MODEL Aircraft

IN THIS ISSUE

- THE AMERICAN MOTORUDER
- THREE PLANS OF OUTSTANDING MODELS
- TUNING FOR SPEED
- TEAM RACE PERFORMANCE CHART
- THE ALLBON DART ON TEST
- MODEL TALK
- WING POSITIONS

APRIL 1951

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.

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

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AeroFred Gallery Free Plans.

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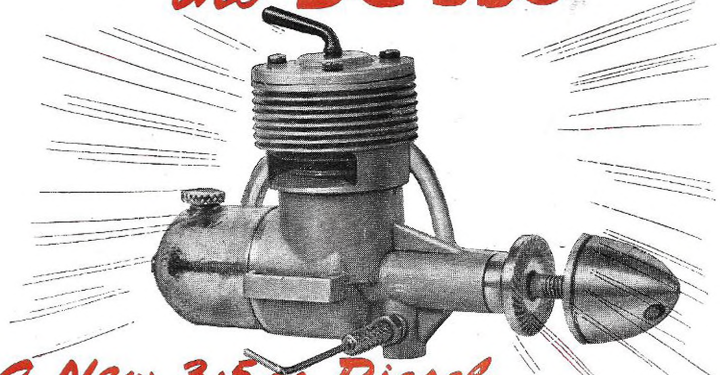

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THE DC 350 IS SUITABLE FOR :—

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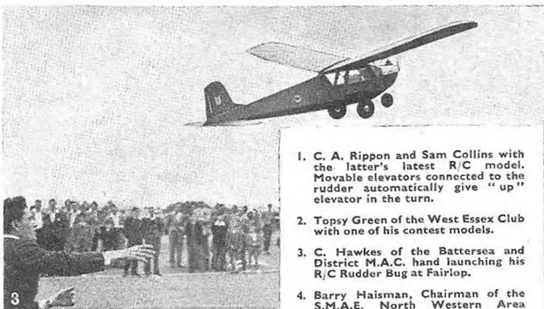

1. C. A. Rippon and Sam Collins with the latter's latest R/C model. Movable elevators connected to the rudder automatically give "up" elevator in the turn.
2. Topsy Green of the West Essex Club with one of his contest models.
3. C. Hawkes of the Battersea and District M.A.C. hand launching his R/C Rudder Bug at Fairlop.
4. Barry Haisman, Chairman of the S.M.A.E. North Western Area Committee, winds up his Wakefield model.
5. Reg Norton of Plymouth designed the Wakefield model being launched by Kit Carson of Ilford.
6. 40 in. span Sopwith Pup by F. Ward of Ashton M.A.C. Winner of a number of concours prizes.

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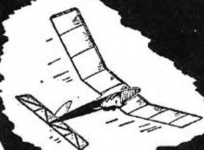

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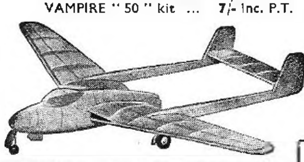

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MODEL *Aircraft*

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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APRIL 1951 VOL. 10 No. 4

Contents

E D I T O R I A L

It has been noted that a number of Municipal authorities are placing an entirely wrong construction on the powers given them under the byelaws recently agreed by the Home Office, in so far as they are interpreting these in their most stringent application instead of the minimum application as stressed in the communication issued by the Home Office for their guidance.

One such case which has come to our notice is the application by one of the London authorities to have CO_2 motors included in the category of power plants which can be banned. Now no-one with the slightest knowledge of this type of motive power could possibly consider them as being the least bit dangerous and it indicates quite clearly that the authority in question is determined to stop model flying if it possibly can.

It is gratifying to note, therefore, that the Home Office has pointed out to several Municipal organisations, who have been pressing for a total ban on the flying of models in the parks and open spaces under their control, that the real object of the byelaws in question is *not* to prohibit the flying of models but to *allow them to be flown* under proper conditions and control.

The following paragraph in the context covering the issue of the byelaws approved by the Home Office should be drawn to the attention of all Municipal authorities whenever possible.

> "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."

This aspect of the byelaws cannot be too strongly impressed on our Municipal authorities.

Cover Story

The subject of the striking photograph which appears on our front cover this month is N. Griffiths of the Grays and District M.A.C. The model is his 75 in. span Fieseler Storch which is powered by a 4.4 c.c. Kemp diesel and has a fine flying performance.

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Here and There

THE EDITOR COMMENTS ON CURRENT TOPICS

SOUTH AFRICAN WAKEFIELD ENTRIES In its September and October, 1950 issues, the South African publication "Flypaper," commented on the fact that the S.A. Wakefield models had failed to reach Finland in time for the Contest. They said:—"The South African Wakefield planes which were airmailed to England and shipped in good time to Finland have been returned to the Union by air, contrary to instructions. . . . Who was responsible for the mistake? What a pity the controlling body in Finland did not cable the Union when the models were not ready for testing. . . Were they still lying in England?"

The Council of the S.M.A.E. have been very concerned about the implication contained in these reports that they may have been in any way to blame for this unfortunate happening. Enquiries were made in an endeavour to ascertain just what did happen to the S.A. models, but these enquiries drew a complete blank, however. Now the mystery has been solved by a letter which the Editor has just received from the Chairman of the South African Model Aeronautical Association. "Doc" Allen says, "At last we have found our Wakefield models and solved the riddle—it has taken six months, all due to a clueless flight clerk of P.A.N. African Air Charter. They were put on board an unserviceable Tudor aircraft and were left there for three weeks! The models were then flown to the United Kingdom and from there on to Finland. They were later returned by air freight (£44!) and dumped in King's Warehouse in Johannesburg, from where they were unearthed about 14 days ago.

I am writing to Mr. Houlberg and thanking him for his efforts on our behalf, and also to all the other chaps who helped us."

Whilst extending our sympathy to our South African friends, in particular to the owners of the models concerned, we are relieved to learn that for once, at any rate, the S.M.A.E. cannot be blamed!

LET'S HAVE REALISM The Festival of Britain control line demonstrations call for an *attractive* type of model. Let us have the stunt and team race machines which *look* like full size aeroplanes, for this show is being put on primarily for the benefit of the public. It is not just another model flying rally.

Even at the sacrifice of some performance, let us have cabins, scale pilots and a paint finish which is both decorative and pleasing. Those oil-soaked, white tissue covered "boxcars" may do their stuff—and everyone knows they fly well enough. Without turning the exhibition into a "concours" what would appear necessary is someone at the "gate" who could vet the proposed demonstration models and tactfully reject those without the necessary eye-appeal. These Festival demonstrations can do the movement a lot of good—or a lot of harm. We must make sure that the time given by the individual modellers taking part in the flying has the most desirable result. Those unpainted boxcars will still be good for the model galas.

FACTS ARE FUN Our contemporary has recently published a list of American records and used these figures to "prove" that we are ahead as regards performance in many free flight classes. What they did not make clear, however, is that from time to time the Americans scrap all their existing records and start again from scratch, as it were, with new record rules. All previous high times are then ignored.

Currently the National A.M.A. Records are for a total of three flights in all outdoor free flight classes, with a limited motor run in the case of power models. There is also a maximum flight limit of 10 minutes. No free flight record, therefore, can exceed 30 minutes. The fact that both towline glider and Class C Power records are currently listed as 30 mins. means simply that the models holding these records have accomplished three (ten minute) limit flights, in succession. What the individual flight times were is not known.

In other words, it is quite useless trying to compare current American free flight records with our own. Only in the control line speed classes and indoor records are the qualifying conditions the same. Our own high time records have been built up from the early 1930's with little change in conditions. The autogiro record, for example, was set up in the mid-1930's. As a matter of interest, American National records in 1938 (calling for "formula" fuselage and a minimum wing loading; maximum line length for gliders of 100 ft. and limited motor run for power models) included :—

Rubber	...	54 mins. 13 secs. by Dick Korda.
Power	...	50 min. 29 secs. by Fiske Hanley
Glider	...	23 min. 13 secs. by Bob File

RUBBER FAMINE AGAIN

With America stock-piling rubber once more, along with many other "essential" materials, and the world price of raw rubber climbing, we may once again experience a rubber shortage. A few years ago raw rubber was plentiful and selling at a reasonably low price. It was more economic to use natural rubber rather than synthetic. Now world conditions have changed all that and synthetic rubber is again coming into the news—in America, at least. The quantity of rubber used by model flyers is an extremely small proportion of normal "civilian" consumption but this supply should, we feel, be safeguarded if possible. Natural rubber is the only suitable material for making aero-strip, as modellers who have used wartime synthetic strip will confirm.

THE FOURTH AUSTRALIAN NATIONALS

The 1951 Australian Nationals was scheduled to be held over five days (December 29th to January 2nd) and included no less than 25 different events. Both the variety of contests and many of the official classifications indicate that the Model Aeronautical Association of Australia have been largely influenced by American practice, although it is interesting to note that A/2 glider, Wakefield and Jetex contests were included.

As a matter of interest the programme for the full five days was :—

Friday

Indoor stick (maximum wing area 150 sq. in.) ; Indoor fuselage (maximum area 150 sq. in.).

Saturday

Control Line Stunt (Junior, Intermediate, Senior) ; Team speed ; Control line speed, ½A motor up to 2.5 c.c. ; A motors 2.501-3.5 c.c. ; B motors 3.501-5 c.c. ; C motors 5.001-11.5 c.c.

Sunday

Free flight power, ½A, A and B, C, same motor sizes as above. Minimum power loading 8 oz. per c.c. Ratio timing (minimum motor run 5 sec.).

Monday

Control line stunt (Junior, Intermediate, Senior) ; Team speed ; Speed record events ; Flying scale control-line ; Radio control.

Tuesday

F.A.I. sailplane ; A/2 Nordic sailplane ; Hand launched glider ; Wakefield ; Radio control (continued) ; Junior Rubber ; Unorthodox power ; Jetex.

TO WATERPROOF OR PLASTICISE ?

After the 1950 Wakefield one of the structural problems uppermost in the minds of many competitors was how to render covering impervious to dampness. Recently an American problem was how to stop dope tightening up under extreme heat and warping the surfaces.

The simple answer to slackening tissue is several coats of dope of the right kind (or alternate coats of acetate and nitrate dope). The answer to over-tightening dope (in heat) is to plasticise the dope with castor oil. Take the model with covering treated for damp conditions out into a hot sun and it is liable to warp all over the place. Fly the model with plasticised dope in damp evening air and the covering will slacken off to an alarming degree.

Somewhere between there should be the "happy medium." Or do we have to have differently treated models for "hot" and "damp" flying conditions ? It is quite an interesting problem.

NEWS FROM B.A.F.O.

The B.A.F.O. Model Aircraft Association held its first Indoor Flying Meeting and Exhibition on January 13th, 1951, in the Adastral Theatre, Buckeburg, in the British Zone of Germany. We are indebted to S/Ldr. E. G. Couch, M.B.E., D.F.C., the Chairman of this very live Association, for sending to us details of this successful event.

The auditorium of the theatre was cleared of seats for the flying programme and the spectators were able to view the flying in perfect safety—looking down into a cockpit or arena containing the competitors and aircraft.

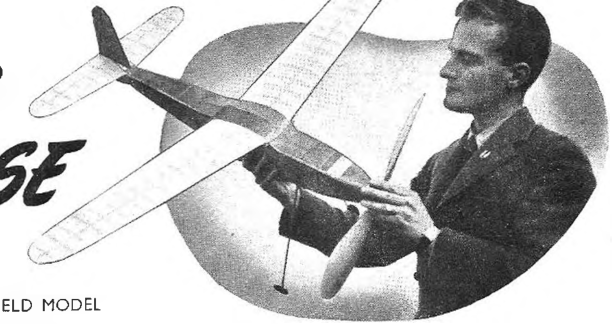
Events included a control-line speed, speed judging and engine-starting contests. Spectators were also invited to try their hand at control line flying with a Mills 1.3 powered "Vandiver."

At the moment B.A.F.O. Model Aircraft Association clubs are flourishing at R.A.F. Stations, Gutersloh Sundern, Buckenburg, Sylt, Wunstorf, Headquarters (Unit), Hesedorf, Handorf and among the R.A.F. personnel at the Hook of Holland.

Most members are now looking forward to participation in the next Association event, a proposed flying meeting against the American "Wheels & Wings" Model Club, which draws its members from the United States Air Forces in Europe. It is hoped to arrange this as an outdoor event in the early Summer, with competitions in all classes.

Corporal Skinner, member of Headquarters Club, and S. A. C. Way, R.A.F. Sylt, with the latter's team racer at the B.A.F.O. Exhibition mentioned above

WILD GOOSE



By
Vic Dubery

A NEW RULE WAKEFIELD MODEL

HERE is a model which conforms to the standard now set for the Wakefield class. Originally conceived for the 1951 contests it was built early in 1950 so that there would be plenty of time for testing and modifications as it was an entirely new design. With very little modification it has turned out to be such a success that the writer regrets he did not enter it in the 1950 Wakefield " 100 " when it was newly finished. Two 1st places, a 2nd and a 5th place have been obtained in contests to date.

Weight Control

If you want a 4 oz. airframe you have to work for it. The hardest wood available of the weight specified should be used. When weighing watch out for sheets which vary greatly in texture across their width as this will give a false figure for their density. The weights specified are about the minimum at which hard balsa wood is obtainable. All wood should be well sanded both sides before use. An over-weight sheet is probably oversize anyway and it pays to check dimensions accurately.

Fuselage

Build two sides according to the shaded drawing and the " formers " from $\frac{1}{8}$ in. × $\frac{1}{16}$ in. by reference to dotted lines on plan and side elevation. Make sure that the corners are right-angles, cement small gussets for strengthening and to give a greater cemented area to the longerons. Check their depth by direct measurement on your fuselage sides, and width from the plan view.

Join the two sides with these and the circular nose former, making sure that the latter is accurately lined up. Now add the shaped top and bottom nose pieces and the top and bottom flanges of the longerons, finally the top and bottom spacers and the remaining details.

Wing

Assemble mainspars and reinforcing spar all in one piece on the plan, making absolutely certain that both spars are at the same angle. Prepare leading edge and trailing edge of each wing, carving

THE DESIGNER . . .

Age 29 . . . Married . . . Son aged 3 months . . . Executive Officer, Ministry of National Insurance . . . Served in Fleet Air Arm with 811 and 735 Sqdns. . . . Vice-Chairman Leeds M.F.C., and P.R.O. of S.M.A.E. Northern Area Committee . . . Qualified for all post-war Wakefield Trials . . . Regrets that successful rubber contest flying nowadays depends mainly on the size of the army of helpers one can muster !

the latter to section beforehand, then tapering by removing surplus from the thick side. (This produces the correct taper in thickness.) Do not carve the portion that will be in the centre section but finish neatly to the curved lines shown at the root.

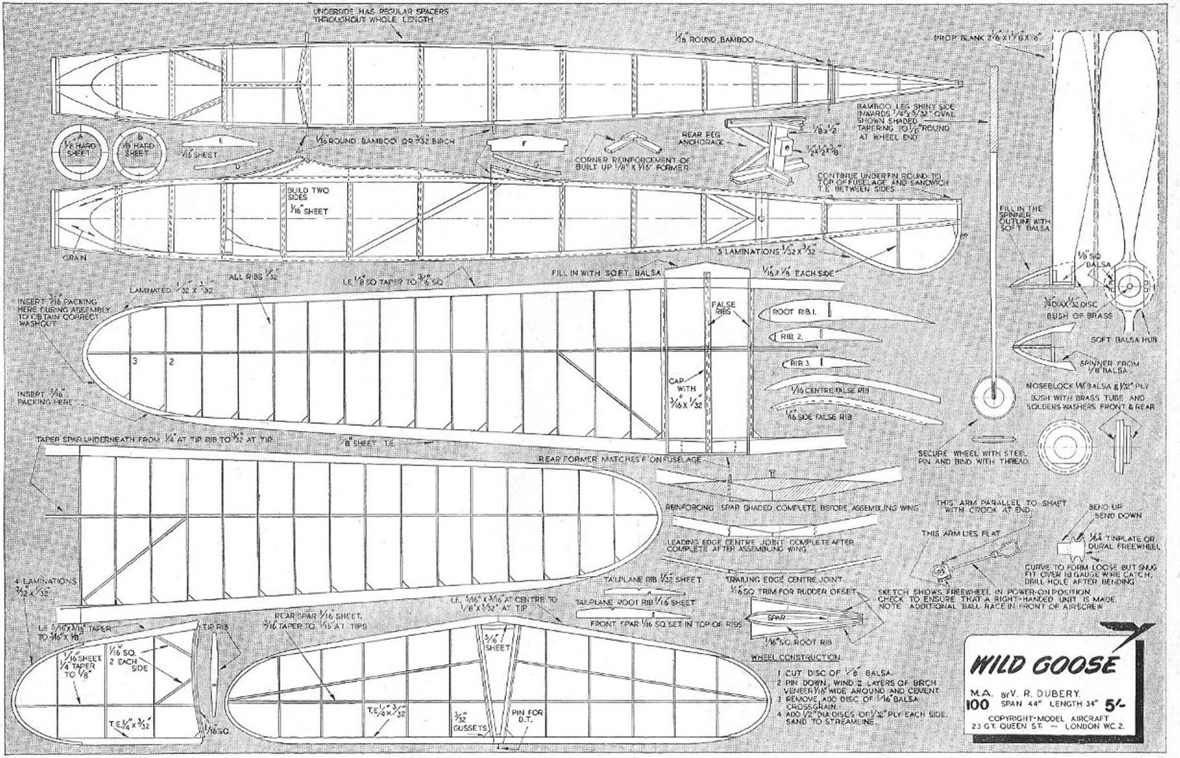
By reference to the centre section drawing trim the bottom of the L.E. & T.E. centre stubs before assembly. Also make the jointing pieces for both ready to assemble the centre section later.

Now assemble the port wing on the plan, the starboard half of the spar propped up. Leave the root rib cap strip and false rib off. Be sure to build the wing tip wash-out accurately.

When dry prop up the port half and assemble the starboard wing on the plan taking care that the tip wash-out is the same again. Now prop up both wings equally making sure they are not twisted, the bottom of the reinforcing spar flat on the bench. Add the previously made jointing pieces between the T.E. and L.E. halves and carve the underside of the centre section leading edge to fit the fuselage. Mount the wing on the fuselage and check its alignment (by equal threads from each spar tip to tail post). In this position adjust if necessary the slight curve of the root ribs so that their inner faces match the outer fuselage contour. Add the remainder of the centre section pieces to match the fuselage lines.

Tail Unit

The fin locates positively in the tailplane in whatever permanent trim you wish. This is no use, however, unless the tailplane positioning is also positive. Four small triangular blocks $\frac{1}{8}$ × $\frac{1}{8}$ triangle × $\frac{1}{4}$ are prepared and (after covering) when the tailplane has been lined up by the thread method these are glued under the trailing and leading edges either side of the top fuselage longerons.



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Dethermaliser

In the V of the tail formed by the two top longerons cement a piece of thread 2½ in. long with a small loop at the free end. Place the fin in position on the tailplane and the latter in position on the fuselage against its forward stop. Put thread loop over the pin at the rear of the tailplane. Rubber bands around the fuselage in front of the bamboo peg are now pulled up over the fin and under the pin, each half of the band lying neatly along the fin saddle. This will pull the whole unit up in the dethermalised position. To set for flight a small band is passed over the pin and the hook on the underfin to bring the tailplane flat on the fuselage. A string fuse through the strands of this completes the unit.

Airscrew

This is the most important part of the model and I always spend a great part of my building time on it. This particular one is of 29 inches average geometric pitch. It is not a true helix because I believe that the inflow at the tips (especially in steep climbs) and the speed-up of air around a spinner make the theoretically perfect helical airscrew inefficient. There is so much to be learnt about model airscrews that it is not possible to be conclusive about this, except that this airscrew is the best I have ever designed and I recommend you make it as per blank and ask no questions. Further developments will be mainly airscrew experiments. The original had two recommended refinements—a tiny strip of hardwood reinforcing the leading edge and tips, and tissue covering, grain opposite to the wood.

Covering

The whole model is covered with Jap tissue, if possible using a dark colour on fuselage and fin. Two full strength coats of dope were put on the fuselage and the remainder of the model had two coats thinned 50-50. All surfaces should be strapped down for drying and "ageing."

Flying

The motor consists of 16 strands ¼ in. wide Dunlop 6010. If your model comes out at 4 ounces airframe weight as did both mine, then the motor should be 4⅛ ounces which will be approximately 45½ in. long depending on the particular batch of rubber. If your job is over weight, reducing the rubber length to make the all-up weight 8¼ ounces is much better than increasing the amount of rubber to maintain the power-weight ratio. This is because the proneness to damage of an airframe of a given weight varies with the square of the all-up weight (anyone who wants mathematical proof of this should communicate with the writer !).

A word about trimming. Various C.G. positions have been tried and no difference in overall performance has been detected. A point 2⅜ in. from the leading edge at the wing root is now used on the originals but this requires ⅛ in. negative incidence under the tailplane trailing edge and $\frac{1}{16}$ in. downthrust. The longitudinal dihedral thus produced gives excellent fore-and-aft stability and assists spiral stability. However, it also gives an exceptionally steep climb which somehow looks inefficient especially around the 20-30 seconds mark when the job appears to be hanging on its prop. It is very difficult to judge just what it is doing at the height reached and the average modeller would probably be advised to keep this trim. You get a faster climbing speed and a slower gliding speed (but apparently the same *rate* of climb and sink) by putting the C.G. back and decreasing the longitudinal dihedral and downthrust but you reduce fore and aft stability. Anyway, do not expect your replica to fly perfectly "straight off the drawing board." For contest work it will have to be trimmed out like any other job.

The originals have $\frac{1}{16}$ in. fin offset (obtained by slicing the sides of the fin saddle) and $\frac{1}{16}$ in. right thrust. This gives a tight spiral at take off, gradually opening out to quite a wide circle glide, the latter being more efficient. The excuse that a tight glide circle keeps the model in a thermal is not valid as with a high "still air" time it only has to touch a thermal to make a maximum.

MATERIALS LIST

Balsa	
Size, Weight and Type	*Principal use*
2 of 1/16" × 3" × 36" 0.75 ounce each straight cut	Strip into 3/16" and ⅛" wide for fuselage. Taper for wing and tailplane spars.
1 of 1/32" × 3" × 36" 0.35 ounce straight cut	⅛" wide strips for wing tips 3/32" wide strips for fin and tailplane. 3/16" wide cap strips.
1 of 1/32" × 3" × 36" 0.35 ounce quarter cut	Wing tail and fin ribs.
1 of 1" × 2" × 36" 1.00 ounce straight cut	Wing T.E. Nose former, Nose block, wheels
1 block 2" × 1¾" × 18" 16 ounce	Airscrew
1 of [illegible] × ¾" × 36" 1.00 ounce	Taper as necessary for L.E. of wing, tailplane and fin
⅛" thick scrap as light as possible even if very soft	Rear peg anchorage, centre section leading edge, spinner and boss fill-in
3/32" × ¼" × 36" 0.1 ounce	T.E. tailplane and fin
Bamboo	
2 of ⅛" × 3/16" × 11½"	Under carriage
3/32" round	Wing and tail pegs
Sundries	
Birch dowel 3/16" round × 2"	Rear peg
Notepaper	Under carriage tubes
1/32" ply 6 sq. inches	
Tissue 2 sheets 36" sq. Jap	
Tinplate or dural for bearing	
Brass tube, 16 gauge	
Wire 16 gauge and 18 gauge	
Bobbins	
1/40" Birch veneer strips	Wheel and airscrew

Dimensions and weights

Span 44", length 34½". Fuselage cross section 10 sq. inches without wing fairing. Gross area 292 sq. inches (Tailplane 69 sq. inches). Airscrew 18 in. diameter, 29 in. average pitch, freewheel.

Weights	Wing	1.1 oz.
	Fuselage	1.1 ,,
	Tailplane and Fin	0.25 ,,
	Undercarriage	0.35 ,,
	Airscrew Unit complete	1.20 ,,
	Rubber	4.13 ,,

N.B.—Any variation in Airscrew and empennage weights will cause C.G. position to change and necessitate ballasting.

TEAM RACE PERFORMANCE CHART

THIS chart has been designed to enable the capabilities of any team-racer to be quickly and accurately determined, or, alternatively, to enable the various performance factor combinations required to achieve a certain overall race average, to be plotted.

The chart takes into account: (1) Fuel consumption, (2) Flying-speed of the model and (3) Pit-stop times, to give final course speed or time figures. It is applicable to both S.M.A.E. Team Racing Class Rules (i.e., Class "A"—up to 2.50 c.c., and Class "B"—2.51 to 5.00 c.c.) and also to the American A.M.A. T.R. Rules.

How to Use the Chart

Although it may appear complicated the chart is, in fact, quite simple and straightforward.

For example, to find the actual time taken for any model and team to complete the regulation 10-mile course, the time taken in seconds for each pit-stop, on Scale "D," is read off against the appropriate diagonal indicated by the number of pit-stops required on the lap scales, A, B or C. Projecting a vertical line (Pit-stop Factor E) from the point of this intersection, to the appropriate speed diagonal (Scale F), the actual time in minutes and seconds, or overall course speed in miles per hour can be read off on scales H and J respectively.

With this as a basis, the possible effects of adjustments in speed and/or consumption (by means of different fuels or propellers) and improvements in pit handling, can be determined at a glance.

Alternatively, setting a limit on the minimum overall performance required, the various methods of achieving this can be noted by quick reference to the chart, and the formula considered most promising then adopted as a basis for design.

Examples

1. Overall Performance.
   Class B Model. Flying-speed 75 m.p.h.
   Laps per tank, 45. Average time for each pit-stop 40 sec.
   (a) To find overall race average for above:
   Pit stops required: 3 at 40 sec. Pit-stop factor 2 : 00.
   Speed 75 m.p.h. Therefore, Total Time = 10 min. 00 sec.
   Course Speed = 60 m.p.h.
   (b) Possible means of improvement:
   (i) Reduce pit stops to 2 by changing airscrew or fuel to increase laps to 54, provided that speed does not drop below 70 m.p.h., or,
   (ii) increase flying speed by changing airscrew or fuel provided laps do not drop below 41/42.
   (iii) Reduce pit stops to less than 40 secs.
2. Design Requirements.
   Class A model to be capable of averaging 55 m.p.h. over 10-mile course, i.e., total time 10 : 54.5, assuming pit stops to be approximately 30 secs. each.
   (a) Long range model:
   (i) 55 m.p.h. non-stop, or,
   (ii) 100 laps, plus, at 58 m.p.h., allowing 1 stop.
   (b) High speed model:
   (i) 50 laps, plus, at 64 m.p.h. allowing 3 stops, or,
   (ii) 40 laps, plus, at 67 m.p.h. allowing 4 stops.

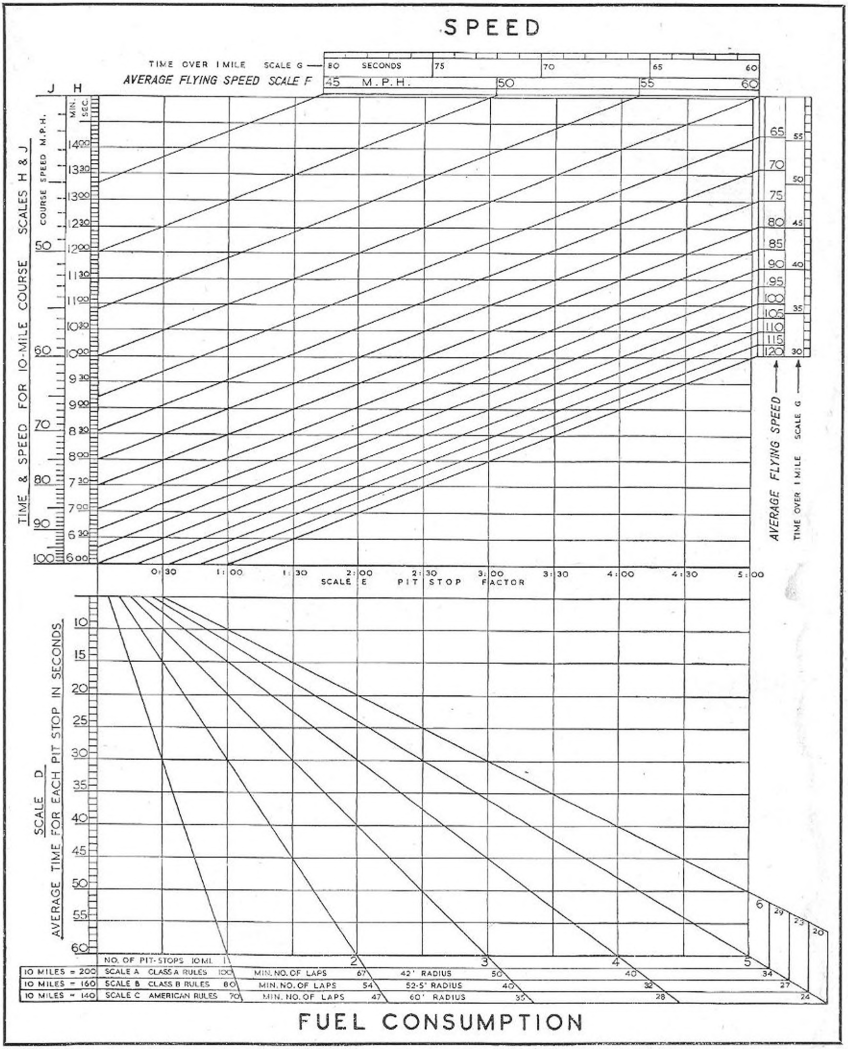
The flying speed of a model can be checked by timing it over one mile (i.e., 20 laps, Class A, 16 laps, Class B) and checking the result in seconds on Scale G against the m.p.h. scale F.

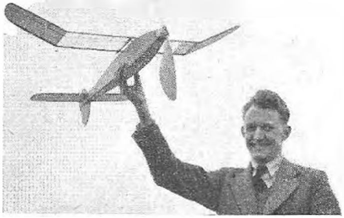
However, in determining "flying speed" and pit-stop times, some decision must be made regarding the time taken for the model to take off and pick up speed on release, and for the period between the engine cutting out and the actual commencement of the "pit stop." Possibly the best solution is to determine "average flying speed" over the actual time taken for take-off to touch-down, allowing the pit stop to be confined to the actual period between the landing of the model and its subsequent release after retrieving and refuelling.

The question of speed vs. consumption is still unsettled at the present time and both types have their equally enthusiastic adherents. Under present rules, the really high speed model would, theoretically, seem to offer the best potential performance, assuming pit-stops can be carried out as quickly as with the less powerful types—a procedure which calls for complete familiarity with high-performance engines by the ground crew.

In favour of the long-range model needing only one stop, it has been pointed out that a certain amount of risk is introduced every time a model is landed, and any trouble experienced during a pit-stop may well waste precious seconds which a model could not make up in superior speed, and that the best way of reducing this risk is to cut down the number of stops required. By the same argument, however, it could be said that, in the event of any model suffering a delay on the ground during one stop, this delay, related to the total time taken out for pit stops, may be less important in the case of the fast model and might, in fact, be made up in part, by an extra effort on the part of the ground crew in subsequent stops.

Nevertheless, it must be admitted that the short-range model demands much more from both pilot and ground crew and in such a hazardous event as a team race, the moderate-speed, long-range model's chances of survival are undoubtedly better.


SPEED
TIME OVER 1 MILE SCALE G
SECONDS
AVERAGE FLYING SPEED SCALE F
M.P.H.
TIME & SPEED FOR 10-MILE COURSE SCALES H & J
COURSE SPEED M.P.H.
MIN. SEC.
SCALE E PIT STOP FACTOR
AVERAGE FLYING SPEED
TIME OVER 1 MILE SCALE G
SCALE D
AVERAGE TIME FOR EACH PIT STOP IN SECONDS
NO. OF PIT-STOPS 10ML
10 MILES = 200 SCALE A CLASS A RULES
10 MILES = 160 SCALE B CLASS B RULES
10 MILES = 140 SCALE C AMERICAN RULES
MIN. NO. OF LAPS 42' RADIUS
MIN. NO. OF LAPS 52·5' RADIUS
MIN. NO. OF LAPS 60' RADIUS
FUEL CONSUMPTION



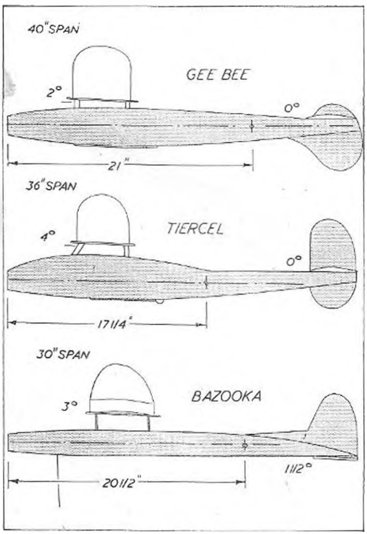
MODEL REPORT

Roy Yeabsley's

GEE BEE

ROY YEABSLEY is widely recognised as a glider expert. He is, in fact, probably the leading contest glider exponent in this country today, placing high in major contests with a surprising consistency. It was Yeabsley, too, who originated the type of " giant " glider for contest work, which has now proved so popular, both to lightweight and F.A.I. loading. It is a point of interest that the original Yeabsley *Sunspot* has lived through at least three contest seasons and has probably aggregated more flying hours than any other single contest model. It was only recently that it was finally regarded as no longer airworthy and destroyed—actually burnt on the flying field!

Much of Roy Yeabsley's success is undoubtedly due to the fact that he is out flying whenever possible, underlining the fact that however good the model, consistent high performance is still a matter of *flying technique.* He is also a member of the strongest " competition " club in the country—Croydon. This again is an undoubted advantage for it is a very rare occasion that one can visit Epsom Downs of an evening or weekend and not find some of the Croydon members test flying. Usually Yeabsley is amongst them. Those glider enthusiasts who aim to emulate his successes should bear this well in mind.



However, the subject of our report is a Yeabsley rubber model, not a glider—the first rubber model, incidentally, we have seen him flying in contests. Whilst employing many of the familiar design features of " lightweights," the detail design is of sufficient interest to warrant a more thorough investigation.

The model itself is large, as lightweights go, with a wing area of nearly 190 sq. in. Total weight is only just over 4 oz. and so the wing loading is very low—lighter, in fact, than most present-day " lightweights." But the most striking feature is undoubtedly the underslung fin—a feature which Yeabsley has retained on his very successful Nordic glider.

Fin area is definitely on the small side, but ample enough with the very long fuselage length employed. Locating the rear rubber anchorage well forward of the end of the fuselage has enabled the wing position to be kept well forward—5$\frac{3}{4}$ in. from the front of the fuselage—with a resultant centre of gravity position of roughly 60 per cent. of the chord. The layout is fully dimensioned on the general arrangement.

The flying capabilities of this model were first brought to light at the Bill White Memorial Cup contest held on Blackheath in January, 1950. Using moderate power (10 strands of $\frac{1}{8}$ in. strip) on a 16 in. single-bladed folding propeller, climb was a fast, tight spiral to the right, reaching some 350 ft. in height in a matter of 40 sec. At the end of the power run the model circled to the *left* on the glide. To achieve this the rudder was set to the left and sidethrust was then used to give a right spiral under power—a " safe " trim since the rudder is always trying to hold the nose up under power.

This trim is worth discussing in some detail for it possesses certain advantages for folding propeller designs—and also one or two disadvantages.

It is undoubtedly a fact that greater height can be obtained with a two-bladed freewheeling propeller than with a single- or even a twin-blade folder. There may not appear to be any difference between a twin-bladed freewheeler and a twin-folder. There is not, as regards thrust output, if both propellers are identical. But it is impossible to obtain the same trim with the folder and obtain maximum effect from the motor without having the model stall on the glide.

Towards the end of the power run, most folding propeller models are flying under-elevated. On some models this effect is very noticeable. Whilst the propeller is still spinning, but nearing the end of its run, the model may actually be diving, only slowing up and retaining trim once the propeller has folded. And this effect is not solely due to the effect of c.g. shift when the propeller is folded.

The right-hand power circle, left hand glide does offer a compromise trim to offset this effect. It is a well-known fact that a stall can be ironed out by tightening the circle on a model. That is, suppose the model was gliding fairly straight, but stalling. Giving it a turn on the glide will overcome the stall. Provided that the amount of turn required is not such as to put the model into a spiral dive or an excessively banked turn, a very good trim will result. Also, as a corollary to this, giving rudder offset to obtain a circling flight on a model initially trimmed for smooth, straight flight will under-elevate it. With that rudder must be applied a small amount of negative tailplane incidence or similar compensating factor.

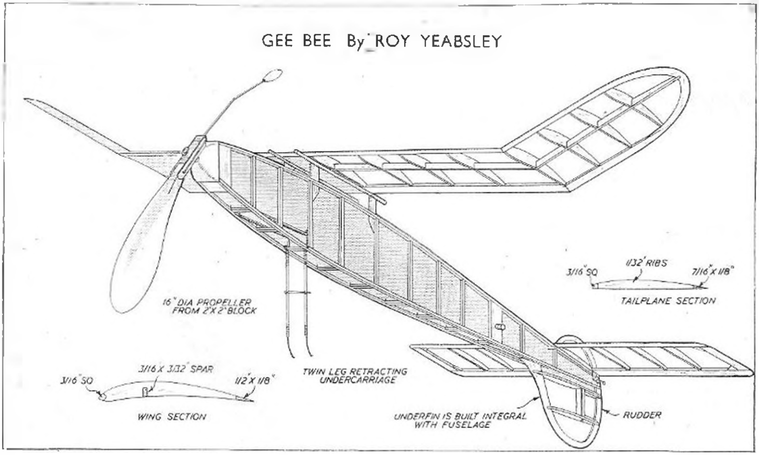
Now on the power trim, a right hand circle has been found best for rubber models, giving the safest method of balancing out torque and gyroscopic reaction of the propeller with the minimum loss of power. In actual practice this means, simply, adding enough sidethrust to overcome torque and turn the model to the right under power, and downthrust as required to prevent a stall occurring under the initial burst. Since the model *is* circling under power, however, it can be trimmed out to be slightly over-elevated for straight flight—i.e., sidethrust takes out the stall which would occur if the model were flying straight under power.

If, now, we utilise this fact towards the end of the power run we can overcome the inherent disadvantage of the folding propeller model. By making the model fly straight towards the end of the power run we bring it into an over-elevated condition to offset the under-elevated condition inherent at this time on the circling "folder."

This can best be achieved by using left rudder. As sidethrust effect dies off, rubber action becomes progressively more powerful until the condition is reached when the two balance one another out and the model is flying straight. When the propeller does fold, of course, the model is again over-elevated for straight flight, but here the rudder gives a turn again—to the left—to compensate for this and maintain most efficient trim.

This type of trim Yeabsley achieved to perfection in the Bill White Cup. His *Gee Bee* definitely outclimbed all other models of similar type and the only models which did succeed in getting higher were Wakefields. All these had a higher sinking speed on the glide. However, this type of trim can show up at a disadvantage in other conditions.

A feature of this trim, as we have seen, is that the model flies straight towards the end of the power run. In windy weather this straight flight is almost



invariably directed downwind. When it is a case of limited visibility—or so much wind drift that models are passing out of sight well inside five minutes—this can result in loss of recorded flight time, although the model itself may actually be airborne for a full five minutes or more.

The right-climb, left-glide trim which can give a folding propeller job just that little edge over its contemporaries is, therefore, essentially a fine weather trim. In fact, lightweights themselves are really only at their best in relatively calm air. The more powerful Wakefield with its somewhat longer power run, invariably works out better in a wind.

Comparison with two other well known designs—Geddie's *Tiercel* and Marcus's *Bazooka*—is interesting. For roughly the same overall length, *Gee Bee* has much the greater span and wing area. The three models illustrated, in fact, represent a typical modern lightweight in the *Gee Bee* : a modern F.A.I. contest rubber model in the *Bazooka* ; and *Tiercel* representing the older school of design though with fuselage cross section to S.M.A.E. formula and weighing in at somewhere between the lightweight and F.A.I. loadings. The original *Tiercel*, in fact, was eventually flying at F.A.I. loading, but it must be remembered that the design is some six years old and undoubtedly ahead of its time when originally introduced.

Both *Tiercel* and *Gee Bee* employ retracting undercarriages, *Tiercel* an ingenious balanced leg and *Gee Bee* a twin-leg unit with the usual rubber-band operation. Legs are of light bamboo with a spreader for rigidity and wire skids bound to the extremities in lieu of wheels.

An undercarriage is a very real problem with underslung fin machines. The length of skid wire necessary for a three-point undercarriage with a single main leg is excessive. A single wire skid is too flexible and a full loop would be necessary, bound either to the fuselage and splayed out at some 45 deg., or to one half of the tailplane near the tip.

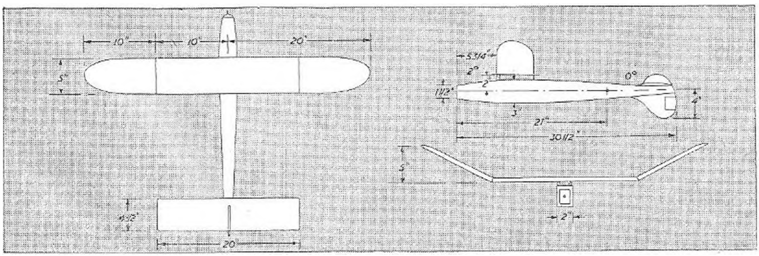
Regarding the design layout of *Gee Bee* itself, with only a moderate parasol height, a long tail moment and very large tailplane area, longitudinal stability should be excellent. Tailplane area is nearly one half of the wing area and is therefore most effective in damping out any stalling tendency which may tend to occur on the glide. This is a trouble which many modellers experience with folding propeller designs—a tendency to build up into a series of stalls on the glide often being difficult to eliminate. An aft c.g. position and adequate tailplane power is the best solution.

The effect of the underslung fin is rather more difficult to determine. Theoretically it should be extremely effective, being in a region of airflow very little affected by the rest of the model. Less area, therefore, is required than for the same effect with a high-located fin. Aerodynamically, the upper fin on *Gee Bee* probably has no effect at all, being simply a "spreader" for the tailplane fixing band.

As regards stability, an underslung fin is very satisfactory as long as the nose of the machine is kept pointed upwards. It is not so good, however, in a turn with the nose pointed down, especially if the machine is slipping inwards at the same time. Hence turning *against* rudder action on the power flight would appear to be a very wise choice of trim. It is usually only on the power flight that such stability troubles show up. Speed is less on the glide and does not build up so rapidly on the glide, even if the nose does drop. It is doubtful, however, that the design would be consistently stable rigged for a right circle throughout using right rudder and right sidethrust.

Both wing and tailplane sections are thin, with small spar sizes. The sparless tailplane has very little resistance to bending and must inevitably warp, if doped. But warps of this nature are not necessarily harmful, provided they are symmetrical and do not change. An "acceptable warp" may be defined as one where the aerofoil curves upwards to a dihedral angle without any wash-in occurring. Mild or moderate *washout* accompanied by a "dihedral" warp can even be helpful, both on wings and tailplane. Warps are the price one has inevitably to accept with ultra-light structures, and sparless construction, in particular, is generally bad in this respect. But being so distant from the centre of gravity it is essential that the tail component weights be kept as low as ever possible.

Summarising, the *Gee Bee* is something a bit different in the lightweight rubber model field and a really excellent model in its class. Proportions are typical of the best modern design trends and could well be used as a basis for other similar models, remembering to increase fin area by 20 per cent. or so if top location is adopted.



Over the Counter

Model aircraft materials are one of the few commodities which have not suffered regular price increases over the last six months or so. Kits, of course, now cost more with purchase tax added, as do motors and many accessories. In some cases—and here all credit is due to them—manufacturers have managed to absorb part of the increased cost themselves.

It seems, however, that some further price increases are inevitable. As from February 1st, the cost of both cellulose and synthetic finishes have risen, the basic "supply price" having an increase of from 6d. to 2s. per gallon. As a rough and ready rule the basic manufacturing price times 3 equals the economic retail price, so retail price increases of anything up to 6s. per gallon may come into effect when present stocks are used up.

Unfortunately, these increases in prices are also accompanied by extreme shortages of supplies, particularly as regards white pigments. White, cream and pastel shades of cellulose may be difficult to obtain in a few month's time.

* * *

In our February table of control line model accessory suppliers we were guilty of at least one unfortunate omission. We refer to the *Trucut* range of power model propellers which have established quite a record of contest successes over the past two seasons. We should have known better. J. G. Eifflander, of control line stunt fame, is a director of Progress Aero Works, manufacturers of the *Trucut* range. Control line fans should need no further recommendation!

There is also a notable addition to our list of team race kits—N. J. Butcher's *Lil' Lulu* for Class B. Flown by the designer, *Lil' Lulu* has placed 1st at St. Albans Rally, 1st at Dover and 2nd at West Essex. The kit is manufactured by E. Law & Son (Timber) Ltd.

* * *

The subject of power props and well-known modellers reminds us of Vince Bentley who was a partner in the manufacture of Tekniflo propellers—now no longer in production. Vince (and family) emigrated to the United States where, we believe, he set up home in a caravan. He became associated with Ed Lorenz on various radio control projects. Lorenz was the master-mind behind the Aerotrol R/C unit which was taken over by Berkeley Models. Since then we have rather lost touch with them both.

* * *

Look forward to some more motors in the half c.c. size. Besides the *Allbon Dart* in current production, and the new *Elfin* of the same size, at least two other manufacturers are interested to the point of having developed prototypes to the point of being ready for production. The original "baby" production motor—the Kalper—is also in full production and available again.

* * *

Allbon Engineering, incidentally, have had temporarily to suspend production as they are moving to larger premises. With improved facilities they will be producing more motors as from March and should soon catch up with any backlog of orders.

HENRY J. NICHOLLS LTD.

308, HOLLOWAY ROAD, LONDON, N.7

Situated within easy reach by bus or Underground of the centre of London, this shop, which was opened in December 1946, is more roomy than most. It is frequently visited by modellers from overseas and has at present a staff of seven.

The firm has maintained a policy for the past four years of dealing almost entirely in model aircraft requisites and has specialised in mail order business.

H.J.N. himself (see heading photograph), is aged 41—is married—and has two sons. During the War he was Chief Instructor on Radar in A.A. Command.

Since the War he has served for three years on the Council of the S.M.A.E., during this time being Technical Secretary for two years and P.R.O. for one year.

He is a keen amateur photographer. Renowned for his ability to start even the "baulkiest" of motors.

Also director of Mercury Models and designer of their most successful commercial kit designs including the Monitor, Musketeer and Mallard.

We visit the E.D. factory

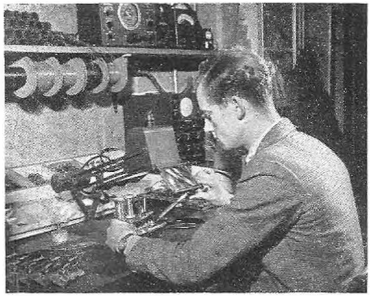
THE firm of Electronic Developments Ltd.—or "E-D's"—as they are known throughout the aero-modelling world—was formed comparatively recently, in 1946. It was started by Mr. J. E. Ballard (Managing Director) in conjunction with sixty-five ex-aircraft engineers who pooled their war savings and became working shareholders of a firm which is now the largest single producer of miniature aero-motors in this country and whose products are distributed throughout the world. E-D motors, radio control units and accessories are on sale in twenty-four different countries and overseas demands are still increasing. Perhaps the striking success of E-D's is best summarised by the fact that after more than four years of intensive production, stocks of motors and radio control units have never existed in their factory for, as Mr. Ballard has put it, " We have always the pleasant headache of trying to catch up on orders."

The executive staff between them can account for a very considerable amount of model and engineering skill and knowledge. *Mr. Ballard* himself was nine years with the National Physical Laboratories, specialising on development work and model experiment. Chief designer of the firm—*Basil Miles*—has designed and built model engines since 1936 and is still as keen and interested as ever in his favourite subject. Assembly Foreman *Bill Wedlock* has been an ardent aero-modeller over the past twenty years and *Bert Day*, another director, can top that by another five years. In charge of the radio development is *George Honnest-Redlitch*, who needs no further introduction. Two other directors *Douglas Fifield* and *Jimmy Donald*, are also model engineering enthusiasts of long standing.

Sixty-five per cent. of the total staff of nearly one hundred are aero-modellers so that there is definitely a large amount of personal interest shown in all productions. Sixty-nine people are employed on production, eight on radio, four on design and development, two on research and two on sales. This latter figure is significant for a small sales staff like this can only mean that the products "sell themselves"—a working example of that excellent commercial axiom, not always realised that " a satisfied customer is another good salesman for the firm."

Production figures for E-D's make interesting reading. Engines total 50,000 per year—and remember they all go out!—radio control units 2,000, with thousands of spares, accessories, propellers, magneto units, and so on, in addition to various special developments and prototype work.

None of the work is put out. That is to say, every single item of production is done in the factory, all machining and finishing, propeller moulding, radio circuit wiring, and so on—the total factory space available being 5,500 sq. ft.—the "swept area" covered by a control line model flying on 40 ft. lines!



Assembling transmitter chassis in the radio department.

Machines include 15 capstan turret lathes, 4 centre lathes, 5 milling machines, 3 internal grinding machines, 1 cylindrical grinding machine, 1 centreless grinding machine, 3 surface grinding machines, as well as numerous drilling, honing, linishing, rumbling, guillotine, press, coil, spindle machines and degreasing, hardening and foundry plants. Together with the supporting tools, jigs, test benches and so on value of this equipment alone is something over £65,000.

The company's policy is always to produce the maximum possible efficiency, performance, accuracy and durability at the lowest possible price. To ensure a uniform high quality for each finished product there is a very efficient inspection department through which all goods pass, all the personnel here being ex-A.I.D. inspectors working to the same rigid specifications as applied to full size aircraft components and assemblies. It is virtually impossible, therefore, ever to buy a faulty E-D product from a model shop—a feature well worth knowing for when, for example, you buy an E-D engine, you know that it will run satisfactorily as it has been tested before it has reached the shop.

What subsequently happens to that particular engine is very much in the lap of the gods. The majority of model engines do get abused terribly, yet a good engine will keep on giving faithful service. Recognising that maintenance and certain repairs will be inevitable, E-D's run a 48-hour service to this end—and it is truly a *service* for the charges made generally represent only a small proportion of the true "costing" of the maintenance job involved. The only time this service exceeds the time stated is immediately following holiday periods and after the Christmas rush.

In chronological order, E-D products started with the E.D. Mk. II 2 c.c. diesel which was designed for "eternal life" and to have a better power/weight ratio than other engines available at that time. This was followed in 1947 by the E.D. Comp.

Special, an improved 2 c.c. engine with enhanced performance. It was this motor, it will be remembered, which confounded the critics at the 1949 Nationals by powering the winning model in the control line stunt event, opposed to such " crack " American " stunt " engines as the " Super Cyclone."

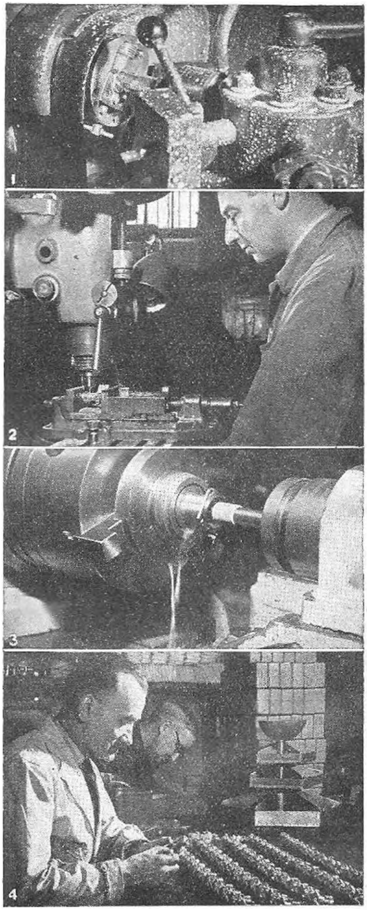
The E.D. Mk. III 2.49 c.c. diesel followed in 1948, with alternative glow-plug head, but in spite of its rugged reliability this motor never did achieve the same popularity as the " Comp Special." 1949, however, saw the introduction of the most popular motor of them all—the 1 c.c. E-D Bee. This excellent little power plant needs no further comment, for it has achieved world-wide fame.

The same year saw also the E.D. Mk. I radio control unit, to the design of G. Honnest-Redlitch, still one of the most reliable model radio control units in the world. Apart from high low tension battery drain there is little or no criticism which could be levelled against this pioneer commercial effort which, although not first in the field, is still a sound proposition by 1951 standards. The E-D Mk III thyratron radio control unit which followed in 1950 met the demand for a lightweight receiver suitable for smaller models and again is as sound in design and operation. The other new 1950 addition to the motor field was the E.D. Mk IV 3.46 diesel, which incorporated rotary disc induction. Concurrently during 1949 and 1950, followed various accessories and an aircraft kit—the Radio Queen.

1951 sees E-D's starting with a full production programme on their current motors, so busy, in fact, that new prototypes, thoroughly tested and approved for production, have simply got to wait their turn. First of these is almost certain to be a new 2.5 c.c. racing diesel. Then there are 5 c.c. and 10 c.c. racing motors both thoroughly tested out. More radio equipment and accessories. More . . . , well, it will be fun to wait and see !

Perhaps the success of E-D's can be summarised in the fact that they are largely modellers themselves and keep on top of what is wanted. More than that—if they think a job is worth doing they will do it, however many the difficulties. A case in point is in connection with their export trade. Sometimes a country would like to import E-D's goods but cannot obtain the necessary import licence. On many occasions this has happened and E-D's have promptly sent out a team of skilled modellers to the country concerned to give practical demonstrations to the import licence authorities and invite military, naval and air-force personnel who are quickly convinced that because of the high educational uses to which modelling can be put model aircraft should be listed as " precision models " instead of toys and consequently import licences are granted. Ironically enough, the one country where " failure " is recorded is our own !

A firm with such a definite policy, however, is booked for success, especially when the quality of its products is consistently high. Those sixty-odd ex-aircraft engineers knew what they were doing in 1946 and will be writing more pages of " E-D History " for many years to come.



1. This photograph shows the crankcase being tapped for the backplate.
2. One of the battery of machines used for milling the cylinder ports.
3. A cylinder bore in the process of being ground.
4. Large scale production of E.D. engines is facilitated by the employment of modern assembly line methods.

Ted Martin *writes on*

TUNING *for* SPEED

●EDITORIAL NOTE.—Although the McCoy 29 engine has been used by the author of this article to describe the methods he advocates for engine tuning, they are applicable to any similar type of high performance engine.

MR. F. DEUDNEY recently concluded his very penetrating articles regarding the factors affecting speed with the significant words "The place to look is the engine."

These words, after much hesitation, have finally persuaded the writer to stick his neck out and offer his findings to those who have not the time and facilities to go into the matter themselves.

First and foremost, the writer would like to make one point clear. It is his opinion that those aspiring to really high speed contest flying in all classes would be well advised to favour a make of racing engine which is built in all the various class sizes. This enables a standard procedure of installation and handling technique to be adopted, thus saving precious time in research and model design.

The manufacturer who suits us best is Duromatic with the famous McCoy line of engines. In saying this, we are not detracting from other British and American engines, but merely being brutally practical. There is nothing like enough interest in speed flying in this country to justify a British manufacturer developing a complete set of racing engines.

Therefore, if you are dead keen the engines to invest in are—the double ball bearing .19, the .29 Redhead, .49 Redhead and the Series 20 .60.

There are several other McCoy engines with minor differences but the above are the best, and the 1950 versions should be obtained if possible—they last longer and have more urge.

By now you must be aware that endeavouring to equal American speeds is going to be an expensive business, and unless you really have the bug, either stick to the small diesel classes or forget the whole thing.

The only thing about speed is speed—plus the satisfaction of overcoming many difficult obstacles and eventually producing an almost perfect and highly specialised instrument, the successful speed model.

A speed model is a minimum aeroplane. Every single nut and bolt must be efficient. Everything that is superfluous is going to cost you m.p.h., even down to the weight of that mirror finish, and building and flying speed models is not fun, it is serious, and often disappointing, hard work.

Finally, before getting down to business, there is just one point to bear in mind.

THE AUTHOR

Designer of the well-known Amco engines and Production Manager of Anchor Motors Model Engineering Division.
Wartime pilot in R.A.F. Transport Command.
Has five commercially produced model engines to his credit.
Married to ex-W.A.A.F. Instrument Mechanic, who handles Amco repairs and correspondence.
Has been modelling for 15 years. Interested in all types of power modelling. No ambitions in rubber or glider.
Believes that there is still vast scope for the further development of piston engines.
Currently converting to production of full-sized engines and development of small engines for military use.

Racing engines, like everything else in a highly commercialised society, are built the best way possible for the price, and you can be reasonably certain of buying 125 m.p.h. worth of engine outright. These words are written for those wishing to add another 25 m.p.h.

There are cases where a man has put down his money and walked out of a shop with a 150 m.p.h. engine in his pocket, but they are rare.

Engine power, for our purposes, means r.p.m., and r.p.m. means mechanical efficiency. Ultimate mechanical efficiency demands component sizes to millionths of an inch, which are normally beyond the resources of model engine manufacturers. If we do get such efficiency, it is only by the law of averages, by the fact that out of the hundreds of engines produced, one emerges containing the ideal combination of slight errors, and results in the perfect engine.

These combinations of slight errors are responsible for the marked difference often observed between two engines of the same design, and one can reasonably expect performance to vary as much as 10 per cent. over a large number of engines. The manufacturer sets himself a minimum standard, and it is sheer luck whether the purchaser gets the best or worst. However, in his own interests, the manufacturer sets his standard at such a level that there is no danger of there being anything basically wrong with the worst example.

Careful choice of materials reduces the range of probable variation and it is fortunate that the general construction of racing engines is such that a variation of more than 5 per cent. in r.p.m., under a given load, is unlikely.

Generally speaking, it can be taken that the type of construction with the greatest variation, and made to standard engineering accuracy has the longest wearing property. However, we are digressing, and the only connection with our subject is that the 1950 McCoys are made of harder wearing materials than their predecessors, and therefore are likely to improve a good deal with use.

Having obtained the engines, your natural inclination will be to run them, and the racing engine noise is an understandable excuse. However, McCoys are not usually tested under their own power before sale, and the parts have not begun to " mate," therefore, stripping the new engine is not harmful. If you do run them, the parts immediately begin to wear themselves into a smooth fit with one another. This process is very rapid during the initial stages and usually results in a great improvement in compression seal.

This bedding down is entirely wasted if you are subsequently going to strip the engine for that mysterious process called " tuning," in fact, yielding to the temptation will remove the microscopic high spots essential to rapid mating, and will leave a polish. It takes much longer for two polished surfaces to wear together, and other parts are meanwhile being worn unnecessarily.

There are many modellers, some well known, who, by now, will have made several derogatory and probably disgusted remarks, on the grounds that they've put everything from nitro-glycerine to diluted mud through a McCoy and it still winds up. We've done it ourselves, and got away with it, the Macs are that good, but such engines do not turn in record speeds. Meticulous attention to detail is absolutely essential. In short, do not run your engines until the tuning process is complete.

The first step, then, is to pick an engine, let us say the .29, and take it to bits.

Use a Phillips screwdriver, obtainable from a wireless shop, and remove the backplate first. This enables you to see the big end when you remove the frontplate and ease the crankpin out of the conrod.

These endplates are a good fit in the aluminium crankcase, and a gentle twisting movement in ONE direction only should be used for withdrawal. Twisting to and fro and generally forcing will probably cause the joint to " pick up," jam the whole issue and damage the surfaces.

At this stage, you will probably notice grit and similar matter at the bottom of the crankcase, and find the crankshaft a bit lumpy to turn in the main bearing. You will be glad you did not run the engine after all.

Engines standing in shops and taken in and out of cardboard boxes, etc., inevitably get dirty.

Next stage is to remove the plug and cylinder head. Loosen the six screws in criss cross order to avoid distortion.

Slip the piston/conrod assembly out of the top, and separate the two. Leave the rings for the time being, and put all the parts, with the exception of the front plate assembly, somewhere where they won't get knocked about or rattled together.

Remove prop nut, prop driver and attendant washers, and take care not to lose the little key in your turnups. Then screw the nut back on to the shaft. The next move is to hold the frontplate in your left hand (not a vice) and carefully tap the end of the crankshaft via the nut and a piece of wood with your right until the shaft is out of the ball bearings as far as the nut will allow. After removing the nut, it will go the rest of the way easily by hand.

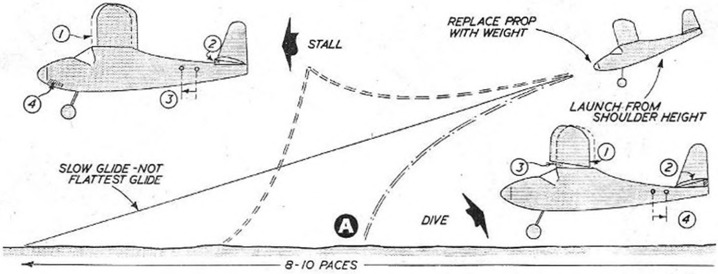
Owing to the method of fitting, the back bearing will probably come out with the shaft, and the front bearing can be tapped out from the back with a piece of $\frac{5}{16}$ in. dowel. Do not use more violence than necessary, because removing an externally gripped bearing by hitting the inner race, obviously tends to expand and distort the bearing. It is, in fact, easily ruined, and, as later described, difficult to replace.

Last of all, the back bearing has to be eased off the shaft. This is done with the aid of two soft screwdrivers inserted between the bearing face and crank-disc, at 180 deg. to one another and a careful levering action. The same stresses are again set up in the bearing, so go easy. Once it has moved sufficiently pressure can be exerted on the inner race and the job is easy. Just one more point. The cam recess on the shaft may allow the bearing to tilt and jam against the end of the recess. Avoid this by keeping the bearing true with the shaft as you slide it along, otherwise, this jamming action may raise a burr.

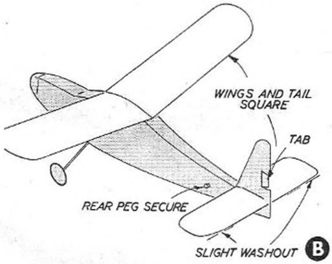
Now comes the tedious process of balancing the crankshaft. That this is a worthwhile bind can be proved by spinning both a balanced and an unbalanced shaft with a blast of air. Colossal revs. can be obtained with the perfectly balanced shaft, without the slightest sensation of movement being detected by the hand holding the bearings. With the unbalanced shaft, however, the bearings will screech and acute vibration periods will be detected, with a definite limit to the revs. obtainable. Considerably more air pressure is required to raise the speed above this limit.

(To be continued)

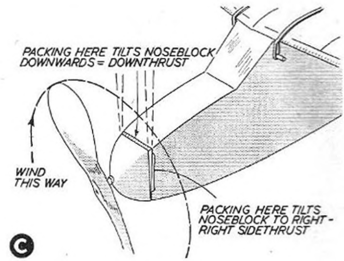
One of the author's early McCoy .29 powered speed models. Built in 1947, it did a consistent 98 m.p.h.



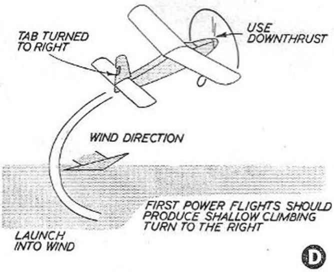
HAND LAUNCHED TESTS OVER TALL GRASS DETERMINE INITIAL TRIM



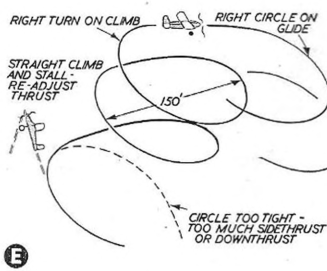
WASHOUT ON TAILPLANE TIPS IS HELPFUL



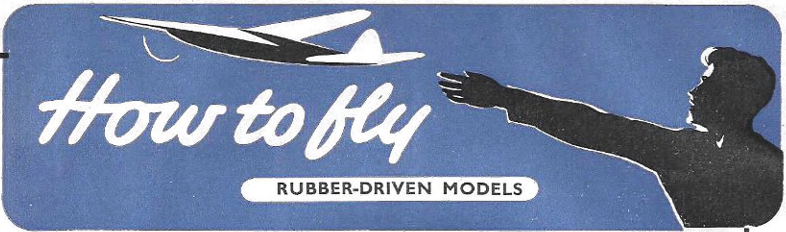
THRUST ADJUSTMENT IS IMPORTANT



RUBBER MODELS SHOULD ALWAYS TURN RIGHT



CIRCLING FLIGHT PROLONGS DURATION



How to fly

RUBBER-DRIVEN MODELS

(A) Initially a rubber model is trimmed very much on the same lines as a glider—from hand launched test flights in still air. To reduce the possibility of any damage you can remove the propeller if of the freewheeling or fixed type and replace with an equivalent weight. Preferably, too, you should glide the model over long grass so that if it does dive or stall in it is not likely to damage itself.

The adjustments are a bit different to glider models. Adding nose weight to balance is not really recommended, for example, if balance can be adjusted by other means. In the case of a stall, the easiest remedy is to move the wing back until the best position is found. If this is not possible on your particular design, positive incidence on the tailplane will have a similar effect. Pack up the leading edge of the tailplane 1/32 in. at a time until the stall disappears. There must still be some 2½ to 3 degrees difference between the wing and tailplane, however.

Finally, if you have to, you can alter the balance point of the model, preferably by moving the rear rubber fixing forwards (3) rather than adding nose weight (4).

The first cure for a dive is to increase the wing incidence (3) or move the wing forward (1). Next you can try adding negative incidence to the tailplane (2). Any one, or a combination of these three should produce the desired result. If badly out of trim, however, it may be necessary to move the rear rubber anchorage back. Adding ballast weight to the tail is bad practice.

(B) Under power any inaccuracies in line-up will be exaggerated. If the wings or tailplane are not square with the fuselage or with one another they will impart a turn to the model. Warps on the wing or tailplane will have a similar effect. It is better to have a wing *washed-out* rather than washed-in. These terms have been defined in a previous article in the " How to Make It " series.

For stability, slight wash-out is very helpful on the tips of the tailplane. Most successful duration fliers use this. On most conventional structures such a warp tends to come in naturally as the component ages. Otherwise it can be steamed in when the tailplane is covered and doped. The trim tab, controlling the glide circle, is set around to the right, but only a small amount to start with.

(C) Having established the approximate glide trim with the initial hand launched tests the rest of the trimming is really a matter of balancing out the thrust line of the model to control the power. The power output from a rubber motor is not constant. When first released the prop. spins quite fast and frequently develops rather more power than is required. The thrust then quickly tapers off.

With a straight thrust line a rubber model is likely to do two things—tend to turn left and nose up and stall. This is prevented by packing the noseblock out to offset the thrust-line and produce a counteracting force. Packing the top of the noseblock out tilts the thrustline downwards, and this is called *downthrust*. Packing it to one side is sidethrust and invariably, with the normal anti-clockwise rotating propeller, *right* sidethrust is used, i.e., the noseblock is tilted to the right.

These two offsets are inter-dependent and, to a certain extent, may be used in place of one another. Using downthrust alone, for example, you can get a straight (or slightly left turning) climb. Using right sidethrust as well you can get a smooth right hand climb and reduce the amount of downthrust required at the same time.

Too much sidethrust will spin the model in. Too much downthrust will make the model fly fast without climbing. Excessive downthrust with sidethrust will spin the model in again. The point to remember is, use sidethrust sparingly. Downthrust is less drastic in action.

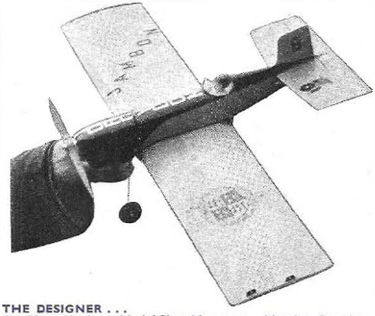
(D) Initial power flights should be made on about one-fifth maximum turns, starting with a fair amount of downthrust to be on the safe side. This will take the model up to a reasonable height and enable you to re-check the glide. Alter the glide trim slightly, if necessary, and get this right before going on to power adjustments.

(E) The object then, once the glide is satisfactory, is to trim out the thrust line so that the model both climbs and glides in smooth right hand circles. The rudder tab offset determines the glide circle and enough sidethrust must be introduced to give a similar circle for the power flight.

A certain amount of downthrust will also have to be used to control the power, so start first with a little down and sidethrust. Gradually increase the turns and watch what happens. If the climb becomes straight with a tendency to stall, increase the sidethrust. If the stall occurs with the model circling, increase the downthrust, and so on throughout the power range. If the circle gets too tight, or even becomes a downward spiral, you are using too much sidethrust or downthrust, or both, and so you must reduce this and start again.

Jambon

BY NORMAN BUTCHER



THE DESIGNER . . .
Age 22 . . . Single . . . Model Shop Manager . . . Member Croydon & District M.A.C. and S.M.A.E. Control-Line Sub-Committee . . Started modelling in 1938 . . . Prefers C/L Stunt and Gliders . . . Dislikes "theorists" who write on what their models *should* do but never compete against the practical types in contests.

WHEN studying the plans of "Jambon," perhaps the first thing which comes to your notice is the fact that the wing area is well over the minimum required. This has been done for a specific reason, namely, that if using an engine of larger capacity, i.e., 2 c.c. to 2.5 c.c., it has been found that a too heavily loaded model does not have that manoeuvrability or glide which makes for safe racing. Even when fitted with a smaller motor there is no apparent loss in performance resultant from this extra area, but should the builder so desire, he can trim the wing tips down until the bare 70 sq. inches minimum remain.

Fuselage

Commence by carefully selecting two pieces of oak or similar hardwood for the engine bearers, making sure that these are completely free from knots or cross graining. Mark the mounting hole centres and drill these with a 6 B.A. clearing drill. Take the cross piece and after having first drilled the bearers, glue and screw each into position to form a crutch. Now cut the ply bulkhead and thoroughly Durafix this to the motor mounts. After allowing reasonable time to dry, bolt the undercarriage into position.

Having cut the sides to the shape indicated on the plan, cement these to the engine bearers and bulkhead, hold together at the rear with a clothes peg and add all the formers. When these have been allowed to dry, insert the 15 c.c. tank and the control system, not forgetting to allow ample clearance for the push rod through the bulkheads. Cement wing dowels securely into position. Cover the top with sheet commencing from either side and meeting at the centre, sand completely smooth, cut out cockpit, add head rest fin and tail plane. Build up control horn as indicated on the plan, cement this to the elevator and link up the entire control system so that there is about 20 degrees "Up" movement and 5 degrees "Down." A word about the cowling. There is a bafflle made from $\frac{1}{16}$ in. sheet which restricts the air flow to the cylinder head of the engine only and behind the cylinder head there are two deflector plates which guide the air flow and exhaust gases out of the cowling.

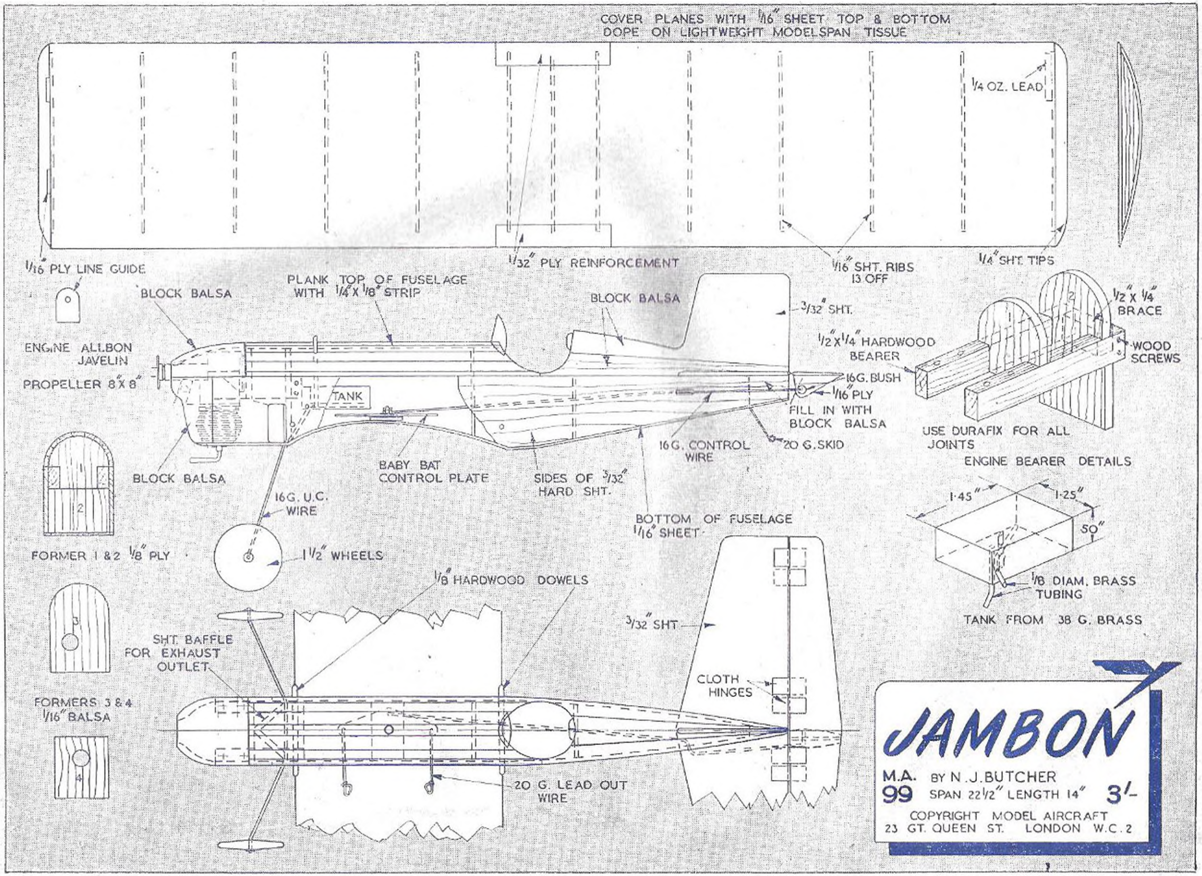
Wing

If you are unable to obtain 6 in. wide sheet take four pieces of 36 in. × 3 in. × $\frac{1}{16}$ in. and cement these together on a flat surface to give two pieces of 36 in. × 6 in. × $\frac{1}{16}$ in. Sandpaper these thoroughly on one side as once the wing is built it is not possible to do any vigorous sandpapering at all. Lay one piece on the building board and cement all the ribs in position, trim to the outline, shape, allowing about $\frac{1}{16}$ in. overlap beyond the end of the ribs. Sandpaper this to conform to the wing section then cement on the top piece holding it in place with pins until dry. After these have been removed and the overlap trimmed off the ends can be sandpapered up square and the tip blocks added. Sandpaper whole lightly and add ply strengtheners.

Finish

Cover entire model with rag tissue or lightweight coloured Modelspan. Coloured dope is not recommended as it adds too much weight. Aerolac gives quite a pleasing appearance, is very light and if given two coats of Banana Oil on top, is completely fuel proof. Give coloured Modelspan four coats of Banana Oil.

FULL SIZE DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 23, GREAT QUEEN ST., LONDON, W.C.2. 3s. 0d. POST FREE.


COVER PLANES WITH 1/16" SHEET TOP & BOTTOM
DOPE ON LIGHTWEIGHT MODELSPAN TISSUE
1/4 OZ. LEAD
1/16" PLY LINE GUIDE
1/32" PLY REINFORCEMENT
1/16 SHT. RIBS 13 OFF
1/4" SHT. TIPS
BLOCK BALSA
PLANK TOP OF FUSELAGE WITH 1/4"X 1/8" STRIP
BLOCK BALSA
3/32" SHT.
1/2" X 1/4" BRACE
1/2"X1/4" HARDWOOD BEARER
WOOD SCREWS
ENGINE ALLBON JAVELIN
PROPELLER 8"X 8"
TANK
16G. BUSH
1/16" PLY
FILL IN WITH BLOCK BALSA
USE DURAFIX FOR ALL JOINTS
16 G. CONTROL WIRE
20 G. SKID
ENGINE BEARER DETAILS
BLOCK BALSA
BABY BAT CONTROL PLATE
SIDES OF 3/32" HARD SHT.
1·45"
1·25"
·50"
16G. U.C. WIRE
BOTTOM OF FUSELAGE 1/16" SHEET
FORMER 1 & 2 1/8" PLY
1 1/2" WHEELS
1/8" DIAM. BRASS TUBING
1/8" HARDWOOD DOWELS
TANK FROM 38 G. BRASS
3/32" SHT
SHT. BAFFLE FOR EXHAUST OUTLET
CLOTH HINGES
FORMERS 3 & 4 1/16" BALSA
20 G. LEAD OUT WIRE
JAMBON
M.A. 99
BY N. J. BUTCHER
SPAN 22 1/2" LENGTH 14"
3/-
COPYRIGHT MODEL AIRCRAFT
23 GT. QUEEN ST. LONDON W.C.2

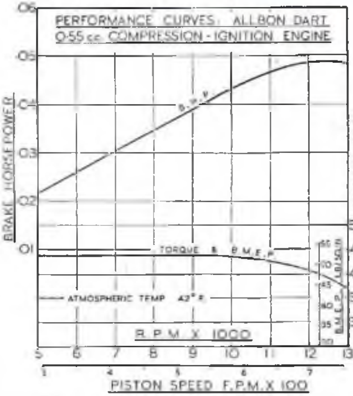
MODEL Aircraft ENGINE TESTS

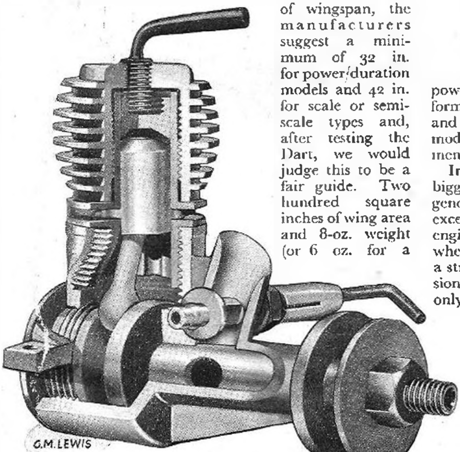
NO. 22 THE ALLBON DART

FOUR or five years ago, when compression-ignition model engines were first becoming popular and the possibilities of the really small engine were being explored, it was considered, in many quarters, that anything much less than 1 c.c. cylinder capacity would not be practicable. In particular, starting, it was believed, would become unduly critical in such small sizes.

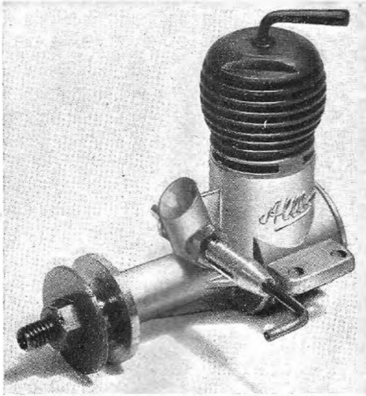
The recently introduced Allbon Dart, which is of only 0.55 c.c., strikes one as a particularly effective argument, if such were needed, against these earlier contentions, for, not only does this little engine remain easy to start, but this quality is not achieved at the expense of performance, the Dart having a maximum output well above that which might be expected of its capacity, judged by normal diesel standards.

It is, in fact, stressed in the makers' literature, that the capabilities of the Dart should not be under-estimated. In terms of wingspan, the manufacturers suggest a minimum of 32 in. for power/duration models and 42 in. for scale or semi-scale types and, after testing the Dart, we would judge this to be a fair guide. Two hundred square inches of wing area and 8-oz. weight (or 6 oz. for a power/duration type) should provide all the performance needed, but if the Dart's light weight and compact dimensions are to be utilised in smaller models, reducing r.p.m. by means of control adjustment can be resorted to.





In appearance, the Dart closely resembles its bigger brother, the 1.49 c.c. Allbon Javelin. The general design of the smaller engine is similar, excepting the fact that the Dart is a "square" engine, i.e., its bore and stroke dimensions are equal, whereas the Javelin has a much shorter stroke giving a stroke/bore ratio of 0.8. The actual stroke dimension of the Dart, however, is, due to the small capacity, only 0.35 in., and this appears to be the shortest of any currently produced British engine. The result is an exceedingly low piston speed—only 58.3 f.p.m. per 1,000 r.p.m.—which, despite a high peak r.p.m., means that the piston velocity is only in the region of 750 f.p.m. at the maximum output. A moderate piston speed is, of course, considered conducive to long life.



Specification

Type: Single cylinder, air-cooled, two-cycle, compression-ignition. Rotary-valve induction through hollow crankshaft. Annular exhaust and transfer porting. Conical piston crown.

Swept Volume: 0.55 c.c. (0.0336 cu. in.).

Bore: 0.350 in. Stroke: 0.350 in.

Compression Ratio: Variable. Stroke/Bore Ratio: 1.00 : 1.

Weight: 1.25 oz.

General Structural Data: Aluminium pressure die-cast crankcase and main bearing housing with detachable rear cover. Mechanite cylinder-liner, with three exhaust ports and three transfer grooves, threaded to crankcase. Duralumin finned barrel/head, threaded to liner, and carrying compression adjuster. Mechanite piston with dural gudgeon-pin yoke. Yoke secured to piston with countersunk screw through piston crown. Nickel-chrome steel crankshaft, ground and polished and running direct in crankcase material. Dural connecting-rod. Reversible spray-bar type needle-valve assembly. Beam type mounting lugs.

Test Engine Data

Total time logged: Approx. 1 hour.

Fuel used: "Record" Competition Diesel Blend.

Performance

First, it should be noted that the performance obtained under test exceeded that claimed by the makers for the Dart. In particular, the exceptionally good torque readings obtained are mainly responsible for the high b.h.p. shown. By converting to b.m.e.p. values, the torque developed it will be noted, is actually slightly better than that of the Javelin (tested in the November 1950 Model Aircraft). This is noteworthy because tests frequently show relatively lower torque values for the smaller engines, due, probably, to losses in mechanical efficiency, by reason of increasing difficulty in obtaining perfect fits to the moving parts as engines are made smaller.

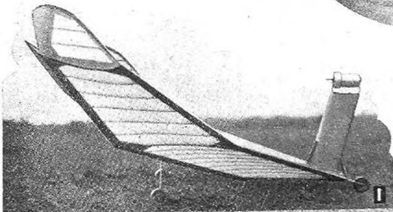
The peak output of the Dart is also reached at a higher speed than with the Javelin and the result of these two improvements is, of course, a higher specific output for the Dart, actually 89 b.h.p./litre as compared with 80.5 for the Javelin.

As already mentioned, the Dart will start quite easily, starting technique being much the same as with the Javelin and other similar diesels. The engine is fairly responsive to the compression lever and adjustments should, therefore, be made in small amounts. No priming through the ports was required during tests, the engine starting readily from cold (air temperature 42 degrees F.) after a couple of choked flicks.

For normal use, the Dart being essentially a free-flight engine, it is doubtful whether operational requirements will take the engine outside a speed range of 6,000/10,000 r.p.m. However, the peak output is achieved at a somewhat higher speed and the tests were, therefore, carried on to 13,000 r.p.m. to reach the point where the curve flattens out.

(*Continued on page* 186)

photonews



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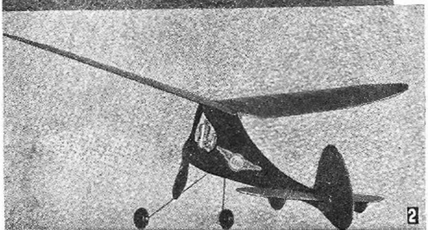

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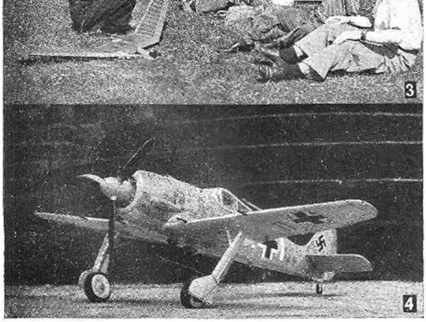

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The flying wing seen in our first Photonews picture this month may look rather weird, but we are assured by its owner, M. M. Gates of London, W.3, that it is a very stable flier—in fact it is difficult to make it do anything other than fly in a straight line! Unlike most flying wings it features an under-cambered wing section (N.A.C.A. 6409)—the section being inverted at the tips. Powered by a Jetex "350" motor, it has a wing span of four feet and weighs $5\frac{1}{2}$ oz.

Les Steele of Cardiff sent us No. 2 which shows his neat little Kalper .32 powered pylon job. The model is a Dave Hillcard design, "The Dwarf" and seems to bear a striking resemblance to the Keilkraft "Slicker Mite."

The Salisbury lads have no flying ground worries with the whole of the local Plain at their disposal. No. 3 shows them watching Ernie Sturgess doing a spot of emergency repair work on his "Sportwagon." In the foreground is an "Alpheratz" flying wing (M.A. Plan No. 72), which our correspondent says flies so well off 20-30 ft. lines that he is tired of making long tramps across the Plains to bring it back. He advises other "Alpheratz" builders that a dethermaliser is a "must."

No photograph could possibly do justice to the fine Focke-Wulf 190-A-3 seen in No. 4. Adapted from a Veron kit by W. Clark-Hall of London, W.14, it features a wealth of detail. Much of the necessary data was obtained when he was able to closely examine one of the specially equipped 190's in Germany at the end of the war. The model has two undercarts, one fixed and the other of the drop-off dolly type. The bomb, D.F. loop and the U.S.W. aerial are removable for flying with the latter type. A scale cooling fan is fitted and operates off the propeller shaft.

5

From " down under " comes No. 5. The photograph shows well-known Aussie control line speed merchant, Allan Lin Goon, holding his McCoy " 49 " powered Australian record holder which has clocked 124 m.p.h.

H. W. Hyde of Hampton Hill, Middlesex, sent to us photograph No. 6 of some of the members of the West Middlesex M.F.C. on Hounslow Heath. They certainly believe in variety—the models in the picture include gliders, control line, F.A.I. power and rubber, and Jetex powered types.

Max Coote, the Technical Secretary of the S.M.A.E., often does a spot of flying at Fairlop. The model which he is seen holding in No. 7 is a .75 Mills powered " Southerner Mite." We send our congratulations to Maxie on his recent marriage and our condolences for receiving his " Z " Group call-up papers as a wedding present. Cruel 'ard, we call it!

The Frog " 100 " powered " Bandit " shown in No. 8 was made by W. Turley of Malton, Yorks, and its best flight to date is 7½ minutes in a 40 seconds motor run. Although reader Turley describes his good lady as " a long suffering aeromodeller's wife," she looks quite happy about being made the stooge for the purpose of taking this photograph.

Interest in solid scale models has been pretty dead since the war, but there are definite signs that they are again becoming popular. One of the many photographs of solids that we have received recently is that from R. C. Brown of Luton, Beds., whose 1/72nd scale Fairey Seafox looks a nice little job to us.

In his letter accompanying our last photograph, J. E. Stewart of Salisbury, Wilts., says: " The uncovered model is N. G. Marcus's 'Dinah-Mite.' The covered model is that of my 'Dynamite'—my wife (no one can hold the candle to her)!" Well now, isn't that nice? It's a good note on which to finish this month's Photonews anyway.


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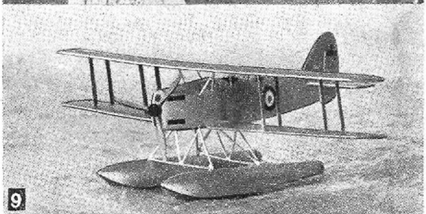
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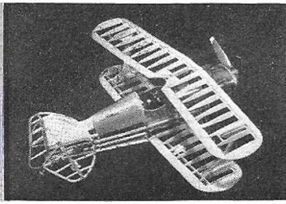
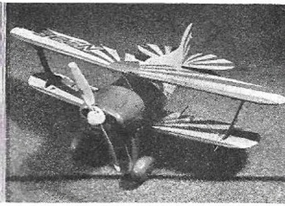
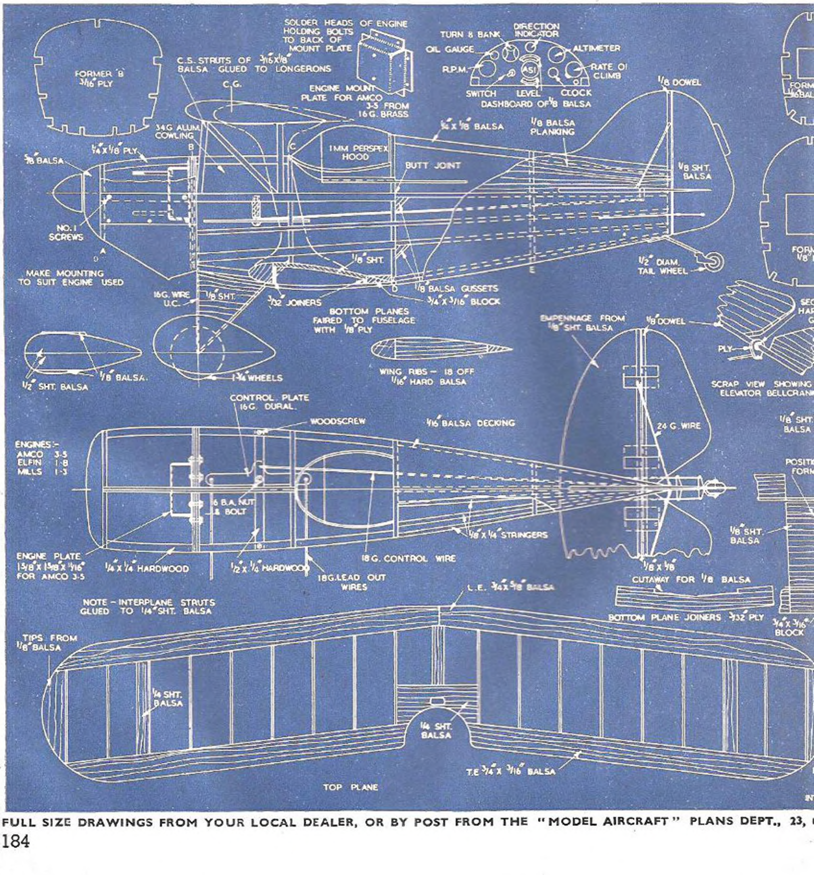


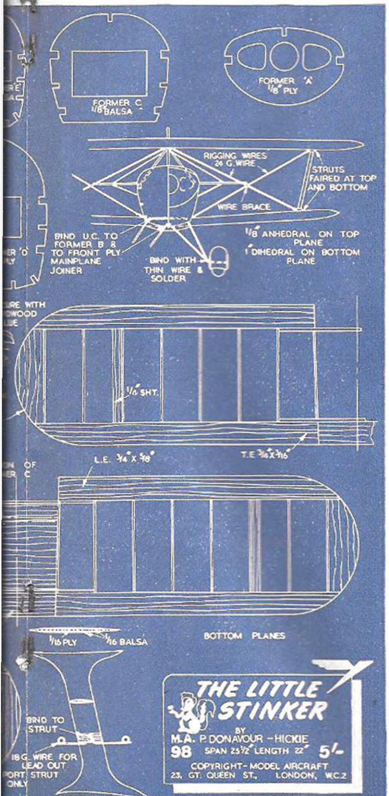




FULL SIZE DRAWINGS FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPT., 23,

he LITTLE STINKER

By P. Donavour-Hickie



GREAT QUEEN ST., LONDON, W.C.2. 5s. 0d. POST FREE.

A SCALE C/L MODEL OF BETTY SKELTON'S FAMOUS STUNT AIRCRAFT

THOSE who were present at the 1949 Gatwick International Air Show, will need no introduction to the 24 year old American girl from Florida, Miss Betty Skelton, and her trim little biplane, "The Little Stinker." The spectacular display of acrobatics which she gave were carried out with the skill and precision which has won her international fame.

The writer was particularly struck by the attractive lines of her tiny plane and thought what a fine flying scale model it would make—in fact, he could hardly wait to get started! Miss Skelton was most co-operative and enabled me to obtain the necessary plans, photographs and details.

In August, 1949, the first model of "The Little Stinker" was completed. It was built to a scale of 1 in. to 1 ft. and was powered by an Amco 3.5 c.c. diesel. During its ten hours of successful flying it was also fitted with Elfin 1.8 c.c. and Mills 1.3 c.c. diesels, but it was considered that the model was too small to be really practical. It was decided, therefore, to build another to $1\frac{1}{2}$ in. to 1 ft. scale and it is this model which is dealt with in this article. Miss Skelton later sent me details of modifications which had been made to her plane, also the new colour scheme, and these have been incorporated.

As "The Little Stinker" is suitable, with necessary modifications to the mounting, for many engines at present on the market, no engine is indicated on the plan. The prototype was fitted with an Amco 3.5 which was mounted radially on the metal bracket shown.

It is not suggested that this model is a suitable one for beginners as the construction requires a certain amount of skill, but it does, however, make up into a very attractive model which will amply repay the care taken during building.

Fuselage

First cut out Formers A-E. A is cut from $\frac{1}{8}$th in. ply, B-$\frac{3}{16}$th in. ply, C-$\frac{1}{8}$th in. hard balsa, D-$\frac{1}{8}$th in. ply and E-$\frac{1}{16}$th in. balsa.

The nose piece is cut from $\frac{5}{8}$th in. block balsa. Assemble fuselage framework in the normal manner, gluing the stringers into the notches in the formers. Care must be taken at this stage to keep the assembly true by frequently placing it over the plan during construction.

THE DESIGNER . .

Age 29 . . . Single . . . In Experimental Department of F. G. Miles (Aircraft) Ltd., at Redhill Aerodrome, Surrey . . . Born in Galway, Ireland, and came to England in 1940 . . . Member of the Zombies Club . . . Started modelling 15 years ago . . . Mainly interested in detailed flying scale control models and would like to see more contests held for this type . . . Keen on photography, riding and cycling.

The top stringers carry $\frac{1}{8}$ in. × $\frac{1}{2}$ in. hardwood block which holds the bellcrank. This should be glued and screwed into place. The bellcrank is made from 16 gauge duraminium (*not* aluminium) and all hardwood joints must be made with a good slow drying glue (*not* balsa cement).

The windscreen and cockpit cover are made from 1 mm. Perspex sheet moulded round a balsa wood former. Cowlings are bent from 34 gauge aluminium and attached to the bulkhead by means of $\frac{1}{4}$ in. No. 1 brass wood screws.

Wings

The construction of these is quite simple, all ribs being of the same size and cut from hard $\frac{1}{16}$th in. balsa. Two 3/32nd in. plywood joiners are used to hold the dihedral in the lower wing which should be 1 in. at the wing tips. The upper wing has $\frac{1}{8}$th in. anhedral at the tips. The trailing edge of the lower wing should be left rectangular in shape at the centre-section where it passes through the fuselage.

Centre-section struts are made from four $\frac{3}{16}$th or $\frac{1}{8}$ in. hardwood or bamboo and are let in and glued to the top longerons. The outer wing struts are made from $\frac{1}{16}$th in. ply sandwiched between pieces of $\frac{1}{16}$th sheet balsa and sanded to section. They are glued to the $\frac{1}{4}$ in. sheet hard balsa in the wings.

Rigging wires are made from 24 gauge piano wire and are hooked at the ends into $\frac{1}{16}$th inch plywood tabs which are glued into the wings.

Undercarriage

The undercarriage struts are shaped from 16 gauge piano wire, the joints being bound and soldered. They are bound to Former B and lower wing plywood joiner with soft iron wire. Fill in strut legs with $\frac{1}{8}$th in. sheet balsa and sand to streamline section. If desired the V shaped spreader bar between the undercarriage struts may be attached to a short strong spring to the back of former B to assist springing. The spats are built up from soft balsa sheet as indicated on the plan and $1\frac{3}{4}$ in. diameter treaded wheels were used on the prototype.

Tailplane and Rudder

These are cut from $\frac{1}{8}$th sheet hard balsa, the elevators being hinched in the usual manner with tape. A $\frac{1}{8}$th in. dowel is glued along the front edge of the elevator with a 3/32nd in. plywood horn firmly glued in the centre. A hardwood $\frac{1}{8}$th square spar is glued along the back of the stabiliser.

Tail Wheel

A $\frac{1}{2}$ in. diameter solid tail wheel is used, the bracket for this being shaped from thin tin. A piece of 18 gauge wire is soldered in for the axle. 18 gauge wire or a piece of clock spring is used for the tail wheel struts and this bound to the $\frac{1}{8}$th in. dowel in the tail.

Finishing

The model should preferably be covered with light weight silk, or failing this, with strong tissue. If the latter is used double cover fuselage. Silk covering should be given two coats of full strength clear dope and tissue three or four coats of ordinary strength clear dope. Two coats of coloured dope should be sufficient for the markings.

The top of the upper wing is finished white with red flashes, the registration number being black with a white margin on the red flashes. Undersurface of the top wing, struts, undercarriage, spats, bottom of fuselage and front half of fuselage are all bright red. Rear half of fuselage is all white. The top of the lower wing is white with red flashes. Fin, rudder and tailpiece are white with red flashes. Registration number, black. The Skunk insignia and all printing is also in black and there is a very thin black dividing line between the red and white flashes. Spinner, white. Underneath bottom wing and tailplane is finished in red and white checker board with the registration number in black. Finally a coat of banana oil should be applied all over to give a glossy finish.

The completed model should weigh between 16 and 18 oz. all-up and, if well constructed and finished, it makes an excellent scale stunter with a good aerobatic performance.

Engine Tests

(*Continued from page* 181)

A b.h.p. of approximately 0.049 was indicated at this speed. This compares with a claimed output of 0.045 b.h.p. The minimum speed tested was 3,500 r.p.m., but 5,000 r.p.m. may be regarded as the practical minimum for smooth running.

As evidence of the engine's unusually useful pulling power at low speeds, it may be mentioned that the test motor turned a 9 × 4 prop, of medium area, at a steady 5,200 r.p.m. For general work 8 × 4 and 7 × 4 props should be adequate. The speeds achieved with these will vary considerably, according to the power absorption characteristics of different makes and types, but will normally allow around 7-8,000 r.p.m. with the latter size.

Far from being the novelty which was the only claim of some early experimental midget engines, the Dart may be regarded as a thoroughly practical unit for all types of small power models. It is well finished and is sufficiently robustly constructed to withstand the usual flying field knocks.

Power/Weight Ratio (as tested) 0.627 b.h.p./lb.

Power/Displacement Ratio (as tested) 89 b.h.p./litre.

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*

THE WAKEFIELD A CLAMBAKE ?

Dear Sir,—The pounding you gave Bill Winter in the "Here and There" column of the current (Feb.) issue of Model Aircraft was unnecessarily severe, if not completely unjustified. For what Winter wrote indicated the thinking of model airplane enthusiasts, other than those who seem unable to bring themselves to believe that any other type of model aircraft could be as interesting and popular as a Wakefield—if they accept any other type of model that is.

Pre-war, when rubber was king, and gliders and power models were as common as model aircraft built by aero-modelling's hierarchy, then there might have been some basis to consider the Wakefield model as the be-all and end-all of model airplanes. But it is now different. Gliders and power models have a following equal to and possibly exceeding that of the Wakefield.

In America now the small ½ A (0.82 c.c.) power job appears to be the most popular type of model. As more good ½ c.c. engines come on to the British market a similar situation might well occur here.

I believe the Wakefield Cup was instituted to foster model aeronautics. Probably a very good way to achieve this aim is, without doubt, to have the Cup awarded to the most popular type of model aircraft since then maximum interest would be aroused. In the past this has been the case but if it can be shown that small-engined power models have a larger following than other types then it would not be at all unreasonable to suggest that to promote the donor's wishes the cup might be awarded for that class of model. Considered thus, Bill Winter's suggestion does not seem unjustified.

Assuming that the Wakefield Cup remains for rubber model competition, then it would appear inevitable that it will lose or have to share some of the prestige you mention in another part of "Here and There." The "very high prestige" the Wakefield contest has held in the past is probably in large part accounted for by the fact that it was for rubber models which were the most popular type. Rubber, gliders and power now have about equal following so it is silly to suggest that International cups awarded for glider and power should not enjoy equal importance to the Wakefield Cup. [Agreed—Editor.]

The continued popularity of free-flight generally is due to the luck element (if you like to call it that) and not in spite of it. Just so long as the possibility of winning remains within the reach of the average person, free flight will be attractive. The trend towards the reduction of the element of luck in the Wakefield should be noted. Last year's contest being held overnight, and with this year's promised thuswise too, has had the effect of bringing a similar arrangement to this year's Final Trials with flights in the late evening and early morning. If by this means the element of luck is reduced, could it be that the following the Wakefield has at present will also be reduced? The competition is going to leave the average chap and wind up as a clambake for the experts where, in pursuit of still-air times, the models finish up with gears, return gears, pawls, dogs, clutches, variable pitch props, etc.

H'm! Was Bill Winter so much off the beam; or was he off the beam at all?

Yours faithfully,

St. Albans, Herts — E. J. Buxton

IS MODEL FLYING A SPORT OR GAME ?

Dear Sir,—Bill Winter . . . whom I suspect had his tongue in his cheek when suggesting a change in Wakefield model type . . . has started a two-part controversy.

(i) Is model flying a sport or a game?

(ii) Which is the best "competition type" of model?

I feel that a lot of harm has been done by treating model flying as a game rather than a sport—using these two terms in the sense that a game has popular appeal whereas a sport leads to specialised development. To progress, or even to survive, the competition side must be regarded as a *sport*, eliminating the luck element as far as possible. If this is condemned on the score of restricting this sport to a number of specialists, the same reasoning condemns International football, cricket or any other established sport.

(*Continued on page* 189)

GRANDPA GETS THE BUG — **By Harry Stil**

THE MOTORUDER

A NEW AMERICAN A/C ACTUATOR

THIS new actuator has been developed by Owbridge via *Rudevator* and *Superudevator*. As the sketch shows, the frame and many other standard components of the original rudevator unit are retained. Unlike its two predecessors, however, *Motoruder* does not give any form of elevator control.

As was mentioned in a previous issue of MODEL AIRCRAFT, climbing, diving and level turns can be accomplished with ordinary rudder control—varying the time of holding the turning control on. The combined elevator-rudder effect given with the ordinary rudevator, therefore, is not strictly necessary.

Rudevator gave rudder and elevator effects, and two-speed motor control applicable to spark-ignition motors. *Superudevator* was a modification, making for rather more efficient operation and again with motor control, but this time adapted to glow and diesel motors. *Motoruder* represents a step towards a simpler unit giving rudder control and motor control.

The escapement is in the form of a square wheel with raked corners, engaging with a cranked pin soldered to the armature. The main coil attracting the armature is wired in with a 100 ohm " economy " coil to reduce the " hold-in " current to a fractional amount. This, in fact, is essentially similar to the split-coil actuators in use in this country. The mechanical hook-up from thereon is very interesting.

The escapement simply releases two shafts, emerging one from each end of the unit. Servo power is a 12 in. loop of $\frac{1}{8}$ flat rubber. The unit itself is mounted amidships, one drive facing aft for the rudder control and one forward for the motor control.

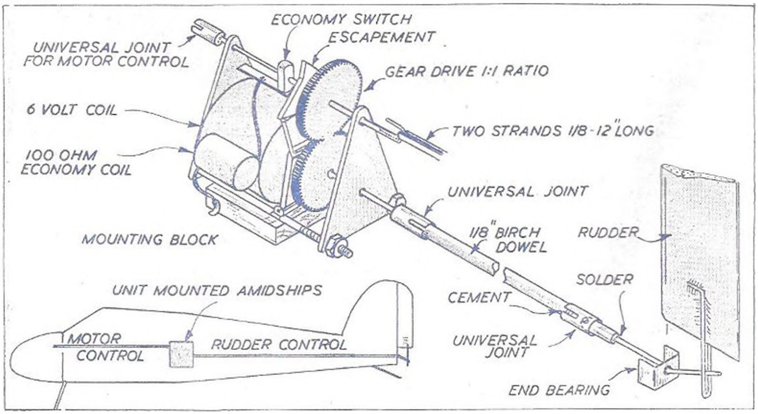
The rudder control linkage is fairly orthodox, except that a rigid coupling rod of $\frac{1}{8}$ in. dia. birch is used, pushing into a split tube at the actuator end and coupled to the rudder crank proper via a universal joint. This joint consists of a short length of tube soldered over the rudder crank, pinned in the tube coupling on the other end of the dowel.

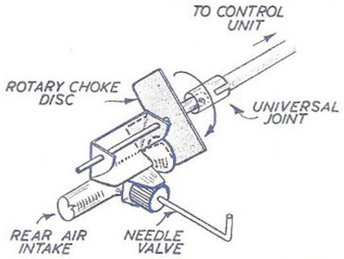
For long couplings a rigid rod is very necessary. The amount of whip which can be generated in a wire of similar length is prohibitive. This type of universal coupling has been thoroughly tried out in practice and is very satisfactory.

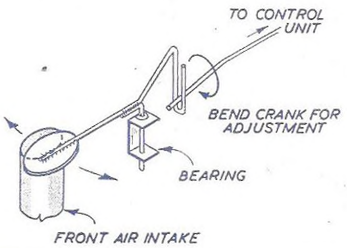
The form of cranked end to the rudder control wire is somewhat different from British practice, and possibly easier to adjust for sensitivity by bending.

At the other end of the model is located the motor control unit. This, in fact, is mounted directly on the motor itself, adaptable to either motors with rear-facing induction pipes or front air intakes (crankshaft rotary valve). In both cases the method of control is the same—a choke disc which alternately blanks off and fully exposes the intake. Intermediate (partially choked) positions can be arranged by modifying the shape of the choke disc as required.

The method of coupling the choke disc to the motor control " drive " is shown in the second sketches. With the rear facing intake this choke disc has a rotary motion; in the other case an







oscillating motion. The disc is mounted as close as possible to the end of the intake tube of the motor without actually fouling it.

This method of speed control by choking works extremely well on most glow plug motors. Whether it is equally effective on diesels still remains to be proved. It is, however, definitely an accepted method in America, where, of course, the bulk of the motors used are of the glow plug type.

With *Motoruder*, it is claimed—or any control system using rudder and motor speed—a full range of manoeuvrability is possible.

Owbridge, who has been flying R/C models of all sizes for the past four to five years, now definitely recommends a 5 to 6 ft. span model with a small motor—" 19 " size (3.25 c.c.). In low speed there is then insufficient power to maintain height and so it is not considered that a motor cut-out control is necessary. The aim with *Motoruder* is not so much a *complete* control system as one which will give all that is necessary and yet still remain a simple, light unit. Total weight of *Motoruder* itself is just one ounce.

Whether we shall see *Motoruder* in operation over here or not this year is a matter of conjecture. It is, however, interesting to learn that a number of leading British R/C modellers have settled on a similar size of model (and motor) to that proposed by Owbridge and some also have been working on the same *range* of control—rudder and motor speed.

Correspondence

(Continued from page 187)

Of all the free flight model types, the one which best combines design, constructional and flying skill is undoubtedly the Wakefield, and yet still retaining that very attractive luck element. You have absolutely to *earn* performance with a Wakefield. Power is relatively limited and the success of a model of this type depends very largely on how efficiently this power is used up.

Gliders dodge this important—and difficult—issue by being towed up to a height, and even a badly trimmed model can do a fair duration if it is capable of being towed up to 300 ft. Power models have an excess of power, and the flyer's responsibility here virtually finishes some 10 seconds after launching.

I have had enough experience with all types of free flight contest models to have built up a definite idea of the requirements of each. Primarily I like model flying as a sport, and I have many times weighed up the sporting qualities of each contest type. The present Wakefield wins hands down as the best *sporting* model and would appear certain to continue to do so as long as the specification allows us to produce a design where sheer performance is the main aim. This is not just a personal preference, although no doubt I shall be accused of bias in this direction.

Any drastic alteration to the Wakefield specification would, I feel, be a sad loss to model flying, for it is a world-recognised class around which the International movement has largely been built. Another one of its attractions is that it is very definitely a non-commercial model type and the professional and semi-professional modeller enjoys no special advantage. This is also true of gliders, but not so of power, or control line.

I suspect Bill Winter of deliberately provoking an argument. He said himself about 12 months ago that he would rather win the Wakefield than any other event. The big mistake is to condemn *any* type of model. If fellows enjoy flying any one type, then don't try to tell them they are all wrong. They have their own perfectly good reasons for specialising in that type.

The time is not so far distant when there will be established Internationals in all the major contest types and the whole business will sort itself out. In the meantime, as a confirmed Wakefield enthusiast I have a Nordic flying, a new radio model awaiting testing and a power duration model to finish off!

Beckenham, Kent. RON WARRING.

SOME ADVICE AND A QUERY

DEAR SIR,—I couldn't agree with you more over your advice to Bill Winter in the February MODEL AIRCRAFT. America will eventually win the Wakefield again, but only by getting down to the job, as do our boys, and not by belly-aching.

By the way, have you noticed how many F.A.I. Records the U.S.A. holds? Need for thought for some of 'em there!

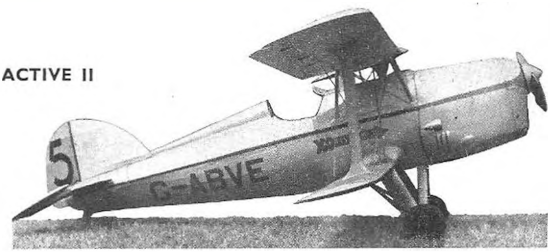
Yours sincerely,

Luton, Beds. P. L. GRAY.

Prototypes Worth Modelling

No. 10. THE ARROW ACTIVE II

By C. B. Maycock



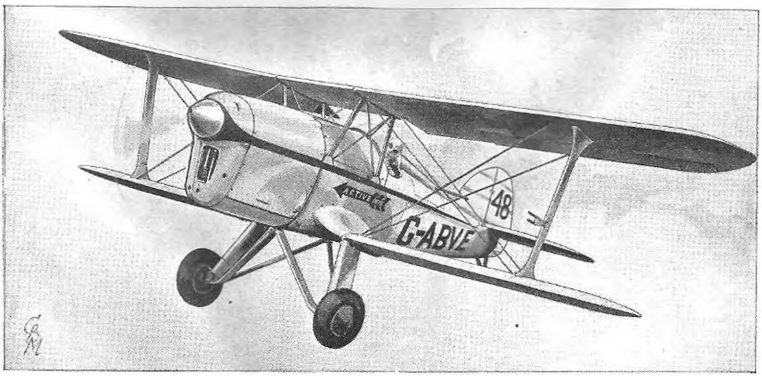
(Photograph by courtesy of " Flight ")

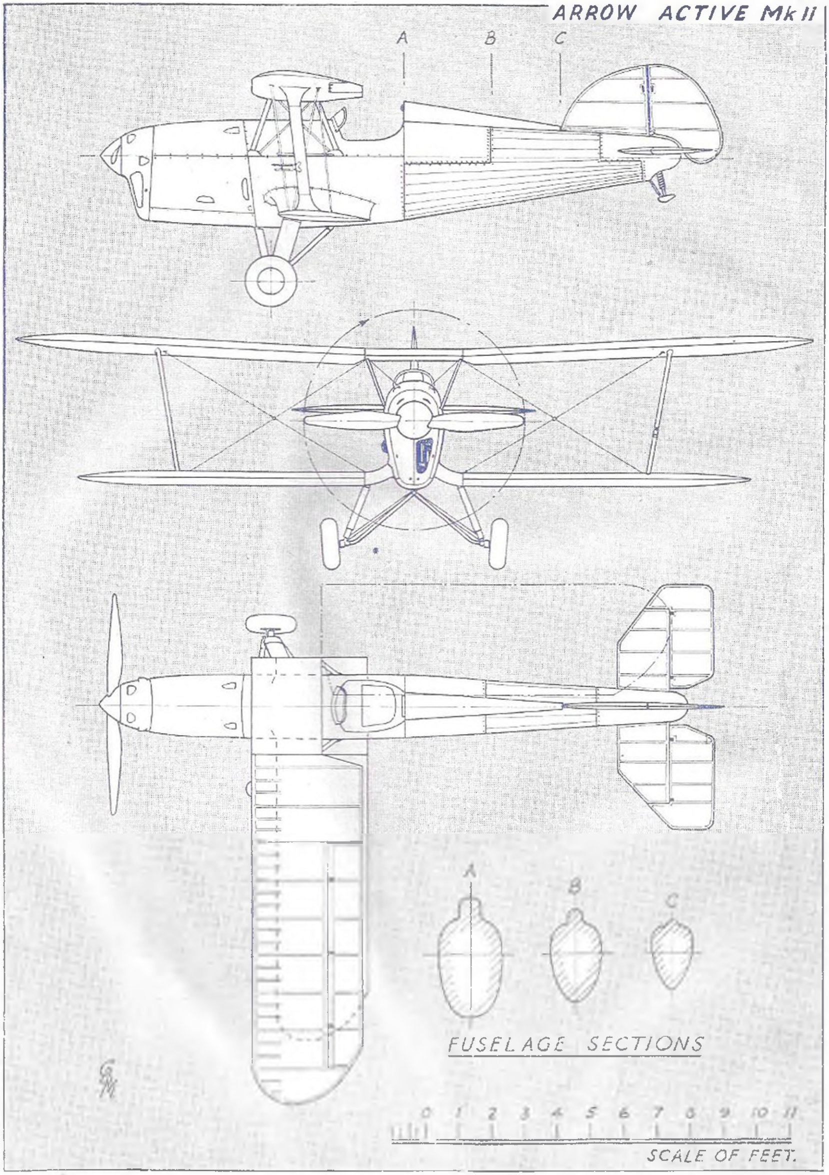
THE Arrow Active II developed from the earlier Mark I was a very attractive sporting biplane of the year 1932. It was designed by Mr. A. C. Thornton, who also designed the first Blackburn Bluebird, it had very clean lines and was fully aerobatic. All metal construction was employed, the forward portion of the fuselage was of metal monocoque constructed of steel longitudinals and duralumin sheet covering. The rear portion had a basic structure of triangular section composed of steel tubes supporting a duralumin framework fabric covered. The wings had dihedral on the top planes only. They had steel spars, duralumin ribs and were fabric covered. It was in the wings that the chief difference between the Mark I and II was to be found. The latter had a centre section mounted on splayed struts instead of the top wing sitting right down on the fuselage, this allowed the provision of a larger fuel tank in the fuselage. The pilot's view was also improved. The tail unit was a framework of steel and duralumin fabric covered.

The engine was a De Havilland " Gipsy III " four cylinder in-line, inverted, air cooled motor with a normal output of 110 h.p. driving a De H fixed pitch metal airscrew.

Both Marks of Arrow Active were flown in the 1932 King's Cup Air Race. Flown by Flying Officer H. H. Leech, the Mark II put up an average of 140 m.p.h., but unfortunately was not placed. The following year it gained fifth place flown by the same pilot. The Arrow Aircraft (Leeds) Ltd., company intended the Mark II as a military light advanced trainer and it seems a great pity that it was not adopted. Its performance was commendable, the top speed was 145 m.p.h., cruising 130 m.p.h. Stalling speed 50 m.p.h. and an endurance at full throttle of 3½ hours. The main dimensions were as follows: Span 24 ft., length 18 ft. 10 in., height 7 ft. 7½ in., width with wings folded. 7 ft. 4 in.

The registration letters of the Mark II were G-ABVE. On the top plane they were nearly full chord and thus overlapped the ailerons.




ARROW ACTIVE Mk II
A
B
C
FUSELAGE SECTIONS
0 1 2 3 4 5 6 7 8 9 10 11
SCALE OF FEET.

Topical Twists

Call of the Wild

Do I detect a welcome breath of civilised behaviour in the recent affiliation request from a society calling itself the TAME MODEL CLUB?

Certainly none of the wild and woolly clubs of my acquaintance would have the nerve to adopt such a contradictory title.

* * *

The Lost Chord

A certain "cross" section of builders deplore
That the Wakefield design is not as before,
And in the new rulings find much to resent,
Especially as no one had asked their consent.
Now, while they agree that one thing it does
Is to dispense with the bloated-up fuzz.

They all seem to make a special complaint
Of counting wing area just when it ain't;
Generally inferring that this, on the whole,
Places a premium on wings parasol.
But, worse than all this, the ruling defines
The invalid nature of their present designs.

Yet why such despair, when small modification
(The trimming of wings and depodification)
Can readily convert that model forsook
Into the style of the new Wakefield look?
As, for example, when we ran the tape
Over a "mid-wing" of kipper-like shape
We found the new ruling, all measurements proved,
Suited it fine—when the wings were removed.

* * *

Club "Mews"

The Ashford M.F.C., it is revealed, have acquired a "stable building" for use as a clubroom.

We can only trust that the models issuing from it have the same desirable characteristic.

* * *

Perchance to build

A spate of hostile muttering is being directed towards that particular Wakefield rule which allows the use of more than one model per contest. Now, without taking any sides, and speaking as one whose yearly building programme is limited to the laboured production of one Wakefield per winter, I am ready to concede all cups and honours to the three models per contest type as being nothing more than the just rewards of such indefatigable labours (endless balsa bashing), total abstinence (laying off the liquor), and complete social abnegation (keeping off the skirt).

This subject, by the way, calls to mind one of last season's, eliminators, when could be seen a group of "one model per" species clustered, in open mouthed wonder, around a car, from which a certain Mr. Big brought forth Wakefield after identical Wakefield with the dexterous rapidity of an abandoned conjurer. And many a gaping jaw became dislocated as like the slap-happy sower of the scriptures, he proceeded, to distribute his stock broadcast fashion over the surrounding countryside.

Local conjecture at the time was divided. Some contended that the models were mass produced, while others put the whole thing down to some sort of illusionist trickery:—mirrors, or mass hypnotism.

Whichever way it is, I know that I shall still have to plug away on the same old theme: one model per contest per year, perhaps.

"Ah, this must be the British team!"

* * *

Out of Sight but . . . .

Latest agitation is for the establishment of an elite corps of Official Timekeepers: recognition to be by way of a small, but distinctive badge.

No particular heraldic device has yet been approved, but suggestions from regular contest types have not been lacking. Of these, Nelson with Telescope Rampant has been rejected, but it is understood that some consideration is being given to the idea of a White Stick and Guide, Dog Regardant.

* * *

Recent quote of young woman: "He can't be grown up; he still plays with model aeroplanes."

Was I insulted! To suggest that we aeromodellers were not mature individuals. Why, I had half a mind to biff her one with my Champion Conker.

* * *

Nationals Service

Now that it has been decided to embark the Nationals on a provincial tour—York last year, Swansea this—news has been received from the Outer Hebridean Area that preparations for the 1956 Nationals are already well under way. Bull-dozers are even now at work clearing an airstrip, while cave accommodation is being rapidly extended. Unfortunately, no refreshments can be provided, but it is hoped that a liberal supply of hunting weapons will be available to all visitors.

* * *

A Freightful Business

The latest import from the American Novelty Society is a new style of contest called P.A.A. Load.

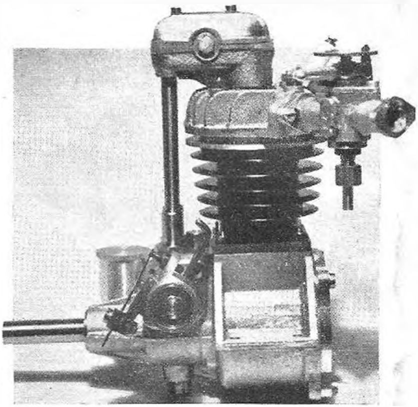
Unlike team-racing which calls for a dummy pilot, this demands the accommodation of a "cubist" passenger, hereinafter to be known as "old squarehead."

As it appears that the complex rules are designed to tax one's ingenuity, I suggest that in this country the contest should carry the more appropriate tag of P.A.Y.E. Load.

By Pylonius

ACCENT ON POWER

By P. G. F. Chinn



The Jensen "C. I. Special" 10 c.c. o.h.v. four-stroke engine

EVERY now and then, a new engine appears which automatically sets one thinking in terms of new models. One such motor was the Amco 3.5 which really established a new standard in diesel power/weight ratios. Another, more recent, example is the Allbon Dart, which, by its diminutive size and light weight, suggests something different; small power-scale models.

In particular, the compact dimensions and low cylinder height of this 0.55 c.c. unit, makes it possible to completely cowl the engine, side-mounted, within the modern horizontally-opposed type cowling commonly found on American light aircraft, such as the popular Piper series, Aeronca, Taylorcraft, Stinson-Voyager, Luscombe-Silvaire and Cessna 140 and 170.

The latter aircraft, the Cessna 170, is an especially attractive choice and, having decided to use this design for our own Dart (when time would allow building) we were pleasantly surprised to hear from Bill Dean that he had already designed and built a Dart powered model to this actual prototype. Whereupon it was resolved to save the effort of drawing up plans and to await Bill's design instead. When he subsequently sent along plans, this blind faith in Bill's ability (!) was amply repaid, for it is difficult to see how the Cessna 170 could be better interpreted than in this excellent little model.

The model is 1 in. to the foot scale, giving a 36 in. span. The two strut-braced wing panels are 156 sq. in. total area which, with the centre-section, gives a gross area of about 176 sq. in. all told. The tailplane area is 46 sq. in. and the all up weight 9 ounces. The wing is set at 1¾ degrees positive to the datum line and the lifting section tail at 2½ degrees negative. The C.G. is at 33 1/3 per cent. chord and this location in the original was achieved precisely and without recourse to ballast. The model differs from the original in having a 5½-degree dihedral angle, to maintain adequate lateral stability.

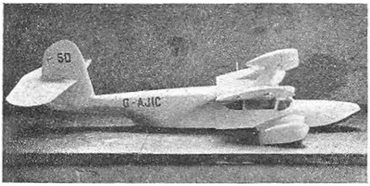
Bill Dean's attractive little flying-scale Cessna 170, powered with an Allbon Dart diesel

The structural design features a fuselage built on the "keel" principle, backbone members being laid on the plans, and formers erected on these, to which stringers are added. The typical Cessna type cantilever undercarriage is effectively reproduced by the use of sheet duralumin in place of the common spring steel wire type. 1½ in. wheels are used and are secured to the struts with 8 B.A. bolts as axles.

The attractive appearance of the completed model is apparent in the photograph. It is finished in silver with orange trim accurately patterned to the decoration used for the production aircraft. No external wing rubbers mar the appearance, an internal rubber band fixing within the cabin being used instead. The struts are anchored at their upper ends by means of a wire and tube fitting and at their lower ends by means of hooks connected by a rubber band passing through a tube in the fuselage. The Dart engine is completely cowled, only the compression-lever and needle-valve extension being visible. The starboard side of the cowling is detachable, in order to give easy access to the motor.

The various constructional details, incidentally, are adequately illustrated by supplementary sketches on the plan which, of course, is to Bill Dean's usual high standard. Bill tells me that the model flies well and, in view of its quite moderate dimensions, it is obvious that it should have a lively performance on the peppy little Dart diesel, using the 7 × 4 Truflo prop specified.

As a matter of interest, the full scale Cessna 170 is an all-metal four-seater, powered by a horizontally-



Brushed-on finish on sheet balsa. (Mills powered flying-boat designed by the writer)

opposed Continental air-cooled engine of 145 b.h.p. The 170 has a 500 mile range, a top speed of 140 m.p.h. and cruises at 120 m.p.h.

The Jensen "C.I. Special"

In a rather different class is another engine, which is undoubtedly worthy of the attention of the more serious model aircraft enthusiast: specifically, the man with leanings towards large models and radio-control.

This is the "Channel Islands Special," a 10 c.c. overhead valve four-stroke petrol engine, made in Jersey by J. & G. Jensen Ltd. It is no exaggeration to say that this engine is a really superb piece of model engineering and, lest it be immediately supposed that its relatively complex construction places it beyond the pocket of the average enthusiast, it should, perhaps, be mentioned that, at its recently reduced price, the Jensen is actually no more costly than many two-stroke units of 10 c.c. capacity.

Despite the vastly greater number of parts comprising the complete engine (there are close to one hundred, not including standard nuts and bolts used in assembly) as compared with a similar capacity two-stroke, the weight is not prohibitive—just under 20 ounces, as against the 16-oz. of the average racing type 10 c.c. two-stroke. The engine, as supplied in standard tune, has a compression ratio of 6.5 : 1 and, on Pool petrol, the output is given as 0.52 b.h.p. at 10,000 r.p.m. This can, of course, be improved on by raising the compression-ratio and using methanol fuel but, for free-flight (including R/C) and moderate flying speeds, the performance of the standard unit is, of course, quite adequate.

The writer purchased one of these engines a few months ago and has since sent this particular unit to a friend in the U.S., a well-known American enthusiast, for use in a radio-controlled model boat, this being intended for demonstration purposes before the American Federal Communications Commission and A.M.A. in connection with licence-free R/C operation. Here, we have the unusual situation where no comparable engine is available in the United States and it was gratifying to hear the highly complimentary remarks which this British engine earned from its new owner.

The Jensen C.I. Special has a bore of $\frac{15}{16}$ in. and a stroke of $\frac{7}{8}$ in. giving a swept volume of 9.9 c.c. The overall height is $4\frac{7}{8}$ in., the width $3\frac{3}{8}$ in. and length $5\frac{1}{2}$ in. In appearance, as will be seen from the heading photograph, the engine bears a resemblance to a typical four-stroke motor-cycle engine and is, in fact, similar in general design, much the same materials being used in its construction. Details of this interesting engine are as follows:—

The crankcase is an aluminium alloy die casting. In addition to carrying the main bearings, which consist of one ball journal and one plain bronze bearing, it provides the housing for the camshaft and skew-gear drive. The crankshaft is of 3 per cent. nickel steel with case-hardened crankpin and is ground all over on cylindrical diameters. It has a separate riveted-on counterweight. As supplied, production engines have a plain, $\frac{5}{16}$ in. diameter shaft projection, one inch long, this being in machinable condition for drive adaption, as required by the purchaser, but the makers state that, if required, they can supply a tapered hub and collet for use with an airscrew.

The cylinder is of close-grained cast iron with tapered section machined fins and is flanged and attached to the crank-case with four studs and nuts. The bore is highly finished and is lapped to a 0.0001 in. tolerance. The flat crown piston is of aluminium alloy and has two cast iron compression rings. The fully floating tubular gudgeon-pin has brass end pads to avoid cylinder wall scoring. The connecting rod is an extremely robust H-section duralumin forging and has a bronze big-end bush. A retaining bolt and washer is used to restrict big-end movement on the crankpin. The cylinder-head, attached with four studs and nuts, is an aluminium alloy die casting, deeply finned, and has bronze valve-seats cast in.

The valve gear features 11/32 in. diameter valves of heat resisting stainless steel, running in bronze guides which are pressed into the cylinder-head. The valve-springs are retained by caps locked to the valve stems by circlips. The rocker-box is an aluminium alloy die-casting, with detachable cover, and tappet adjustment is effected by rotating knurled eccentric bushes on the rocker shaft. The rockers, themselves, are made from mild steel and are case-hardened throughout. The push rods are 5/64 in. diameter silver steel with hardened spherical ends and operate in $\frac{3}{16}$ in. steel tube covers. Tappets are machined from 9/32 in. diameter silver steel and are hardened and ground.

The camshaft, located above, and at right angles to, the crankshaft, is of 7/32 in. diameter silver steel and is driven by a pair of spiral gears of steel and gunmetal. The cams are of carbon steel, hardened throughout and accurately ground. Both cams and gearwheels are keyed to the shafts. The half engine speed camshaft, of course, also times the spark and a contact-breaker assembly, adjustable for advance and retard, is mounted on the left hand side of the camshaft housing. Tungsten points, adjustable for gap, are used.

A most interesting component of the Jensen is the carburettor assembly, which is of rather more elaborate design than the simple mixing-valve found on popular two-strokes. The essential parts of this unit comprise a die-cast body, with shaped venturi, which is bolted by means of a flanged joint, direct to the cylinder-head induction port, a barrel type throttle, lever controlled, and a needle-valve for mixture strength adjustment. This carburettor provides a much greater degree of control than that possible with the usual miniature engine, speed being controllable over a useful range simply by movement of the throttle lever—as in the case of full scale engines.

The principle of the carburettor is that the barrel has a 5/32 Whitworth internal thread into which the jet needle is fitted. When the barrel is rotated, by means of the throttle lever, to open the throttle, the jet needle, being restrained from rotational movement by a spring engaging its knurled head, is lifted very slightly, and allows an increasing quantity of petrol to pass the jet, thus maintaining a constant mixture strength as air supply is increased.

It will be noted that "petrol," rather than "petroil" is mentioned. The engine does not depend on the usual form of lubrication with small engines in which lubricant is blended with the fuel, but has a separate oil tank fitted to the crankcase nose. Lubrication is operated by crankcase de-depression and is controllable by means of a small needle valve in the base of the tank. When the piston is at T.D.C., oil is drawn through the crankshaft to the crankcase, where it is flung on to the cylinder walls and penetrates to the camshaft gear. Only the rocker gear then requires separate lubrication, which is simply effected by the application of a few drops of oil each time the engine is run.

For those interested, the Jensen C.I. Special can be obtained from Messrs. Craftsmanship Models Ltd., Norfolk Road Works, Ipswich.

Finishing

The aircraft section of the 1950 *Model Engineer* Exhibition, as with previous years, included some good examples of model aircraft finishing. On a few of the exhibits, many hours had obviously been spent in obtaining a "professional" finish of a quality which, of course, few enthusiasts would feel disposed to bestow on an everyday flying model. However, a good finish does not necessarily involve long hours of tedious work. It can be obtained with little extra effort provided that the right materials are used and a little care is exercised.

Finishes applicable to model aircraft can be roughly classified under three headings: (a) lightweight translucent doped finishes, usually brushed on; (b) coloured dope or lacquer finishes, brushed or sprayed and (c) sprayed and rubbed down cellulose finishes.

The first is essentially that adopted for lightweight and competition models with tissue covering, e.g., power/duration types. The second is mainly applicable to general purpose types and C/L models using tissue, silk or sheet balsa covering. The third is primarily for the purpose of an "exhibition finish" but has practical merit for speed models.

Power/duration models covered with tissue ("Modelspan" is ideal here) need at least two, and preferably three or four, evenly brushed on coats of dope to fill the covering material, followed by one of banana oil to give a gloss finish and render the covering less sensitive to changes in atmospheric conditions. A thinly applied coat of translucent coloured lacquer, such as "Aerolac," can then be used to good effect, adding very little weight and aiding visibility.

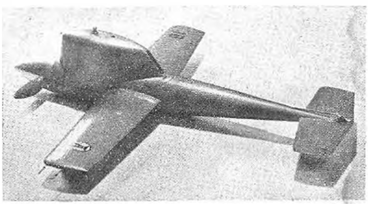
As is well known dope applied over tissue or silk which is at all damp, or applied in a damp atmosphere, will cause blushing. These white patches can sometimes be removed by brushing on thinners but if this is not effective, a coat of banana oil will usually do the trick.

Coloured dopes, brushed on and used on C/L and heavier F/F models, or on sheeted parts of duration types, are best applied in at least two or three thin coats. Over sheet balsa, rubbing down with very fine glasspaper between each coat will remove blemishes. Sheet balsa surfaces can be either covered with tissue to provide a better surface for the dope, or its grain can be filled with a suitable preparation. Wood filler can be purchased or, alternatively an effective substitute can be made up by mixing french chalk or talcum powder with dope and rubbing this into the wood. Do not brush on wood filler but rub it into the wood, using thinners to dissolve any lumps which may form on the surface.

For a properly polished cellulose finish, numerous coats with plenty of rubbing down are required. A spray-gun is a worthwhile investment here. After grain filling, a couple of coats of cellulose can be sprayed on to even up the colour and show up any blemishes, which are then removed, the process being repeated until a smooth, even surface is obtained.

To obtain a finely atomised spray, especially with low-pressure equipment, the cellulose must be well thinned down and rubbing down after every two or three coats is therefore sufficient. For rubbing down, the writer has found No. 400A silicon-carbide paper, lubricated with soap and water, very suitable.

When a satisfactory surface has been obtained, this may be polished with an abrasive metal polish, such as "Brasso" or "Bluebell," followed by a liquid car polish of the "Karpol" or "Lifeguard" type. If a transparent fuel proofer is to be applied—as is necessary with most modern fuels—two or three coats are advised to obviate the risk of this being removed in the final polishing.



Polished, sprayed-on finish of metallic bronze cellulose. (Eta powered speed model designed by the writer and built by J. Chinn)

MODEL TALK

BY
BILL DEAN

P. E. Norman with his E.D. 3.46 powered Bristol Bulldog

● INTEREST IN flying scale—both free flight and control line—has never been greater than it is today, so we think it's about time that we devoted a little space to the subject. One of the best known F/F scale exponents is P. E. Norman, who has been building this type for over twenty years now. We spent an interesting evening over at this modeller's workshop recently and came away with plenty of gen for *Model Talk* readers. P.E. is 39 years old and he joined the aeromodelling ranks in 1925, when he built a conventional rubber powered duration. A couple of years later, he was flying a *Sopwith Camel* fitted with pendulum controlled elevators. This must have been one of the first models (perhaps *the* first) to feature this method of flight control. All of P.E.'s subsequent scale designs have been fitted with pendulum controlled elevators and a recent *Typhoon IB* also had ailerons working on the same principle. Incidentally, the undercarriage on this particular model automatically retracted and detracted. P.E. built his first power model in '36 and soon he was using the " hollow log " method of fuselage construction for semi-scale designs. These models were the forerunners of the well known *Antspants* and *Natsneeze* designs which were later produced in kit form. Like nearly all of us, Norman hates to part with any of his models and at present he has something like fifty in his collection—most of them power jobs and not a control liner amongst them. Half of the motors are home made and several were produced without the use of a lathe! The scale models include the *Typhoon* (no less than seven versions!), *Tempest, Spitfire, F.W.*190, *Gloster Gamecock, Bristol Bulldog, Sopwith Camel* (and *Pup*), *S.E.*5, *Fokker D*6 (and *D.R.*1).

P.E.'s methods should interest many modellers, so details follow. The dimensions in brackets are typical for a 50 in. span model of the biplane variety. To start with, all the flying surfaces are outlined with reed ($\frac{3}{16}$ in. dia.), which is curved to the outlines and pinned in position on the plan. The bamboo spars ($\frac{3}{16}$ in. × $\frac{1}{8}$ in.—cut from long canes) and the balsa ribs ($\frac{1}{8}$ in. sheet), leading ($\frac{1}{2}$ in. × $\frac{1}{4}$ in.) and trailing (1 in. × $\frac{1}{4}$ in.) edges are added—then the reed is carved and sanded to conform to the aerofoil section.

Fuselage construction is begun by cementing four hard balsa longerons ($\frac{1}{4}$ in. sq.) to the front former (5-ply), followed by the remaining formers ($\frac{1}{16}$ in. ply). Strips of bamboo ($\frac{1}{4}$ in. × $\frac{1}{8}$ in.) are bound and cemented to the longerons, as far back as the cockpit. Stringers are hard balsa ($\frac{1}{8}$ in. × $\frac{1}{16}$ in.) and most of the structure in the vicinity of the engine and the wing attachment points is usually covered with fibre sheet (1/32 in.). Engine bearers are sheet fibre ($\frac{1}{2}$ in. thick)—being tapped and bolted to the engine bulkhead ($\frac{1}{4}$ in. fibre sheet). Fibre is preferable to ply for engine mountings as it is stronger and does not soak up fuel. The engine mount is attached by a crash proof fixing (see photo) and a flexible airscrew used so that power plant damage of any description is well nigh impossible. Fibre sheet is also used for making boxes for wing fittings—and wing tongues are usually cut from 5-ply. But where-ever possible, one piece wings are preferred. Silk or nylon should be used for covering to increase the general strength and provide tear protection when the models land in trees and bushes.

Fibre sheet is available in thicknesses ranging from 1/32 in. to 1 in. thick—while reed comes in sizes from $\frac{1}{16}$ in. to [illegible] in. dia. Both are cheap materials (sold by weight) and ten shillings worth is sufficient for several large models. Few model shops sell these materials, so P.E. passes on the address of his own supply source: Farmer Brothers, Fulham Road, Fulham, London, S.W.

We spotted many neat ideas on P.E.'s models. Such as: Covering the forward portions of *Fury* and *Bulldog* type fuselages with metalised silver paper (obtained from wallpaper stores). . . . Strips cut from cheap (Woolworths) plastic belts to represent rear undercarriage legs. . . . Hollow struts made up on balsa forms—held in place with rubber bands passing through the centres. . . . Radial cowls made from aluminium saucepans. . . . Guns, exhausts and similar details formed from painted plastic tubes.

To conclude, here is a brief description of some of P.E.'s non-modelling activities. During the week, he teaches at two well known art schools and his home at Banstead, in Surrey, is packed with examples of his work—which include water colours, wood carvings, sculpture and metal work. When the Queen Elizabeth was refitted after the last war, he was responsible for much of the decorative wood carving. On top of all this, P.E. also plays at dozens of musical festivals every year—frequently accompanied by his wife, who is a talented pianist. He makes his own violins and told us that each one takes about five weeks to complete, after which the final varnishing is spread over a year. He has two children, one a boy who is already showing signs of following in his father's footsteps. The sky at Epsom is going to be pretty crowded when P.E. Junior starts to fly his own scale models there as well!

★ ★ ★

● SCALE JETEX designs are becoming very popular. For a long time modellers steered clear of the new jet fighters (apart from the *Vampire*), until an American modeller hit on the idea of clipping the jet unit into a trough set in the underside of the fuselage. In flight, the installation is practically invisible. Several British kit designs—including the *Sea Hawk*, *Attacker* and *Thunderjet*—feature this method. The latest Lockheed jet design—the needle-nosed *F-90* would do well with Jetex power. Like most Lockheed aircraft, the *F-90* fighter has very graceful and distinctive lines. We hear that one model engine manufacturer is experimenting with a midget turbo-jet, but commercial production of such a unit seems a long way off.

★ ★ ★

● NORMAN BUTCHER has a few comments to make on the subject of scale models. He writes:

"At most scale contests, where models are judged for adherence to scale and finish, the latter is usually taken to mean a high degree of *constructional* attainment, rather than an exact scale reproduction of the finish of the real aircraft. In fact, with the exception of modern fighters, real aircraft finishes have often been very rough by comparison with modelling standards. Consequently, my latest scale control liner—of the *Bristol Racer* monoplane—will be as near as possible an exact replica of the original, even down to the paintwork. I am seriously thinking of using this model in open stunt events this season. To get out of the present team racer design rut, my next design will be based on the orthodox high-wing cabin monoplane layout."

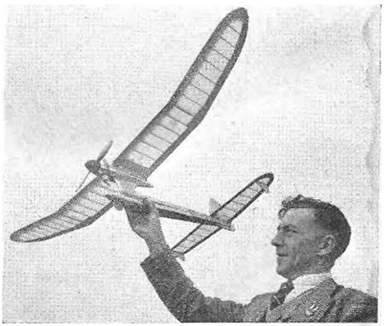
★ ★ ★

● WE WONDER how many Ellila inspired twin-motor Wakefields will be flown at the Wakefield Eliminators (May 6th). If we find the time to build a new model, it will probably be of this type. The main differences between Ellila's last model and his 1949 winner, was a shallower fuselage, "W" spacers, sheeted wing leading edge, smaller wheels and the addition of a spinner. Looking over the plans, we noted that the rigging angles of the flying surfaces had also been increased slightly. This is a point worth remembering, for cutting down "belly drag"—as models fly at relatively high angles of attack. In a recent American article, the Finnish expert reveals that he changed to a single tensioned motor on his 1950 model, but unsatisfactory flight tests soon made him go back to twin motors and gears of the type he used on the '49 design. If he wins the Trophy for the third year running we think he deserves to keep it!

★ ★ ★

In Brief

● IF YOU chose the right design, even rubber powered scale models are capable of duration performance. Henry Struck, the well known American designer once put up a four minute plus flight with an *Interstate Cadet*, to win the flying scale event at the American Nationals. . . . Writing in his Scrap-Box column, Bill Winter mentions that Jim Walker is soon to announce details of an entirely new method of controlled flying—under the name of *Air-line Control*. Walker, inventor of U-control, claims that with this new equipment, models may be *rolled*, in addition to such normal C/L stunts as looping and inverted flight. . . . We wonder why the side winder stunt job has never caught on in America to the same extent as it has in Britain. . . . Frank Ehling has an unorthodox method of getting his power models away at a contest. He fits a retractable ultra long single leg undercarriage which allows the model to take off almost vertically—in the best V2 tradition. . . . Hank Cole has developed an unusual type of control line trainer. It consists of a flying wing in which the outboard swept-back tips are hinged to the centre section at an acute angle. Control handle movements make the entire outer sections move so that the operator has visual indication at all times of up and down. Take off's are improved as the control surfaces are outside the prop slipstream and therefore only become effective as flying speed is approached.



A. F. W. Moore of the Blackheath M.F.C. holds aloft his Elfin 1.8 powered Frog Powavan. This highly original design was produced for International Model Aircraft Ltd. by J. R. Vanderbeek

TEAM RACING FUELS

By K. R. Waddingham and D. G. Taylor

Ken Marsh and Ken Muscutt checking tank capacity at the West Essex Team Race

THE authors have noticed that most of the major team racing events so far have been won by medium capacity diesel-powered jobs. These models, though slower than the "29" Gloplug jobs have won out on range, making only one or two stops. The "29" models often manage 35-40 laps per tank which means that they have to make four stops although the final hop may only be 5-10 laps.

Our aim, therefore, has been to produce a fuel which will give 40 + laps (three stops) with a power output equivalent to standard methanol blends. Other requirements for such a fuel are availability and reasonable price, so we have endeavoured, where possible, to use constituents which can be bought over the model shop counter.

Blending a percentage of petrol or benzol with the methanol was first tried. This definitely increased the range but reduced the speed considerably and made the needle settings very critical. Next we blended the benzol with Barron Nitro-Superglo, the nitro-methane content of which improved the power output, flexibility and ease of starting considerably. A further development was to mix various percentages of Mercury No. 4 and Barron Nitro-Superglo which gave similar results. Incidentally, we believe Mercury No. 4 to be a mineral oil fuel, while Barron Nitro-Superglo is a castor oil fuel. However, in practice we have found that these fuels blend quite well provided that the bottle is shaken up before use.

Table I gives results of some of the tests we have carried out on two Frog "500" powered team racers. The speeds quoted are average results for the whole flight.

TABLE I

Test No.	Fuel	Percentage	Prop.	Laps	Speed m.p.h.
1	Methanol Castrol "R"	75 25	9 × 8 Truflex 8½ × 8 ,, 8½ × 8 Truflo	37 32 35	70 70.6 75
2	Barron Nitro-Superglo	100	8½ × 8 Truflo	34	82
3	Mercury No. 4	100	9 × 8 Truflex	69	60
4	Mercury No. 4 Methanol Castrol "R"	50 37½ 12½	9 × 8 Truflex	51	65
5	Nitro-Superglo Benzol Castrol "R"	50 37½ 12½	8⅝ × 8 Truflex	44	67

Test No. 1 — Indicates an average of 70 m.p.h. and less than 40 laps.

Test No. 2 — Similar to No. 1 but higher speed.

Test Nos. 3 *and* 4 — Straight No. 4 gave adequate range with reduced speed. After blending with methanol the speed increased, but the range was reduced slightly too much. A better mixture would be Mercury No. 4 65 per cent., methanol/Castrol "R" 35 per cent.

Test No. 5 — This fuel gave excellent results using a standard Frog "500." At a recent club team race, three stops were made during a ten-mile race and the laps per tank were 39, 40, 45 and 41; the race being won by K. R. Waddingham with five laps in hand. The joint author, D. G. Taylor, finished second. Both were using standard 9 in. × 8 in. Truflex propellers cut to 8⅝ in.

The tabulated results show that a range of 40 laps is easily obtainable with any "29" Glo-Plug engine at speeds approaching those obtained with straight methanol fuels. Further, we believe that many of the more economical engines will, with a suitably high percentage of Mercury No. 4, petrol or benzol, exceed 54 laps per tank (two stops).

To do this and maintain a high speed with ease of starting and flexibility of running it will be necessary to blend in a rather higher percentage of nitro-paraffin than is obtained from Nitrol-Superglo and we suggest that Barron Nitro-Propane could be used, up to 10 per cent. of the whole mixture. Such a fuel might then be :—

Benzol (or petrol)	40 per cent.
Methanol	25 ,, ,,
Nitro-Propane	10 ,, ,,
Castor Oil	25 ,, ,,

(Continued on page 202)

WING POSITIONS

By Ron Warring

CURRENTLY, with the introduction of the amendments to the Wakefield specification and the establishment of the Nordic A-2 glider class with a specification based on total wing and tail area, the question of the respective merits of different wing positions assumes considerable importance. There are the two aspects to consider—efficiency and stability—both, to a certain extent, inter-related. With "fixed" wing areas (i.e. governed by a definite specification), efficiency is very important. The 1950 Wakefield has shown us that it *is* possible to run contests in absolutely non-thermal conditions. There would be strong support for running other important contests under similar conditions when, assuming that the leading fliers were all capable of trimming their respective models to the limit, performance figures would then be a measure of aerodynamic efficiency.

Nor is a careful study of wing positioning confined to rubber model and glider designers. Efficiency may not be of such great importance in power duration models where unrestricted wing area is permissible, or in sports models where sheer performance is a secondary consideration. But *all* free flight models require adequate stability. Stability is generally assured by correct design proportions, but the margin of stability so arrived at by this generalised method will be affected by the position of the wings relative to the fuselage. With a pylon-type power duration model, for example, there would appear to be an optimum pylon *height* for any particular combination of design size and power.

The first point to explain is just what there is to be gained by plugging the wings into the sides of a fuselage. In other words, what is the efficiency of the non-existent centre section (actually the fuselage between the wing halves)? The subject has been dealt with before, but so many people still appear ignorant of the basic facts, that they will bear repeating. They will be of particular significance now that the Wakefield rules have been changed to compute wing area on *gross area* (FAI method) instead of on net area or actual wing area (the old SMAE method).

The distinction between these two definitions is illustrated in Fig. 1. The net area is the actual area of the wings of lifting surfaces. Where the wing halves fasten on to, and are separated by, a fuselage, the virtual wing planform is continued through the fuselage. That this virtual area can be effective as a lifting area we shall see in a moment. It is included in defining *gross wing area*, and so in all cases other than a simple "uninterrupted" wing, gross area is greater than net area.

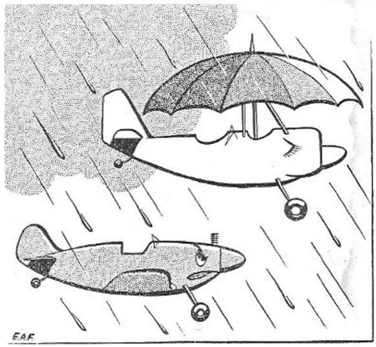
Under the old SMAE rules, therefore, a design layout utilising a gross wing area greater than the nett wing area gained a certain amount of effective wing area for nothing (actually at the cost of the weight of the wing fixing). Under rules where wing area is defined as gross area, the question is very much more open. It now virtually becomes a question of—is the weight of the wing fixing on a shoulder wing layout worth it? The gain is now mainly a mechanical one two piece wings for convenience of handling and carriage; and positive wing positioning. Aerodynamically a one piece wing of identical (gross) area cannot have a lower efficiency (unless badly positioned) and should be lighter in overall weight.

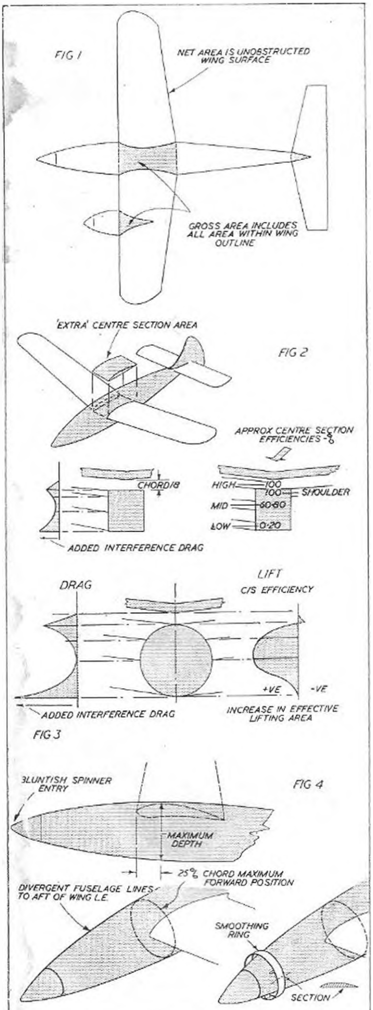
However, let us first examine the experimental data which are available on centre section efficiencies with different wing positions. Treating these in a generalised manner, typical figures for parasol, high, shoulder-, mid- and low-wing layouts on a slabsided fuselage are summarised in Fig. 2.

Down to a low-shoulder wing position the efficiency of the centre section as a *lifting* area remains appreciably unaltered, provided the wing-fuselage junction is good, i.e., no gap. Best position is with the upper surface of the wings level with the top of the fuselage, when the centre section should be 100 per cent. effective as a source of lift. This is because the lift distribution over the wings is continuous from tip to tip—the upper surface of the wings contributing the greater proportion of lift and the upper surface is substantially unbroken from tip to tip.

Lowering the wing results in a definite falling off in centre section efficiency. In the low wing position this figure may be anything from 0 to 20 per cent.

The effect is somewhat similar on a circular fuselage (Fig. 3) although the variation is more marked. A shoulder wing position still has, roughly,





a centre section of 100 per cent. efficiency as a lifting area, but in the extreme high and low wing positions interference between wings and fuselage is most marked and may even result in a loss of effective lifting area on the *net* area of the wings so placed. The shoulder wing position is definitely best in this respect, with a high centre section efficiency. The mid-wing position has the least drag of any of the combinations and a possible centre section efficiency (as a lift producer) of about 80 per cent. The fact that this centre section area is a maximum at this mid position gives the mid-wing layout a possible overall advantage. Aerodynamically, at least, therefore, the mid-wing layout would appear to be the best to use with a circular section fuselage.

With the slabsided fuselage (Fig. 2) the virtual centre section area remains the same, with the shoulder wing position most effective as regards lift. The mid-position gives least drag, drag increasing as the wing is raised or lowered from this position. The drag increase by raising the wing to the shoulder position is, however, slight. Drag in the low wing position is appreciably increased. In any of the combinations, drag of the wings and fuselage together is almost certain to be higher than the sum of the fuselage and wing drag separately. With the mid-wing streamliner this additional "interference" drag can be reduced to zero.

Interference drag can also be reduced to zero by locating the wings away from the fuselage, the critical distance being 1/8 the (wing) chord with a slabsided fuselage and 1/10 the chord on a circular section fuselage. In this respect, therefore, the parasol wing layout has an advantage, although the total effective lifting area is now only the net area of the wings.

On an overall basis, with net wing area limited, there is a definite advantage to the two-piece plug-in wing. The best example is, of course, the mid-wing streamliner for we have that additional (centre section) lifting area obtained with no structural weight (other than weight of the wing fixing), and with no increase in drag. However, in practice it is debatable whether this high efficiency would actually be realised and, especially on a slabsided fuselage, it is best to assume that the interference drag added to the separate drags of the wings and fuselage is likely to be of the order of the drag of a parasol wing with a net area equal to the gross area of the plug-in wing combination—the minimum amount of parasol being 1/8th of the wing root chord.

Compared with a high wing of the same (gross) area however, the plug-in shoulder-wing or mid-wing combination should be more efficient. The high wing combination will have the same total wing drag, plus an additional interference drag.

On the face of it, therefore, when it comes to designing a model to a specification based on limited *gross* wing area, both the parasol and shoulder-wing layouts appear equally effective, and both superior to the orthodox high wing type. With identical construction, the parasol wings themselves will be heavier—having greater actual area. But to the weight of the shoulder wings (built to the smaller or net area) must be added the weight of the wing fixing. On the whole the latter should still come out lighter. If of normal tongue and box type, the tongues themselves certainly need not weigh as much as the difference between the two wings. The weight of the fuselage box should then be more than offset by the weight of the wing mount necessary on the parasol model fuselage. Both types will, of course, be heavier than the equivalent high wing layout, and so all round there is very little to choose between all three. There is less likelihood of running into trouble, aerodynamically speaking, with the parasol arrangement. A bad wing-fuselage junction on a shoulder wing layout, for example, may completely break up the airflow in this region and give rise to a considerable increase in drag as well as a falling off in lift in this region of the wing. But properly done it can be very effective and mechanically sound. There is also the point that plug-in wings go hand in hand with tapered wing planforms, slightly more efficient aerodynamically and certainly the better structural outline. A properly designed lightweight tapered wing has less tendency to develop asymmetric warps than a similar parallel chord wing, especially if the latter is in one piece from tip to tip.

Another point of extreme importance, affecting both efficiency and stability, is the shape of the fuselage at and leading up to the wing position. This is a subject which has, so far, received very little attention in model work. It has been found particularly significant in the full scale world and although models are undoubtedly operating under very different airflow conditions at around 15 to 20 m.p.h., many of the same generalisations must apply.

The main thing is to ensure that the airflow over the fuselage does not break away before reaching the wing junction. If it does, wing section efficiency cannot be anything but low (low lift and high drag). This would appear to be particularly important on models where emphasis is laid on glide performance (e.g. Wakefields and contest gliders).

The greater the length of fuselage in front of the wings the more difficult is it likely to be to preserve good airflow back to the wing position—or the more important forebody shape becomes. The entry shape on the majority of rubber models is generally poor and so it seems that here there might be considerable room for improvement. Pylon-type power models are not affected by this issue since the wings are generally entering free or undisturbed air.

In fact, there is considerable evidence to the effect that the breakaway of airflow from the fuselage of the average Wakefield is well in front of the wings—probably very close behind the front former. A "drag-producer" such as a flat disc on the front of the prop. spinner appears to have no effect on performance, indicating that the original airflow conditions were just about as poor as they could be!

There is the possibility of some considerable gain in overall efficiency in paying attention to this point, particularly where some serious attempt is made to streamline the rest of the model. Fuselage lines from the tip of the spinner back to the wings should be as

FIG 5

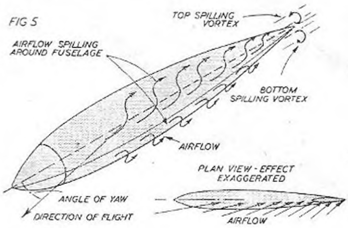


FIG 6

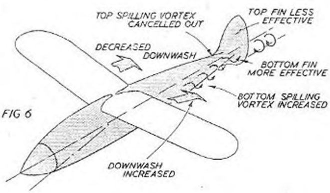
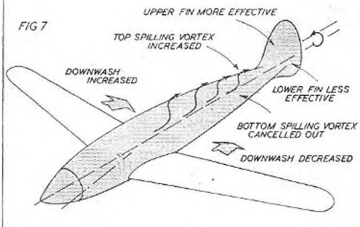


FIG 7



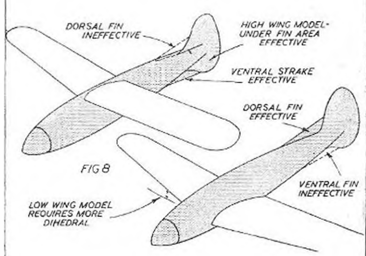


FIG 8

smooth as possible, with no radical change in contour. The spinner shape itself would probably best be rather bluntish—not pointed—and it is almost certain that the maximum depth of the fuselage should never come in front of the wings—Fig. 4—for the change in contour here is a most likely separation point.

Even with careful attention to shape it is still problematical whether or not it would be possible to preserve a smooth airflow so far back as the average wing position on an orthodox Wakefield—to the inherent disadvantage of all streamlined and semi-streamlined set-ups. The parasol layout is likely to be less affected. One can only advance the suggestion that a little experimental work would appear to be justified, such as the fitting of a circular slot or "smoothing ring" around the fuselage forebody behind the nose former to see if any increase in performance can be realised with a controlled airflow.

The final point to be discussed in this article is the effect of the airflow over the wings and fuselage on stability—and in particular the type of airflow resulting at the tail end of the machine. Readers are particularly referred to an article called "Sidewash and Stability" by H. K. Millicer, which appeared in the July 27th 1950, issue of *Flight*. In discussing sidewash effects the author touches on many points of interest to model designers and does, in fact, pay tribute to aeromodellers for appreciating the *effect* of such flow, if not the cause.

Broadly speaking, stability in, and recovery from, a skidding or yawing motion where the model has been displaced side-on to its normal direction of flight is governed by dihedral power and fin power. Airflow over the fuselage itself, when yawed, is as shown in Fig. 5. There is a flow from the forward-facing side around the top and bottom of the fuselage—as well as from nose to tail, resulting in a pair of weak (on a model) vortex trails from top and bottom having effect of increasing the sidewash or airflow angle at the tail. The bulkier the fuselage the greater the volume of "trailing air" produced.

This airflow condition is considerably modified by the position of the wing. High or shoulder-wing positioning has the effect of cancelling out the top fuselage vortices and increasing the strength of the bottom fuselage vortices—Fig. 6— at the same time modifying the downwash over the wings themselves. This means, in effect, that the angle at which the airflow strikes the fin (when the model is yawed) is straightened out over the upper fin but increased over the lower fin. The lower fin has, therefore, a greater effective angle of attack in yaw.

The net effect is twofold. With a high wing position the efficiency of the upper fin as a stabiliser is reduced (due to cancelling out of top vortex flow), whilst the dihedral is effectively increased (due to modification of downwash). In other words, fin area *underneath* the fuselage (where the vortex strength is doubled) is very much more effective than fin area above the fuselage, although, of course, it is not generally possible to locate all the fin underneath the fuselage without running into other stability troubles.

This effect—reduction in fin efficiency—was described in the article introducing "anti-spin fins" published some three years ago when it was mentioned that fins outboard from and clear of the fuselage airflow were more effective than an increase in central fin area.

Interference conditions with a low wing layout in yaw are very dissimilar—Fig. 7. The downwash effect is now reversed, reducing the effectiveness of the dihedral—and it is a well established fact that a low wing model needs more dihedral than a high wing machine—and giving increased sidewash over the *top* of the fuselage. In other words, *top* fin is more effective on a *low* wing layout and, being in the region of increased sidewash, needs *less area* than for a comparable high wing model.

The author of the *Flight* article quotes some interesting figures which, applying as they do to full scale, can only be regarded as illustrative for model work. His figures for dihedral effectiveness are :—a high wing position being equivalent to an extra three degrees of dihedral and a low wing position to three degress *less* dihedral than an arbitrary standard.

The actual value of the sidewash at the tail would appear to be anything up to twice the angle of yaw. Thus in a 10 deg. yaw, for example, the upper fin on a high wing machine might be at 10 deg. angle of attack with the lower fin at 15-20 deg. Furthermore, small dorsal and ventral fins have been found extremely effective with a height of only 5 per cent. of the fuselage diameter—a ventral (or upper) fin (strake) being pertinent to the low wing layout and a dorsal fin (strake) to the high wing machine. The fitting of a fin strake to a high wing model, as is often seen, would appear to be relatively useless.

Team Racing Fuels

(*Continued from page* 198)

N.B. Any fuel containing nitro-paraffin (e.g. Mercury No. 7) may be used as an alternative to Nitro-Superglo.

These fuels with high benzol or petrol and nitro-paraffin contents are rather hotter running than methanol mixtures and generous cooling slots are required.

The process for obtaining the best fuel may now be summarised as follows :—

Make a flight using ordinary methanol fuel, noting average speed and range. If the model is not doing 40 laps, start replacing some of the methanol by benzol or petrol 5 per cent. at a time and note the speed and range again. Repeat until a suitable range, say, 42-43 laps is regularly obtained. If the speed falls, mix in 5 per cent. nitro-paraffin or blend with Nitro-Superglo as indicated in the tables.

If the model, however, does over 40 laps on ordinary fuel, you may like to try for 54 laps and two stops by using the previously mentioned nitro-propane fuel.

Here we must emphasise that all the percentages quoted are for our engines only (Frog "500") the correct values for your particular engine can only be found by experiment.

A FEATHERING AIRSCREW

BY G. A. T. WOOLLS

THE idea of turning airscrew blades "edge on" to the line of flight, in order to reduce drag in the glide, is by no means new. A method developed by Marvin Setzke from a suggestion by Carl Goldberg, is described in Frank Zaic's 1937 Handbook, and a definite flight improvement was claimed. Like the "return gear" motor drive, also described in the 1937 yearbook, the feathering prop has staged a comeback, due mainly to its use by E. W. Evans on his very successful "Vansteed."

The beauty of the idea is that it has the advantages of both freewheeling and folding, with none of their attendant disadvantages. The drag is reduced without change in c.g. position, or reduction in forward area, which, in the case of the folder, causes the fin to increase its effectiveness to the possible detriment of spiral stability.

Actually the blades are not fully feathered, which condition causes the airscrew to lie horizontal, due to equal pressure on both blades, and act as a forward stabilizer. In fact, the airscrew blades are turned to a very high pitch so that a slow rotation is maintained throughout the glide.

Having summarised the advantages of the feathering airscrew herewith a few notes which together with the sketches should make the construction clear.

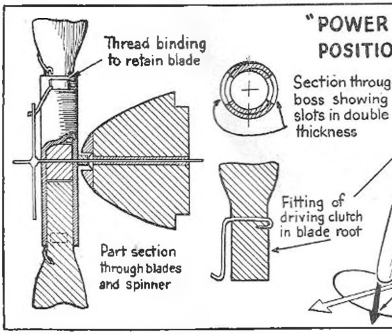
The blade roots are of a circular section (birch dowel, approx. $\frac{5}{16}$ in. dia. spliced, *a la* cricket bat, into the balsa blades) and they fit freely into a tubular hub. This is made from 1-mm. birch plywood, boiled in water for a few minutes, wrapped around a suitable former, and bound with rubber until dry. It is then unbound, glued, and again bound to the former. Overlap the edges, generously, in fact the tube should be of double thickness for over half the circumference so that the slots in which the wire clutches operate have double thickness at each end. The centre of the hub tube is plugged with a short length of dowel. Alternatively, the hub tube could be made from a length of thin walled dural tubing of the requisite bore.

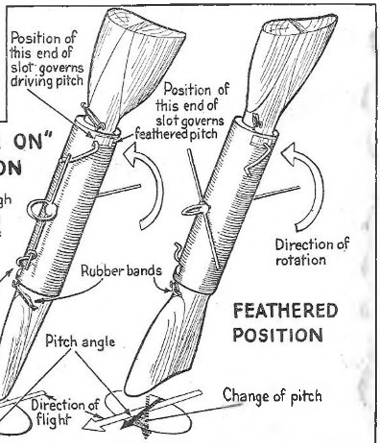
The driving clutches are formed from piano wire (20 s.w.g.), passed through a hole drilled in the blade roots, at right angles to the blade face, bent back on itself, and forced back into the root. The other end is then bent to form the clutch as per sketch.

The slots in the hub are cut approx. $\frac{1}{8}$ in. deep to receive the clutches and must be long enough to limit the rotation of the blades in the hub, between the "Power On" pitch and feathered position. Hooks bound to the hub and blades hold the small bands (cut from cycle valve tubing) which pull the blades into their feathered position.

The 20 s.w.g. piano wire driving bar, bound and soldered into the winding loop formed in the prop shaft, engages with the clutches and forces the blades into the "Power On" position and also drives the airscrew around.

A short length of brass tubing, soldered to the shaft behind the hub takes the pull of the wound motor, and allows the airscrew to freewheel freely, disengaging the clutches from the driving bar and then the rubber bands pull the blades into the feathered position.



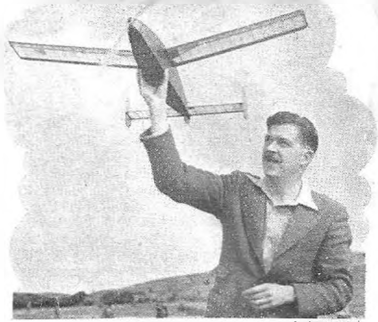


NORTHERN NOTES

★ AS EXPECTED, the Area Committee spent the greater part of the February meeting discussing the competition arrangements for the coming season. The five semi-centralised contests were arranged for Rufforth, Clifton, Rufforth, Clifton and Leconfield respectively, pre-supposing of course that Clifton will be available; I understand there may be a little difficulty there. Anyway, the first four meets are at York, at one place or the other, so you bods can get cracking and lay on those coaches. I was pleased to note that the September 2nd meeting was arranged for Leconfield, it will give the East Riding clubs a chance to show what they can do. Who knows, it may be that one or two of them may get together and give the rest of the Area some ideas on organisation. Final details of these meetings have not yet been worked out; I expect there will be one or two extra comps. laid on, and maybe one or two new ideas forthcoming. One of these, by the way, is pre-entry into the Wakefield and A/2 Eliminators, whilst the Area were partly in favour of pre-entry, they thought it smacked too much of regimentation to make the whole of the contests pre-entry and so are trying out the idea in this manner. Comp. secs. will be able to send in their club's entries up to seven days before the actual contest dates, entry fees need not be sent with the entries but can be paid on the day. As I expected, the entries for the Team racing events were not overwhelming, seven in all being the grand total, and surprisingly only 15 clubs have entered for the Area Knock Out Trophy. What's happened to the other 20 odd clubs, windy?

★ LOST, STOLEN or strayed. The Huddersfield Terror, alias the Snooper. Believed last seen heading in the direction of David Brown's field with his nose fast in his bootlaces. Any information would be appreciated by Peter Stringer and for his information I hasten to add I had nothing at all to do with it.

★ MEMBERS OF the Area were not a little surprised to learn that the York club have decided to withdraw the much appreciated invitation to the odd bod to drop in on Clifton 'drome when so inclined. It appears that an official agreement for the use of Clifton by the York Club has been signed and the club committee have decided that this agreement includes only bona-fide members of the York club and no others. To say the least, this decision seems very narrow, it means they cannot fly off a match in the Area knock-out at Clifton, even if drawn at home, since it would mean two or three strangers at Clifton,



K. F. P. Rutter of Harrogate with his Wakefield model

and if a Country Member should turn up wishing to take part in one of the decentralised contests—well! Imagine the poor bloke's feelings when it is pointed out, be it ever so politely, that only members may tread upon the sacred soil. And I wonder what the Yorks bods would say if they turn up at another club's rally and they are politely informed that they must not fly on someone else's ground? Seems to me a perfect example of the old army (or is it Naval?) motto "Bless you Jack, I'm in the boat!" Oh, for the pre-war days, when all modellers mucked-in together, and rivalry if keen was at least friendly.

★ FOLLOWING UP the idea of giving some newsy news about the clubs in the Area: a week or so back I had the pleasure of attending (suitably disguised as a tame pit pony) the official opening of the Creswell club's new club room. The club is one of, if not, *the* youngest club in the Area but their way of going about things is one which many of the older clubs could emulate with advantage. The tale of their club room is a case in point; stuck for a suitable room after outgrowing local stables and blacksmiths' shops, they approached a member of the local council emphasising the point that aeromodelling would keep the youths of the village out of mischief and were given permission to use a Nissen hut which the local squatters had overlooked or by-passed. I should say it had been by-passed because when taken over it was in a very poor state, no windows, doors burst open and full to overflowing with some diabolical waste asbestos product, in fact, a sight to put anybody off. That didn't deter the Creswell lads; weekend after weekend they worked, cleaning, painting, glazing, fitting up electric light, scrounging floor covering and all the other little jobs necessary to turn the once neglected hut into a really first class club room. This hut now has three rooms fitted with work benches, easy chairs, radio and what have you; the entire work has been done by club members and financed by funds cajoled and bullied from goodness knows where. But the point is—they have done it.

And what's more, by dint of tact and courtesy they have the members of the local council and the local school authorities on their side too, in fact after a touching speech (touching is the word) by the Area's prize cadger, Councillor Keeton opened a public subscription list with a donation of 2 guineas and a promise of more influential names to follow. The local school gaffer, in his after dinner speech, made a witty point; he said the Creswell club had made an important aeronautical discovery, they now knew how to make pocket money fly. Good luck, Bob, Tom, and the rest of the gang ; you'll soon fill up the walls with the certificates you want if you keep the same spirit flying. And incidentally I'll be over again one of these days if only to have a look at Cuckney.

★ ONE OR two points in the new competition programme could do with a bit of clarification. I note that hand launching is now permitted in S.M.A.E. competitions, at the launcher's discretion. How will this tie up with the Merit Certificate rules, is hand launching permitted here also? And I see that one or two people are under the impression that the Society has laid down that there will be a fixed and definite time for the conclusion of each round in Area Semi-Centralised competitions. Is this a definite rule, or merely stated for the general guidance of Area Comp. Secs., and the actual details of starting and finishing times left to their individual ideas. One notes too, that in the times stated for the completion of rounds, the last round finishes at 6 p.m. How come? I have always been under the impression that finishing time in all comps. was 7 p.m. and for the sake of everyone concerned don't let's drag in G.M.T. and/or British Summer Time, or as it may be during the Festival period, British Double Summer Time.

★ AND SO, whilst we are still in a softened mood, let's touch on the pleasant things that have happened this month : first of all, congratulations to " Those Two " (Sylvia Bell and Peter Stringer to the ignorant) upon the occasion of their engagement—may they live long and die happy—may their wedding be soon—may there be lashings of beer and beautiful bridesmaids and may I be invited. If I'm not there'll be some cracks in this column somewhere.

CONTEST CALENDAR

Mar.	25th	**GAMAGE CUP.** Unrestricted Rubber. D/C.	
(Easter)		**PILCHER CUP.** „ Glider. D/C.	
Mar.	26th	CROYDON & DISTRICT GALA. Fairlop Aerodrome.	
April	1st	SURBITON GLIDER GALA. Epsom Downs, Surrey.	
„	15th	***ASTRAL TROPHY.** F.A.I. Power Duration Area.	
„	15th	**RIPMAX TROPHY.** Radio Control. Area.	
„	15th	**S.M.A.E. CUP.** A2 Glider Eliminator. Area.	
„	29th	NORTH HAMPSHIRE RALLY. Lasham Aerodrome, Nr. Alton.	
May	6th	***WESTON CUP.** Wakefield Eliminator. Area	
„	6th	**HALFAX TROPHY.** Unrestricted Power/Ratio. Area.	
„	13th & 14th	**BOWDEN TROPHY.** Power/P.A.A.-Load. International.	
„	14th	**POWER CONTEST.** Power/Duration.	
(Whitsun)		**" AEROMODELLER " R/C TROPHY.** Radio Control. Centralised. Probable venue Fairlop Aerodrome, Essex.	
May	27th	***K. & M.A.A. CUP.** A2 Glider Eliminator. Area.	
„	27th	**GUTTERIDGE TROPHY.** Wakefield Eliminator. Area.	
June	10th	**PREMIER SHIELD.** Wakefield Eliminator.	
„	10th	**A2 CHALLENGE CUP.** A2 Glider Eliminator Centralised. Cranwell Aerodrome, Lincs.	
„	17th	WEST ESSEX GALA. Fairlop Aerodrome.	
„	17th	WALSALL M.A.C. RALLY.	
„	17th	SWINDON M.A.C. SLOPE SOARING MEETING. Wiltshire Downs.	
„	24th	NORTHERN HEIGHTS GALA DAY, Langley, Buck.	
„	24th	MERSEYSIDE SLOPE SOARING MEETING, Clwyd Hills, N. Wales.	
July	1st	***" MODEL ENGINEER " CUP.** U/R Team Glider. Area.	
„	1st	**WOMEN'S CUP.** U/R Rubber/Glider. Area.	
„	1st	**POWER CONTEST.** U/R Power/Duration (.01-1.5 c.c.) Area.	
„	14th	**FESTIVAL OF BRITAIN.** National Model Flying Championships, Empire Stadium, Wembley. Control Line Stunt, Speed, and Team Race.	
July	15th	**KEIL TROPHY.** U/R Power/Ratio. Area.	
„	15th	**LADY SHELLEY CUP.** Tailless. Area.	
		THE BRITISH NATIONALS Fairwood Common Aerodrome, Swansea.	
Aug.	5th	**" GOLD " TROPHY.** C/L Stunt.	
„	5th & 6th	**C/L SPEED.** C/L Speed.	
„	6th	**THURSTON CUP.** F.A.I. Glider.	
„	6th	**" MODEL AIRCRAFT " TROPHY.** F.A.I. Rubber.	
„	5th & 6th	**S.M.A.E. R/C TROPHY.** Radio Control.	
„	6th	**SIR JOHN SHELLEY CUP.** F.A.I. Power/Duration.	
„	12th	SOUTH COAST GALA. All free-flight power.	
„	18th	**INDOOR NATIONALS**	
„	18th	Free Flight—Stick H.L..	
„	18th	„ „ —Fuselage H.L.	
„	18th	„ „ —Unorthodox	Probable venue—Manchester
„	18th	R.T.P.—Class A & B	
„	18th	„ —Speed	
„	19th	DAILY DISPATCH RALLY, Woodford.	
„	19th	ALL-HERTS RALLY. Radlett Aerodrome, Herts.	
„	26th	HUDDERSFIELD AIR LEAGUE RALLY.	
Sept.	2nd	***FARROW SHIELD.** U/R Team Rubber. Area.	
„	2nd	**JETEX CONTEST.** Ratio. Area.	
„	2nd	**SCALE POWER.** Power/Duration. Area.	
„	16th	**BRITISH CHAMPIONSHIPS.** Rubber/Glider/Power. Cranwell Aerodrome, Lincs.	
„	16th	**TAPLIN TROPHY.** Radio Control. Centralised. (Venue to be announced).	
„	30th	**DAVIES TROPHY.** Team Race League Finals. Fairlop Aerodrome, Essex.	
Oct.	7th	**U.K. CHALLENGE MATCH.** Rubber/Glider/Power. Centralised. Heathfield, Prestwick.	
„	14th	**" FLIGHT " CUP.** Unrestricted Rubber. D/C.	
„	14th	**FROG JUNIOR TROPHY.** Unrestricted Rubber/Glider. D/C.	
„	28th	**HAMLEY TROPHY.** Unrestricted Power/Duration. D/C.	

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

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

REPORT OF S.M.A.E. COUNCIL MEETING HELD AT THE HORSE SHOE HOTEL, TOTTENHAM COURT ROAD, LONDON, ON SUNDAY, FEBRUARY 18th 1951 at 11.0 a.m.

The following were present: Messrs. A. F. Houlberg (Chairman), R. F. L. Gosling, D. A. Gordon, H. W. Barker, S. D. Taylor, C. S. Rushbrooke, M. A. L. Coote, K. J. A. Brookes, E. F. H. Cosh (London), G. Foden (East Anglia), J. M. Taylor (W. Scotland), A. Scott (S.E. Scotland), B. A. Messom (Northern), D. Salloway (North Western), R. C. F. Day (Southern), H. G. Hundleby (S. Midland), Flight Lieutenant A. F. Davidson, D.F.C., (Royal Air Force M.A.A.), D. S. Scoffham (Royal Aero Club).

South Eastern Area

The Treasurer, Mr. H. W. Barker, reported that the information which he had requested from the Secretary of the Area had not so far been received. He stated that after recovery of outstanding amounts due for advertising in the 1950 C/L meeting programme there would probably be a loss of £40 in respect of the sum of £160 advanced by the Society to meet the cost of printing. It was noted that the South Eastern Area had called a Committee Meeting on the same day as the Council Meeting and it was decided to request the Area to send a representative to the next Council Meeting on the 31st March. The Area Committee's attention is to be drawn again to the Council's decision not to sanction the holding of the 1951 S.E. C/L Championships Meeting, unless the Council were represented on the Organising Committee. Messrs. A. F. Houlberg and H. W. Barker, were appointed to serve in this capacity.

Records

The following records were ratified :—Light Weight Glider (H.L.) J. G. Joyce, (Leeds M.F.C.) 3 mins. 55 secs. A2 Glider (H.L.) K. Pickles (West Yorks M.A.C.) 3 mins. 49 secs.

The following record applications were accepted :—Light Weight Rubber Float Plane, J. O'Donneil, (Whitefield) 1 min. 43.5 secs., Light Weight Power Tailless, M. M. Gates, (Unattached) 2 min. 47 secs.

Merit Certificates

These were awared to the following :—Class B. No. 196 Lefever, G. J. (West Essex) Class A. No. 476 Hawkes, J. F. (North Wirrall) 477 Ralph, J. (Glevum) 478 Sutton, D. (Watford) 479 North, P. G. (Cardiff) 480 Giles, A. R. (Cardiff) 481 Foulkes, P. D. (Cheadle) 482 Hunt, R. G. (Evesham) 483 Hewitt, A. J. (Sth. Birmingham) 484 Briggs, A. L. (Grimsby).

Applications for affiliation

Applications from the following new clubs were accepted. Leyland & District M.F.C. S. 12. J. 7 Fee £2.9.6, Bridlington Model Club (N. Area) S. 7 J. 11 Fee £1.19.0, Withernsea & District M.A.C. S. 5. J. 9. Fee £1.12.0, Thetford Experimental Society of Telearclusts. (E. Midland Area) S. 9. Fee £1.13.0, Baldock M.A.C. (S. Midland Area) S. 3. J. 4. Fee £1.11.5, Irvine & District M.A.C. (W. or Scotland Area) S. 10. Fee £1.15.6. Dunfermline M.A.C. S. 12.J.3. Fee £1. 13. 0.

Finance.

The Treasurer presented his Statement of Accounts which showed a balance in hand of £656.2.5d. and was accepted.

1951 S.M.A.E Handbook

Due to a substantial increase in the cost of production it was decided that the price should be increased to 1s. 6d.

Wakefield Draw

The council were informed that two books of tickets had been sent to each affiliated club. Holders of books are requested to return the counterfoils to the Treasurer, Mr. H. W. Barker, 14, Mayfair Avenue, Lincoln, on or before May 1st. 1951 *by registered post.*

Area Resolutions

London Area. (*a*) "That the London Area regrets the recent proposal of the S.M.A.E. Council restricting the Officers of the Society from attending functions of the Northern Heights Club, in view of the facts now established that Mr. Bell spoke at the recent A.G.M. as an individual and not as representing his club. It is therefore proposed that this motion be rescinded."

After a short discussion the proposal was carried.

(*b*) "That the Council considers increasing the amount of profit allowed to Area Committees on the sale of S.M.A.E. materials to enable Areas to dispose of same without financial loss."

This proposal was defeated, it being pointed out by a number of Area representatives that no loss was involved in the sale of S.M.A.E. goods in their particular Areas.

Other Resolutions

(*a*) "That the Council request each Area to conduct an interna raffle for engines (or other goods) to be purchased at cost price by negotiation with the trade." This proposal was withdrawn after several delegates had pointed out that it would be more advisable to concentrate on the disposal of Wakefield Draw tickets.

(*b*) "That double entry fees be charged for such contests as are delegated for International Contest eliminators."

It was decided to defer any decision on this proposal until next year's contests are being considered.

(*c*) "That, during the Festival of Britain period, foreign visitors providing proof of membership of their own National Model Flying Organisation shall be offered temporary honourary membership to the Society, enabling them to enter S.M.A.E. Contests at the same rate as ordinary members instead of at the much greater non-members rate." Carried unanimously.

(*d*) "That the F.A.I. be requested to consider modifying the models mensuration system to permit the surface areas being computed from actual instead of projected areas." It was decided to ascertain the views of the F.A.I. Model Commission on this proposal.

(*e*) "That the Council shall issue a statement regarding the eligibility or otherwise of non British Nationals to participate to Wakefield or other trials conducted for the purpose of selecting British Teams for International Contests."

The Council decided that whilst non British Nationals would be permitted to enter such trials they would *not* be able to gain places in British Teams.

Advisory Committees.

Captain S. D. Taylor, submitted a draft scheme for contest organisation which involved the appointment of certain permanent officials. The following were elected to fulfil these duties. *Controller*, Captain S. D. Taylor, *Jury*—A. F. Houlberg, E. F. H. Cosh, C. S. Rushbrooke, (Deputy) R. F. L. Gosling. *Check Point Officer*—M. A. L. Coote, *Field Controller*—B. A. Messom. *Take-off Area Controllers*—D. A. Gordon and C. Brett. *Stewards*—H. Hills.

1952 Contest Programme

B. A. Messom urged that the 1952 programme be decided well before the end of the 1951 season in order to make possible an earlier publication of the Handbook. He proposed that the 1952 events be based on the 1951 programme, thus giving a full year for preparation of the 1953 programme. This proposal was seconded by C. S. Rushbrooke and carried.

Press Matters

M. A. L. Coote, drew attention to the fact that certain model specifications and contest rules had been published before they had been ratified by the Council. The Competition Secretary was instructed to advise all members of Advisory Sub-Committees that under no circumstances were they to divulge such information in the future. The Council agreed that new rules, etc., should be promulgated by the P.R.O.

Merit Certificates Qualification

It was decided that hand-launched flights made in contests would not be accepted for merit certificate qualification.

The Meeting terminated with a vote of thanks to the Chair at 5.30 p.m.

NORTH EAST AREA COMMITTEE

Despite the bad weather, the attendance was good at the Area A.G.M., held on 4th February.

Officials for the coming season are Mr. C. T. Applegarth (Chairman), Mr. P. McAlroy (Secretary), Mr. R. M. Bainbridge (Treasurer), Mr. P. Bainbridge (Comp. Secretary) and Mr. E. G. Earhart (P.R.O.). To further inter-club relations, a monthly news-sheet will be produced and a Team Racing League is being organised.

On the day previous to the A.G.M., a prize-giving tea was held in Durham. One of the ladies serving tea confused Mr. R. F. L. Gosling with Lord Lawson of Beamish, the Durham Club's President, and asked if Lord Gosling would like more ice-cream ! Following tea, a first hand account of the 1950 Nordic A2 Contest was given by Mr. Gosling and two excellent colour films, very kindly loaned by Mr. Len Stott, were shown.

SOUTH WESTERN AREA COMMITTEE

The A.G.M. of the South Western Area, was held at Torquay on January 21st, and in the absence of the chairman, Mr. J. F. Wilson-Smith, Mr. E. J. Taylor presided. A letter was read from Mr. Smith tendering his resignation, in view of the fact that the Teignmouth Club now consisted of two members, and could not continue affiliation. The meeting decided that Mr. Smith be invited to join the Torquay Club and continue as chairman. The hon. secretary, Mr. D. W. Bullock, in his report, regretted small area contest entries and hoped 1951 should prove a good year. The hon. treasurer, Mr. F. P. Earle's report showed a balance of £7 2s. 11d., the area also having property and stock value £5 15s. 2d.

Election of officers resulted : Mr. P. Ash (Plymouth) vice-chairman, Mr. F. P. Earle (Torquay) hon. treasurer, Mr. D. W. Bullocke (Torquay) hon. secretary, Mr. G. Lynn (Plymouth) competition secretary, Mr. E. F. Taylor (Torquay) press officer, Mr. P. G. Wilde and Mr. J. W. Newbold-Bradshaw, hon. auditors.

SOUTH EASTERN AREA COMMITTEE

We learn that the Ashford Club has hired a two storey stable building from the local council, which, when repaired, cleaned and furnished, will provide an excellent workshop and clubroom, with all services laid on. On completion a great publicity drive will be staged. Six team racers will be ready for the coming season. Not bad going for 10 members !

We can confirm the date of the Brighton South Coast Gala, at the Chattri as 12th August, 1951. Power classes A, B and C, hand launch.

The Gillingham Club's Annual Dinner and Prizegiving took place on the 6th January at the Gaumont, Rochester, winners were :— Club Championship, R. Adams ; Power Trophy, D. Ellis ; Croneen Cup (Power precision), R. Chilvers ; Craftsman Cup (Glider) and Robertson Cup (Power ratio), —. Hipwell, Glider Cup, —. Ward.

The Sevenoaks Club's prizegiving party was held recently at the Vine Tavern, Sevenoaks. Films taken at various Club activities were shown, and were thoroughly enjoyed by all present. G/Capt. Gordon, President of the Club presented trophies to the following :— Club Rubber Cup, F. A. Dabnor. Gordon Glider Cup and Taylor Power Cup, E. N. Mason. RARA C/L Stunt Cup and Kingswood Scale C/L Cup, T. G. Pannell.

As well as large gliders, several members of the Southern Cross are producing free flight power jobs including San de Hogan and various sizes of Civy Boy. One original job has a span of 6 ft. and an overall length of 5 ft. 6 ins. !

WAYFARERS (HERTFORDSHIRE) M.A.C.

We are campaigning for new members and believe that there are many keen modellers in the Watford area who are not members of organised clubs.

Our club which numbered only 16, "lost" 4 to the forces last year and is likely to be reduced by another 3 this year. Only if we can enroll a few more members will we be able to continue the steady progress we have made since our foundation two years ago.

We are trying to get into touch with modellers in Watford, Rickmansworth, Bushey, Croxley Green and Garston, and those living in these districts who are interested are invited to write for details of membership to the Hon. Sec., D. E. Jones, 74, Bushey Mill Crescent, Watford, Herts.

SOUTH BRISTOL M.A.C.

At present the Club are in the very fortunate position of having two flying fields, No. 1 due to a kindly farmer and No. 2 due to some hard work by our Secretary, Dave Ramsay and much appreciated co-operation between another local model aero club and the Ministry of Civil Aviation.

We also have the use of a large room at St. Mary Redcliffe Community Centre, where a good cup of tea can also be obtained.

The Club members are all "flying modellers" and endeavour to attend all Area Rallies. We proudly boast good attendance at *all* last year's Area Rallys and won a reasonable amount of, at least, placings.

At the first 1951 Area Rally, Ron Hillman took 1st place in the Power Event with an Amco .87 powered model with the name of the "Homesick Angel." Ray Redman seems to enjoy really "hot" motors. At both of the last Area Rallies his team racer has burst into flames ! Graham Mills delighted the crowd with some neat flying by his M.A. Seagull, ad in general the flying in the Club is of a good standard. We welcome all interested "active" modellers and if you are interested just call in on our gallant Secretary, Dave Ramsay, at "The Model Supplies," Bath Bridge, Bristol.

BLACKHEATH M.F.C.

The highlight of the club's activities at the year's commencement was of course the Bill White Competition reported in M.A. last month.

Over the winter months we have indulged in a spot of R.T.P. flying. Interest has been fairly keen in this aspect of club life and also in a number of lectures and discussions conducted by leading local modellers.

The A.G.M. was held on Friday, 19th January, with much talk flowing, thereby producing lots of indoor "risers." After the election of officers, where a few changes took place, presentation of club cups for 1950 competitions commenced, with some chaps coming forward with monotonous regularity, bless 'em ! As a guest we had Mr. Ricks of Willesden who was invited along to pick up his winnings from the Bill White. Congratulations Mr. R—do it again next year. Our Hon. Secretary Mr. K. C. Hackman has won, for the second year running, the Ron Mack Trophy. Keep it clean, son.

The club members are usually to be found on Blackheath on Sunday afternoons. Clubs who may be interested, contact our Hon. Secretary K. C. Hackman, 22, Lambert House, Beckenham Hill Road, S.E.6, and we'll do something about arranging scratch competitions with booby prizes.

We have heard a rumour or two that, because Blackheath numbers are not so large as at one time, we are going down the drain. Don't believe it. One or two bods have remarked on the fact that if a declining club can organise a competition as successfully as the Bill White, what could it do if fully alive and kicking ? Wait and see !

LEEDS M.F.C.

The Club held its Annual Dinner and Prizegiving on January 25th. A very enjoyable evening was had by the 54 club members and their guests, although Bob Parish must undoubtedly have suffered from slight indigestion afterwards !

After the prizegiving by the President, Mr. Vauvelle, members were entertained with a clever and interesting demonstration of conjuring by Mr. Mann.

Three new trophies have been added to the Club's "Iron Rack." The sincere thanks of the Club are extended to Mrs. Archer, Mr. Plews and Mr. Woollard for their kind presentations.

The Club glider has been developing steadily under the auspices of the Joyce family and Alan Archer. Several have been built and flown, and it is hoped to form a competant glider team for the 1951 season.

A number of radio control models by Messrs. Gudgeon, Hepenstall, Light and Co., are nearing completion, and test flying will commence in a few weeks.

Members are looking forward to the coming season, and the "Old Faithfuls," Vic Dubery, George Cameron, Henry Tubbs and confederates (?) are dusting their engines, rubber motors and towlines in anticipation.

NORTH-WEST MIDDLESEX M.F.C.

The club is looking forward to the 1951 Competition season with high hopes. Power and glider is our main interest, competition gas jobs range from a .5 Dart to a Dooling "29." Large lightweight gliders are to the fore but numerous Nordics are on the stocks.

Membership is approaching the half century and anybody interested should write to the Secretary ; D. Arthur, 86, Drummond Drive, Stanmore, Middx.

CROYDON & DISTRICT M.A.C.

The Club will be holding a Gala Meeting at Fairlop Aerodrome Essex on Easter Monday, March 26th.

Contests will be held for power (max. engine run 15 sec.) rubbe (hand launched) and glider (328 ft. line).

Competitors making the top twelve times (Agg. 3 flights) irrespective of the type of model flown, will receive prizes. No Croydon Club members will be competing !

Further details from :— N. Butcher, "Cartref," Croft Road Sutton, Surrey.

The Croydon and District M.A.C. concluded a very successful season with their Annual Dinner and Prize-giving held at the Cafe Royal, Croydon, on February 21st

SOUTHERN CROSS A.C.

We learn that one of our members was recently flying an "Unlimited" C/L model when the model struck some overhead high tension cables. Both lines were burnt through and the model was badly damaged in the ensuing landing. Although considerably shaken the flyer was unhurt, and in future he will make certain that there are no cables near the flying field. (He shudders at the mention of pylons. I wonder why ?)

Flying from Thundersbarrow on Sunday, 21st January, Grahame Gates recorded a hand launch glider flight of 4 : 26.5 secs. and a claim for the Area F.A.I. record has been submitted. The model, with a span of 12 feet, required 46 ozs. of ballast to bring it up to F.A.I. loading ; total flying weight being 98 ozs. Without the ballast a time of some 2½ mins. was recorded, and is claimed as an Area lightweight record. Thus Grahame closes another Gate on an other Area record ! (With apologies to our secretary).

SWINDON M.A.C.

An enjoyable evening was had by members and friends on the occasion of the club's recently held Second Annual Dinner.

The committee's decision to make it a completely informal function was unanimously appreciated. Speeches and toasts were cut to a minimum leaving more time for entertainment and "refreshments," etc. The latter concession being universely approved by the inevitable contingent of "Elbow Benders" ! !)

After the last platter had been licked clean and glasses replenished the assembly settled down to enjoy a very interesting film show. And so concluded an unusual but thoroughly successful dinner.

The club's winter hibernation is showing signs of breaking up and a full contest programme is being mapped out for the coming season.

The club hopes to see all old friends and many more new ones at their annual slope soaring contest to be held on the Wiltshire Downs on June 17th, 1951—details of which may be obtained from the Hon. Sec. R. H. Smith, 107, York Road, Swindon.

WHITEFIELD M.A.C.

Two club contests were held during January and featured a 2 min. flight limit. This was introduced because of the size of the field and the nature of the surroundings (totally built up in all directions). This resulted in consistent flying and times were very close. The Rubber Contest for the Currington Cup held on January 14th was won by J. O'Donnell with 3 " 2 min. maxs "—actually 451 secs. total —runner-up was R. Woodhouse with 343.7 secs. agg. Both were flying last season's Wakefields.

The F.A.G. Glider Contest for the Leeming Cup was held on 28th January in a dead calm although with a fair amount of mist. This competition resulted in a tie for G. and H. O'Donnell with 3 "maxs," (actually 590 and 547 secs. agg.) both flying "6 ft. Midlairs." Very close behind was R. Faulkner flying a very unusual finless lt. wt. glider (with 5 ozs. of ballast !) patterned after the Yugoslav models seen last summer. His agg. was 352.2 secs.

These two contests decided the club championships for the 1950 season—pts. being awarded in inverse order to places in all club contests and S.M.A.E. decentralised. Senior and Junior Champions were J. and M. O'Donnell with 22½ and 13 points out of a max. of 31. This system has not proved very satisfactory and will probably be modified to include more contests for the 1951 season.

The club's latest British Record claim is J. O'Donnell's 1 min. 43.5 secs for the Lightweight Rubber Floatplane record. The model was a modified "Raff V" fitted with American Power Type floats—1 main and 2 rear. Take-off site was the largest available puddle !

WALSALL M.A.C.

The above Club is holding a "Festival of Britain" Model Plane Rally at Walsall Airport on Sunday, June 17th, 1951.

The rally will consist of Open Power, Open Rubber and R/C Control Competitions.

Prizes to the value of £60 are to be presented and further details can be obtained from the Hon. Secretary, G. Williams, 110, Sandwell Street, Walsall, Staffs.

WEST BROMWICH M.A. AND C.S.

During 1950 the standard of building has improved considerably and many excellent models have been produced. Most notable of these were an Elfin 2.49 powered "Gypsy" by S. H. Clarke which placed 3rd in the Mid Area Rally at Walsall with only 2 flights, a host of Radio Controlled jobs, an own design glider by Don Clarke which was lost at Loughboro before making a contest fight and many fine flying scale models by Mick Merrick.

Control Line flying has never really caught on in the club but Doug Aston (Treas.) Trev Hudson and Phil Baker are the most proficient members at this branch of the hobby.

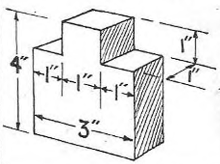
The cups and prizes for last season's contests were presented at the first Annual Dinner of the Club which was attended by some 36 members and wives.

A.2. Gliders are proving very popular at the moment and no less than 11 members are designing or building them.

Radio Control is also receiving a great deal of attention. Arthur Ore is building a "Spartan" for his R.C. unit, J. Penn and his son Alan have no less than 2 Stentorians, a Falcon and a Radio Queen and almost as many R.C. units. Ray Onions is currently flying his Rudderbug, while Competition Sec. S. W. Vaughan has installed an E.D. unit in his "Centurion."

From the standard of models at present being built and the keen interest of members we should do well in Competitions during 1951.

BOWDEN INTERNATIONAL TROPHY
P.A.A. LOAD CONTEST



IN THE RULES FOR THIS CONTEST WHICH WERE PUBLISHED IN LAST MONTH'S ISSUE WE OMITTED TO STATE THE MINIMUM WEIGHT OF THE DUMMY OCCUPANT —THIS IS EIGHT OUNCES.

SURBITON AND DIST. M.F.C.

Our annual Glider Gala will be held on Epsom Downs on 1st April starting at 11 a.m. and finishing at 5.30 p.m. Contest will be for unrestricted gliders, Towline length 328 ft., and nobody with more than this length of line on his spool will be allowed to fly. Each competitor is allowed three flights, five minute rule will apply. S.M.A.E. general contest rules will apply where relevant.

The top four members from any one club will constitute the winning team, and will hold the gala trophy for one year.

Individual prizes :— Senior, 1st £5, 2nd £3, 3rd £1. Junior prize £1.

Entrance Fees ; Seniors 1s., Juniors 6d.

There will be no programmes this year.

Any additional information can be obtained from Mr. D. C. Butler 111, Somerset Avenue, Hook, Surrey.

ST. HELENS M.A.C.

The St. Helens M.A.C. has recently been completely reorganised, and at the A.G.M. held on January 5th the following committee was elected : Chairman—R. Swindells ; Secretary—J. S. Hirst, "Bath House," Boundary Road, St. Helens, Lancs. ; Treasurer—A. Scott ; Competition Secretary—R. Pennington ; Press Secretary —A. Scott ; Junior Representative—D. Rigby.

Trophies awarded as follows ; Power—J. Kieman ; Glider—A. Scott ; C/L Speed and C/L Stunt—R. Scott ; Junior Championship—D. Rigby. No-one qualified to win the Rubber Trophy and no competition has yet been held for the new Team Race Trophy.

Club Records for 1950 were ; Power—9 min. 50 secs., J. Kieman ; Glider—3 min. 40 secs., A. Scott ; Junior Glider—1 min. 25 secs., D. Rigby ; C/L Speed—80 m.p.h., R. Scott (this was also a British, Class 1 Speed Record).

Most members are interested in C/L Stunt, but Team Racing is catching on, and interest in F/F Power and Gliders (especially Nordic A2) is growing.

Membership is growing steadily and we hope to make our presence felt in this year's competitions much more than has been the case in the past—you have been warned !

WOODLANDS M.F.C.

The club have purchased four cups with a promise of four to come. They are to be flown for in the near future. One is an annual cup for the best allrounder of the year.

Scale F.F. models are getting more popular in the club, apart from Jimmy (gadgets) Bridgewood, a firm scale enthusiast, our treasurer, Dick Bromley, has taken up the art with a Lancastrian, 52 in. span with retracting undercarriage and two .75 Mills supplying the power (a lot of work for one flight isn't it !).

SHEFFIELD S.A.

We now have a new secretary in G. H. Wilkin which should release our friend Ted Muxlow for even better things in 1951. Rumour has it that he will be in the Wakefield team this year.

On January 3rd we opened our Annual Exhibition which once again proved a great success. Money must be scarce this year as our receipts were down, but our funds were all the better in spite of this. Quite a number of the Northern clubs had models on show. The major award going to the Farrance brothers of West Yorks for a flying model Supermarine Seagull. A really grand piece of work.

WEST YORKS M.A.S.

On Saturday the 10th February we held our first Annual Prize Giving and Social. About one hundred guests were present, some from clubs as far distant as Sheffield, Huddersfield, Leeds and Spen Valley. Our Prizes were distributed as follows :—

1st Power, W. Farrance. 1st Rubber, Wommack. 1st Glider J. Hepworth. The Championship cups went to W. Farrance, Club Champion, and K. Farrance, Junior Champion.

A special Prize was given to E. Muxlow of Sheffield for his good flying during the past season, and was opened with great enthusiasm, only to find a 6d. Glider, which was immediately trimmed and a spot of indoor flying done.

We are looking forward to the coming season and hope to attend many rallies in our area besides many of the club going down to Swansea for the Nationals.

LUTON AND DISTRICT M.A.S.

With the opening of the new season many jobs are being built, but these are very varied. The rubber minded types—George Fuller, Roy Clements, Dan Bateman, and Sid Miller—are all building furiously to try for the Wakefield Team this year.

Talking of teams, Ron Hinks is concentrating on the A.2. glider for this season.

The Power Section of the Club is going to bigger areas with medium power, i.e. 750 sq. inches, with a Frog 500 supplying the power, should have some glide!

Among the Yo-yo Boys, one is building a Betty Skelton's "Little Stinker," with a McCoy 49 for power. Two "Tauruses" are promised from Bernard Emmerton and Roy Humphries sporting Attwood 60 and McCoy 60 in the front. A scaled-up "Fox Stunter" for an Attwood 49 motor is also on the stocks from Trevor Clark.

Team racing has not lost interest in the Club, and both classes are being built.

So, with these jobs ready, let's hope we have a good summer this year for a change.

ST. ALBANS M.A.C.

The club started off its new year with a film show. Among those shown, were some very good ones taken by Ken Marsh of West Essex, of several of the large meetings of 1950. We had a demonstration, in the film, on "How to fly a Wakefield," by George Fuller and Pete Brown.

Several members trooped down to Fairlop, for the Bill White Memorial Cup, only Fuller and Brown managed to get all their flights in, but were not placed.

The date for this year's "Festival" All Herts Rally is Sunday, August 19th.

HULL PEGASUS M.F.C.

Not much in the National News, the above club is still very active locally, and regularly gives control line displays at Boothferry Park to Hull City fans on the big match days. Readers may be amused to know that at a recent "do," some autograph hunters put us "on their books" in between catching some famous footballers. It was very amusing to us anyway!! I can assure you timid types that after the first few tries the crowd of forty thousand or so are no bother to us at all. It is *some* feeling, however, to look round the sea of faces and wonder how many new recruits we may inspire to try it. Team racing is receiving serious attention and Charlie and the boys have already done some winning in this area. As they prefer local flying, some doubt exists whether we shall compete at any big meetings.

CHEADLE M.A.S.

Members of the club have had an active winter season, in fact more flying has been witnessed than last summer (?).

A members only competition was held on January 21st at Mellor. Flights before 2 o'clock were hampered by low clouds, it was very unusual to see a tow line disappearing into cloud base. Les Chadwick's rubber job officially clocked 45 sec. into cloud and appeared again some 2 minutes later.

Since there were only 3 entries in the power contest it was declared null and void, what a difference from 2 years ago! Top power flight recorded was R. Askews 2 m. 41 sec. (Frog 500).

The following 1951 seasonal records have been accepted by the committee Glider P. Foulkes 2 m. 18 secs., RTP duration B. T. Faulkner, 2 min. 58 sec.

The Society now 35 strong and almost exclusively F.F. contest flyers are looking forward to the 1951 season which begins on February 11th at Chester.

CHINGFORD M.F.C.

Have got cracking in the new season, and are taking full advantage of the calm weather on Sundays at Fairlop. Credit must be given to Ray Groome for a beautifully built "Lil-Duper Zilch," powered by a Frog 500 running on a balloon tank, this motor never missed a beat throughout the flight.

Junior members are also to be seen flying E.T.A. 19's and Amco 3.5's all over the sky. Despite the accent on C.L. flying, the free-flight boys are knocking up some good flights. The Wakefield and Glider men are very quiet as yet, waiting for warmer weather perhaps; best thing for cold weather are "Dyna-Jet's." Yours truly, J. Hall, I fly my trainer at 110 m.p.h. Nice and warm!

SUNDERLAND AND D.M.A.C.

Some intrepid explorers wandered South (ahead of the missionaries!) and established friendly contact with the modelbods at Seaham Harbour. The result of the meeting is an arrangement for an inter-club "do" on their ground at Warden Law on Easter Sunday. This is "Gamage" day, and as Mr. Bainbridge of the Seaham M.F.C. won the Gamage Cup in 1949 we expect to see a thing or two! As well as rubber we hope to hold competitions for glider, C/L and free flight power—weather permitting.

By the way, two of our members can show twenty models flyable between them—including a R/C sailplane. Any challengers at that figure?

It has been decided to take an official "team" for T/R purposes. The idea is to select a team to begin with, then if any other "trio" think they can do better they challenge the holders. The ultimate winners are the official club team and, in theory, the best team available at any given time. This lark will begin as soon as we get back to our home ground at Usworth in the lighter evenings.

NORTH WESTERN WINTER RALLY

That a Winter Rally is worthwhile was proved by an entry of over two hundred. A cold and blustery wind, accompanied by continuous rain in the second and third rounds, did not preclude some excellent flying. Sagging tissue bothered nobody because it didn't; we must have good dope up north.

In the rubber competition, run by Mrs. Haisman from the shelter of a tartan umbrella, the new Wakefields obviously were being held back for the eliminators. The diamond cabin layout was much in evidence. In at least one case the frail construction used (in the dubious belief that ultra-light airframes are essential) did not pay: after a shallow dive the nose of the model in question collapsed like rotten cheese. It does seem that the popular trend in Wakefield design will be good for occasional long flights and the balsa trade.

The gliding even received most support, entrants showing a strong favour for the A.2 Class of model. Scandinavian influence was quite marked by wings with tip dihedral only, generous undercamber on wings and tails, and tow-hooks slung well aft. Towing techique showed some improvement, particularly when Area Champion Al Molyneux was at the winch end. The winner flew a "Prince" with great consistency.

For a change, highest times were clocked by the power fliers. The Accrington contingent of three showed how to do it by placing first, second and third, and forty seconds ahead of the fourth man. A 2.49 Elfin took Motler's red and yellow model aloft, other features being a 400 sq. in. wing, an unusually high pylon, and a weight of 14½ ozs. The other Accrington models were Amco-powered Super Phoenix. Also of interest was Fred Clarke's shoulder-wing Wakefield airframe with a small diesel screwed to the front and the nose unshortened. It performed remarkably well, outstanding features being its high speed and smoothness under power. Generally noticeable was the lower mortality rate among power models, no doubt due to larger surface areas for the same motors.

By the prizegiving, the rain had increased to a downpour. From the shelter of the Jeep, Mr. Gosling presented well-deserved magazine subscriptions to the winners.

Pleased with the success of the Rally—which paid for itself completely and left a useful profit—the Committee plans to hold two Rallies next Winter.

Position	Name	Club	Agg.	Lowest.
		RUBBER (Hand-launched)		
1.	J. O'Donnell	Whitefield	28?.4	9.0
2.	A. Wrigley	Prestwich	280.1	89.5
3.	S. A. Ward	Ashton	256.6	55.1
		GLIDER (328 ft. line)		
1.	J. Moran	Bolton	375.7	119.4
2.	Evans	Cheadle	303.0	71.5
3.	A. Molyneux	Wallasey	282.0	65.5
		POWER (20 secs. run)		
1.	H. Motler	Accrington	481.5	138.0
2.	L. Bickerstaffe	"	322.0	96.0
3.	E. Lord	"	299.8	76.8

STOCKTON AND DISTRICT M.F.C.

The club held a rally on the 28th of January which was attended by members of the Darlington and Durham clubs. It was voted a great success and provided a days' enjoyment for everyone besides giving a boast to the club funds. The hopes we had were shattered when Mr. Skelton and Mr. Kell of Darlington brought their "Ambassador" A.2. gliders along. Despite the absence of wind! these jobs went right to the top of the line with very little effort on the part of the launcher and recorded excellent times despite the cold, none lifting, air and the short line in use. Only one entry was obtained in the power event, despite the number of these jobs that arrived at the field, although the combined rubber and glider event produced quite a large number.

ALNWICK AND DIST. M.C.

The Aero Section has been granted £15 for the purchase of an R/C transmitter and a stop watch.

Control line has yet to catch on, also team racing, there being only two maniacs at present, A. Sandford and Ted Ayling, but we hope for more support in the future.

Alnwick Moor seems favourite for flying this being free of trees and quite suited to F/F and Gliders. Easter is eagerly awaited by all whom we kick off for the summer and there should be around 40 models and 30 flyers so we'll have to see about those S.M.A.E. certificates.

Jack Richardson our "Model Shop" man is at present our only R/C fan and his Skyskooter ED III set up is being much admired by all, if it flys like he hopes it will, it should prove very popular amongst the locals.

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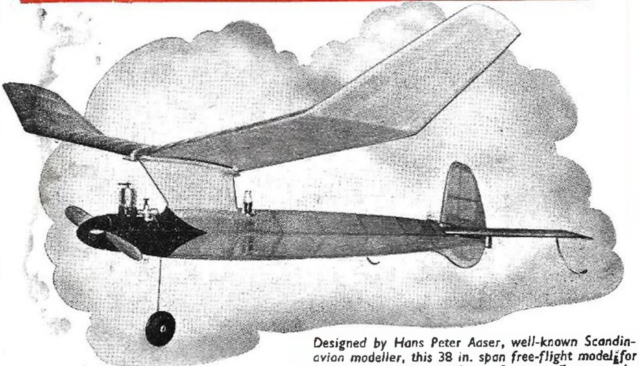

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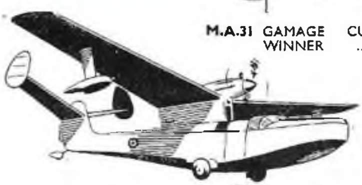

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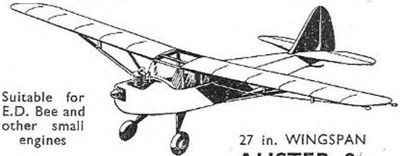

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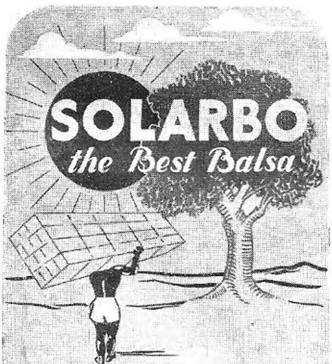

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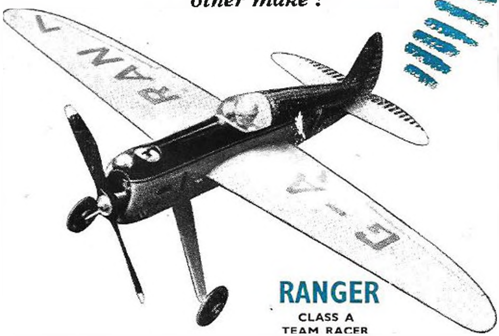

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