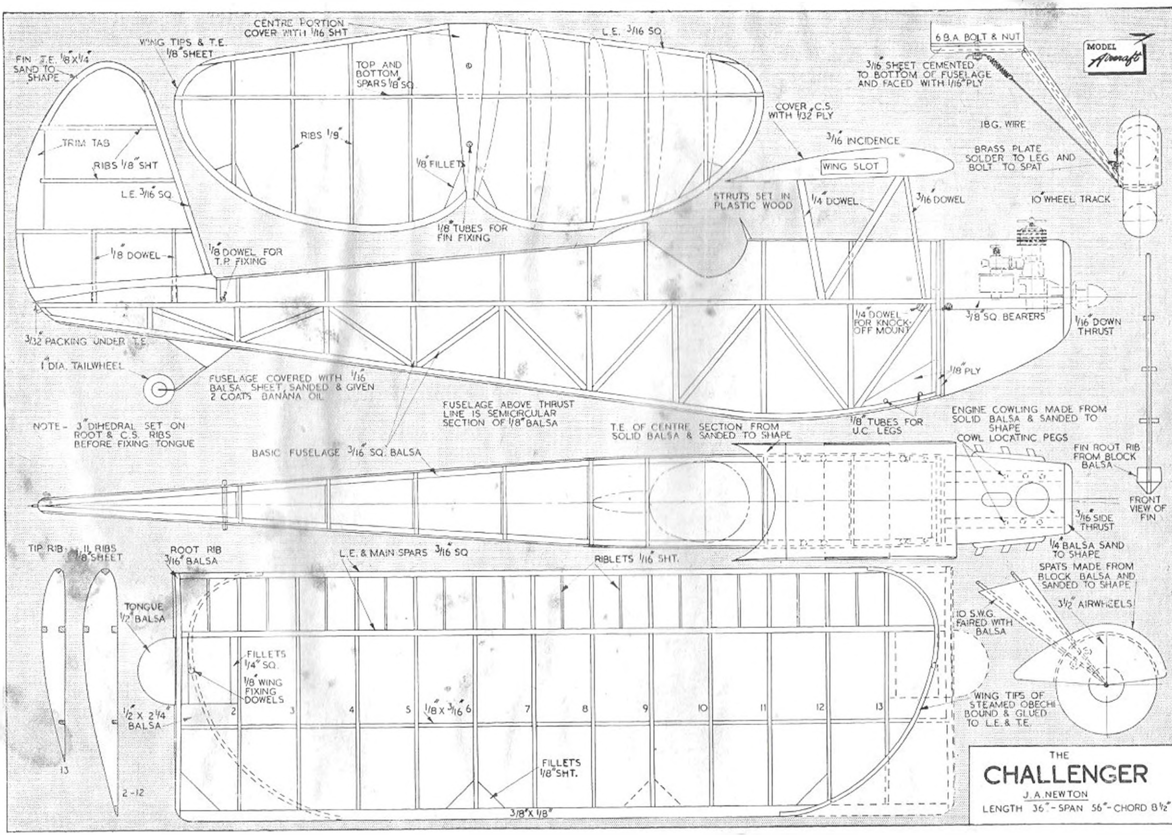


CENTRE PORTION COVER WITH 1/16 SHT
L.E. 3/16 SQ.
6 B.A. BOLT & NUT
MODEL Aircraft
WING TIPS & T.E. 1/8" SHEET
FIN T.E. 1/8" X 1/4" SAND TO SHAPE
TOP AND BOTTOM SPARS 1/8" SQ.
3/16" SHEET CEMENTED TO BOTTOM OF FUSELAGE AND FACED WITH 1/16" PLY
COVER C.S. WITH 1/32 PLY
18G. WIRE
TRIM TAB
RIBS 1/9"
3/16" INCIDENCE
BRASS PLATE SOLDER TO LEG AND BOLT TO SPAT
RIBS 1/8" SHT
1/8" FILLETS
WING SLOT
L.E. 3/16 SQ.
STRUTS SET IN PLASTIC WOOD
1/4" DOWEL
3/16" DOWEL
10" WHEEL TRACK
1/8" TUBES FOR FIN FIXING
1/8" DOWEL
1/8" DOWEL FOR T.P. FIXING
1/4" DOWEL FOR KNOCK-OFF MOUNT
3/8" SQ. BEARERS
1/16" DOWN THRUST
3/32 PACKING UNDER T.E.
1" DIA. TAILWHEEL
FUSELAGE COVERED WITH 1/16 BALSA SHEET SANDED & GIVEN 2 COATS BANANA OIL
1/8" PLY
FUSELAGE ABOVE THRUST LINE IS SEMICIRCULAR SECTION OF 1/8" BALSA
1/8" TUBES FOR U.C. LEGS
ENGINE COWLING MADE FROM SOLID BALSA & SANDED TO SHAPE
NOTE - 3" DIHEDRAL SET ON ROOT & C.S. RIBS BEFORE FIXING TONGUE
T.E. OF CENTRE SECTION FROM SOLID BALSA & SANDED TO SHAPE
COWL LOCATING PEGS
BASIC FUSELAGE 3/16" SQ. BALSA
FIN ROOT RIB FROM BLOCK BALSA
FRONT VIEW OF FIN
3/16" SIDE THRUST
1/4 BALSA SAND TO SHAPE
TIP RIB
11 RIBS 1/8" SHEET
ROOT RIB 3/16" BALSA
L.E. & MAIN SPARS 3/16" SQ
RIBLETS 1/16" SHT.
SPATS MADE FROM BLOCK BALSA AND SANDED TO SHAPE
3½" AIRWHEELS
TONGUE 1/2" BALSA
10 S.W.G. FAIRED WITH BALSA
FILLETS 1/4" SQ.
1/8" WING FIXING DOWELS
2 3 4 5 6 7 8 9 10 11 12 13
1/8" X 3/16"
1/2 X 2¼" BALSA
WING TIPS OF STEAMED OBECHI BOUND & GLUED TO L.E. & T.E.
13
2-12
FILLETS 1/8" SHT.
3/8" X 1/8"
THE
CHALLENGER
J. A. NEWTON
LENGTH 36" - SPAN 56" - CHORD 8½"

● ONCE AGAIN we lead off this month's Power Talk with news of team racing. Although the S.E. Area C/L championships will have been held by the time these words appear in print, we pass on the following information. Entries for the T.R. event already include Croydon, West Essex, East London and the Midland Area. Switzerland and Holland are expected to be represented—also an American contingent from Burtonwood.

Ron Moulton is really sold on team racing—with two models already flying and a third on the stocks. The first is a neat mid-wing powered by an inverted de Long 30. Span is 25½ in. and wing area 126 sq. in. Ron calls this one the *Playbox*. The cowl is hinged for quick access to the fuel tank in the "pits." Number two ("9" in the photograph) is an Elfin 2.49 sidemounted design, based on the full size Goodyear racer—*Rivets*. The model features a wing of similar span and area to *Playbox*. All up weight is 16 oz. This should also be a hot number with an Amco 3.5 in the front.

Cyril Shaw has designed a pretty little "apple-cheek" racer for the Allbon Javelin. Appropriately named *Half-pint*, this 17½ in. span model has only 50 sq. in. of wing area. On 35 ft. lines, speed is between 60 and 65 m.p.h. The 1 oz. capacity tank gives about 5 min. flying time. This means that in such a contest as the S.E. Championships, only one stop (if any) for refuelling would have to be made in the five mile eliminations. In the final, two refuelling stops at the most (over 10 miles) would be required. But unfortunately the rules call for a minimum line length of 52½ ft.—too long for safe racing with a Javelin design.

The Comet Power Club proposes two classes for T.R. events—Class 1 for 0-2 c.c. (35 ft. lines) and Class 2 for 2-5 c.c. motors (52½ ft. lines). We heartily recommend the adoption of these classes for all future team races. By all means keep models to reasonable proportions by fixing an upper limit of 5 c.c., but many fine little motors will be kept out of racing solely on account of the 52½ ft. lines rule. With the present line lengths, most racers will probably feature such motors as the Frog 500, Eta 29, Yulon 30, E.D. 3.46, Mills 2.4 and Amco 3.5—plus the popular American 29's. Allow 35 ft. lines and we shall see plenty of designs for the Javelin, Bee, Mills 0.75 and 1.3, Amco 0.87, Elfin 1.8, E.D. 2 c.c. and similar power plants. Small racers—like any other models—are cheaper and quicker to both build and repair. They would do much to popularise T.R. with the average modeller. If, at the end of the 1950 season, one size of engine was found to have an overwhelming advantage over the other—separate events could then be introduced for each class to prevent the exclusive adoption of either the upper or lower engine capacities.

Most C/L modellers appear to be interested in the possibilities of T.R., but many are being frightened away by the rather stringent rules. For instance, is the "fully-cowled engine" rule really necessary? The choice of suitable scale team racers is considerably narrowed by this rule. If you want to build a Spitfire for T.R., it means either (a) making a much larger model than is desirable; (b) fitting an Amco 3.5—or similar "short" motor; (c) making an extension shaft, or (d) adding a miniature helmet cowl over the projecting cylinder head. Our solution to this problem is to amend the rule to read—"Engines must be fully cowled *or* side mounted." Or how about removing all cowling restrictions on scale entries only? Phil Smith's F.W. 190, Fury and Spitfire controliners should be good for T.R. work.

In the February MODEL AIRCRAFT, the St. Albans club asked for constructive criticism of the rules for the All Herts T.R. event (August 20th). Well, how about the above suggestions for using 35 ft. lines with smaller power plants and the relaxation of the cowling rule for scale types?

In our opinion, the trickiest problem in T.R. is that set by the inexperienced or careless flier, who may crash into his opponent's model or lines. We can imagine something like a riot starting if the leading model in a final is brought down (on lap 159!) by negligence on the part of one of the other competitors. And would the injured party be able to claim compensation under S.M.A.E. insurance? Quite a problem, isn't it!

If you decide to build a scale team racer, why not choose one of the Goodyear midgets. Most of them feature "apple-cheek" cowls that are just right for enclosing side mounted power plants. Accurate three-views of all the participating designs at the '49 American National Air Races, appeared in the February *Air Trails*. Our favourites, out of the 25 aircraft so presented, are the *Estrellita, Cosmic Wind, Long Midget* and the *Arganda Special*. If we find time to build a team racer this season, it will probably be a semi-scale type with the most attractive features of each of these aircraft incorporated.

Those who are interested in the way American team races are run, should write to the boys who started it all—the F.A.S.T. club (First All Speed Team), 737 South Pasadena Avenue, Pasadena, California, U.S.A. The best article on team racing we have come across so far (Dec. '49, *Air Trails*) was written by Les McBrayer, a member of the F.A.S.T. club. According to McBrayer, the original idea in introducing team racing was: (1) to encourage the building of more realistic models; (2) actually racing several models at a time in the same circle; (3) minimising the advantage of a hot motor; (4) increasing spectator appeal. Considered essential by this American writer, are engine cut off's (so that engines may be stopped as soon as the winning lap is passed) and automatic " stooges " for releasing the models.

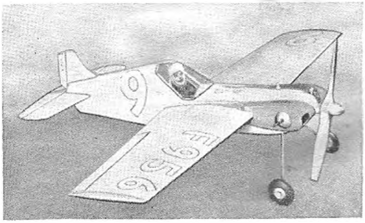
★ ★ ★

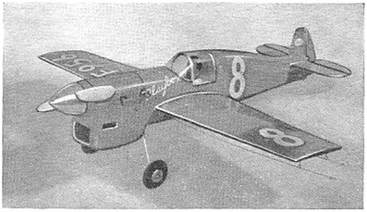
● ROY YEABSLEY called in at our workshop the other day and showed us the plans of his new A2 glider design—the *Revenge*. The fuselage of this model is very sleek—with a tongue and box fitting for the wings. Span is 64½ in. and the wings are similar to those of the 1948 Nationals winner (*Super Sunbug*). Wing section is Gottingen 532—area 405 sq. in. Tailplane area is 116 sq. in. and the fin is positioned under the fuselage. Roy tells us that the main reason for the latter was to avoid errors in rudder setting and to simplify installation of the tip-up D/T tailplane. Looks a very promising design—watch for it at the coming A2 events.

We, too, have designed an A2 glider—in this case, to the upper limits of the formula. Span is 65½ in. and the uncovered weight 13½ oz. The model is conventional in appearance—being a high wing (polyhedral) cabin type. The tip-up tailplane is operated by a diesel type Elmic. It's a long time since we flew a contest glider, so we are not exactly banking on being in Sweden on July 30th !

★ ★ ★

● IN ADDITION to aeromodelling, J. H. Maxwell is very interested in ultra-light full size aircraft. In fact, at one time he was on the design staff of Slingsby Sailplanes, so it is hardly surprising that his latest model is a 1/12 scale *Slingsby Motor Tutor*. Not only is this model true to scale in outward appearance (including dihedral), tail area, aerofoil section, rib spacing and so on)—the weight and power are also in proportion. The engine is an O.K. CO_2 with the bulb holder mounted vertically in the pilot's seat. As a CO_2 bulb is just about the same weight as a 1/12 scale man, even the C.G. is in the scale position ! Next model on the Maxwell building programme is a K. & B. Infant powered *Flying Flea*. We only hope it performs better than the real aircraft !


A neat Elfin 2.49 powered team racer by Ron Moulton


Another of Ron Moulton's team racers : power unit, de Long 30

J. H. Maxwell says that his chief interest lies in experimental aeromodelling and that he is at present engaged on tests of a practical nature—designed to obtain data which will be useful to the average model builder. An example of this programme is a 16 ft. whirling arm for testing airscrews under conditions approximating closely to actual flight.

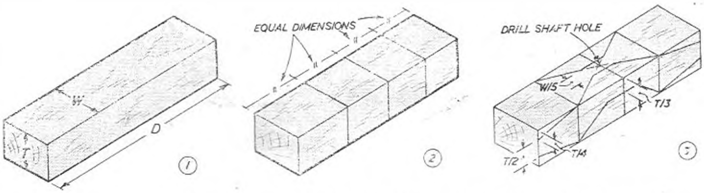
★ ★ ★

● LAURIE BARR—last year's National Champion—writes in with news of his plans for 1950. Here's an excerpt from his letter:

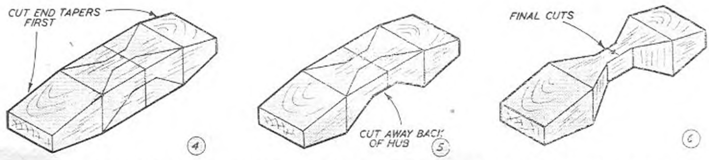
" This year I intend to fly in all but R/C contests. In gliders, I have a bigger and better version of Peter Gilbert's *Thunder King*. Span is 11 ft. 4½ in. (chord 14½ in.)—and flights are 5 min. plus on a 328 ft. towline. Next comes an A2 glider—a good looking functional job of 60 in. (7 in. chord), weighing 14¼ oz. I am also flying a combined stunt and team racer design. Wing area is 318 sq. in. and a full span flap is fitted (plus usual elevator control). A Frog ' 500 ' supplies the power (9 in. × 6 in. Truflo) and it chugs round at 75 m.p.h. on 70 ft. lines. Weight is 21 oz. No offset is used—just 1 oz. of wing tip weight and staggered lines. The fuselage is well streamlined and planked all over. I shall be going in for F/F again—this time using a Frog ' 500.' Layout will be conventional—but a pressure type cowl will be fitted. I have two Wakefields on the board as well, so I look like being kept busy. Last year's *Thunder King* will be given an airing at the Surbiton Glider Rally."

In Brief

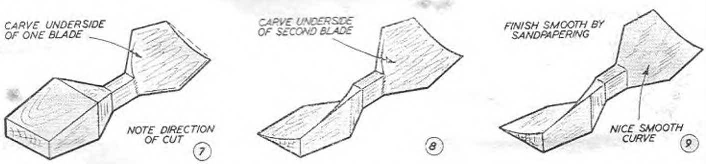
● SHAW'S ARE bringing out a speed kit that will retail for 7s. 6d.—or less. This is an 11 in. span design for the Javelin diesel. It features a " V " tail—is not unlike Cyril's record holding *Hearse* (" 49 " size) . . . . " St. Albans M.A.C. are to be visited by Group Captain Donaldson, who flew a Meteor at 616 m.p.h., and Reginald Denny, Hollywood film actor and pioneer of the model aircraft industry in America."



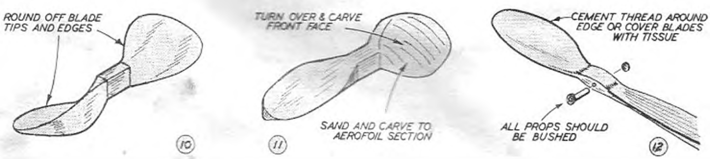
BLOCK DIMENSIONS DETERMINE PITCH, BLADE SHAPE, BLADE AREA, SO PLOT ACCURATELY



VERY CAREFUL CUTTING IS NECESSARY TO GET A TRUE BLANK FOR CARVING. FRETSAW IS USEFUL



FIRST STAGE IS TO CARVE THE UNDERSURFACES OF EACH BLADE, WITH NECESSARY UNDERCAMBER



ROUND OFF TO BLADE SHAPE, CARVE UPPER SURFACES TO AEROFOIL SHAPE. SAND AND BALANCE

How to make it

NO. 4. CARVING PROPELLERS

(Figs. 1, 2, 3). Medium hard block is best for props—tough enough to carve thin and still be strong, but not unduly heavy. Using the standard "quartering" method for laying out, pitch is determined from block dimensions. Pitch $= \frac{\pi D \times T}{2W}$

$$= \frac{11 \times D \times T}{7W}$$

W is generally about $\frac{1}{8}$ D, and if you use this figure, prop calculations simplify to:—

$$\text{Pitch} = 4 \times \pi \times T \left(\text{or } \frac{88T}{7}\right)$$

$$W = D/8$$

$$T, \text{ for any pitch} = \frac{\text{Pitch}}{4 \times \pi}\left(\text{or } \frac{7 \times \text{Pitch}}{88}\right)$$

Mark out the block *accurately*, as shown, and mark all four sides of the block. Then, before any cutting, drill the shaft hole through the exact centre and be sure that this is truly vertical.

(Figs. 4, 5, 6). With the *block* marked out, the next stage is to cut to *blank* shape prior to carving. Here a fretsaw, jig-saw or small hand saw is best, and again you must work accurately. Unless you make square cuts your final propeller will have different pitch angles on each blade. Cut off the end tapers first, as shown. Then cut away the back of the hub, but be careful not to cut into the hub portion itself as a cut here will weaken the whole prop. The same applies to the final cuts and it is advisable to work outside the actual drawn lines and trim down to final shape with a knife.

The *vital* cuts are the ones which determine the blade edges, viz., top left and bottom right edges of the blank, so be sure that these, at least, are cut absolutely true to the marked outline. The layout shown is the simplest to work, for none of the important guide lines is destroyed during the cutting out process. Take care over this stage.

(Figs. 7, 8, 9). First carve the undersurface of one blade. A very sharp penknife is best for this, finishing with various grades of sandpaper. Note that with the blade facing away from you, you always cut off the right-hand edges of the blank, otherwise you will get an opposite hand prop.

A fairly generous undercamber should be carved into the blades and the whole undersurface should have a smooth, flowing curve from hub to tip. Avoid sharp changes of section and in the final sandpapering make sure that all bumps or hollows are removed.

Too much undercamber will produce a "slow" propeller. That is, drag will be high and it will not be able to revolve fast enough to produce the required thrust. On the other hand, no undercamber at all will produce a relatively inefficient blade, which again will not develop maximum thrust. Although you finish the undersurfaces at this stage, you will have to come back to them again for a final work over after carving the upper surfaces, particularly in the region of the hub. The object is to work the blade *thickness* down to the lowest possible figure, consistent with the proper strength and blade *section*.

(Figs. 10, 11, 12). Before carving the upper surfaces, cut and trim the blank to the actual blade shape required. The best method is to use a card or paper template to mark out each blade. Alternatively, shape one blade and then make a tracing to transfer to, and mark off, the other blade. It is important that each blade is identical.

Carving the upper surfaces consists of working the blades down to a nice thin aerofoil section. This section is best judged by feel and if necessary, work away some more of the undersurface, too. When finally sanded smooth, you can then finish off the hub by sandpapering.

The propeller must then be balanced by mounting on a piece of wire and seeing which is the heavier blade. Sand more wood off this, from as near the tip as possible, until the prop will balance horizontally. Dope, cover with tissue, or edge with thread for maximum strength and durability.

Propellers should never be left unfinished. Balsa tends to pick up moisture readily, which will cause the wood to swell and give a rough blade surface. The weight of moisture absorbed, too, can spoil the trim of the model.

One of the simplest ways of getting a good finish is to give the blades about half a dozen coats of really thick dope, sanding down with flour paper between each.

KNOW YOUR ENGINE

PART III INSTALLATION

By P. G. F. Chinn

FOR the beginner who, tackling his first power model, builds a kit model, engine installation should present few problems. Very soon, however, he will want to try his hand at an original design, or to adapt an existing design to a different engine, and some knowledge of engine installation methods will therefore be desirable.

Before the war, when most power models were relatively large, a "crash-proof" engine mounting was often used. Compared with present-day trends, engines were fragile and models heavy and a crash might easily bend a crankshaft or fracture a crankcase. A flexible mounting, of which Col. Bowden's cast elektron mounting was a typical example and which would give under impact, undoubtedly saved serious damage in many a crash.

The Bowden type mounting, or an adaptation of it, can still be used with advantage on the larger types of free-flight model where wing-loadings may exceed 14 oz. sq. ft. or so. The principle of this form of mounting is shown in Fig. 1. The entire unit can, of course, be cowled if desired and the rubber shock cords enclosed within the fuselage. A feature of this type of mounting is that the complete power unit can be easily and quickly detached from the fuselage.

To prevent movement through vibration a mounting of this type should be a close fit in the fuselage front, which should be well braced, and excessive engine overhang should be avoided. The detachable bulkhead may be of fairly heavy plywood and the actual engine mounting can be bent up from sheet metal. Heavy rubber should be used for the shock cords and these, if exposed to mineral oils, must be frequently renewed.

With any form of rigid engine mounting, the construction used is, of course, dependent on the type of model. Obviously, a C/L speed model will require a very much stronger and heavier installation than, for example, a lightweight power-duration model.

Probably the most popular and satisfactory form of mounting is the beam type and most engines in production are fitted with crankcase lugs to permit such an installation.

The beam mounting (Fig. 2) usually takes the form of two wooden beams, projecting from the front fuselage bulkhead to which the engine lugs are bolted, and extending back into the fuselage through one or more interior bulkheads. Generally, the total length of the bearers should be between twice and three times the length by which they project unsupported from the front of the fuselage. In the case of C/L models, this measurement can be increased and it is often worth the extra weight involved to extend the bearers to provide an anchorage for the control-plate or, in the case of a fast stunt model, to utilise them to support the mainplane. (Fig. 3.)

An alternative form of mounting which has become popular during recent years is the bulkhead type fixing in which the engine is secured to the front bulkhead, or "firewall," either by means of studs or bolt-holes in the crankcase of the engine itself, or by a simple sheet metal bracket bolted to the beam-mount lugs.

This system has the advantage of being lighter and is well suited to power-duration type installations. (See Fig. 4.) It is less satisfactory for C/L work, because the front bulkhead always tends to tear out in a crash. However, it is possible to strengthen the assembly at the expense of a slight increase in weight and a method of doing this is shown in Fig. 5.

Another type of installation which was, for a time, quite popular in the U.S. for competition free-flight, is that in which the engine bearers, complete with front bulkhead, are removable from the fuselage. This was used on Carl Goldberg's well-known "Clipper" cabin model and the entire spark ignition equipment, coil, condenser, batteries, all wiring and also the undercarriage, were mounted on the bearers. Being removable in a complete unit, maintenance and inspection of these ignition components were greatly simplified.

A more recent development of this idea is that employed on Goldberg's latest power-duration model, "Cumulus" (illustrated in "Power Talk," January issue MODEL AIRCRAFT) in which the front section of the fuselage below the thrust line is removable complete with engine, tank, shut-off valve, flight-timer and undercarriage.

In C/L speed model design, the engine installation assumes considerable importance. The extremely high power output developed by the modern miniature racing engine demands a very strong and rigid mounting and this is invariably of the beam type, except in the case of certain small Class "A" engines.

The majority of present-day speed models feature fuselages turned or carved from the solid and hollowed out and only sufficiently wide to accommodate the engine. A firm foundation is thus provided for the bearers which can be secured to the lower fuselage shell over their entire length. (Fig. 6.) The bearers themselves should be of a hardwood, such as ash or sycamore and should extend well back into the

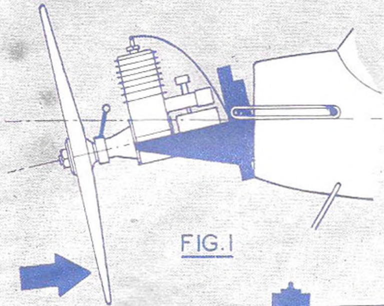


FIG. 1

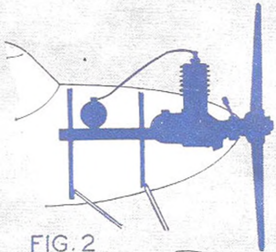


FIG. 2

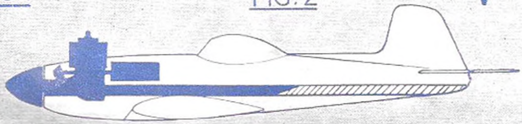


FIG. 3

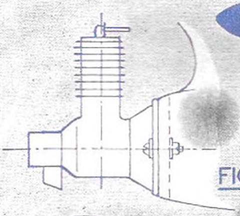


FIG. 4

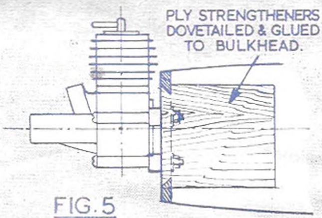


FIG. 5

FIG. 6.

FIG. 7

FIG. 9

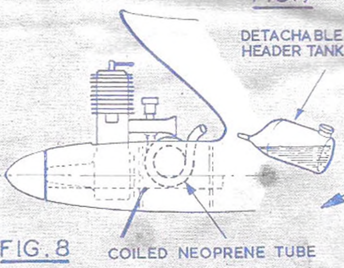


FIG. 8

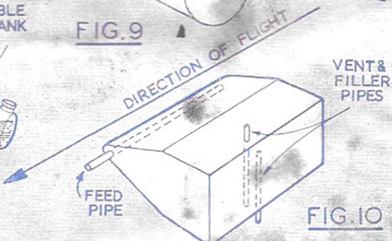
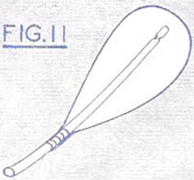


FIG. 10

FIG.11



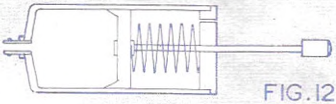
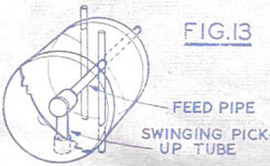


FIG.12

FIG.13



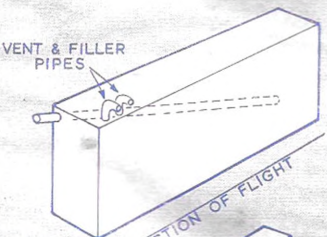


FIG. 14

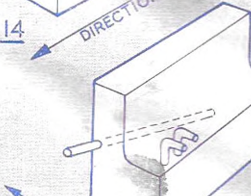


FIG.15

fuselage—preferably to the trailing-edge of the wing or even to the full length of the fuselage. Weight need not be increased to any great extent since the bearers will, of course, be tapered off with the lines of the fuselage.

Another form of construction which has been used with success in America for 10 c.c. speed models is that involving the use of a machined metal engine mount, usually of duralumin or magnesium alloy. This generally takes the form of a " crutch " sandwiched between the upper and lower fuselage shells and, again, may run the whole length of the model. Taking this a stage further, the Dooling engine of George Fong's "Hell-Razor," which set up an A.M.A. record of 159.23 m.p.h. last year, was mounted directly to a cast magnesium lower shell. Besides greatly increased strength and rigidity, an advantage claimed for this form of construction is that this considerable quantity of metal is responsible for improved heat dissipation and thus cooler running of the engine. (Fig. 7.)

Whatever form of engine mounting is employed, it is essential that this is aligned properly. Bolt holes should be correctly lined up with the engine lugs and, with the more powerful types of engine, the use of extra locking-nuts or of special nuts of the Simmonds " stop-nut " type is advisable to prevent movement through vibration. For most popular engines, 6-B.A. bolts or machine screws and nuts are satisfactory. For engines of under 1 c.c., 8 B.A's. can be used, however, while for 10 c.c. racing engines, the use of 4-B.A. bolts is recommended.

With the increased popularity of C/L flying, fewer engines are now sold with fitted fuel tanks. The conditions under which models, speed and stunt types in particular, are now operating have greatly complicated carburation problems and tank design has assumed considerable importance.

For free-flight work, however, the conventional type of tank is quite satisfactory. All that is necessary is to ensure that the feed pipe still reaches the fuel in a steep climbing attitude and that the tank is placed as close as possible to the needle-valve assembly. An extremely simple arrangement, yet one which the writer has found entirely satisfactory for power-duration work with small diesels, is that shown in Fig. 8.

This consists of only a piece of Neoprene tubing, the length of which is determined by the engine run required, fitted to the jet and coiled round inside the fuselage. The free end is left readily accessible and, for starting, a small tank, such as Jay's stunt type, is plugged in. With the Neoprene tubing full, the engine is started and controls adjusted. The tank is then detached from the tube and the model released.

The system has the advantage of light weight, reasonably accurate timing of the engine run while the detachable header tank allows ample time for warming up and adjustment of the controls.

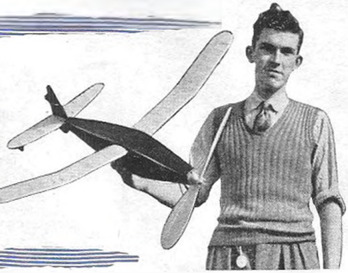
For simple C/L trainers and elementary speed models, a special tank is not essential. It must, however, be remembered that, when the model is under way, centrifugal force will throw the fuel

(*Continued on page* 130)

Simon

1949 GUTTERIDGE TROPHY WINNER

By W. Hinks



"SIMON" was one of the most successful Wakefield models of the 1949 season, and one example built and flown by J. F. McKenna, whose photograph appears above, placed first in the Wakefield Eliminator with three perfect five minute (maximum) flights, thereby winning the Gutteridge Trophy. Unfortunately McKenna was unable to obtain leave from the R.A.F. in order to compete in the Wakefield "100."

Fuselage

Build the two sides together over the plan in the usual manner. Whilst drying build wing box from hard $\frac{1}{8}$ in. sheet and bind with tissue and cotton. Remove sides from plan and join together by means of wing box and centre cross-pieces, then add remaining cross-pieces, working from centre to rear and centre to nose of fuselage. Fit $\frac{1}{16}$ in. sheet in lower rear bay and front bays, under-fin and paper tube for fin fixing, rear motor anchorage, and d t box into position. Before cementing nose former, sand $\frac{1}{8}$ in. down thrust and [illegible] in. side thrust into nose. Cement paper tube for undercarriage and strengthening gussets into place. Cut stringers roughly to shape and cement in position, sanding nose to streamlined shape when cement is dry. Centre stringers are let into second bay of fuselage by $\frac{1}{16}$ in. It is important that $\frac{1}{8}$ in. × $\frac{1}{16}$ in. cross-pieces are used at the rear motor anchorage and $\frac{1}{8}$ in. × $\frac{1}{16}$ in. cross-pieces *and* spacers are used at front motor anchorage, to give ample rubber clearance. The gussets and wing braces around wing box should not be fitted until after wing root ribs have been checked for alignment on wing tongues.

Wings

Build tips over plan and whilst drying carve ribs, either by template method or individually. Notch trailing edge $\frac{1}{16}$ in. to take ribs and temporarily cement 1/32 in. sheet under each notch to preserve wing section. Remove tips from plan and pin leading and trailing edges in place. Trim ends of tips to fit and cement in position, packing up extreme ends of tip $\frac{3}{16}$ in. Notch all the ribs to take spars and cement into place, working from tip to centre. To ensure that both panels of wing have the same incidence, plug wing tongues into fuselage wing box, slide root ribs over the ends of tongues and check incidence by comparing flat undersurface of root ribs through fuselage. Any error can be easily rectified before cementing root ribs to tongues. When root ribs and tongues are dry, trim outboard end of tongue flush with rib No. 2 and cement in place, ensuring that root rib is absolutely flat on the building board and that outboard end of tongue is resting on the piece of packing under rib No. 2, this producing equal dihedral on each panel. When thoroughly dry remove wing from plan and sand leading and trailing edges to comply with wing section. Crack leading and trailing edges where shown on plan and pack up to give correct dihedral and add strengthening gussets. Top spar should be fitted before removing wing from plan; fitting of lower spar is last process before covering.

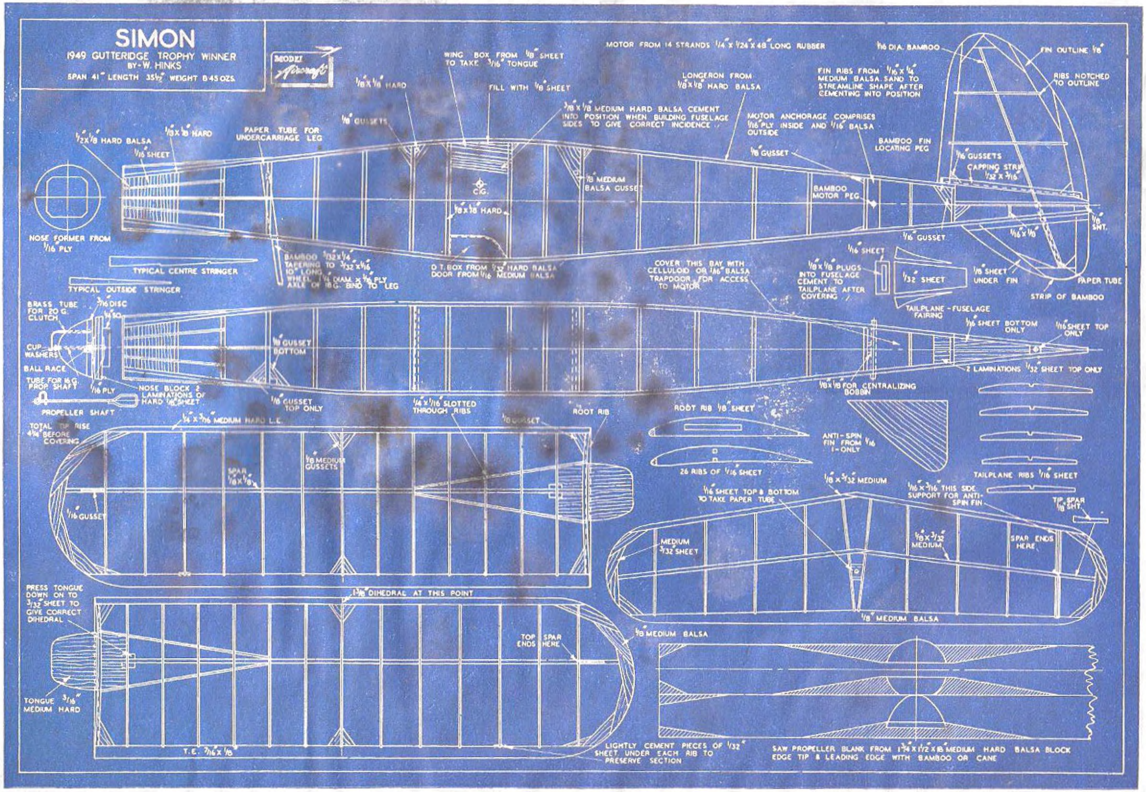
Fin

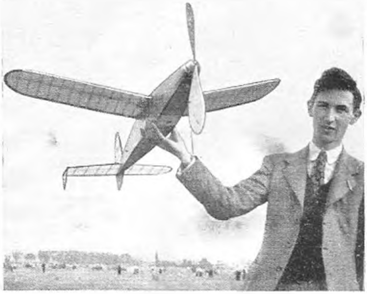
Pin outline of $\frac{1}{8}$ in. soft sheet over plan. Ribs are $\frac{1}{16}$ in. × $\frac{1}{4}$ in. oblong strips which are notched to take leading and trailing edges and spar. Mark position of ribs on outline and remove from plan. Cement ribs and bamboo spar in position, add gussets to lower rib and sand whole to streamlined shape. Complete by cementing capping strips to lower rib and small bamboo peg into leading edge to locate fin.

Tailplane

Is quite orthodox construction, the whole assembly being built flat over plan. For best results cut leading and trailing edges and spar from same piece of $\frac{1}{8}$ in. sheet. Note that main spar ends at tip ribs and separate tip spars are used to prevent distortion of section over tips. A short length of paper tube is located in centre section of tailplane

FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 23, GREAT QUEEN STREET, LONDON, W.C.2, 5s. 0d., POST FREE


SIMON
1949 GUTTERIDGE TROPHY WINNER
BY W. HINKS
SPAN 41" LENGTH 35½" WEIGHT 8.45 OZS.
MODEL Aircraft
WING BOX FROM 1/8" SHEET TO TAKE 3/16" TONGUE
MOTOR FROM 14 STRANDS 1/4" x 1/24" x 48" LONG RUBBER
1/16 DIA. BAMBOO
FIN OUTLINE 1/8"
RIBS NOTCHED TO OUTLINE
FIN RIBS FROM 1/16 x 1/4 MEDIUM BALSA SAND TO STREAMLINE SHAPE AFTER CEMENTING INTO POSITION
LONGERON FROM 1/8 x 1/8 HARD BALSA
1/8 x 1/8 HARD
FILL WITH 1/8" SHEET
3/16 x 1/8 MEDIUM HARD BALSA CEMENT INTO POSITION WHEN BUILDING FUSELAGE SIDES TO GIVE CORRECT INCIDENCE
MOTOR ANCHORAGE COMPRISES 1/16 PLY INSIDE AND 1/16 BALSA OUTSIDE
1/8" GUSSETS
PAPER TUBE FOR UNDERCARRIAGE LEG
1/8 x 1/8 HARD
1/2 x 1/8 HARD BALSA
1/16 SHEET
BAMBOO FIN LOCATING PEG
1/8" GUSSET
1/16 GUSSETS
CAPPING STRIP 1/32 x 3/16
1/8 MEDIUM BALSA GUSSET
C.G.
BAMBOO MOTOR PEG
1/8 x 1/8 HARD
1/16 SHT.
1/16 x 1/8
1/16 GUSSET
NOSE FORMER FROM 1/16 PLY
BAMBOO 1/32 x 1/4 TAPERING TO 3/32 x 1/16 10" LONG WHEEL 1½ DIAM x 1/16 PLY AXLE OF 18 G. BIND TO LEG
D.T. BOX FROM 1/32 HARD BALSA DOOR FROM 1/16 MEDIUM BALSA
COVER THIS BAY WITH CELLULOID OR 1/16" BALSA TRAPDOOR FOR ACCESS TO MOTOR
1/16 SHEET
1/8 x 1/8 PLUGS INTO FUSELAGE CEMENT TO TAILPLANE AFTER COVERING
1/32 SHEET
1/8 SHEET UNDER FIN
PAPER TUBE
STRIP OF BAMBOO
TYPICAL CENTRE STRINGER
TYPICAL OUTSIDE STRINGER
TAILPLANE - FUSELAGE FAIRING
BRASS TUBE FOR 20 G. CLUTCH
3/16 DISC
1/4 SQ.
CUP WASHERS
BALL RACE
TUBE FOR 16 G. PROP SHAFT
1/16 PLY
NOSE BLOCK 2 LAMINATIONS OF HARD 1/8" SHEET
PROPELLER SHAFT
1/8" GUSSET BOTTOM
1/8" GUSSET TOP ONLY
1/16 SHEET BOTTOM ONLY
1/16 SHEET TOP ONLY
2 LAMINATIONS 1/32 SHEET TOP ONLY
1/8 x 1/8 FOR CENTRALIZING BOBBIN
1/4 x 1/16 SLOTTED THROUGH RIBS
ROOT RIB 1/8" SHEET
ROOT RIB
1/8 GUSSET
1/4 x 3/16 MEDIUM HARD L.E.
TOTAL TIP RISE 4 1/4" BEFORE COVERING
1/8 MEDIUM GUSSETS
SPAR 1/8 x 1/8
1/16 GUSSET
ANTI-SPIN FIN FROM 1/16 1-ONLY
26 RIBS OF 1/16 SHEET
TAILPLANE RIBS 1/16 SHEET
1/8 x 3/32 MEDIUM
1/16 SHEET TOP & BOTTOM TO TAKE PAPER TUBE
1/16 x 3/16 THIS SIDE SUPPORT FOR ANTI-SPIN FIN
TIP SPAR 1/8 SHT.
MEDIUM 3/32 SHEET
1/8 x 3/32 MEDIUM
SPAR ENDS HERE
1/8" MEDIUM BALSA
PRESS TONGUE DOWN ON TO 3/32 SHEET TO GIVE CORRECT DIHEDRAL
1 3/8" DIHEDRAL AT THIS POINT
TOP SPAR ENDS HERE
1/8 MEDIUM BALSA
TONGUE 3/16" MEDIUM HARD
T.E. 7/16 x 1/8
LIGHTLY CEMENT PIECES OF 1/32" SHEET UNDER EACH RIB TO PRESERVE SECTION
SAW PROPELLER BLANK FROM 1¾ x 1½ x 18 MEDIUM HARD BALSA BLOCK
EDGE TIP & LEADING EDGE WITH BAMBOO OR CANE



W. Hinks, designer of the "Simon" Wakefield model, with one of the earlier prototypes

(for fin spar to pass through) by means of $\frac{1}{16}$ in. sheet top and bottom.

Undercarriage

Leg is made from hard outside part of springy bamboo, tapering, as shown on the plan. Wheel is from $\frac{1}{16}$ in. ply bushed with brass tubing and is held in place on 18 s.w.g. axle by a small piece of plastic tubing.

Propeller

Carve from block as shown on plan. Before doping, cement strips of thin bamboo or cane round leading edges and tips of each blade. Apply four coats of dope, sanding between each. Cement spinner disc to rear of propeller hub and build up spinner from scrap balsa. Apply four coats of dope to spinner and one further coat to whole of propeller, sanding with very fine sandpaper to finish. Nose block is quite straightforward as shown on plan.

Covering and Finishing

Cover with jap tissue or similar and give two coats of dope to fuselage and wings and one coat to tail unit. Build up tailplane fuselage fairing from sheet and fit d/t box door by means of jap silk hinges cemented to covering of fuselage. For ease of rubber insertion, a trap door can be fitted at rear of fuselage or one bay covered with transparent celluloid : d/t shute is from jap silk 12 in. square and is anchored level with leading edge of tailplane.

Power

Fourteen strands of $\frac{1}{4}$ in. × 1/24 in. rubber 48 in. long. Dunlop 6010 is recommended, which should take 1,000 turns if properly broken in.

Trimming

By orthodox method. No washout on wings is necessary, neither is it desirable.

Model Report

(Continued from page 100)

undercarriage unit is not unduly stressed in a normal landing. This, in fact, is one of the basic ideas behind a new R/C model of the writer's, developed primarily from the Rudder Bug in an attempt to retain as many of the good characteristics of that original design and eliminate some of its bad points. Some leading details are sketched in Fig. 4, a particular point of interest being the wings. These are of thin section, and strut braced, giving a much greater overall strength for a given weight than a one-piece wing, as well as being more portable. The idea, too, is to try out wings of different area, basically on the lines that in strong wind, smaller wings are used to increase the flying speed. Light winds use the largest possible wings for best manoeuvrability.

The centre of gravity is being rigged rather farther forward than usual with the idea of making the model more smooth in response to control and flying it under-elevated to increase speed. Flying a radio model is very different to flying a full size aircraft, for the pilot is on the ground and has an entirely different aspect of what the model is actually doing. There is a definite time lag between a movement on the part of the model and the pilot realising what the model is doing ; and if the model itself is sluggish in initial response to control movement, over-control is almost inevitable.

Some experiences with the Rudder Bug again well illustrate this point. With a relatively large rudder movement and C.G. at 35 per cent., response to rudder is unappreciable for a second or so. Then a wing drops and the model sweeps round almost violently. At the first sign of the model turning, control must be neutralised for a 180 degree turn, otherwise it becomes a full 360 degree turn before the pilot has realised what has happened. Similarly, if too slow to apply correction should the model start to turn off course with control neutral, the model is more likely to perform a full "S" turn with considerable drift downwind before it is brought back on to course again. The usual tendency is to change one's mind in the middle of all this, apply opposite rudder again which makes things worse, and then forget the rudder sequence entirely, which is surprisingly easy even with a simple right and left rudder escapement. Certainly any system incorporating more than just two control positions absolutely demands a control box of some sort which can be marked out or aligned in synchronisation. And nothing even approaching the ideal radio controlled *model design* has yet been produced.

HIVAC XFGI VALVE

In the article by W. H. C. Taylor, entitled "A 2 oz. R/C Receiver" which appeared in our last issue, it was stated that this valve was in short supply.

We now understand that Messrs. Hivac Ltd., have made arrangements for adequate distribution through the normal trade channels and it should now be possible to obtain this valve from any retailer.

MODEL *Aircraft* photonews

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PHOTONEWS starts off this month with two photographs from our old friend, Ed Stoffel. No. 1 shows Les Mowbray of the West Essex Aeromodellers, with his latest twin boom free-lance pusher. This fine looking model has a wing span of 63 in., and is powered by a de Long " 30."

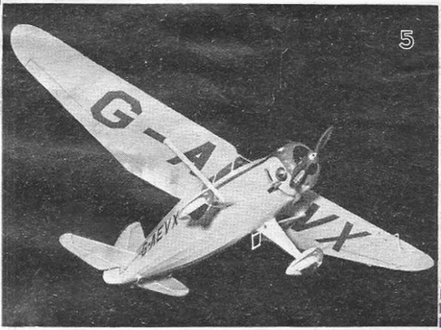
Photo No. 2 is of another free-lance design. This time a 7 ft. Madewell " 49 " powered job, by A. Warren, of the East London Club.

Next, we come to a photograph taken at the Irish Nationals, at Baldonnel Airport, Dublin, which has started us wondering whether or not the name on the model refers to the owner's hair-do.

Photographer Ed. Stoffel himself and his 1950 version of the " Aristocrat " are the subjects of No. 4. New features are a slimmer fuselage, geodetic tailplane construction and tapered wings.

No. 5 was sent to us by H. Parrish, of the Ashton M.A.C. It shows a 1 in. to 1 ft. scale C/L model of the Stinson Reliant, which is powered by a 1.8 c.c. Elfin. Thanks, reader Parrish—we would like to receive more photographs as good as this one.

That London Area live-wire, Max Coote, organised a very fine exhibition of model aircraft last month at the Odeon Cinema, Swiss Cottage, London, N.W., to coincide with the showing of the American flying film " Twelve o'clock High." Messrs. Keilkraft and Model Aircraft (Bournemouth) Ltd., co-operated with the loan of models, as did the members of the Northern Heights M.F.C. and other modellers. The exhibition was opened by Mr. Henry Brooke, M.P. for Hampstead, and photograph No. 6 shows " Rip " (C. A. Rippon), explaining to him the finer details of one of the models.



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We have a soft spot for well made flying scale jobs and the 10 ft. span R/C Piper Cub, shown in No. 7 is certainly a good loker. Noel Barker of the Surbiton Club, is the owner and the model is powered by an O.K. Twin.

Roy Yeabsley scored a very popular win in the Blackheath Club's Bill White Memorial Cup Contest, and photograph No. 8 shows him being congratulated by Jack North, Harry Hills, and fellow members of the Croydon and District M.A.C.

Introducing a little international atmosphere into Photonews, No. 9 comes from Vienna, and shows a typical Austrian F.A.I. glider. It is called "Schlurf"—something like "Robin Hood" in our language—and the span is 80 in. Our correspondent, Oscar Czepa, says that the construction is of pinewood strip and plywood, and the sinking less than 1 ft. per sec.

J. L. Pitcher, of the Croydon Club, can probably claim to be the oldest regular contest flier in the country and he is a keen rubber duration fan with many successes to his credit. He is shown in No. 10, checking in his model at last year's Wakefield "100," and who is that on his left? Who could it be but H.J.N.—the best photograph of him that we have yet seen published—sorry Henry!

Rudder Bugs are apparently being built in all sizes. The two shown in the last photograph are by Syd Allen, of the Battersea Club. The one on the right is full-size and that on the left half scale. We have also seen a $1\frac{1}{2}$ scale Ohlsson "60" powered version by John Appi, the worthy host at the Horseshoe, Tottenham Court Road, W., where members of the London R/C circle meet each month.

That's all for this month chaps. If any of you have photographs which might be suitable for inclusion in Photonews, send them in will you? Thanks!


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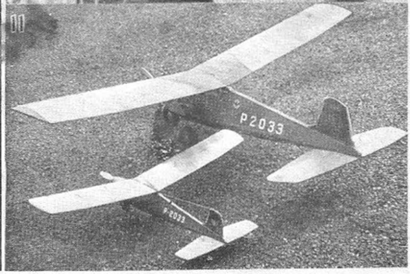


11

SIMPLIFIED WING CONSTRUCTION

By J. Van Hattum

AS we build monoplanes generally with unbraced wings, our models have that clean look that gives an impression of the right kind of simplicity. However, when one studies the internal structure, it is often seen that this desirable quality does not penetrate the skin. Mr. Bill Stout, designer of the Ford Trimotor in the 'thirties, and one of those delightful technical philosophers, once laid down the dictum: " Simplicate and add more lightness."

We model aircraft enthusiasts could well take this to heart, for in many cases the internal structure is far from being a sound engineering proposition.

Now, we cannot all be trained structural engineers and many of us shy from bending moments, shear stresses and end-loads; a quite understandable reaction for people who take their hobby not too strenuously. On the other hand, it does pay to design a logical and sound internal framework. By carefully investigating the job that every member has to do and by not fitting that extra spar or extra rib when the existing one may be able to do the job after slight modification, we can save weight, cut down building time, get a cheaper model, and very probably add to the strength. Apart from all this, the careful builder will get more satisfaction from his work when he knows that the finished article has been carefully thought out.

The wing construction presented here is by no means an original idea, but one that deserves more general use, as it fulfils many of these demands and is, moreover, delightfully easy to employ. Undoubtedly, it will meet with some criticism on theoretical grounds, mainly because it appears to be neither one thing nor the other. By this I mean that the sheeting is used from spar to leading edge on the top-surface only. In other words it is only half a torsion-box and, therefore, no torsion-box at all. Being open on the lower side, torsion would distort it almost as much as if the wing were completely tissue-covered.

But hold on a minute! What about fuselages? Put full turns on that motor, slash the tissue covering on one side, and . . . crump; there she goes! On that fuselage the torsion of the fully wound rubber motor is taken largely by the paper. Nobody worries much, *but* every Wakefield builder knows that he must not fly with a damaged fuselage covering.

It always seems logical to make use of the covering as a structural member, since it has to be there anyway. So here it must provide the required torsional stiffness and help to save quite a lot of weight.

In the wing as shown here, the nose-sheeting is really part of the structure that takes the upward load; in this respect it forms one unit with the spar and the leading edge. Owing to its curvature, it will take considerable compression loads, which do in fact act in the upper surface of the wing. A modification which improves structural efficiency is easily obtained by turning the spar through 180 degrees, thus placing it, in section, sideways instead of upright. For, to get greatest strength for a given weight, we must distribute the material as much as possible around the outer surface. A spar placed through the centre of a symmetrical section does little or no work; this is done by the covering!

One of our concerns is to prevent the sheeting from buckling, as that would be followed by failure, so it must not be too thin; $\frac{1}{16}$ in. for average-size models and 1/32 in. for small types. The sheeting can be stiffened by additional light stringers and close spacing of the ribs. That means complication, so compromise by making the sheeting not too thin.

Here is the building sequence and I found it quite workable:

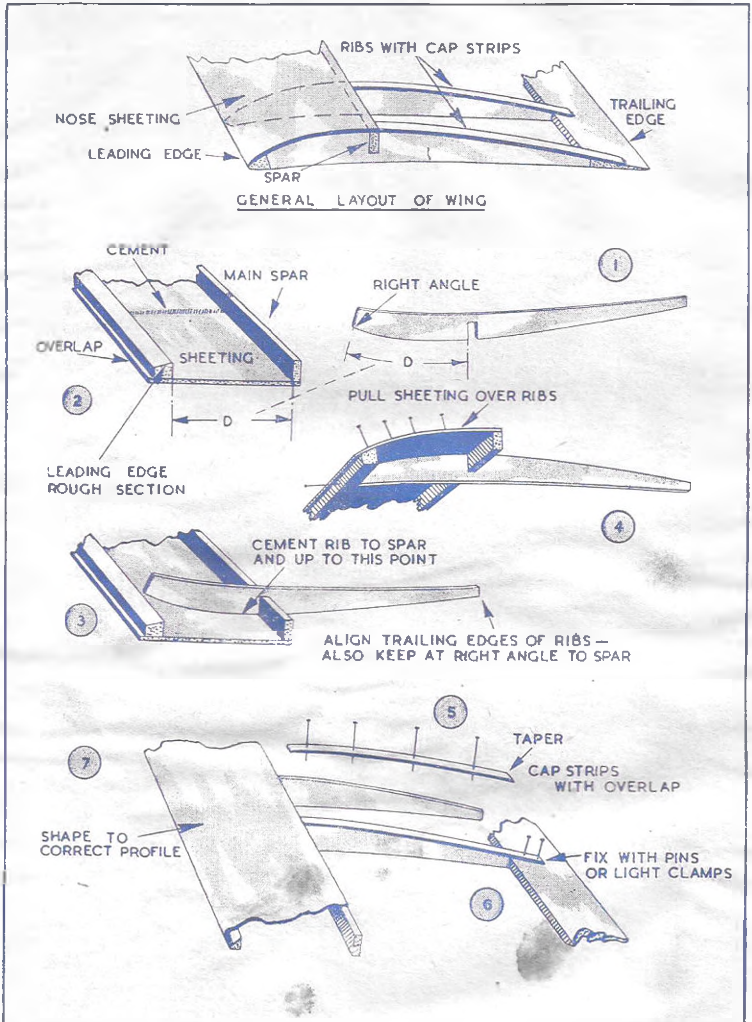
1. Cut required number of ribs using ply template; sand to shape, cut slots.
2. Determine exact position of leading edge, distance " d " from main spar. Glue both to sheeting; leave small overlap.
3. Having pre-glued all round ribs, mount them on spar and line up trailing edges—see also that they are parallel. This job is easier than it seems; the structure remains flexible until the job is concluded.
4. When the glue is well set, pull ribs on to sheeting or vice versa, using plenty of glue to make the joint. Keep in place with pins: lots of them!
5. Fit cap-strips on top of ribs—sand ends to run into trailing edge.
6. Assemble trailing edge, dihedral-braces, wing tips, etc. Shape nose. You will find the job much less tricky than it looks on paper; when properly carried out the wing just " falls into place."

★ DON'T MISS THIS

Next month's 68-page " Model Aircraft " will contain all our regular features and in addition many first-class articles and designs by well known experts.

" Over the Counter " will include a reference table of all the current stunt control line kits on the market, together with a review of the latest kit models.

You can help us to meet the greatly increased demand for copies by placing a regular order with your newsagent or model shop.


RIBS WITH CAP STRIPS
NOSE SHEETING
TRAILING EDGE
LEADING EDGE
SPAR
GENERAL LAYOUT OF WING
CEMENT
MAIN SPAR
OVERLAP
SHEETING
1
RIGHT ANGLE
D
2
D
PULL SHEETING OVER RIBS
LEADING EDGE ROUGH SECTION
4
3
CEMENT RIB TO SPAR AND UP TO THIS POINT
ALIGN TRAILING EDGES OF RIBS — ALSO KEEP AT RIGHT ANGLE TO SPAR
5
7
TAPER
CAP STRIPS WITH OVERLAP
SHAPE TO CORRECT PROFILE
FIX WITH PINS OR LIGHT CLAMPS
6

TAPING TECHNIQUE

By

J. H. Maxwell

CELLULOSE tape, of the self-sticking variety, has been the subject of a good deal of publicity recently, and at least two brands have been advertised regularly in the model aircraft journals. These advertisements have pointed out the usefulness of the tape for emergency repairs and as an aid in building, and, of course, modellers know that it is also handy for fixing access doors, detachable fairings, cowlings and so on; but we cannot recall ever having seen it suggested as a jointing material for important structural joints. That is the suggestion we wish to make in this article.

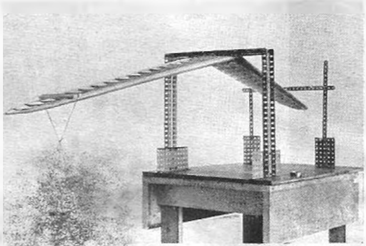
Most models of any size incorporate one or more transport joints; that is, joints which have to be made upon arrival at the flying field, and broken again when the model is being packed up for transporting home. Probably the most common and, at the same time, the most difficult (structurally) of these transport joints is the one joining the two halves of a wing, and it is with this joint in particular that our taping technique is concerned.

Wing Joints

However, before going on to discuss taped joints in detail, we should like to make it clear why the present generally accepted wing joints are structurally rather poor, and in need of improvement.

In a wing, the spanwise members (i.e., the spars, and/or the stringers) should be kept close to the top and bottom surfaces. That is why spars should be as deep as possible, why sheet covering is so effective, and also why a multi-stringer wing, if properly designed, can be amazingly strong for its weight. This principle is especially important at the root of the wing, where the loads tend to be highest; yet it is at this vital point that most model designers cast science to the winds, and stick in a couple of dowels or a tongue and box fitting. Dowels and tongues are inherently weak because they are so shallow (remember, spars should be *deep*) and because they lie on or near the neutral axis of the section. True, the weakness is largely overcome by making the dowels of birch and the tongues of plywood or dural, but this in turn makes the job heavy, and one is left with the uneasy feeling that it is a clear case of brute strength ousting science.

What is the alternative? The ideal method of joining the two halves of a wing is to have them



The above photograph shows the test apparatus which was rigged up by the author

sheet covered at the root, on both the top and the bottom surfaces, and to *join the sheet covering*. Doing this in practice, however, presents quite a problem. We had tried, and discarded, cement skins and even zip fasteners before it occurred to us that cellulose tape might do the job. A preliminary trial showed that the idea had possibilities, and so we got down to an examination of it, as follows.

Tests on Cellulose Tape

To find out the strength of cellulose tape we rigged up the apparatus shown in Fig. 1. This consists of a beam joined by a hinge on its lower face to a fixed block. On the top faces of the block and the beam are two balsa platforms, and the test pieces of tape are stuck to these, joining them. At the outer end of the beam hangs a weights pan, and when weights are placed on it the balsa platforms tend to move apart, thus applying a tension load to the tape.

The first lesson learnt was that cellulose tape will not stick satisfactorily to plain balsa. It simply pulls off, taking with it the surface fibres. This was overcome by giving the platforms a glossy skin consisting of two coats of thick banana oil, and the tape then adhered perfectly.

Discovery number two was that, provided the amount of overlap (see Fig. 1) is not less than $\frac{3}{4}$ in., the shear strength of the adhesive is greater than the tensile strength of the tape. That is to say, the tape does not come unstuck, it breaks.

In each test, we kept on adding weights to the pan (2 oz. at a time) until the tape broke, and thus obtained the ultimate tensile strength of the material. However, in structural design, it is not always sufficient that a joint should not *break*; very often the amount it yields or stretches before it breaks is the governing factor. In this case we found that the tape stretched, giving a gap (Ref. Fig. 1) of about 0.1 in. between the edges of the platforms before it broke. This would hardly be permissible in a wing, for it would mean that the two halves might flap a little, and, at least, the dihedral would be affected. We found, however, that at one stage in the loading, when the gap was rather less than 1/32 in., if the load was mostly removed the tape recovered, and left a gap of only about 0.01 in. This condition corresponds roughly to "proof" loading in full size aircraft, and we therefore decided to call it that name.

The actual values obtained for ⅜ in. wide tape are as follows:—

Ultimate tensile load	210 oz.
"Proof" load (see above) ...	100 oz.

If the tape is other than ⅜ in. wide, these loads should be increased or decreased in proportion to the width.

For those readers who are particularly interested in the strength of materials, we might mention that the tape was 0.003 in. thick, and therefore the above ultimate value is equal to a tensile stress of 7,000 lb./sq. in. Which is just about the figure one would expect for this material.

Wing Strength Requirements

Having obtained these strength values, we, naturally, wanted to be able to use them in designing actual wing joints. But, before one can stress a joint, or any other piece of structure, one must know how strong it is required to be, and, for this information, it is necessary to refer to some earlier experiments. These were made to find out the strength of an old Wakefield wing.

About the time this wing was new (1937), we rather prided ourselves in being "all-weather" fliers, and so the model in question was flown on some pretty foul days. Now, the wing never did break in the air, but, on several occasions, when we were handling the model in a wind, the two ⅛ in. diameter dowels, forming the centre line joint, snapped. Altogether, after flying the model for a couple of years, we formed the opinion that this wing was just about as weak as a wing dare be for all-weather flying.

For test purposes, the wing was fixed upside down, as shown in the photograph on the previous page, and weights were added to the pan in the foreground until the dowels broke. The bending moment required to break the dowels was found to be 180 oz. in. Since the centre of pressure

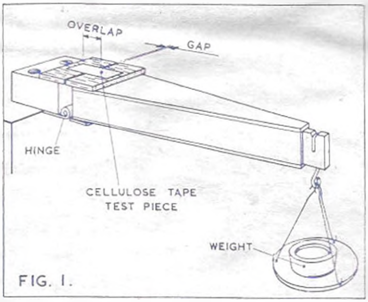


FIG. 1.

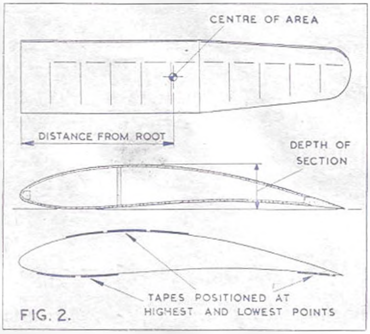


FIG. 2.

of each half of the wing was at about 11 in. from the centre line, this figure of 180 oz. in. represented a load of 16½ oz. on each side, or 33 oz. for the whole wing. Now, the load on a wing in normal flight (known, in aircraft parlance, as the 1G condition) is equal to the all-up weight of the model, minus the weight of the wing. In this case it was 7¼ oz., and, therefore, since 33 oz. is roughly 4½ times 7¼ oz., we can say that the wing failed under a load of 4½G.

To the best of our knowledge, no other data on model wing strength are available, and so there is no alternative but to use this figure of 4½G.

Stressing Taped Joints

This article has now furnished all the information required to design a taped wing joint, and details of the stressing procedure follow. To make this quite clear, we shall take the previously mentioned Wakefield wing as an example.

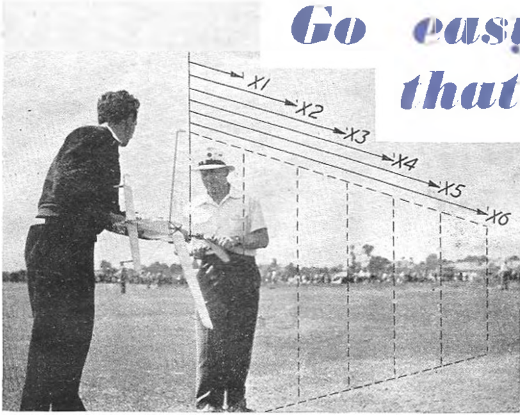
Weigh the model minus its wings	7¼ oz.	(1)
Multiply (1) by 4½ (i.e., 4½G) ...	33 oz.	(2)
Find the centre of area of one-half of the wing (see Fig. 3) and measure its distance from the centre line	11 in.	(3)
The bending moment is $\frac{(2) \times (3)}{2}$	181 oz. in.	(4)
Measure the depth of the section at the root (see Fig. 3) ...	0.6 in.	(5)
Divide (4) by (5)	301 oz.	(6)

This gives the total load on the tapes on the underside of the joint. Each tape will take 100 oz. at "proof," so to obtain the number of tapes required divide (6) by 100. The answer, in this case, is 3, and the same number should be used on the top surface.

To anyone who has never tried taped joints, a total of six pieces of ⅜ in. tape to join a Wakefield wing may seem ridiculously weak, and, to be quite honest, we felt a little doubtful ourselves. However,

(*Continued on page* 131)

Go easy with that motor!



JUST about twenty years ago the writer used to wind rubber models the hard way—by hand. And since props at that time were more often than not carved out of firewood, it usually meant a well blistered finger for every day's flying. When winders became more common, he was certainly one of the first to appreciate their general usefulness!

But, e . with winders, it was usual to shape these contraptions to fit directly over the prop and wind with the noseblock *in situ*—just a geared-up finger, in fact, until the next stage when stretch winding became the general rule.

Real stretch winding was introduced by the Americans, the object being to hook the winder on to the prop shaft and then walk as far back as possible before starting to put on turns. You got more turns that way—and it looked quite spectacular. In fact, an essential part of the technique of any first rate contest flyer (actual or assumed) *circa* 1936 onwards was this exaggerated stretch winding. It was carried to the extreme where it looked suicidal—and often very nearly was. The writer was only one of those who had a prop shaft straighten out under the strain, or a winder reduce itself to its basic individual components. Apart from the usual almost total loss of the model when such accidents did occur, it was really more discouraging to the fellow holding on. He invariably bore the brunt of the shock and often shed his blood in the cause of progress.

The standard " drill " was to walk back as far as possible before winding, so that the motor was stretched to at least six times its natural length. Assuming that you got that far—and the more nervous generally gave out at a five-times stretch—you then wound, and went out still farther if you could, until 50 per cent. turns were reached. After that the remaining 50 per cent. turns were put on coming in all the time. The gain was a definite increase in the possible maximum number of turns.

At some later stage it appeared worthwhile to the writer to carry out some experiments with stretch winding to see just what this gain was—and just how dangerous the process could be. There was no doubt at all that you *could* increase the possible maximum turns in this way—about 10 per cent. extra being the top figure. But it needed good quality rubber—and a plentiful supply of it. About three of four limit windings by this technique just about rendered it useless for further contest work.

The chance of breakage during winding was also checked and with a six-times stretch was found to be very high. At the half turn stage, the safety margin was very low. For example, if you stopped at a six-times stretch and kept on winding the motor broke with less than 10 per cent. more turns applied—i.e., at between 55 and 60 per cent. possible maximum. So the winding in process for the last 50 per cent. turns had to be handled carefully.

The same technique applied to certain present-day rubber appears to stretch it beyond the elastic limit and although the turns can be got on, the rubber goes " stringy " and loses a large percentage of its power. So what is gained by extra turns is more than lost by falling off in torque output. In bad cases, you may get far less power out of a fully (stretch) wound motor than the same motor on only half turns.

As a direct comparison of method, tests were made with similar motors stretched to only three times natural length. Here, although maximum possible turns were less, you could wind on up to 80 per cent. maximum turns with the motor held at three-times stretch before coming in. In other words, the margin of safety is very much greater. So much greater, in fact, that judging the final " coming-in " turns is relatively easy and quite safe. About the only worry here was to avoid bunching by coming in too fast on the last hundred turns or so. Thus to play safe, and particularly with rubber of dubious quality, the three-times stretch seems by far the best proposition.

Another series of experiments on a different aspect of the question gave some further interesting figures.

(Continued on page 123)

M.A. Engine Tests

No. 11.—THE FROG "500"

WHEN one has tested scores of engines of all makes and types, it is not difficult to assess the approximate performance of a new unit before submitting it to tests. A brief inspection of porting, combustion chamber design and general construction, will enable a fair estimation to be made of the probable output and revolutions at which this is reached.

Occasionally, however, subsequent tests will disprove any such estimate and this was found to be so in the case of the Frog "500," the actual performance obtained being somewhat higher than that which had been anticipated. There is nothing very unusual about the design of the "500," yet the test engine gave, under favourable conditions, well over 0.4 b.h.p., a very good performance indeed for a 5 c.c. motor and one which is all the more remarkable when one remembers the very moderate price of this engine.

Actually, the Frog "500" introduces, to the British enthusiast, a type which has hitherto been rather neglected by manufacturers in this country. What might be termed a high-performance general-purpose engine, the type is exemplified in the 5 c.c. class by such designs as the American K. & B. "Torpedo," DeLong, Forster "29" and Ohlsson "29." These engines have been widely and successfully used for some years (with the exception of the Ohlsson, only recently introduced) for power-duration, speed, stunt and, more lately, for radio-control. They possess the high power output, at medium to high revolutions, necessary for present-day duration or stunt work, yet they remain sufficiently tractable, at lower speeds, for medium size R/C models and, with minor modifications, have put up some astonishingly good performances in speed events. The performance obtained from the Frog "500" under test seems to promise equal versatility.

Specifications

Type: Single cylinder, air-cooled, two-cycle, glow-plug ignition. Induction through shaft-type rotary-valve. Single transfer and exhaust ports. Baffle piston.

Swept volume: 4.92 c.c. (0.3005 cu. in.). Bore: 0.750 in. Stroke: 0.680 in.

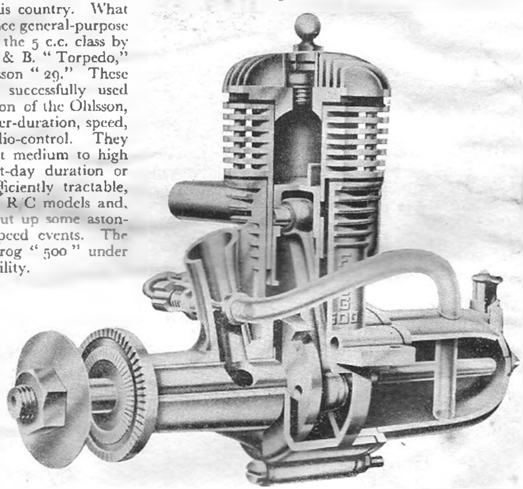
Compression ratio: 8 : 1 (approx.). Stroke/bore ratio: 0.907 : 1.

Timing: Rotary-valve opens 15 deg. ABDC, closes 53 deg. ATDC. Exhaust-port opens 64 deg. BBDC, closes 64 deg. ABDC. Transfer-port opens 58 deg. BBDC, closes 58 deg. ABDC.

Port areas: Exhaust, 0.14 sq. in. Transfer, 0.097 sq. in.

Weight: Complete with free-flight tank: 7.75 oz.

General structural data: Die-cast aluminium alloy crankcase, rear cover, cylinder-head and fuel tank. Hardened steel cylinder, ground and honed. Cast-iron piston, ground and lapped. Hardened steel crankshaft, ground and lapped. Phosphor-bronze main bearing. Silver-steel fully-floating gudgeon-pin with aluminium end-pads. Forged connecting-rod of Hiduminium RR. 56 alloy. Fuel tank attached to rear cover with one screw and may be rotated for inverted or side-mounted operation, or removed for C/L work. Beam or three-point bulkhead mounting.



Test Engine Data

Total time logged prior to test : 1½ hours.

Ignition equipment used : K.L.G. "Miniglow" short-reach glow-plug. 1½ V to start.

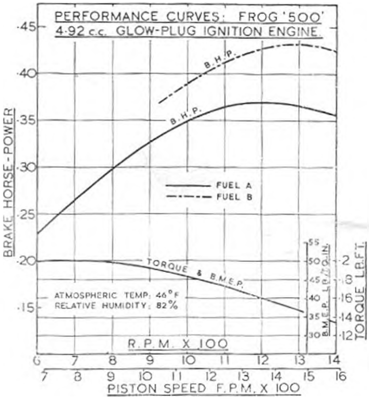
Fuels used : (a) : Frog "Red Glow." (b) 37½ per cent. B.D.H. nitro-methane. 37½ per cent. "Record" racing methanol. 25 per cent. B.P. castor oil.

Performance

Running-in commenced with a series of short runs at speeds up to 8,000 r.p.m. It was quickly noticed, however, that, as the "500" warmed up, it did not suffer the falling off in power which, although less evident with petrol-type engines than with diesels, is usually encountered with newly assembled lapped piston engines and, on checking on the reaction dynamometer, it was found that the engine would hold a steady torque reading of 0.2 lb ft., while running out a complete tank of fuel. Since this represents a b.m.e.p. of some 50 lb. sq. in.—a good figure for an engine of this type—it appeared obvious that the frictional losses of this particular engine were quite low.

To determine b.h.p. on standard "Red Glow" fuel, the engine was then run at speeds varying from 6,000 to 14,000 r.p.m. The decline in torque, noticeable beyond 8,000 r.p.m., as speed was pushed up, was fairly steady and, on plotting the b.h.p. curve, this was found to be very flat, indicating a peak of 0.37 b.h.p. at approximately 12,000 r.p.m. and an output rather above average at the lower end of the speed range.

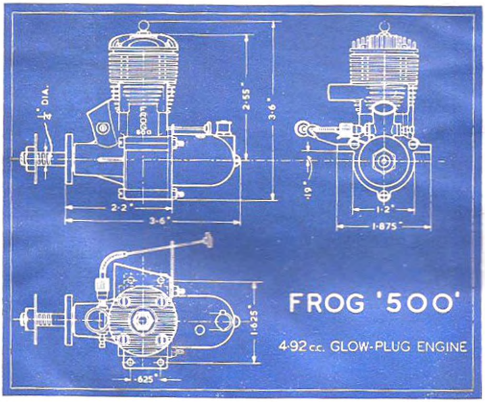
The "500" was later checked on a nitro-methane fuel, using the standard Arden formula containing 37½ per cent. nitro-paraffin as recommended in the manufacturer's leaflet. The response to this fuel was remarkably good and resulted in a maximum



of just over 0.43 b.h.p. being developed with the peak pushed up approximately 1,000 r.p.m.

No difficulty was experienced in starting the "500" and the procedure laid down in the leaflet accompanying the engine can be adopted to good effect. Normally, priming through the exhaust port is required, but, when warm, the engine can be restarted after a couple of choked flicks only.

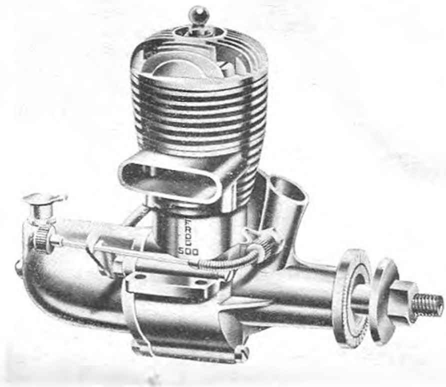
An unusually wide range of speed control, by variation of mixture strength, is claimed for the Frog, a feature which, of course, is particularly useful during the trimming stages with free-flight models.



On the test engine, the tension of the needle-valve ratchet spring was decidedly firm, a good point during a bench test when vibration at excessively high speeds tends to upset slack adjustments, but this resulted in a certain amount of "sponginess" in the action of the adjusting knob, due to the flexible coupling interposed between this and the needle-valve and, under these conditions, precise adjustments were rendered difficult. Later however, when installed in a model, the ratchet tension was eased and it was then possible to appreciate the useful range of speed which can, in fact, be obtained by adjusting the needle-valve.

The flexible needle-valve extension is, of course, a useful feature and helps to keep one's fingers away from the propeller. When the engine is side mounted (as is often the case with stunt models) the needle-valve assembly can be reversed and the adjusting knob stem brought back along the top of the fuselage, a position which is very conveniently located for adjustment with the left hand after starting.

At the time of writing, the "500" has also been flight tested, the model used for this purpose being a "Stunt King" with certain minor modifications to keep the c.g. location approximately correct. Side mounted, the jet of the "500" is well outside the centre-line of the standard tank position and this has led to richening up which may be minimised by using a finer pitch airscrew, allowing the revs. to rise, and suggest the use of a 9 in. by 6 in. propeller. The speed of the "Stunt King" with the "500" is around the 60 mark and, of course, the Frog provides all the power necessary for this highly successful design.



For power-duration work, the "500" should be particularly good, due, mainly, to the unusually high output available at around the 8-9,000 mark. Surface areas for power-duration models, of course, are somewhat dependent on individual ideas but a wing area of not less than 500 sq. in. is probably advisable to reduce the hazards of trimming a high-speed climb. The writer's Class B power-duration design planned for the "500" will be slightly less than 4 sq. ft. and it is hoped to keep the weight down to 30 oz.

A contact-breaker is shortly to be made available for the "500." This should be of particular interest to those who prefer spark ignition for free-flight or radio-control.

Power Weight Ratio : As tested, using standard fuel : 0.764 b.h.p./lb., using nitrated fuel : 0.89 b.h.p./lb.

Power Displacement Ratio : As tested, using standard fuel : 74.8 b.h.p./litre, using nitrated fuel : 87.5 b.h.p./litre.

Go easy with that motor!

(Continued from page 120)

The basis of these tests was to hook the rear end of the motor on to a spring balance and find the actual tension built up in the motor during winding and unwinding.

Just hooking the winder on to the motor and stretching it out as far as you can go—the start of the old six-times stretch method—the tension in a Wakefield motor of 16 strands of $\frac{1}{4} \times 1/24$ strip goes up to as high as 50 lb. And that load is supported by the winder hook at one end and the rear peg at the other!

Now the interesting thing is that as soon as you start to wind on turns, the tension drops off appreciably. Even maintaining the same stretch it can go down to as low as 10-15 lb., tending to build up again as the 50 per cent. turns mark is approached, but never anything like the initial 50 lb. figure. The final tension when the motor is fully wound is usually something less than 10 lb.

Moderate stretch winding produces far less strain on everything concerned. Stretching the motor to about three times its natural length before applying turns results in an initial tension of about 15 lb., which drops off to 8-10 lb. as soon as winding commences, and then even lower. By a slight variation of this technique, you can wind so that the tension in the motor never much exceeds 5-7 lb., *by winding on turns as soon as you start to stretch the motor out.* In other words, if, instead of stretching the motor straight out and then starting to wind, you wind on slowly as you stretch out, the high initial tension figure is practically eliminated. You can get up to the same maximum turns figure in the end—and it is so much safer this way!

An interesting sidelight from these experiments was the absolute confirmation that any device such as automatic downthrust adjustment or variable pitch propellers *worked off varying motor tension* are just so much nonsense. The tension in an unwinding motor varies very erratically. At the beginning it is generally fairly low and increases as the motor unwinds. It varies up and down all the time and the only *marked* difference is when it falls off suddenly just towards the end of the motor run. That is why a mechanical motor tensioner will work all right.

Over the Counter

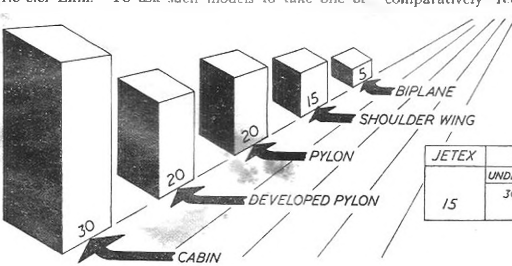
A FEATURE WHICH WILL BRING YOU UP-TO-DATE NEWS OF THE LATEST TRADE PRODUCTS

THE first of this new series deals exclusively with free-flight power kits, in which are also included Jetex models. Jetex models, in fact, are surprisingly popular, accounting for some 15 per cent. of the total of models analysed. Corresponding " popularity figures," expressed in percentages, are given in the table at the foot of this page.

As was to be expected, Class " A " models outnumber all other sizes, accounting for 60 per cent. of the total, in fact. It will also be seen that these Class " A " models appear to be more or less evenly divided between the " under 1 c.c. " and " over 1 c.c. " sizes.

Most models in Class " A," of course, are generally suitable for a whole range of motors, which may, in fact, embrace the full Class " A " range. Thus, the *Southerner* or *Slicker Mite*, for example, would fly quite all right on a .32 c.c. Kalper motor and still take motors in the upper end of Class " A," like the 1.8 c.c. Elfin. To ask such models to take one of the 2.5 c.c. motors, however, would be overdoing it, although it has been done. There is no sense in over-powering a free-flight power model, and so it is always best to stick to the recommended range of motor sizes.

The outstanding popularity of small power models is typical of both this country and the United States. Our manufacturers more or less concentrated on the larger Class " A " models when post-war production got under way, working down to the smaller Class " A " or " $\frac{1}{2}$-A " sizes as the under-1 c.c. motors began to appear. Now the range is being extended upwards through Class " B " and into Class " C," although, as yet, no specific Class " C " contest design has yet appeared. The Class " C " kit models suitable for duration contest work are still only large Class " B " models which are capable of taking a motor in excess of 5 c.c. capacity. This, of course, is only logical when we consider that only comparatively recently have commercial motors



JETEX	CLASS A		CLASS B	CLASS C
	UNDER 1CC	1-2·5CC		
15	30	30	20	5
	60			

CUMULUS

Zippers have probably won more contests than any other single design, and almost all subsequent pylon designs have followed the same trend. The *Sailplane* (1939) and *Interceptor* (1941) followed, but then there was a gap in Goldberg's free flight activities until about two years ago, although he did experiment with variations of the *Zipper*. The outcome is the *Cumulus* which is, in many respects a modernised and re-designed *Zipper*. Characteristic of Goldberg, it is quite an intricate model with a number of unusual, even complicated details.

POWAVAN

J. R. Vanderbeek, the designer, adopted the idea of raised thrust line and underslung fuselage to produce an experimental prototype. This model was so successful that virtually no changes were necessary to make it a practicable and almost fool-proof commercial design.

Looping tendencies under power come from the two main factors. In most designs the thrust line is below both the centre of gravity and the centre of resistance. The *Powavan* reverses this condition to good effect, and, in consequence, has a particularly stable and rapid climb.

FIREFLY

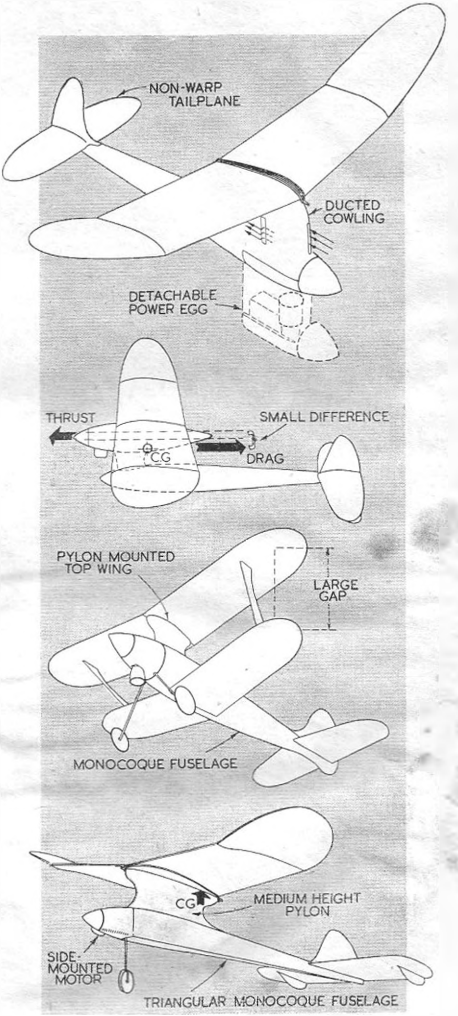
It is not usual to come across a biplane free flight model, especially in the commercial world, and certainly not one which is as attractive in appearance as the new Frog *Firefly*. Retaining good " duration " features, semi-scale appearance is enhanced by the open cockpit located behind the top wing pylon, with a long rear fairing extending back to the fin.

The wing assembly is fully detachable, and, therefore, reasonably crashproof.

MALLARD

This is another British free flight design which follows more or less orthodox pylon-type layout. Pylon *height*, however, is somewhat lower than usual. The design was originally tested out with a very high pylon, but exhibited a tendency to " Dutch Roll " which, whilst not necessarily harmful, was not attractive. Lowering the wing position has cured this completely, without upsetting stability.

The *Mallard* is somewhat smaller than the *Cumulus*, and is intended for diesels between 2 and 3.5 c.c. With an all-up weight of 16 oz. it conforms to F.A.I. rules.



FREE-FLIGHT POWER KITS

Whilst every care has been taken to make these tables as complete as possible, up to March, 1950, no responsibility can be taken for omissions or errors contained therein.

Span in.	Kit	Price	Manufacturer	Type	Class	Suitable Motors (Design motors in bold type)
30	ZEPHYR	10/6	E. Law & Sons	Pylon	A	**Frog 100**
31	JUNIOR ZIPPER	14/6	British Model Aircraft	Hatchet Fuselage	A	**E.D. Bee**, Mills II, etc.
32	AIRFLO MITE	8/6	Shaw's Model Aircraft	Cabin-Pylon	A	**Amco .87**, Mills .75
32	SOUTHERNER MITE	11/6	E. Keil & Co.	Cabin	A	**Mills .75**, Amco .87
32	SLICKER MITE	10/6	E. Keil & Co.	Developed Pylon	A	**Mills .75**, Amco .87, CO_2
33	TRIUMPH "33"	16/-	Aeromodels	Pylon	A	**Frog 100**, E.D. Bee, Mills .75, Amco .87
34	PIRATE	13/6	E. Keil & Co.	Cabin	A	**E.D. Bee**, Amco .87, Mills .75, Arrow
35	SCARAB	15/-	Worcraft	Shoulder Wing	A	Amco .87, Mills .75, E.D. Bee, Frog 100
36	YOLANDE	10/6	E. Law & Sons	Cabin	A	E.D. Bee, Mills .75, Mills II, etc.
36	MARTINET‡	21/-	Model Aircraft (Bournemouth)	Cabin	A	Mills .75, Mills II, E.D. Bee, etc.
36	VIXEN	12/6	International Model Aircraft	Cabin	A	Mills .75, Amco .87, E.D. Bee, Frog 100
34	FIREFLY	*	International Model Aircraft	Biplane	A	**Frog 100**, 160, 180, Mills II, E.D. Bee, Javelin, Arrow
37	STREAKER	19/9	Model Aircraft (Bournemouth)	Pylon	A	**Amco .87**, Mills .75, E.D. Bee, Frog 100, Javelin, Arrow
40	HELL'S ANGEL	15/-	Shaw's Model Aircraft	Pylon	A	**Frog 100**, E.D. Bee, Mills II, Frog 100, Javelin, Arrow
40	ENVOY	14/9	Shaw's Model Aircraft	Cabin, Tricycle U.C.	A	**E.D. Bee**, Amco .87, Mills .75, Mills II, Javelin, Arrow
40	FOX	*	International Model Aircraft	Pylon	A	**Frog 100**, Amco .87, Mills .75, E.D. Bee, Mills II, Javelin, Arrow
41½	HERMES	15/6	Halfax Models	Cabin	A	**E.D. Bee**, Mills II, Mills .75 Javelin, Arrow, Frog 100
42	SOUTHERN DRAGON	25/-	Southern Junior Aircraft	Cabin	A	**Mills II**, E.D. Bee, Frog 100, 160, 180
42	HORNET	19/6	Model Shop (Newcastle)	Semi-Scale Parasol	A	**Mills .75**, Amco .87, E.D. Bee Mills II, Javelin, Arrow
42	WASP	22/6	Model Shop	Biplane Version of Hornet	A	**Mills .75**, Amco .87, E.D. Bee Mills II, Javelin, Arrow
42	STRATO-D	15/-	International Model Aircraft	Pylon	A	**Frog 100**, 160, 180, E.D. Bee, Mills II, Elfin 1.5
42	SLICKER	22/6	E. Keil & Co.	Developed Pylon	A	**Mills II**, E.D. Bee Frog 100, 160, 180, Elfin 1.5
44	SCORPION	37/6	E. Keil & Co.	Cabin	A-B	Mills II, E.D. Comp., Allbon, Elfin, etc.
44	AIRFLO BABY	18/6	Shaw's Model Aircraft	Cabin-Pylon	A	**Mills II**, Frog 100, 160, 180, E.D. Bee
44	BANTAM	25/-	British Model Aircraft	Cabin	A-B	Mills II, Mills 2.49, E.D. Comp., etc.
44	JANUS	15/-	International Model Aircraft	Shoulder Wing	A	**Frog 100**, 160, 180, E.D. Bee, Javelin, Arrow, Elfin 1.5
44	ZIPPER	21/-	British Model Aircraft	Hatchet Fuselage	A-B	E.D. Comp., Mills 2.49, Allbon, etc.
44	BANDIT	21/-	E. Keil & Co.	Cabin	A-B	Mills 2.49, E.D. Comp., E.D. III, etc.
45	HAMMERHEAD	14/6	Shaw's Model Aircraft	Hatchet Fuselage	A-B	E.D. Comp., Mills 2.49, Elfin, Allbon
45	FROG "45"	27/6	International Model Aircraft	Cabin	A	**Frog 100**, 160, 180, Mills II, E.D. Bee, Javelin, Arrow, Elfin 1.5
48	MALLARD	*	Mercury Model Aircraft Supplies	Pylon	A	Elfin 2.49, Elfin 1.5, Mills 2.49, E.D. III, Amco 3.5, Javelin, Arrow, Elfin 1.8
48	RAPIER	22/6	Halfax Models	Hatchet Fuselage	A-B	E.D. Comp., E.D. III, Elfin, **Mills 2.49**, etc.
48	POWAVAN	25/-	International Model Aircraft	Pylon: High Thrust	A	**Frog 100**, 160, 180, Mills II, Javelin, Arrow, E.D. Bee
48	CIRRUS	*	International Model Aircraft	Pylon	A	**Frog 160**, 180, 250, Mills II, Javelin, Arrow, Elfin 1.5, Elfin 1.8
50	SLICKER "50"	32/6	E. Keil & Co.	Developed Pylon	A-B	E.D. II, E.D. III, E.D. Comp. Allbon, Elfin 2.49, Mills 2.49
50	OUTLAW	27/6	E. Keil & Co.	Cabin	A-B	E.D. Comp., Elfin, Allbon, E.D. III, etc.
54	PACEMAKER	37/6	Premier Aeromodel Supplies	Cabin	A-B	Mills 2.49, E.D. III, Allbon, etc.
59	CUMULUS	*	E. Keil & Co.	Developed Pylon	B-C	Eta 19, Mills 2.49, E.D. III and IV, Frog 500
60	SPARTAN	45/-	Halfax Models	Cabin	A-B	Mills 2.49, E.D. III, Allbon, etc.
60	CENTURION†	59/6	International Model Aircraft	Cabin	A-B	**Frog 180**, 250, Mills 2.49, etc.
60	SUPER SLICKER	47/6	E. Keil & Co.	Developed Pylon	A-B	**Mills 2.49**, etc., up to Frog 500
60	SOUTHERNER†	47/6	E. Keil & Co.	Cabin		**Mills 2.49**, E.D. III, Eta, Yulon, Frog 500
60	JUNIOR "60"†	39/6	E. Keil & Co.	Cabin		E.D. III, Wildcat, Frog 500, E.D. IV, Eta 29, Yukon
72	STENTORIAN†	69/6	Model Aircraft (Bournemouth)	Cabin	B-C	Frog 500, Yulon, etc.
90	RADIO QUEEN†	98/6	Electronic Developments	Cabin	B-C	**E.D. IV**, etc.
96	FALCON†	117/6	E. Keil & Co.	Cabin	C	Nordec, Rowell, etc.

* Price not yet announced. † Suitable for Radio Control. ‡ Convertible to Control-line.

FREE-FLIGHT POWER KITS FOR JETEX MOTORS

Span in.	Kit	Price	Manufacturer	Type	Jetex Motor	Span in.	Kit	Price	Manufacturer	Type	Jetex Motor
18	Min-o-Jet ...	3/-	Veron	Solid	50	30	Air-o-Jet ...	7/6	Veron	Pod & Boom	100
18	Skyjet "50"	3/9	Keilkraft	–	50	32	Skyjet 200 ...	7/6	Keilkraft ...	–	200
21	Mijet ...	5/6	Jetex	–	50	33	Widjet	6/6	Southern Jun. Aircraft ...	–	200
24	Skyjet "100"	5/6	Keilkraft ...	Pod & Boom	100	35	Cir-o-Jet ...	10/6	Veron	–	200
26	Flying Wing	5/-	Jetex ...	Tailless	50 or 100	36	Durajet	14/6	Jetex	Parasol	350

suitable for free-flight appeared in the Class "B" range. Development of the large Class "C" model is very much retarded by the fact that there is not the demand for motors of this size to justify commercial production.

The larger models, in fact, are almost exclusively R/C types which, for duration work, might require a 10 c.c. motor, but only a 5 c.c. Class "B" motor for radio flying; and there is now a number of really good large Class "B" motors to fit this bill. Manufacturers cannot, obviously, produce kits for a class of model where no suitable British motors are available. An American motor may just fit the bill, but these are both expensive and difficult to come by.

The table of current British free-flight power kits includes only the better-known models which are still in production or should be still available through the model shops. Some of the lesser-known examples which have had only a very limited production have been excluded, as also have models which are known to have been withdrawn from production and stocks exhausted. Nor does it include *scale models*, which will be the subject for a later review. Yet, even reduced to these limits, some 50 different models are included: considerably more than the variety usually stocked by the average model shop.

Included in the table are various new kit model designs which have so far only appeared in prototype form, or are just going into production, but not yet available in the model shops.

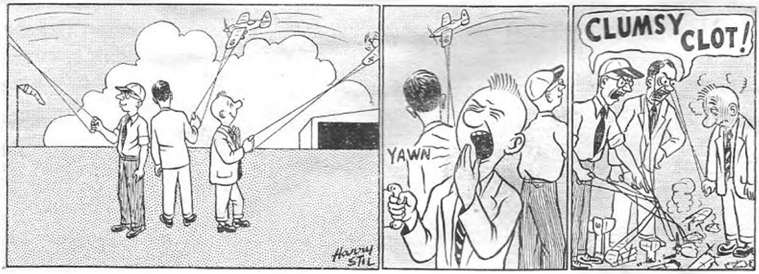
Some of the more outstanding examples which should be available very shortly are described briefly opposite, of particular interest being the fact that Carl Goldberg's new design, the *Cumulus*, is to be manufactured in this country under licence. The corresponding American kit has only just appeared.

The diagram summarises the *types* of model most popular in the commercial field, where it will be seen that *cabin models* account for some 30 per cent. of the total. Pure pylon and developed pylon types (like the *Slicker*) are about equal, with 20 per cent each, although the two pylon types together outnumber the cabin models (40 per cent. against 30 per cent.). Shoulder-wing models form a surprisingly high percentage of the total, and a number of biplane models are also included.

This really represents the battle between "eye-appeal" and performance. In the overall power duration field, the figures are different. Pylon models predominate, both types being twice as popular as cabin designs. Shoulder-wing and biplane models are a rarity. Free-lance designers have a much less restricted field, favouring the functional design, which accounts for these differences. Only a relatively small proportion of the commercial designs can be considered out-and-out contest models. They endeavour to compromise between attractive appearance and contest performance, although, of course, a number of them have particularly good contest records.

WAKE UP AT THE BACK THERE !

By Harry Stil



FAMOUS FIRSTS

● EDITORIAL NOTE :—In presenting this article we fully realise that we are treading on highly controversial ground. Whenever anything " new " appears there is always someone to pop up and claim that he did the same things years before. However, be that as it may, ideas ranging from design trends to small items of detail design can generally be traced to some individual *who was the first to put it over in a practical form*, or in a manner now accepted as general practice. To him should rightly go the credit. Leonardo da Vinci is said to have " designed " a helicopter many centuries ago, but no one could seriously dispute that the successful helicopter as we know it today is largely due to the practical development of Igor Sikorsky and his associates. Sikorsky " made it work " whilst da Vinci had an idea that it might be possible. There is a very large gap between these two extremes.

IN our list of " Famous Firsts " we have tried to associate individual items with those modellers we believe the first to " make it work." A wide field is covered and if there is any we miss and on which readers would like information, we will do our best in a future issue. In the main we have not gone back too far in model aircraft history as we feel that the established nation-wide movement was really born in the early 1930's. Whilst there was a relatively strong movement before even the first World War, with international competition, current practice has so changed that such details would be of academic interest only. We will merely mention in passing that one of the first successful *flying machines* was a steam-powered model (Stringfellow, 1851), and that the first authentic record of anyone using rubber as a motor for model aircraft is credited to Penaud, a Frenchman, *circa* 1880.

Balsa was comparatively unknown in this country before the early 1930's. It was not until an American team visited England in 1930 that our modellers came up against the lightweight type of rubber model. Joe Erhardt, who won the Wakefield that year (and again in 1931) was one of the leading exponents of that type of machine at the time. Contemporary British airframe materials were spruce, birch, bamboo and wire (wing tips and tail outlines) with silk or oiled silk covering.

Jap Tissue—Attendant on balsa came other new materials, including quick-drying balsa cement and lightweight Jap tissue. First use of all these materials was born in America in the 1920's, early modellers first making their own cement or using a commercial adhesive known as " Ambroid."

Silkspan—For covering is more modern development. This special waterproof paper is produced by Alden Paper Co., of America, largely at the instigation of Frank Zaic. The process is patented, so that manufacture is, at present, limited to the U.S.A. who use it also (in slightly modified forms) for stationery such as Air Mail envelopes.

Ultra-Lightweight Models, which were the ultimate outcome of using lightweight materials, were common in this country from about 1936 onwards. But the type of model we now term " ultra-lightweight," typified by parasol, polyhedral, low aspect ratio wings, short motor length in long fuselage, " prong " un-

dercarriage and single-blade folding propeller, was first brought to something like the ultimate by Mick Farthing, *circa* 1942.

Streamliners—Representing probably the other extreme, were first produced to contest standard by R. N. Bullock. His 1936 Wakefield model was a typical streamliner, as we know them today, with stringered, tissue-covered fuselage and plug-in shoulder wings. The basic layout of streamliners has not changed greatly since that date.

Slabsiders — Cannot really be credited to any one individual. Almost all the first fuselage models were slabsiders and they do not mark any particularly outstanding design trend.

Streamlined-Slabsiders—Present a slightly different case. A. A. Judge's 1936 Wakefield winner was partially streamlined in the sense that the nose was rounded off and a spinner incorporated on the propeller. But the streamlined-slabsider as a type of contest model was really developed by Ron Warring, incorporating shoulder-wing mounting. C. A. Rippon produced the wire shoulder-wing fixing in 1940.

Power Duration Models—Came into being in the early 1930's, in America. Competition being open to all types of model, pioneer " gas " modeller Maxwell Bassett literally cleaned up in all duration contests until the rules were amended in 1933. Bassett was, at this time, well ahead of his contemporaries in this field. His models featured high-parasol wings and the majority of the early models followed similar trends.

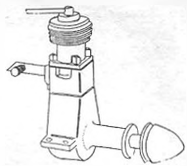
Pylon Models—Probably marked the biggest single step forward in the development of the power duration model, this layout being originated by Carl Goldberg with his "Valkyrie" in 1938. Prior to this Goldberg has been almost exclusively an indoor duration flier. One of the first "pylon" Wakefields was C. H. Grant's "IsleFly" (1938-9).

Developed Pylons—Followed the introduction of Goldberg's first commercial design—the "Zipper"—where the lines of the pylon were faired into, or incorporated in, the fuselage and one of the leading designers in this respect was Leon Shulman. His "Zombie" (1941) started a fashion for hatchet-shaped fuselages, the lines of which have been more pleasingly smoothed out in many subsequent designs of this type.

Miniature Aero Motors—Of the spark-ignition type have, of course, been produced by individual modeller-engineers for almost the past fifty years. An American book published before the first World War gives design details and data on a power plane fitted with a conventional spark-ignition motor. But the first *really* successful miniature power plant was undoubtedly produced by William Brown, these being the motors, in fact, used by Bassett in his contest-winning and record-breaking models. This motor later went into production as the Brown Junior and is still quite a good reliable job by modern standards.

Diesels—Are a war and post-war development. Their origin is a little obscure, but it seems almost certain that the first successful motors of this type were produced in Switzerland around 1940. German diesels were described in *Modelflug*, 1942-3. These were copied and subsequently developed on many different lines throughout Continental Europe during the war years, where the influence of the early Swiss model as regards layout was often most marked. One of the earliest diesels produced in this country (just after the war) was made by George Court, this subsequently becoming the prototype of the Frog "100" and another early British designer was L. Sparey.

Glow-plug Motors—must rightly be credited to Ray Arden. The principle has been known for many years and there was, indeed, a "hot-coil" motor produced in America before Arden's glow-plug. In this country George Court, again, accidentally (and quite unknowingly at the time) had glow-plug running on a normal spark-ignition motor using alcohol fuel and a home-made spark plug with platinum points. But Arden is still the true "father" of all current glow-plug motors.



CO_2 Motors—Have appeared in various forms. The very early types were pre-1914, one French firm marketing a 7-cylinder model; 1930 types were of Japanese origin, working off compressed gas produced by a mixture of dry ice, CO_2 gas in frozen (solid) state and acetylene—a form of compressed air motor with mixed gas feed. The first commercial CO_2 motor of the modern type was designed and built by William Brown for the Herkimer concern—the O.K. CO_2—since when it has been much copied, even down to the smallest practical size of ⅛ in. bore and stroke.

Of equal importance to progress, of course, has been the improvement in detail design of motors, and the following mark some of the major advances.

Rotary Valve Induction.—The crankshaft rotary valve used for the first time on a production motor with the "Baby Cyclone." Rotary disc valve induction appears to have first appeared on a production motor with the "Bantam" designed by B. Shereshaw. In this country E. Westbury utilised both principles on many of his designs from about 1930 onwards.

Racing Motors—As a type distinct from "free flight" motors, were originally developed for model cars, the first being R. Snow's "Hornet."

Alcohol Fuels, too, appear to have come into use at about the same time, more or less "taken over" from model race car practice.

SMAE

Wakefield Draw

CLOSING DATE

All counterfoils and unsold tickets must be returned by the closing date **May 31st, 1950.** The draw will take place on **June 10th, 1950**

Correspondence

- *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*

BAN KIT MODELS FROM WAKEFIELD ?

DEAR SIR,—In his article on "Shoulder-Wing Wakefields" in the February issue of MODEL AIRCRAFT, Ron Warring implies that Great Britain now leads the world in Wakefield design. I wish that this were so in fact, but how can it be when our last year's team flew only four original designs—two of the team flying models designed by somebody else? There is not much doubt in my mind that the Americans are still ahead of us in Wakefield design and the all-round performance of their team last year confirms this view.

Despite the fact that Roy Chesterton won the 1948 contest with a model designed by E. W. Evans, I think that there will be many Wakefield enthusiasts who will agree with me that we will not take the lead in Wakefield design until the S.M.A.E. makes it a rule that only models designed and constructed by the entrant shall be eligible to compete for a place in the British team. Last year so many "Jaguars" were entered in the Trials that by the law of averages it was almost certain that at least some of them would get into the team. This model's popular win in the 1948 contest was no doubt largely responsible for this state of affairs, but at present any kit manufacturer could organise a sufficiently large number of entries in the trials to be reasonably certain of getting one model in the team by sheer weight of numbers. This is surely not the way to improve the breed.

I suppose that it will be argued that a Wakefield winner is entitled to "cash in" on his success by selling his design to a kit manufacturer and I for one do not blame him for doing so. The builders of these kit models have, however, many National contests for which they can enter and I strongly feel that the keen Wakefield designers should be encouraged by not having to compete in the trials against a very large number of these kit models or models made from plans published in the aeromodelling journals.

This problem never seemed to arise before the war and Wakefield flyers of the calibre of Ralph Bullock, Dick Korda, Jim Cahill, Bob Copland, Gordon Light, Emmanuel Fillon, Reg Parham, E. W. Evans and many others, would never have dreamed of flying anyone else's design in *the* International contest—it would have been unthinkable.

Whilst I am writing there is another Wakefield matter that I should like to comment on. I note that it is being suggested in some quarters that the present formulae should be altered because, it is alleged, design has reached stagnation point. This is not the case in my opinion. Whatever other reasons may be put forward for a revision of the rules—and I agree that there *are* some good reasons—stagnation of design is one which would be very difficult to substantiate. Like many others who were present at the processing of the 1949 models at Cranfield, I was struck by the wide diversity in design of the models, the Italian and Swedish models being particularly noteworthy in this respect. It was obvious, to me at any rate, that the present formulae still provides Wakefield designers of all nationalities with plenty of "meat to get their teeth into" and I agree wholeheartedly with Ron Warring, who I heard say recently, that "To design, build, trim, and fly successfully a Wakefield model is the most difficult and exacting of all aeromodelling problems."

Yours faithfully,

"WAKEFIELDER."

AEROMODELLING IN THE DOLDRUMS ?

DEAR SIR,—May I trespass on your valuable space to comment on the present state of aeromodelling, which, like many other hobbies and luxury industries, is feeling the effects (temporarily, we hope) of present-day conditions. Whilst no doubt this state of affairs is largely due to the fact that the average chap now has less money to spend on hobbies, I do not think that this is the only factor to be taken into account when considering this problem.

In the past whenever aeromodelling has needed a boost some fresh development has come along to attract new devotees to the hobby. Since the war we have had two such stimulants, viz., the marketing of small diesel engines and the introduction into this country of C/L flying, both of which have attracted many newcomers. Stimulants, however, often have a reactionary or boomerang action when the initial effects have worn off and I think that it is from this that we are suffering at present.

When the small, comparatively cheap, diesels came on the market many youngsters had more spare cash than they have today, and, although they had never built or flown any type of model aircraft, they started off with an engine and a power model kit, usually of the rocket-climbing pylon type. It was hardly surprising that many of their models finished their first flights a mass of wreckage—and they never knew why! Their interest was killed before it had had a chance to develop and they naturally turned to some less expensive and discouraging pastime.

Secondly, C/L flying has brought into our hobby a type of individual who never has been and never will be a *true* aeromodeller. To them the model is of secondary importance and is merely a means to an end, i.e., to attract attention to themselves. They are, in fact, purely and simply, exhibitionists. C/L flying appealed to these individuals because it made *them* and *not* the model the centre of attraction. But C/L flying is no longer a novelty and does not now arouse a great deal of spectator interest, consequently those who came into aeromodelling to take up C/L flying now find it dull and they too decide to try some other hobby. They do not generally turn to some other form of model flying, such as gliders or rubber-driven models, because here it is the model that counts and not the chap holding the handle. If it is thought that I have exaggerated on this point, ask any rabid stunt C/L fan if he ever flies on fields not normally frequented by members of the public. I think that you will find, as I have done, that even when such fields are available they will not use them, preferring instead to fly in parks, recreation grounds, etc. It must be admitted, of course, that, as in everything, there are exceptions. I know many chaps who, like myself, fly all types of models, including C/L, the difference is that when *we* get tired of C/L we have our first loves to fall back on and we remain keen aeromodellers.

What is the answer? Well, first we must try to attract more lads of below teen-age to aeromodelling and we must encourage them to start, *not* with power models, but with simple gliders and then rubber-driven models. The introduction of the Nordic International Glider Contest is a step in the right direction: I hope that it will be a great success and reawaken interest throughout the world in what is surely one of the most interesting and pleasant forms of model flying. Perhaps a nation-wide flying contest for gliders of an approved simple design might be sponsored by a national daily newspaper, the S.M.A.E., the Model Aircraft Trade Federation and the aeromodelling press. The magazines might devote more space to beginners' articles of the right type. Kit manufacturers can help a good deal by producing really good beginners' kits at a reasonable price and by advertising them not only in the model magazines but also in boys' books. I am well aware that there are already beginners' kits on the market and most of them represent good value for money, but some have apparently been prepared with very little thought for the age of the potential purchaser. They contain sheets of rock hard balsa crammed tight with printing, some of the parts being so tiny that you almost need a magnifying glass to see them, and the poor youngster is expected to cut out the whole lot with a razor blade!—a difficult task for even an experienced aeromodeller. Too often, also, the instruction leaflets are anything but easy for a non-aeromodeller to understand. If I intended to produce a beginners' kit, before putting it on the market, I would give a dozen kits to lads of, say, 10-12 years of age, and if nine out of the twelve could not make from them models which would fly reasonably well I would scrap the idea and start again. Probably 75 per cent. or more of the kits at present on the market are for power models and there is no doubt that since the war kit sales have been higher than ever before, but how many of the purchasers of these kits have stayed in aeromodelling—a very small proportion I fear. There's food for thought here.

And now we come to the clubs. I know only too well how difficult it can be to try to interest and instruct junior members, but I believe that the effort to do this is in the best interests of the movement and the club, despite the fact that it is often an apparently thankless task. I deplore the present tendency to form clubs with memberships restricted to contest experts. Such clubs do nothing to help the aeromodelling movement to expand and should be discouraged. The S.M.A.E. might endeavour to evolve some means of helping the clubs which *do* try to encourage and instruct junior members, perhaps by a grant based on junior membership, or a reduction in the junior affiliation fee, which could be offset by an increase in the fees charged to the "expert" type of club.

I am sorry that this letter has become longer than I intended, but maybe my remarks may inspire other readers to express their views on the points which I have raised.

Yours faithfully,

London, W.C.4. D. FINCH.

CROP WARNING

DEAR SIR,—The Society has received a further complaint from the owner of a farm adjoining Fairlop Aerodrome, to the effect that owners of models are doing considerable damage to young crops whilst retrieving planes and gliders.

The authorities take a serious view of actions which hinder agricultural production and the continuance of a thoughtless practice may well lead to our loss of this airfield.

The farmer is tolerant and suggests that a person retrieves his model *via the gate* (not the nearest weak point in the hedge) and then passes along the line of cultivation, retrieves the model and returns the same way, closing the gate behind him.

There is no need for a party to invade the field.

Yours faithfully,

Londonderry House, London, W.1. D. A. GORDON, Hon. Sec., S.M.A.E.

Taping Technique

(Continued from page 119)

a test on the same old wing soon reassured us, for at 180 oz. in. bending moment (the load at which the dowels *broke*) the taped joint was hardly distressed at all.

The weight of ⅜ in. wide tape is 0.00136 oz. per inch, so that six pieces, each about 1½ in. long, weigh 0.012 oz. This compares with approximately 0.1 oz. for the dowels and their paper tubes. Thus we may say that this particular taped joint was roughly twice as strong, and only one-eighth of the weight.

Practical Considerations

Although the example quoted above was a Wakefield wing, the taping technique applies equally well to power models and gliders. Further, it can be used for shoulder, mid, or low wings if a short centre section is built into the fuselage, or wing stubs are grown out of the fuselage sides. The wing panels are then taped to the projecting ends of the centre section or the stubs. The stressing calculations are the same as before, but the required number of tapes must be used on each of the two joints.

The calculated number of tapes is the minimum that should be used, and, if one wishes to "play safe," there is no harm in adding one or two more. However, the number of tapes used should never be more than double the calculated number, or the joint may be stronger than the rest of the wing.

The tapes should be positioned at the highest and lowest points of the section (see Fig. 3). If the joint is not on the centre line, as in shoulder wings, etc., it is advisable to wrap an additional piece of tape round the leading edge, and another round the trailing edge.

Each piece of tape should be slightly stretched as it is being applied.

In conclusion, it might be said that taped joints are simple, practical, and neat. They are stronger and much lighter than the older methods, and they can easily be designed in a scientific manner.

Know your Engine

(Continued from page 110)

outwards and the feed pipe should, therefore, draw fuel from the outer rearward corner of the fuel tank. If an integral tank such as that fitted to the Mills Mk. II is used, a fast model on short lines will force fuel out beneath the filler cap and a better plan is to replace this with a cork stopper. Usually there is a small pinhole in the other side of the fuel tank to provide the necessary air-vent.

For the fully aerobatic C/L model, a "stunt" type tank, correctly installed, is essential. Stunt tanks can be classified in two main types: those depending on centrifugal force to maintain an uninterrupted feed and those designed to operate independently of centrifugal force. In the former category are found all "wedge" tanks and similar designs in which the feed is taken from the outer side of the tank. (Figs. 9 and 10.) Under the second heading are balloon tanks, "pressure" tanks and mechanical types as exemplified by the Em-dee "Eezi-flo." (Figs. 11, 12 and 13.)

Theoretically, the "non-centrifugal" type should be best, since the average stunt control-liner does not depend only on centrifugal force to maintain line tension but usually has the additional assistance of rudder and/or motor offset, weighted outer wing or asymmetrical aerodynamic layout. Thus, in an overhead manoeuvre where gravity may tend to cancel out centrifugal force, the model will maintain line tension, but the fuel may drop away from the outer (now "upper") side of the tank.

Despite this, however, the wedge type tank is probably the most popular form of stunt tank in use at the present time. In the faster type of model, especially, it appears to function fairly satisfactorily. Nevertheless, in the writer's experience, the simple balloon tank is more reliable and often provides the answer to a satisfactory fuel feed when all else has failed. Balloon tanks are especially suitable for glow-plug engines running on alcohol and castor-oil fuels.

The "pressure" type tank operates on a similar principle to the balloon tank. As fuel is used up, the space within the tank is taken up in this case by movement, under spring tension of a plunger. As with the balloon tank, air is excluded from the system and bubbles in the feed pipe cannot occur.

The "Eezi-flo" tank utilises a rather ingenious feed system consisting of a weighted rotating pick-up arm within the cylindrical tank. In all except fore and aft movement, the tendency is, therefore, for the arm to follow the fuel around within the tank and if the fuel should drop in an overhead manoeuvre, the arm will drop, too. An essential to the effective operation of this tank with glow-plug engines, incidentally, is the need for rinsing out after use since the slightest corrosion may impede free movement of the feed arm.

With all stunt model installations, the centre-line of the tank should be located approximately on a level with the needle-valve. This avoids excessive variation in the level of the fuel (and thus the pressure at which it reaches the jet) when the model is put into inverted flight and other manoeuvres.

Speed model tanks present special problems of their own since the pressurising effect of centrifugal force at really high speeds may seriously upset carburation.

A relatively wide tank, such as is employed in stunt work proves unsatisfactory for high-performance racing models, because the variation in fuel level (which may almost assume the vertical at maximum speed) as fuel is consumed, is greatly exaggerated by centrifugal force. The usual practice, therefore, is to make the tank as narrow as possible, the required capacity being obtained by making it taller and longer than normal. (See Fig. 14.)

Even with such a design as this, however, the fuel feed is far from perfect. The tendency is, of course, for an excessive amount of fuel to reach the jet during the first few laps, causing the mixture to be excessively rich, so that the engine tends to "four-stroke" and does not reach its full revolutions. As the fuel is used up, however, the mixture strength assumes correct proportions and the engine begins to give its full output. Whether or not the engine then soon cuts out, due to the mixture strength decreasing further, will depend on whether the design of the tank provides adequate capacity within a narrow range of fuel-level movement on the combustible mixture strength range of the fuel used and on the initial needle-valve adjustment.

A variation of the vertical type speed tank is that recommended by the Dooling brothers and now often referred to as a "piano" tank. (Fig. 15.) This generally permits a larger capacity than a tank of normal section and is greatly favoured by the model racing car fraternity. The design would appear to be well suited to speed model aircraft where there are space limitations on the length of the fuel tank.

S.M.A.E. News

REPORT OF S.M.A.E. COUNCIL MEETING HELD AT LONDONDERRY HOUSE, PARK LANE, LONDON, W.1, ON SUNDAY, MARCH 5th, 1950, AT 11 a.m.

The following were present :—Messrs. A. F. Houlberg (Chairman), R. F. L. Gosling, D. A. Gordon, H. W. Barker, H. R. Turner, H. J. Nicholls, C. S. Rushbrooke, F. E. Wilson, E. F. H. Cosh (London), G. F. Foden (East Anglia), H. G. Hundleby (South Midland), W. Lowery (South Wales), R. C. F. Day (Southern), H. Rewell (South Eastern), B. A. Messom (Northern), D. Salloway (North Western), D. F. Scoffham (Royal Aero Club).

Correspondence

A letter from Messrs. Percival Marshall & Co. Ltd., organisers of *The Model Engineer* Exhibition, was read, inviting the society to again organise the Model Aircraft Section of the 1950 Exhibition on the same terms as last year. The society to receive the sum of £200 for their services in this connection. The Council agree to accept the offer and to ask the London Area Committee to again co-operate with the arrangements.

Correspondence from Mr. Max Coote was read in which it was complained that the "Ripmax" Trophy had not been displayed or presented at the 1949 prize-giving. The Council were informed that the trophy had now been dispatched to the winner, W. Harlow, of Peterborough, and it was decided to send a reply to Mr. Coote apologising for the omission and delay.

The Chairman stated that he had been advised that it would not be possible to hold the Wakefield and Nordic Finals at Cranfield, as the aerodrome would be needed for flying on that day. An endeavour is to be made to run these events at Wittering Aerodrome, near Peterborough.

The Council is to consider an invitation to send two or more flyers to represent Great Britain in the Pay-Load Power Event which is to be sponsored by the Plymouth Motor Corporation at the 1950 American Nationals.

Area Officers' Conference Proposals

"That the necessary flights required for Class 'A' and Class 'B' Merit Certificates may be made with any type of model."

Carried.

"That an annual report of all of the Society's activities and work be promulgated by the P.R.O. to all clubs and members."

Carried.

"That the Society's constitution be amended at the next A.G.M., by the deletion of the reference to the minimum number of members which affiliated clubs must have."

Carried.

Finance

The Treasurer, Mr. H. W. Barker, presented his report and stated that the balance of cash in hand was £480 8s. 2d.

Wakefield and Nordic Contests

The transport of the British teams to Finland and Sweden was discussed and quotations for air travel considered. It was decided to book a seven-seater aircraft for each event and to obtain an option to alter this booking to two 28-seater Dakotas if it was found that a sufficient number of people wanted to travel to these contests. The fares would be £40 return to Finland and £25 return to Sweden. Applications for seats in the aircraft to be made to the Secretary as soon as possible.

1950 *British Nationals*

Mr. Messom reported that the Ministry of Civil Aviation had now approved the use of York Aerodrome for this event and he had obtained permission to use the York Rugby Football Ground, which is near the town centre, for the C/L contests. Details of hotel accommodation in York can be obtained from the City Information Service, Public Library, York. No camping will be allowed on the aerodrome, but local farmers are to be approached for suitable sites.

Records

The following records were ratified :—

C/L speed—Class IV. D. R. Powell, (East London M.A.C.), 97.3 m.p.h. Power—Flying Scale. W. T. Tinker (Ewell M.A.C.), 1 min. 36.5 sec. Lightweight Glider—T.L. W. J. Callender, (Hayes & D.M.A.C.), 7 min. 41 sec. Indoor-Tailless R.O.G. M. R. Thomas, (Oldham & D.M.A.C.), 9/12/49, 37 sec. Indoor-Tailless R.O.G. M. R. Thomas, (Oldham & D.M.A.C.), 23/12/49, 1 min. 26.5 sec. Indoor-Tailless H.L. M. R. Thomas (Oldham & D.M.A.C.) 23/12/49, 1 min. 25.8 sec.

(With reference to the Flying Scale Record, the Records Officer reported that, at the Council's request, representatives of the London Area Committee had checked Mr. Tinker's "Piper Cub" and found that it complied in every respect with the new flying scale record requirements).

The following record applications were recorded:—

Indoor-Tailless H.L.—M. R. Thomas (Oldham & D.M.A.C.), 1 min. 46.2 sec.; Indoor-Helicopter R.O.G.—S. A. Ward, (Wolves M.A.C.), 2 min. 00 sec.; Indoor-Fuselage R.O.G.—R. T. Parham (Worcester M.A.C.), 6 min. 55 sec.; Indoor-R.T.P. Speed—T. A. Jolley (Warrington M.A.C.), 42.83 m.p.h. Outdoor-Lightweight Glider, T. L.—M. L. Hanson, (Solihull M.F.C.), 10 min. 30 sec.

Merit Certificates

These were awarded to the following:—Class B: No. 269, D. Bennett (Whitefield). Class A: No. 342, P. Horsley (Mersey); No. 343, B. J. S. Foster (Mersey); No. 444, E. G. Currington (Prestwich); No. 345, C. Westerby (West Yorks.); No. 346, W. Tootell (Chorley); No. 347, F. Nixon (Chorley); No. 348, G. Davies (Chorley); No. 349, B. Picken (Wigan); No. 350, J. Hepworth (West Yorks.)

S.M.A.E. Badge

The Council decided to allow affiliated clubs to use a small block of the S.M.A.E. badge for their letter-headings, etc., subject to the payment of the cost of the block.

Applications for Affiliation

Applications from the following clubs were accepted:—

Gt. Yarmouth & District M.F.C., Seniors 10, Juniors 2, fee 27s. Kings Lynn M.C., Seniors 20, Juniors 1, fee 51s. Nunhead M.F.C., Seniors 10, fee 25s. Kentish Nomads M.F.C., Seniors 14, fee 35s. Knowle M.A.C., Seniors 8, Juniors 13, fee 33s. Stourbridge & District M.C., Seniors 15, Juniors 10, fee 47s. 6d. Beverley & District M.A.C., Seniors 8, Juniors 13, fee 33s. Lockwood M.A.C., Seniors 10, fee 25s. Spen Valley & District M.A.C., Seniors 15, Juniors 18, fee 55s. 6d. Wavertree M.F.C., Seniors 19, Juniors 5, fee 55s. 6d. Christchurch M.A.C., Seniors 12, Juniors 2, fee 32s. Headley District M.F.C., Seniors 16, Juniors 3, fee 43s. Sheppey M.A.C., Seniors 10, Juniors 1, fee 26s. W[illegible] C/L M.F.C., Seniors 10, fee 25s. Airdrie & District M.F.C., Seniors 13, Juniors 3, fee 35s. 6d. Edinburgh M.F.C., Seniors 17, Juniors 9, fee 51s. 6d. Taunton & District M.A.C., Seniors 10, Juniors 6, fee 31s. Glevum M.C., Seniors 1[illegible], Juniors 3, fee 43s. Moonrakers M.A.C. (Devizes), Seniors 10, fee 25s.

Radio Control

Mr. E. F. H. Cosh was requested to endeavour to arrange a meeting between the S.M.A.E. R/C Sub-committee, the R/C Models Society and representatives of the Radio Society of Great Britain.

Power Records

The Council agreed to a proposal that the engines used for flights for which any power record is claimed must be checked by the Technical Secretary before the record is ratified.

Electrical Timing

As world speed record attempts must now be timed by electrical apparatus, it was decided to make enquiries with a view to the purchase of suitable equipment by the Society.

NEWS from the CLUBS

ROYAL AERONAUTICAL SOCIETY (PORTSMOUTH)

We strongly sympathise with all committees who have to contend with those "dead" members, and steps are now in hand to wake them up. We hope that others, too, will follow the example set by Birmingham at their committee elections.

Our chairman and P.R.O. have been negotiating with the Parks Dept., and find their efforts well rewarded, with a 3½ acre C/L site.

The contest-minded element are now preparing for the fray and show an interest in a wide range of classes of model, the vogue still being, however, C/L stunt flying.

MANCHESTER INDOOR RALLY

This event, held yearly, and organised by the Manchester & District Council of Model Aero Clubs, was staged in the Manchester Corn Exchange, on February 19th.

Many of the contestants expressed their pleasure at the change of venue and judging by results it was a very good move. Early in the day, R. Parham made an attempt on the Free Flight R.O.G. record and returning a flight of 6 min. 42 sec. made certain by exceeding the present record by 2 min. 9 sec.

With the various contests under way, yours truly had a chance to look round. Barry Haisman had a power job and was discussing trimming procedure; R. Woodhouse (Whitefield) had his latest Wakefield. Several odd-looking speed jobs were test flying and members of the Comet Power Club had an r.t.p. model powered by a 2 c.c. Kemp.

R. Parham had a very successful flight of 6 min. 55 sec., and so broke the H.L. Free Flight (Fuse) Record. S. A. Ward, of Wolverhampton made two attempts on the British Helicopter Record and turned in a flight of 2 min. After winning the r.t.p. speed contest, A. Jolly, of Warrington, made a flight at 42.83 m.p.h., some 5 m.p.h. faster than the present record.

Results

Class "A" R.T.P. Individual:—1st, E. C. Muxlow (Sheffield), 933.5 sec. agg.; 2nd, R. Parsons (Sheffield), 696.5 sec. agg.; 3rd, H. Tubbs (Leeds) 666.5 sec. agg.

Free Flight: 1st, E. C. Muxlow (Sheffield), 1,111 sec. agg.; 2nd, R. Parham (Worcester), 1,059.3 sec. agg.; 3rd, N. E. Davies (Liverpool), 954.6 sec. agg.

R.T.P. Speed: 1st, A. Jolly, 41.95 m.p.h. (Warrington); 2nd, W. Eden, 40.2 m.p.h. (Warrington); 3rd, J. West, 37.3 m.p.h. (Warrington).

Inter Area Team Event:

Winners for second year running, Northern Area. Aggregate for eight flights, 1,877.5 sec.

Only two areas [illegible] this event, the North and the North-West.

The trophy kindly given by [illegible] *Dispatch*, together with the individual prizes, were presented by [illegible] Meads, administrator of the Kemsley Trust, who said: "[illegible] of aerodynamics and gravity have been defied [illegible] contraptions. But behind this light-heartedness [illegible] of scientific knowledge."

After this, the visitors departed their [illegible] had a really good day and only waiting for the [illegible].

LEEDS M.F.C.

Several brand new Wakefields are making [illegible] at a newly acquired field, where flying is taking [illegible].

An all out effort is being made this year to stimulate [illegible] among the junior members, the same rule applying as [illegible] year, namely, any junior member has half his travelling [illegible] area or decentralised rally refunded, provided he enters in the competition.

Several coaches have already been booked for the [illegible] competitions, and the club is generally in "good training" for the season.

WEST ESSEX AEROMODELLERS

The club have located two war surplus aerodromes within [illegible] miles of headquarters. Each is the "12 o'clock high" type of [illegible], very suitable for R/C when Fairlop becomes too crowded. Continuous prang-free R/C flying is now a regular W.E.A. Sunday feature.

The recent air-film show on March 8th was well supported by local clubs.

Don't forget our rally on June 18th.

UPTON M.F.C.

One of our most valued members, "Bill" Smith, holder of two club records (Wakefield, 9 min., and open rubber, 15 min.) has left the club to join the forces. We wish him the best of luck. A number of large gliders are being built for the coming competition season, also several Nordic class gliders. There are at present three Nordics in flying trim, one of these being designed and built last October before the S.M.A.E. decided to hold a competition for this class of model.

CROYDON AND DIST. M.A.C.

The advent of some reasonable flying weather recently has enabled several members to produce their latest brain-childs and prove that the faraway look they have been wearing all winter was not for nothing.

Great interest has been shown in the Nordic glider events scheduled for the coming season and a number of designs have been successfully flown, including one 17½ oz. version by our secretary, Ted Setterfield, who was talked into building it as his first free-flight model. The success of this has spurred him on to greater things as he now has an extensive building programme ahead of him—maybe we'll see him with a Wakefield yet!

Free-flight power has attracted a number of new followers also, no doubt due to the inclusion of this class in this year's Plugge Cup. All sizes are being catered for, from "Infant Torpedo" powered babes to Ron Ward's gigantic 1,032 sq. incher. This last mentioned is using a Vivell 49 for motive power and weighing only 2½ lb. the glide has to be seen to be believed.

C/L is at present enjoying a comeback after a long lapse and the stunt men are busy polishing up their flight patterns—the speed merchants are just polishing up their models, of course. At least one team racer has been put through its initial tests and shows great promise. Powered by a McCoy 19, it is of built-up construction with sheet covering and the "team" is now busy experimenting with different props and fuels to determine its best performance.

CHRISTCHURCH M.A.S.

Several founder members of the Portsmouth R.Ae.S. Models Section, now resident in this part of the S. Area, have combined with local enthusiasts, most of whom are seasoned modellers, to form the above club. We have been fortunate in obtaining Mr. R. A. H. Johnson, as chairman (late of Halifax) and great hopes are entertained for the coming season. Interests are representative of all classes. Power models of the Hi-ball-come-Banshee type, Mills or Elfin powered, are already in evidence and there are Wakefields and Nordic A2's coming off the boards. The C/L lads are practising team racing with stunt models until the "pukka" jobs put in an appearance.

ST. ALBANS M.A.C.

The past month has seen a great revival of the club. Thanks to new blood and a very pleasant winter there has been much flying.

We began by a decentralised competition with the San Diego Jokers. This covered gliders only and a further limitation was one of 150 ft. line length. As is usual with our capricious weather, that Sunday was the only bad one in the month, with rain and wind. We lost by 15 sec. on team average times.

Lectures held during the month included one by Ron Moulton, on "Team Racing" and an extremely interesting one by Group Captain Donaldson on "High Speed Flying."

The team racing event at the All-Herts Rally will *not* be run to the specifications given in our notes published in the February issue of MODEL AIRCRAFT. After much discussion at a committee meeting it was decided that the event will be run to the S.M.A.E. rules. We feel that this will assist modellers by not requiring them to build a different type of model for our own event. The only differences will be the requirement of a hook tail-skid for use in automatic release, and the inclusion of an engine cut-out capable of being operated by the pilot.

Other details of the rally events are as follows:—

All C/L events to S.M.A.E. rules.

Rubber, glider and free-flight power rules are as in previous years, with the exception that models may be hand launched if so desired.

Details of the new Concours d'Elegance event will be given next month.

EVESHAM AND DISTRICT M.A.C.

Regular Sunday morning flying takes place each week and at last the standard of flying is beginning to improve. Equal interest is given to all the types of planes.

Recent outstanding models are:—

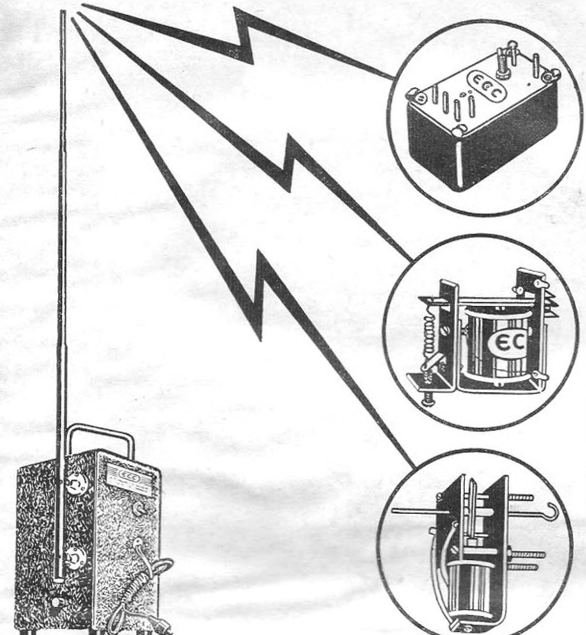
(1) An E.D. IV scale "Spitfire"—F.F. and span 6 ft. This model features detailed cabin and fully-sprung undercarriage, and has half-a-dozen flights to its credit so far.

(2) Amco 87 powered "Proctor," F.F., span 28 in., which has recently taken the air. The designer is considering converting it to C/L.

(3) A beautifully finished "Zombie" which has raised the club's rubber record to 3 : 10.

(4) Two team racers, a "Gladiator" and "Mew Gull," both approx. 34 in. span and E.D. IV powered. They have yet to fly in the same circle!

Tele-Commander TRIUMPH!



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Features :—

- Fitted with Type 5A Relay.
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Batteries :—L.T. 1.5 volt Pen cell or larger.
H.T. 45-60 volt. B122-B123 or larger.

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This diminutive relay is ultra-sensitive and will operate on current changes of as small as .2 ma.

- Balanced armature.
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- Armature constructed of special Mu-metal reducing residual magnetism to a minimum and eliminating sticking.

SIZE :—1 × 1 × ¾ ins. Weight ⅛ oz.

ESCAPEMENT. Type 1.

This lightweight escapement is well known by radio-controllers as the most simple and economical servo mechanism produced to date. Easy to fit—sturdy, yet light.
Fitted with double winding and current saving device, a feature introduced to the aeromodellers of this country by E.C.C.
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The design of our Transmitter, proved to be the best on the field, remains unchanged, with the exception of a placed carrying handle now fitted and the telescopic aerial replaced with a sectional aerial.

This is to introduce our newest Beau,
But we regret production's slow,
Performance makes demand great,
So you may have a little wait,
For this R/C, the latest wow,
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CONTEST CALENDAR

April	30th	North Hampshire Rally, Odiham.
,,	30th	**Keil Trophy.** Power Duration. D.C.
,,	30th	**Lady Shelley Cup.** Tailless. D.C.
May	7th	Swindon M.A.C. Slope Soaring Contest, Wiltshire Downs. (Above Broad Hinton.)
,,	14th	**Weston Cup.** 2nd Wakefield Qualifier. Area.
,,	14th	**K. & M.A.A. Cup.** A 2 Nordic Glider. Area.
,,	21st	South Wilts Rally. Old Sarum.

THE BRITISH NATIONALS

May	27th	**"Gold" Trophy and other control-line contests**
,,	28th	**Thurston Cup.** F.A.I. Glider.
,,	28th	**"Model Aircraft" Trophy.** F.A.I. Rubber.
,,	28th	**Women's Challenge Cup.** Rubber Glider.
,,	29th	**Sir J. Shelley Cup.** Power Duration.
,,	29th	**S.M.A.E. Radio-Control Cup.** R.C.
June	11th	**Wakefield Trials.** Selected entry from **A 2 Glider Trials.** Contests held on April 16th and May 14th. Centralised—venue to be announced.
,,	18th	West Essex Gala, Fairlop.
,,	25th	**Hamley Trophy.** Power Duration. D.C.
July	2nd	Northern Heights Gala, Langley, Bucks.
,,	9th	**Control-line Stunt and Speed.** Area.
,,	16th	Sevenoaks Gala Day, Dunton Green, Kent.
,,	23rd	**Wakefield Trophy**—Finland.
,,	23rd	All-Herts Rally, Radlet, Herts.
,,	30th	**A 2 Glider Contest**—Sw[illegible]
Aug.	6th	Bolton M.A.S. Rally, Affetside.
,,	6th	**Bowden Trophy.** Power Precision.
	&	**Taplin Trophy.** Radio Control.
	7th	**Control-line Speed.** Centralised—venue to be announced.
,,	13th	South Coast Gala, Brighton.
,,	27th	Huddersfield Air League M.A.C. Rally.
,,	27th	Merseyside M.A.C. Slope Soaring Meeting, Clwyd Hills, N. Wales.
Sept.	3rd	**AREA AUTUMN RALLY**
		Farrow Shield. Unres. Team Rubber.
		"Model Engineer" Cup. Unres. Team Glider.
		Astral Trophy. Power Ratio.
,,	17th	**S.M.A.E. Cup.** Open Glider. D.C.
,,	17th	**"Flight" Cup.** Open Rubber. D.C.
,,	17th	**Frog Junior Cup.** Open Rubber. D.C.
,,	17th	Portsmouth and District M.A.C., Southern Counties Rally, Thorney Island, Hants.

S.M.A.E. CONTESTS IN BOLD TYPE

SOUTHERN AREA COMMITTEE

Report of the A.G.M., held at the Cotswold Hall, Highfield Lane, Southampton, on February 19th, 1950, at 3 p.m.

Clubs represented, Cowes, Ryde, Winchester, Basingstoke, Alton, New Milton, Odiham, R.Ae.S. (Portsmouth), Portsmouth, Southampton and Petersfield.

The minutes of the previous A.G.M. held on December 12th, 1948, were read and confirmed. Reports were presented by the chairman, Mr. Welch, and the secretary, Mr. Pearce, both of whom stressed the apparent lack of interest shown by many clubs in the area. Both announced their intention to resign.

There were no reports from the competition secretary or the treasurer, due to their unavoidable absence, but Mr. Vincent, of the Portsmouth and D.M.A.C. presented the accounts on behalf of the hon. treasurer. It was stated that due to differences in presenting various rally and sales accounts to the treasurer, it had not been possible to balance the detailed accounts although the overall cash account was satisfactory. The meeting agreed unanimously on a proposal by Mr. P. Guilmont, seconded by Mr. Thomas, that an E.G.M. should be called within a reasonable period for approval of the area accounts.

The following gentlemen were elected to form the area committee for 1950.

Chairman	Mr. F. Vincent	(Portsmouth & D.M.A.C)
V/Chairman & P.R.O.	Mr. J. L. Barnes	(Christchurch M.A.S.)
Secretary	Mr. B. Pearce ..	(Southampton M.A.C.)
Treasurer	Mr. L. Glover ..	(R.Ae.S. Portsmouth)
Area Delegate ..	Mr. R. C. F. Day	(Portsmouth & D.M.A.C.)
Comp. Secretary ..	Mr. C. R. Foot	(Odiham M.F.C.)

Auditors appointed were Mr. B. Welch (Southampton M.A.C.) and Mr. H. J. Childs (Winchester M.F.C.). In the absence of any valid nomination for the post of Area Secretary, Mr. Pearce agreed to carry on until the E.G.M. Postal votes were sent in by Grange, R.A.F. Andover & Ventnor M.A.C.'s and Salisbury and D.M.E.S. The South Area Challenge Trophy, won by the Southampton M.A.C. on the results of the Area Rally, was presented to Mr. Shearn by Mr. Welch. The meeting closed at 4.15 p.m.

SOUTH-EASTERN AREA

Report of the third A.G.M. held at Redhill, on Sunday, January 29th, 1950.

Chairman: Mr. H. J. Towner.

The following clubs were represented: Dover Youth Club M.F.S.; St. Georges Heights M.F.C.; Brighton D.M.A.C.; Eastbourne M.F.C.; Southern Cross A.C.; Hastings D.A.M.; Sevenoaks M.A.C.; Chichester D.M.A.C.; Mid-Sussex A.M.

Arising out of the minutes, the secretary stated that the area had tried the sub-area scheme during the past year and it was generally agreed that it was a success and should be continued.

The Chairman in his report traced the history of the area since its inception, stating that for the first two years no great activity took place and that clubs were shaking down and getting to know one another. The area, he said, really came to the fore with the presentation of the Dover C/L meeting, since to be known as the S.E. Area C/L Championships.

The Secretary stated that the area was slightly stronger than at the previous A.G.M., but that expenses in running the area were very considerable, especially in regard to postage and stated that in his capacity as secretary he had written some 3,000 letters during the past year.

The Treasurer's report showed an excess of expenditure over income during the year. Copies of the report were circulated.

The Competition Secretary stated in his report that clubs in the area did not support the area centralised contests during the past year in the numbers that he had hoped. He asked a special effort during the coming season. Turning to National records, he said that two are now held within the area, i.e., the open rubber and Wakefield, and Class VI Speed (jet).

Election of Officers

Mr. Bent agreed to take over as insurance officer. It was also agreed that as the area holds its meetings in various towns in the area it would be advisable to have two vice-chairmen. Those proposed were Mr. Delderfield, and Mr. Skipworth. The meeting then proceeded with the election of its officers for the ensuing year with the following results:

Chairman: Mr. H. J. Towner (Eastbourne); Vice-chairmen, Mr. L. B. Delderfield (Southern Cross), Mr. Skipworth (Dover); Hon. Secretary: Mr. H. Rewell, (Southern Cross); Council Delegate: Mr. H. Rewell, (Southern Cross); Treasurer, Mr. A. Mullett, (Brighton); Competition Secretary: Mr. N. J. Butcher, (Hastings); P.R.O.: Mr. H. D. Austen (Dover); Insurance Officer: Mr. R. Bent (Dover); Records Officer: Mr. R. F. Bosall (Chichester).

The meeting closed at 6.30 p.m. with a vote of thanks to the chairman.

NORTH EASTERN AREA COMMITTEE

1950 Area Contest programme.

Area Spring Rally—April 16th: Newcastle Town Moor, 2 p.m.—(1) Gutteridge Trophy; (2) Halfax Trophy; (3) Open Glider.

May 14th—Shotton or Newcastle Town Moor, 2 p.m.—(1) Weston Cup; (2) K. & M.A.A. Cup; (3) Open Power; (4) Open Rubber.

July 9th—Newcastle Town Moor, 2 p.m.—(1) Control line; (2) Open Glider (junior and senior events); (3) Rubber Contest (old Flight Cup Rules); (4) Semi-scale power.

Autumn Rally—Sept. 3rd: Venue unfixed, 2 p.m.—(1) Farrow Shield; (2) Model Engineer Cup; (3) Astral Trophy; (4) Scale event (power and rubber).

SPALDING AND DISTRICT M.A.C.

Club dinner held February 22nd, 1950, presentation of club trophies for competition winners and certificates for awards at the annual exhibition held last May.

Competition Winners

Power—A. C. Willcox: Total time, 627 1/5 sec. Model: "Scorpion," powered Mk. II Mills. Club record broken with flight of 511 2/5 sec. o.o.s. Model was seen flying for at least 30 min. and was finally found the following day eight miles away in a potato field.

Senior Rubber: G. Gilliat. Total time, 186 1/5 sec. Model: "Rocketeer" (second year in succession).

Junior Rubber: R. S. Culpin. Total time: 136 1/5 sec. Model: "Competitor."

Sail Plane: J. R. Mann. Total time: 285 2/5 sec. Model: "Sunspot."

C/L Stunt: N. D. Earth. Model: "Small Fry" (powered with Mills Mk. I).

Times though generally on the small side are about average, thermals seem to be very few and far between in the Fens.

The club has now been formed three years, has about thirty active members and is sound financially, last year spending £50 on club trophies.

NORTHERN HEIGHTS M.F.C.

The above club's annual gala day will be held at Langley Airfield, Nr. Slough, Bucks, on July 2nd, 1950.

The Queen's Cup will again be featured, the rules being the same as in previous years, i.e., 200-300 sq. in. wing area, 12 oz. min. weight, L2/100 fuselage formulae, 33 per cent. tailplane area.

All model enthusiasts will be welcome.

E.D. *Clockwork* TIMER

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FIVE TOWNS M.A.C.

Serious test flying has commenced with the spring weather, two Wakefield hopes are now fully tested and have been carefully put away awaiting the first eliminator. Details of these are as follows:

"G.W.7" Wakefield, by G. Wytcherley, weight 8.54, span 46.5, wing section G.F.E.3 (original) power: 16 strands Dunlop ¼ × 1/24. Squared off wing tips, non-stall tip, tailplane section: 50 per cent. Clark Y. Fuselage: Streamlined box, wing mounted high with fairing over centre section.

"Longtonian 7," by Gordon Roberts. Weight, 8.4; span, 46; wing section, modified R.A.F. 32; 18 in. paddle prop, eccentric pin rudder adjustment, tip-up tail dethermaliser. Fuselage streamlined box with wing fairing.

The Nordic glider class is awakening some interest and Gordon Roberts has already tested his "Ebeneezer," his difficulty has been to get up to the weight, bei.g used to lightweights. Details: Span, 68 in.; wing section, Hungarian B8258h, streamlined slab-sider, tip-up tail D.T., eccentric pin rudder adjustment, lifting tail, off-set tow hooks. Tests showed 2¼ min. using 150 ft. line.

"Spin Dizzies" Ron Buck and Frank Snow have just attempted two in a circle, but it added up to the wrong number the lines got crossed! Still, knowing these two, it won't be long now before they have the hang of this.

One R/C job is now being tested by Derek Griffin and Don Bosworth. Details: Junior 60, weight 4¼ lb., [illegible]or receiver, home-made transmitter, powered by an ancient but still lively Baby Cyclone. Rudder control only as yet.

We are expecting to use Wakefield models for the Gamage and will probably fly this off at the Evesham rally, we prefer the climate down there.

YORK M.A.S.

The club has held its extraordinary general meeting re the 1951 S.M.A.E. programme and general rules. The good crowd discussed, for two hours various suggestions and ideas which were modified, tabulated and filed for reference of the N.E. Area. A fine afternoon on March 12th brought forth a good percentage of the society on York Aerodrome. A Windjammer sailplane, built by Clifton Aeromodels took to its wings on the first thermal of the year and crossed the centre of the City and landed in a busy thoroughfare without damage. A good-sized crowd was astonished at seeing a seven-footer land in such a place. A citizen handed it over into custody of the police. By the time this appears, T. Heselwood and R. Hodgson ought to know a few of the answers to R/C, having built a "Radio Queen" between them. J. P. Fielding also has a "Stentorian" for R/C on the stocks. Fred Miskin was spotted testing out his 60 in. span sailplane "Dream Bogey," maiden flight being 2 min. 0.0 sec. R. Hodgson is having a similar nightmare. One or two mishaps marred the day, however. Mr. Sidebottom lost a "Gillichopper" through an unfortunate ground accident, likewise J. P. Fielding lost his "Jersey Javelin" in a power-dive that finished up 2 ft. below the concrete deck. Hard luck J.P. Ron F[illegible] was back with a rubber job, I noticed. Weather not quite what it might have been for rubber jobs, but Ron's "Zombie" seemed to be showing [illegible]. Sam Messom's old Wakefield has yet to make its debut. A few members have planned Nordics for future competitions.

CHESTER M.F.C.

Our second annual dinner and prizegiving was held on February 4th, and attended by 91 guests, including the Mayor and Mayoress and the Sheriff of Chester, also members of the Liverpool and Wallasey Clubs.

Junior member Mike Chidley won the Dowyer Challenge Cup (awarded on a points basis over the season's events, 3 points for first place, 2 for second and 1 third, 1 point is also awarded upon entering an event). We are surprised to note that many clubs pack up flying during the winter, we manage to "have a go" most Sundays, if one or two go to the flying field, others are bound to follow, we find. At the moment we are busy building for the season's event.

Like some of the Wallasey chaps, we are experimenting with high thrust-line low C.L.A. power jobs, which show promise.

WHITEFIELD M.A.C.

The end of the indoor season saw some hectic flying as the two club contests occurred at almost the same time as the indoor contest at the Corn Exchange, Manchester.

J. O'Donnell won the club r.t.p. duration contest (Class "A") with 510 sec. agg. for three flights. He also made top N.W. Area times in individual and team Class "A" contests at the Corn Exchange, raising the club record [illegible] to 3 : 51.

The club r.t.p. speed contest [illegible] for J. O'Donnell with a time of 8.65 sec. for 10 laps ([illegible] m.p.h.). In the same contest R. Faulkner had the interesting (?) experience of cutting his take-off dolly in two with the prop. after one lap!

Outdoor flying is still progressing. R. Woodhouse's rubber driven "Canard" having a best flight of 2 : 04 H.L., but poor rubber restricting best r.o.g. flight to 94 sec.

New models are beginning to appear in the flying field. H. O'Donnell's brand new 6 ft. "Miolnir," F.A.9 glider designed by a club member, flying straight off the board, with incidences and C.G. as built. It did 1 : 54.4 on its first t.l. flight off 100-120 ft. line. Best times in the last month have been 3 : 15 and 4 : 15 by J. O'Donnell's own design 6 ft. "Pothunter."

L.S.A.R.A: NEWS

The fact that little has been heard of late concerning the activities of the L.S.A.R.A., is not an indication that it is dormant, but merely a reflection of the secretarial difficulties which it has been encountering.

The Director of Research, Mr. N. K. Walker, found that he was quite unable to direct research and carry out the secretarial duties of the association effectively at the same time, and it became necessary to find someone else to take these duties off his shoulders.

Mr. P. R. Payne filled the breach with success until his recent move to Bristol, where his new duties have made it impossible for him to devote the necessary time to the work of the association.

The secretarial work has now been reorganised, and it is hoped that this will facilitate the work of the association and enable those interested to be kept informed of the activities of the association through the model aircraft press, in addition to the established channel of the association technical reports.

The present membership of the association is 185, but it is regretted that the majority are in arrears with either one or both of their accounts as this makes the working of the association very difficult. It is hoped that any members who are in arrears who read these notes will immediately rectify the situation and thus enable the association to proceed with its work free from financial embarrassment. In order to reduce wasted secretarial effort it was decided at the last meeting of the Research Council not to send reports to members who become more than 2s. in debt with their report float account, or more than two years in arrears with their subscriptions. It was also decided that members who failed to pay their dues after adequate warning, should cease to be regarded as members and their names removed from the membership list.

Of the research work being undertaken the most interesting is that being carried out on propellers for power driven models and on "proportional" wireless control, in both of which very useful progress has been made.

Great advance has been made in research with power models having a high rate of climb and figures of 5,000 ft. per min. (60 m.p.h.) are now being obtained.

The progress at the Cove Headquarters has been hampered by lack of finance and the shortage of building material, nevertheless, advance has been made though progress could be more rapid if more assistance was forthcoming.

The foreign sections of the association report considerable progress and the All-India Aeromodellers Association has now become associated to the L.S.A.R.A.

The U.S.A. reports increased interest in the work of the Association and Mr. Henry Jex working at the Massachussetts Institute of Technology is preparing some reports which should be of considerable interest.

In Canada, Mr. Mann, of Ottawa, has built a tailless glider which is giving a good account of itself and Mr. Henshaw, of Hamilton, has built a useful wind tunnel which is giving promising results, and which is described in Report No. 36.

The development of the German section is being hindered by exchange difficulties and a certain amount of red tape which prevents the interchange of apparatus. For instance, a very excellent balance built by the German section for the Cove wind tunnel has been held up at the West German Customs for some time.

Recent reports to be issued are:—

No. 36. "The Hamilton Wind Tunnel," by D. Henshaw.
No. 37. "The Critical Reynolds Number," by D. Henshaw.
No. 38. "The Theory and Performance of Rectangulars—sectioned torque bars," by P. R. Payne, N. K. Walker, B.Sc., and F. E. Deudney, B.Sc.
No. 39. "A Simple Two-channel Proportional Control Transmitter," by J. Fenn, B.Sc.
No. 40. "The Performance of Model Propellers," by P. R. Payne and N. K. Walker, B.Sc.

Also Technical Note No. 3. "Airscrew Performance Data," by R. Turner, B.Sc.

BELFAIRS M.A.C.

A week after the club's annual exhibition from which C. Cullen was judged senior champion for his A/2 Nordic glider, and A. Longstaffe, junior champion, for his Argus powered by a K 2 c.c., the club was challenged by the Estuary Power Modellers to a stunt C/L competition. The competition was judged to S.M.A.E. rules and a team of three represented each club. Belfairs won by a total of 552 points against Estuary Power Modellers 401.

P. Field won the senior championship cup for flying last season, and the Arundel Cup for junior championship was won by D. Willmott. P. Treadaway won the Brown Cup for the best collection of three [illegible].

SOUTHERN CROSS A.C.

The club held an E.G.M. on March 4th to discuss the 1951 contest programme. Some suggestions were put forward, namely (i) that in power contests the motor run be limited to 15 sec., hand launch, or 20 sec. r.o.g., all models, however, to be fitted with an undercarriage; (ii) the power contests be divided into classes according to engine size, although opinion was divided over the actual classes; (iii) that the Nationals be extended to cover every possible type of model; and the club intends to try out (i) and (ii) in its own contests in the coming year.

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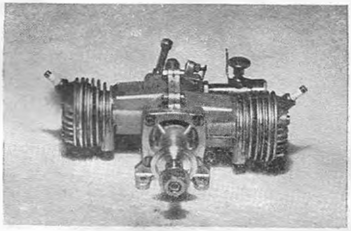

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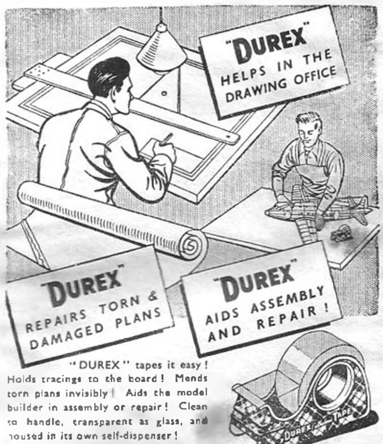

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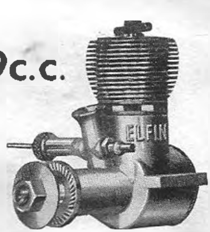

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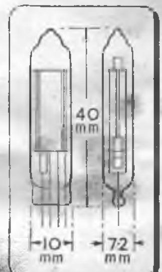

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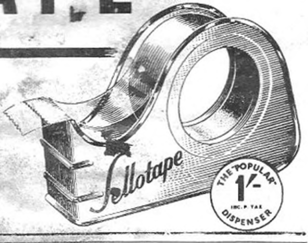

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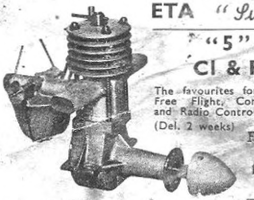

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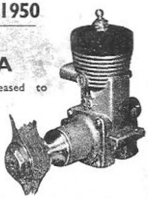

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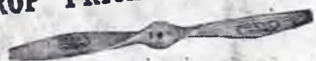

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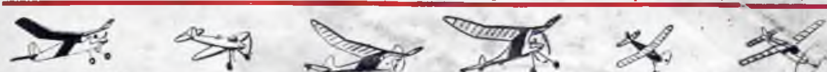

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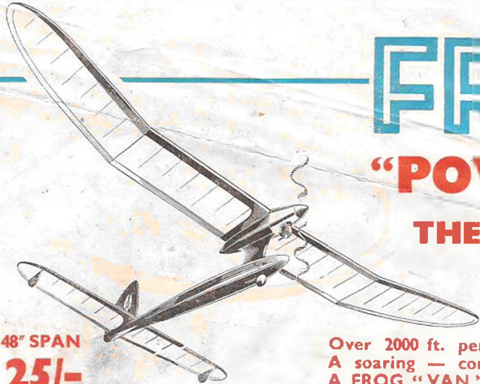
FROG

TRADE MARK



"POWAVAN"—

THE LAST WORD IN POWER MODEL EFFICIENCY!

48" SPAN

25/-

Over 2000 ft. per minute with a FROG "100"!
A soaring — contest winning — sailplane glide!
A FROG "VAN" DESIGN — so that you can win!

The amazing FROG "Powavan" sets a new high standard in power model design, and is really NEW—not just a re-hash of an existing model. The layout has been carefully developed to make full use of the power available in a startling climb—considerably more than 2,000 ft. per min. with a FROG "100"—and ensure stability in all weathers. The "Powavan" is ideal for duration and ratio contests and has proved that a high-efficiency "sailplane" glide may be obtained with a carefully designed power model.

Contents of the FROG Super Kit are from the finest materials and feature the FROG quick-reference scheme of numbering all cut-out parts to correspond to the drawings. They include precision-cut balsa fuselage, nacelle, wing and tail-unit parts, shaped wing and tail leading and trailing edges, shaped balsa block parts, cut plywood bulkheads, covering tissue, cement, bent wire parts, new type soft-plastic tyred landing wheel and all other accessories, plus detailed drawings and instruction leaflet.

Provision is made for two types of motor cut-out and a "lift-up-tail" dethermaliser. Recommended motors are the FROG "100" Diesel and "160" Red Glow.

NEWS FLASH!!

These new FROG Super Kits are destined to be as successful as the terrific FROG "500"—They are the first of a brilliant new range by FROG designers C. T. Buffery, A. A. Judge and J. R. Vanderbeek—more are to come, so look for the FROG adverts!!

12/6

"VIXEN"

A neat, "simple-to-build" semi-scale model for engines of up to 1 c.c. capacity. The new FROG "Vixen" has been designed to provide a stable, "first model" for newcomers to power flying, and an all-weather "sports" type for experienced fliers. It is suitable for "precision" contests such as the Bowden International Trophy, and, is, in fact, a descendant of C. T. Buffery's Bowden winning FROG "45."

The FROG kit is quite complete, and features the FROG quick reference scheme of numbering all cut-out parts.

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"GOBLIN"

To those who wish for a good start to their aeromodelling career, we thoroughly recommend this neat little 24 in. span FROG cabin model by A. A. Judge. The "Goblin" has been specially designed to be absolutely simple to construct and certain to fly far and well!

The FROG "Goblin" Kit represents exceptional value for money and includes selected strip balsa wood, precision cut-out parts, plastic wheels and nose-bush, wire for undercarriage legs, shaped air screw blades, covering tissue, cement, and other accessories.

International Model Aircraft Ltd.

MERTON · LONDON · S.W. 19. ENGLAND.

Makers of "Frog" Super Flying Models & Engines.