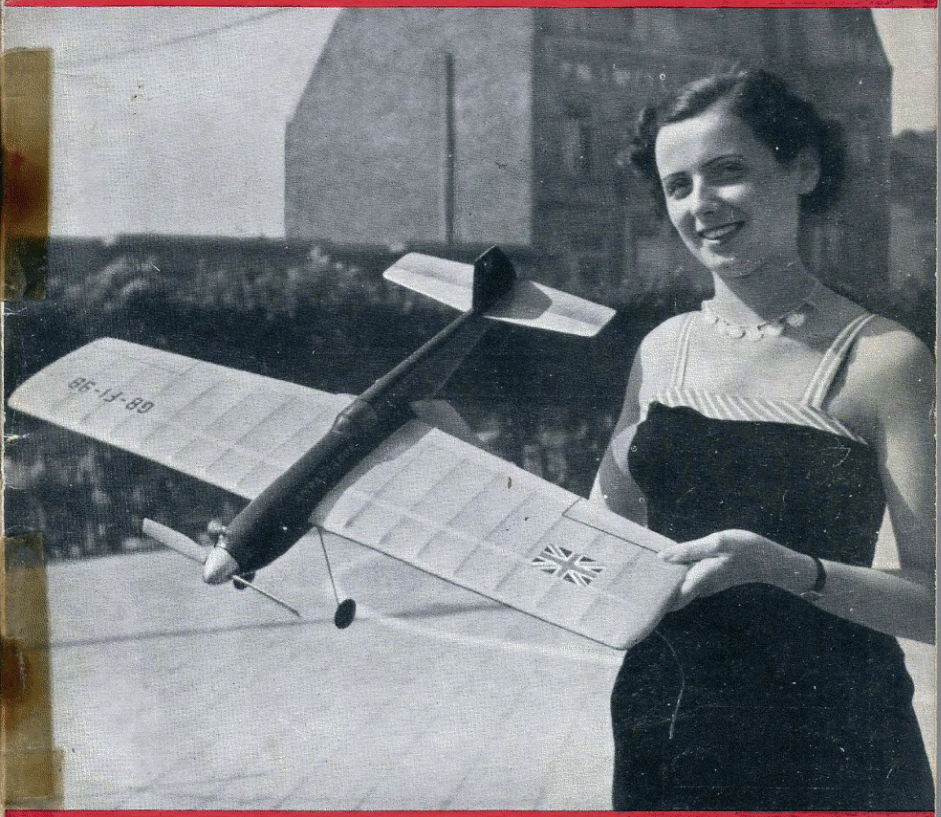
AERO MODELLER

DECEMBER 1951



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2/6

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

AeroFred Gallery Free Plans.

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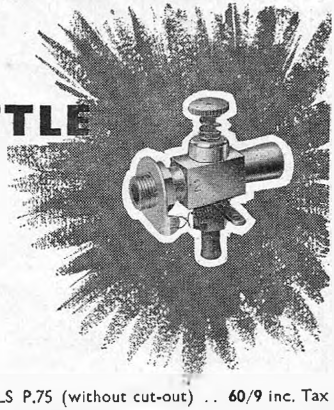

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INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

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"Covers the World of Aeromodelling"

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1951 IN RETROSPECT

WHEN reflecting on events during the past season it is inevitable that competition matters dominate our thoughts, and it is mainly on this theme that our recollections are based. Nevertheless we do not overlook the fact that the vast majority of our readers are non-competition flyers, but it is obvious from our correspondence that they are very interested in the activities of the contest-minded minority.

In the International field Great Britain has successfully held her own during the past season, the sweeping successes gained at the control-line meeting at Knokke being an eye-opener to everybody. High places in both Wakefield and A/2 glider meetings held in Finland and Yugoslavia respectively were another indication that we have flyers capable of securing top honours in all phases of aeromodelling.

Yugoslavia were hosts for the second time in the history of model aviation, and an interesting factor was the return of Austria and Germany to the international competition field following the recognition of their respective National Aero Clubs by the F.A.I.

At home we have seen an even greater increase in the numbers of entries for competitions, and this is nowhere more noticeable than in the established Rallies and new events that have taken their place on the regular annual calendar. The introduction of the British Championships and United Kingdom Challenge Match sees two first-class events which we are certain will retain their place in the National list, bringing selected top class flyers together in an annual battle.

Other factors worth mentioning are the stabilising of Team Racing as a class of event that provides both good fun for the flyer and an interesting spectacle for onlookers, and with this must be coupled the very fine series of demonstrations of control-line flying given at the Festival of Britain South Bank Site, Wembley, and in many other parts of the country.

Perhaps one of the most significant happenings during 1951 was the resuscitation of Indoor Flying on a National standard, and we of the AEROMODELLER greet this renewed interest in the ultra light-weight model with enthusiasm, and the sincere hope that suitable venues will be found for this very exacting class of flying.

The steady growth of the R.A.F. Models Association is a welcome sign of the times, and, coupled with the development of practical Radio Control flying as a good omen for the future.

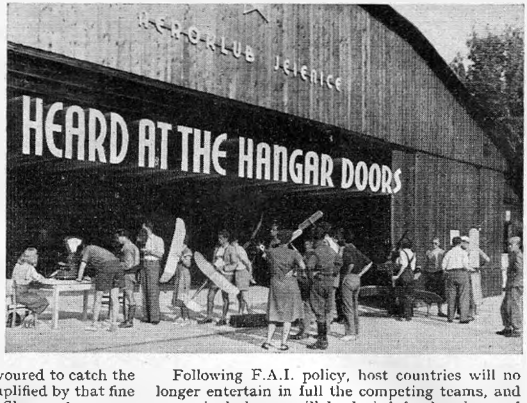
Our one dismal recollection is that connected with the increasing instances of hooliganism witnessed at various places, particularly relative to the utter disregard by some individuals of property rights, as a result of which farmers in many parts of the country justifiably view aeromodellers with some acidity. May we hope that 1952 will see a change of mind on the part of these delinquents.

Last but not least we welcome the increasing tendency to "fly for fun" as distinct from out and out competition participation, for it is with this huge majority of average aeromodellers that the future of the Movement lies.

Cover Picture . . . .

Europe's 1951 champion control line model the "Ambassador" flown to victory by Alan Hewitt, rests in the fair hands of Mme. José Vallez of Belgium during the control line championships at Knokke-sur-Mer. A combination more worthy of aesthetic appreciation would indeed be hard to find!

FOR the sixteenth time it is our pleasure and privilege to wish our readers : " Happy Christmas ". That small circle we first greeted so very many years ago, when we could almost boast of knowing most of our readers personally, has now extended far beyond the limits of such an intimate knowledge, but we would like everyone of those thousands to feel that it is indeed a personal greeting that we offer to all, young and old, novice and expert, here in this country and in the sixty odd lands overseas where AEROMODELLER is read and enjoyed.



With this enlarged Christmas Number in our new modern format we have endeavoured to catch the true spirit of Noel, so well exemplified by that fine old aerial adventurer Santa Claus who never seems to miss a single spot landing, and have set serious things aside for the nonce with articles in lighter vein, and almost for the first time since McGillicuddy held the stage have given fiction a place in our columns.

For those to whom the Christmas holidays represent many welcome hours of extra building time we present some quality projects. There is " Ambassador "—Alan Hewitt's European stunt champion to provide a combination of grace and performance : " Popsie " a new precision cum-radio control design from " Tomboy " Vic Smeed ; " Sparrow "—a flying wing sailplane from Germany : and finally we are—as usual—first in the field to offer you a powered autogyro that really performs in the shape of " Ro-dart ".

Even those who expect to see wintry conditions on our Yuletide cover will be charmed by the happy summer flashback to Knokke where vivacious Miss José Vallez is seen holding the victorious Ambassador an equally vivacious model.

We hope you like our offerings and will remember that at this festive season no more welcome present for that absent friend could be provided than an AEROMODELLER subscription !

1952 Wakefield

Preliminary information received from the Swedish Aero Club indicates that the 1952 Wakefield Contest will be held during the period 3rd to 7th July, and a letter to hand from one of our Swedish correspondents states that the venue is to be the Kungsängen aerodrome at Norrköping, one of the best fields in Sweden. (Norrköping is known as the " Manchester of Sweden ", and lies approximately half-way across Sweden between Gothenburg and Stockholm.)

Following F.A.I. policy, host countries will no longer entertain in full the competing teams, and a nominal charge will be levied for housing and feeding of all those participating, though naturally the hosts undertake to make this available at the most reasonable terms possible.

We fully agree with this new policy, for it has become an increasing burden in recent years to undertake the full entertainment of competitors, the general contest organisation costs being quite sufficient to meet without the additional commitments of both lodging and feeding large numbers of competing aeromodellers. (It is not generally realised that the cost to the S.M.A.E. was some £1,000 to conduct the Wakefield event in 1949, the last time the Contest was held in Great Britain.)

As the finals are anticipated to be held under the same conditions as the Finnish contests, i.e., late evening and early morning, it will be interesting to see how the British Trials are conducted in order to meet such requirements. We fully expect a " battle royal " between the " thermal hunters " and the " still air " contingents !

Another International 'Star'

Closely following on the announcement of Henry Tubbs' award (November issue) we are pleased to record yet another British success in the International Merit Certificate-field.

Number 3 is that well-known Norfolk modeller, John I. Chinn of the Norwich M.A.C., who has ripped through the necessary requirements for such honours in record time. He qualified for his " A " Certificate on the 13th November, 1950, and gained his " B " endorsement on the 4th March, 1951. Then, having made his final Rubber qualifying flights on the 3rd June, he flew off both Power and Glider sections on the same date !

Full details are as follows :—

Rubber	3/6/51	4 : 33	4 : 46	3 : 20
Glider	14/10/51	4 : 21	3 : 16	4 : 31
Power	14/10/51	5 : 12	3 : 25	2 : 58

Congratulations on a very fine effort, and we hope to be able to record many more such successes in the near future, for we are confident that there are a number of British aeromodellers who could qualify if they gave a little attention to the matter.

The Junior Question

Following on Clubman's remark on the subject of junior encouragement (page 695, November, 1951 issue) the following letter has been received, which certainly gives the other side of the picture, and is worth careful study by all club officials—and individuals.

The writer, secretary to an average sized club, makes the following points :—

" Last winter we decided to split up (on club nights) into three teams of 8 or 9, with at least two Seniors per team, in an effort to encourage the competitive spirit and to assist and teach the juniors to attain a reasonable standard of building and flying.

" The Seniors have offered to put their experience and knowledge at the disposal of any junior at any time, but very rarely is any use made of this offer. We have held instruction classes in building, scaling up plans, soldering, etc., etc., but the youngsters exhibit little interest and their building ability shows no sign of benefit.

" Our Committee (on which Juniors are represented) has constantly made efforts to encourage the youngsters—but what do we find. Most of the Juniors are keen ; all of them are unduly noisy ; many are downright ill-mannered, a few can build their own models from simple kits—even fewer can make them fly ; and none of them is ambitious and keen to improve. The majority are quite happy to just turn up at the clubroom, there to indulge in horseplay and create as much noise as possible, so that ordinary quiet conversation becomes impossible.

" The Juniors love to " spectate " at flying sessions—but they are always ready with a host of alibis as to why they themselves haven't a model ready to fly.

" No doubt other clubs have experienced similar difficulties to ours in this business of slackness among members, and probably some of them have managed to overcome the trouble. We should be very grateful for a solution to our problem, and if you or anyone can put forward ideas which might cure the " disease " we shall be only too willing to give them a trial ".

We shall be only too pleased to publish any comments on this vexed subject, but would ourselves advance the opinion that our correspondent has probably the wrong temperament to deal with the younger individual. Any school teacher will tell you that correct approach to the young mind is vastly different to the adult, and it is absolutely asking for trouble to try and force the younger element into " submission " to the adult code. Separate junior nights is one answer to our friend's problem, and special junior contests where the competitive spirit can be fostered without the handicap of an inferiority complex created by competition against experienced Senior members.

Free Socks !

Secretaries of model aero clubs will be interested to hear that Shell-Mex and B.P. Ltd. is now able to supply a limited number of miniature windcones (windSOCKS to you !) on loan to clubs on application. Mounted on six-foot standards, these cones are two feet long, and should be most useful at meetings. Applications should be made in writing to Shell-Mex and B.P. Ltd., Shell-Mex House, Strand, London, W.C.2.

Congratulations and Goodbye Jimmy

Jimmy Tangney of the United States Navy has become a well-known figure in British aeromodelling during the past two years, and is undoubtedly one of the most popular fellows to have flown in this country. His prowess, particularly with the Wakefield class of machine, is extraordinary, and he has recently followed up his success at the Trials with a stout effort in the London team competing at the British Championships.

In addition, he again flew in the Irish Nationals, held at Baldonnel on the 2nd September, rounding off his stay in Europe by winning the Irish Wakefield Cup from such doughty opponents as Bob Copland, Des Woods and Norman Osbourne.

Jimmy, who comes from Aurora, Illinois, is 29 years old, and has been a popular member of the Croydon club during his stay in England. He expects to return to the States at the end of this year, and will be sorely missed by the many friends he has made during his all too short visit. A fine flier, and one of the best types of sportsman, we confidently look forward to meeting him at future Wakefield Finals, for he undoubtedly has the stuff it takes to make the American Team.

Jimmy in action at Fairlop during the 1950 Trials.

A 32½" SPAN CL. STUNT MODEL.

THE AMBASSADOR

DESIGNED BY A. HEWITT.

4/-

THE AERODROME STAINFORTH BEDS.

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED.

-CONTEST RECORD-

1ST COLD TROPHY 1951

1ST STUNT & CONCOURS KNOKKE-SUR-MER 1951

TECHNICAL DATA.

SPAN	32½"
AREA	268 SQ.IN.
TAILPLANE SPAN	13"
" AREA	16 SQ.IN.
ELEVATOR	1"
LENGTH	25½"
WEIGHT	11 OZ.
POWER	2.8 C.C.
LINE LENGTH	52½' - 60'
C.G. POSITION	1" BACK FROM L.E.

MATERIALS

BALSA	
2 STRIPS OF	⅛" x ⅛" x 36" HARD
1 STRIP "	⅜" x ¼" x 36"
1 SHEET "	3/32 x 3" x 36" MED-HARD
"	3/32 x 3" x 36" SOFT
"	⅛" x 3" x 36"
"	1/16" x 3" x 36"
"	1/16" x 4" x 36" HARD
1 BLOCK "	¼" x 4" x 12½" SOFT
MISCELLANEOUS	
10" OF	⅛" x ¼" HARDWOOD
18" "	16 SWG PIANO WIRE
10" "	30 " "
SMALL PIECE OF	⅛" PLY.
" "	⅛" "

-EXPLODED VIEW OF NOSE-

20 G. WIRE BENT TO FORM ELEVATOR HORN, WITH 30 G. WIRE STIFFENER, BENT & SOLDERED TO IT AS SHOWN, THEN SECURELY TAPED TO ELEVATOR.

3/32 MED HARD

TAPE HINGES

3/32 MED SOFT

MODEL TO BALANCE ON FRONT LINE AT BELL CRANK

⅛" SQ. BEARERS

¼" SOFT SHEET

TOP FROM 3/32 MED SOFT TAPER TO ⅛" AT FIN

3/32 MED SHEET

PUSH ROD 18 SWG

SCRAP BALSA

3/32 MED HARD FIN

3/32" PLY

3/32" SHEET BOTTOM TAPER TO 1/32" AT TAIL.

FUSELAGE SIDES FROM 3/32" MED

TANK

ELFIN 249 SHOWN

CUT OUT THESE PANELS TO FIT WING, THEN REPLACE CEMENT BOTTOM SHEET AFTER.

.14"

.325"

-TANK DETAIL-

1½" SPINNER

SOFT BLOCK COWLING

⅛" SQ HARD LONGERONS

POSITION OF UCART

-FORMERS-
NO'S 1 & 2 OF ⅛" PLY
3 TO 8 OF ⅛" BALSA

UCART 16 SWG 4½" LEG, 7" TRACK. BIND & CEMENT TO FORMER 2.

CANOPY FROM 2 PIECES OF CELLULOID

BUSH

CELLULOID DISC
⅛" SOFT BALSA
⅛" PLY

RIBS FROM ⅛" MED SOFT SHEET

RIBS NO 2 TO 8 MADE BY SANDWICH METHOD

HOLES FOR CONTROL WIRES IN LEFT HAND WING RIBS ONLY.

SOLDER GALLEON 'DEAD EYES' TO BELLCRANK, LOOP 'LANYARDS' LEAD-OUTS ROUND & SOLDER ENDS.

WING TIPS FROM BLOCK

3/32 X ⅛" LEADING EDGE

LEADING EDGE CUT AWAY TO CLEAR ENGINE BEARER WHEN ASSEMBLING

⅛" PLY BRACE

MAIN SPARS CUT FROM ⅛" HARD SHEET

1/32 DIE LEAD IN OUTER TIP

LEAD-OUT TUBES

⅛" PLY

-CENTRE SECTION DETAIL-

TRAILING EDGE FROM ⅛" MED SOFT SHEET

⅛" SHEET GUSSETS

⅛" SHEET WEB

The Stunt Design of the Year!

AMBASSADOR

By ALAN HEWITT

- *1st. Stunt Concours Knokke !*
- *1st. Stunt Knokke !*
- *1st. 1951 Gold Trophy !*
- *1st. Deanson Cup, Walsall !*

THE DESIGNER

Aged 24 . . . Bank Clerk . . . member South Birmingham M.F.C. . . . . main interest is in control-line stunt and A/2 sailplanes . . . also a keen motor-cyclist and follower of *good* jazz.

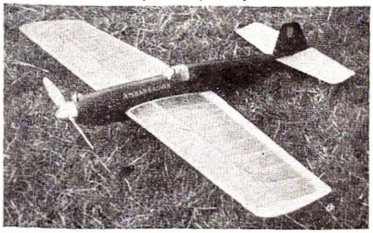
WHEN Alan Hewitt romped away with first place in the S.M.A.E. control line eliminators at Radlett on May 13th, his first concern was whether or not the restricted space at Knokke would allow him to fly at his best, using the same winning " Blue-Lon " 5 c.c. Yulon powered model. Line-length for the Belgian meeting was liable to be limited to just over 50 ft., so Alan brought out pencil and set-square to design a special " Ambassador " to represent Gt. Britain.

He based the design on a beam mounted Elfin 2·49 and set 12 ozs. as his maximum design weight. It was virtually a scaled down version of a job made the previous year for his Yulon, with a long slim fuselage and medium aspect ratio wings. This prototype was soon completed, and weighed only 11 ozs., which, as control-line fliers will know, is very light, even for 227 sq. ins. (Photo shows Alan with the original.) After many test flights, it was found necessary to re-cover with heavy-weight Modelspan to prevent the fuel soakage through the wing surface, bringing the weight up nearer to the planned 12 oz., and it was in this condition that the Ambassador executed its plenipotentiary duties at Knokke with such magnificent results. Not only did it carry off the Concours d'elegance for stunt; but with expert Alan at the handle, it won the stunt flying event as well.

Thanks to a major repair job on the tail assembly by friend Phil Reid, Alan was able to take the model to Swansea for the Gold Trophy contest, which had been won by brother Brian in '49 and '50. Readers already know the result, for Alan whizzed through the fastest manœuvres we have ever seen, and beat Brian into first place for Britain's major stunt trophy by 7¼ points.

Two points Alan asks of each Ambassador builder are :— First, to make sure that the specified balsa grades are used, and second, to use flexible lead-out wires to prevent line snagging through vibration.

Full instructions are issued with each full-size A.P.S. plan for the " Ambassador ", so that you may be able to duplicate this outstanding 70 m.p.h. stunter—why not try one yourself ?



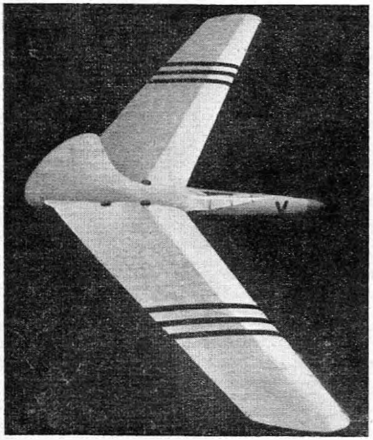
Sparrow

by
Reinhard
Wolfg
Roeser

Aged 20 . . . . a keen German sailplane exponent . . . with particular interest in tailless design . . . also keen on Jetex and f/f power, photography and chemistry . . . has been modelling since he was eight.

THIS interesting and unorthodox post-war German design is the second of its type to be produced by Reinhard Roeser.

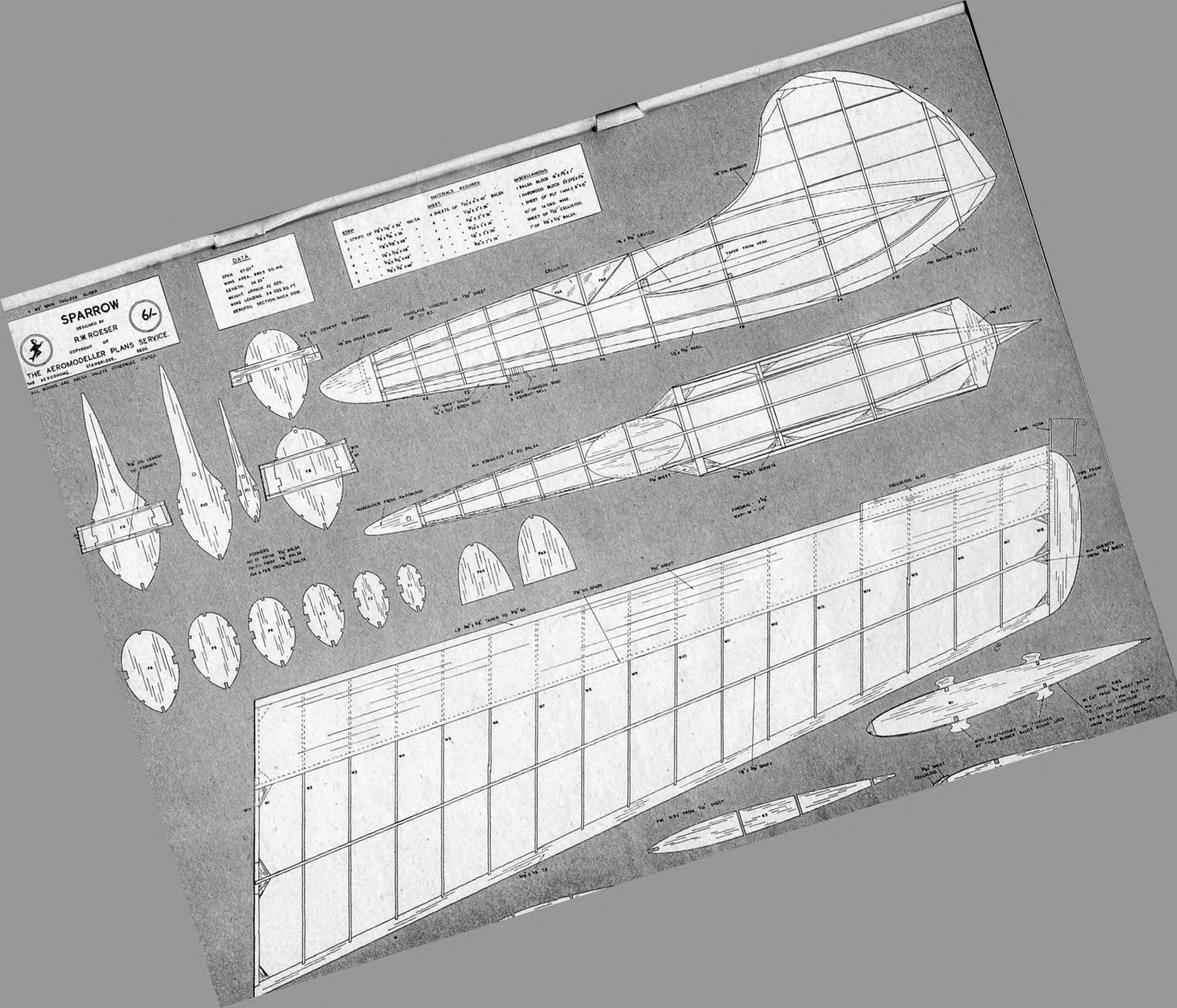
Basically the same as that which we now present, the prototype was of all-ply construction, rib capping-strips being of drawing paper. As would be expected, this model was considerably heavier than the balsa version and its gliding capabilities were less. Designed primarily for slope-soaring, the first "Sparrow" had a fast sinking speed. On a normal tow-line, instability was somewhat marked, but towing became practicable by the use of the L.S.A.R.A. "Rolling Bobbin "and tow-hooks at the wing tips. For those readers who are not familiar with this method, it should be explained that the tow-line terminates in a bobbin through which runs another line with ring at either end. These rings attach to the tow-hooks on each wing of the glider and, should it slew to either side when being towed up, the bobbin runs along the line and the tow pull has the effect of righting the model in its flight-path.



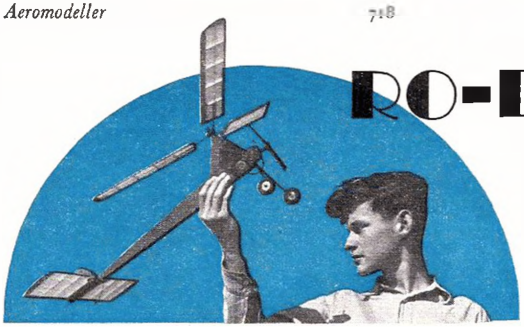
The designer warns intending builders that a few test flights may be necessary before the handling of this type of glider becomes familiar. Glider exponents will, no doubt, be surprised to discover that "Sparrow" has the NACA 0012 symmetrical wing section, with its 12 per cent. thickness ratio, more usually found on control line stunt models.

Many readers will remember another interesting tailless of this type, although considerably larger than either of the above, which was featured in the "Operation Research" article in May, 1950. This was the scale XFGI of 13 ft. 6 ins. span by the Dynamic Model Unit of Dayton, Ohio. Dropped from a full-size aircraft, it was radio-controlled and carried a safety parachute for landing. From the data obtained, a full-size glider of similar layout was built and flown.

Complete instructions for building are issued with each full size reproduction of the 1/5th scale plan opposite, price 6/- post free from the Aeromodeller Plans Service.



SPARROW
DESIGNED BY
R.W. ROESER
COPYRIGHT OF
THE AEROMODELLER PLANS SERVICE
THE AERODROME, STANBRIDGE, BEDS.
6/-
ALL WOODS ARE BALSA UNLESS OTHERWISE STATED.
DATA
SPAN 87.07"
WING AREA 884.3 SQ. INS.
LENGTH 34.35"
WEIGHT APPROX. 22 OZS.
WING LOADING 3.6 OZS. SQ. FT.
AEROFOIL SECTION NACA 0012.
MATERIALS REQUIRED
STRIP
SHEET
MISCELLANEOUS
1 BALSA BLOCK
1 HARDWOOD BLOCK
1 SHEET OF PLY
10" OF 14 SWG. WIRE.
SHEET OF 1/32" CELLULOID.
CELLULOID
TAPER FROM HERE
FIN OUTLINE 1/8" SHEET
FUSELAGE COVERED IN 1/32" SHEET UP TO F3.
1/4" DIA HOLE FOR WEIGHT
CEMENT TO FORMER
14 SWG. TOWHOOK BIND & CEMENT WELL
NOSEBLOCK FROM HARDWOOD
ALL STRUCTURE 1/8" SQ. BALSA
CELLULOID SLAT
TIPS FROM BLOCK
ALL GUSSETS FROM 1/16" SHEET
14 SWG. HOOK
SHEET GUSSETS
FORMERS
CEMENT TO FORMER



RO-DART

We gave you F. G. Boreham's inclined hinge discovery for helicopters, and the direct diesel drive 'copter in "It's designed for You" . . . . . now we present an outstanding Diesel Autogiro

by

DENNIS NEALE

CASUAL conversation in a model shop in 1948 influenced Dennis Neale into trying his hand at a powered Autogiro. His first attempts were not exactly exciting, and so he reverted to the more conventional type of model, but the thrill of rotary wing flight came back to Dennis with the introduction of the ·5 c.c. Allbon Dart. With the extra knowledge gained in the two year gap, he was able to approach again the Autogiro idea with more understanding and after reasoning out general principles of design he met with immediate success in the first prototype.

Ro-Dart is developed from that prototype which demonstrated itself so successfully at the Eaton Bray 1951 Summer Camp.

The secret of Ro-Dart's success lies in the arrangement of the rotor, relative to the thrust-line. The advancing blade is at 0° incidence, and retires backwards, as it were, at 10°. Correct tail proportions, weight distribution and rotor blade areas also contribute greatly to its success.

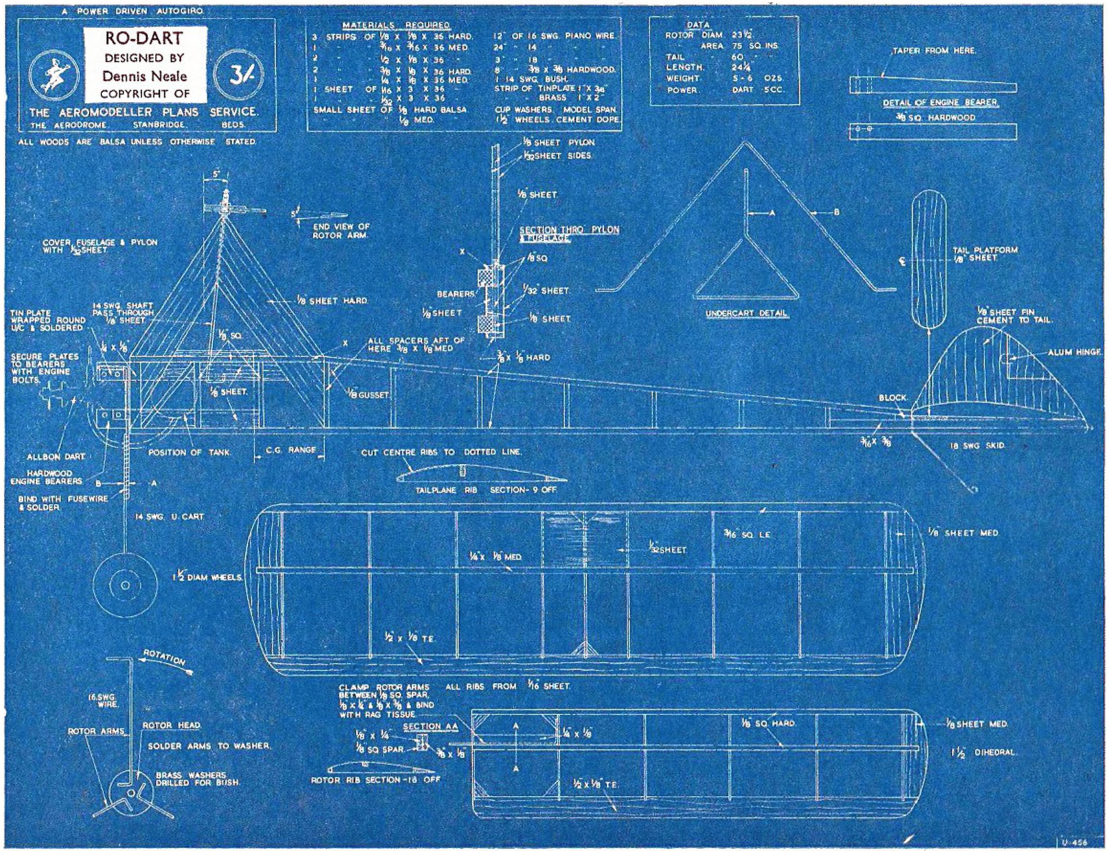
Full building instructions are issued with each full-size A.P.S. Plan; but to aid other rotary wing fans and stimulate your interest, we give flying gen here.

Flying. Check to see that the C.G. is between the two given lines. If it is in front of the forward line, ballast the tailplane, if behind the rear line, leave it until test flying. Use an 8 × 4 in., 7 × 4 in., or 8 × 5 in. (plastic) prop for the initial flights. With the motor running fairly fast, launch into wind with the rotor revving enough to lift the model from your hand. If the model turns gently with very little bank, increase the motor speed. The model should now climb. The model turns to the right or left equally well, but needs different trim for right and left. If the model gains no height, check to see that there is no downthrust and if there is, remove it. If there is no downthrust, pack up the rear of the tailplane until the model climbs. If the model flies very fast and does not gain height, and has no downthrust, either sweep back the rotor axle more, or pack up the rear of the tailplane. If the model zooms upwards from a hand-launch, and then stops, dives and pulls out in an "S" turn, check to see you have no upthrust, and pack up the leading edge of the tailplane. It took me a whole afternoon of flying to recognise this manœuvre as a stall!! If the model flies with a bank to one way, and has a tendency to side-slip one way, add more dihedral and check that the rotor incidences are correct. If the model heels over to the right, this means the blades on the left hand side of the rotor (from rear) are getting too much lift; therefore, decrease their incidence, and vice-versa for a bank to the left. If the model proves very difficult to trim, change to a different prop. If the rudder and side-thrusts are needed to make the model turn, check to see that the rotor head is vertical, and in extreme cases, use the rotor head to turn the model by bending it in the direction you want it to go, or move the C.G. further back, as this has a stabilising effect. O.K.? Now get rotoring! You will soon become used to the unusual trimming methods.

The Designer . . . Aero-engineering student at Imperial College, London University . . . aged 17 . . . member Egham M.F.C. . . . Is interested in all aeromodelling except control-line and rubber.

Heading photo is of club-mate Allan Baker, who duplicated the designer's Ro-Dart with equal success.

Left: Den Neale and prototype on the Eaton Bray take-off spot. Note the large prop for the Dart, (8×4 in.).



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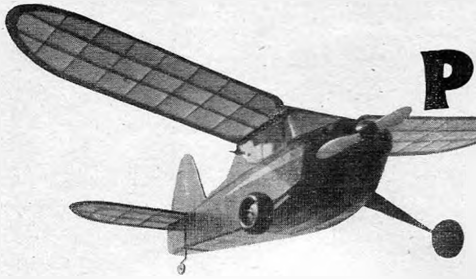


POPSIE

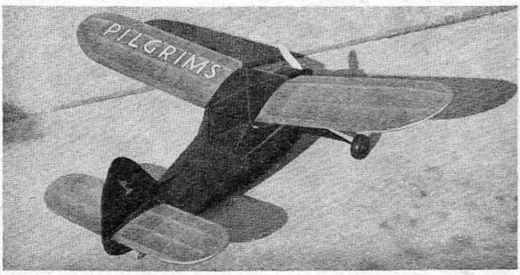
A 38½ inch SPAN MODEL FOR LIGHTWEIGHT RADIO CONTROL EQUALLY SUITABLE FOR SPORT FLYING

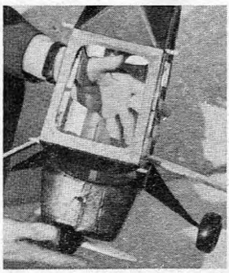
BY VIC SMEED

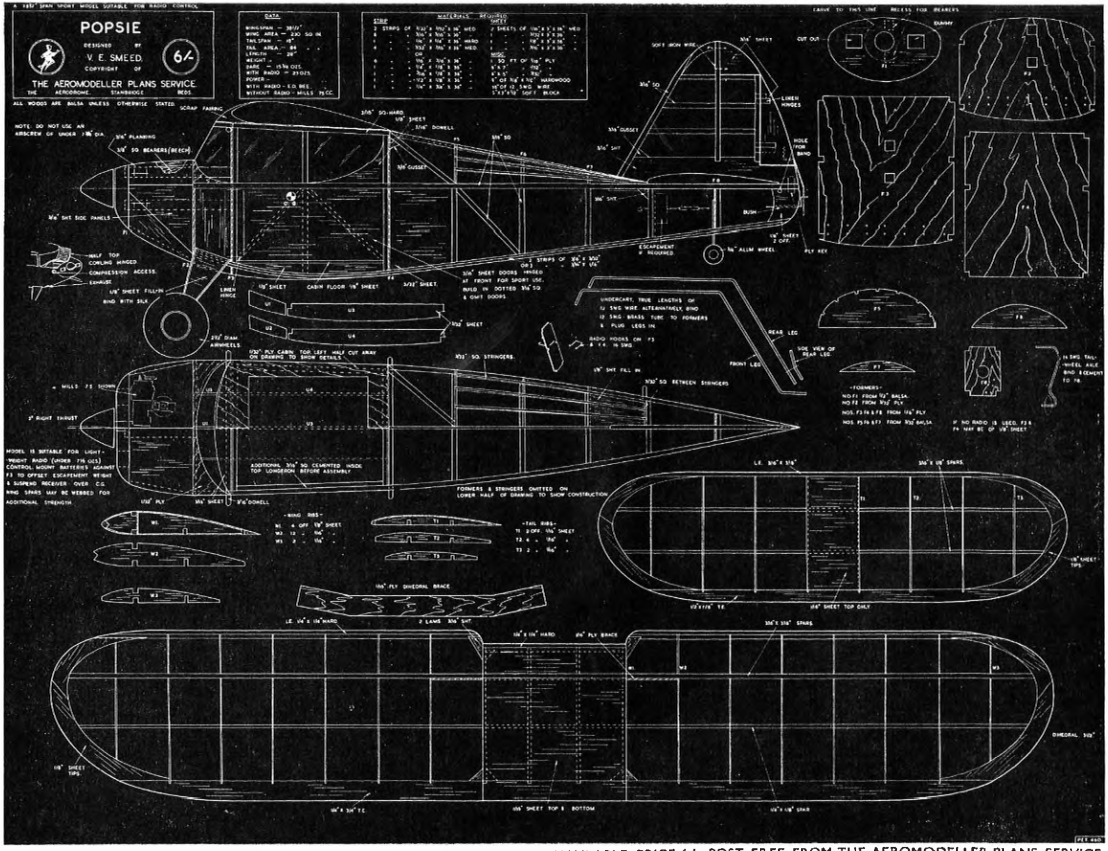
THE stubbiness of this little model is the result of an attempt to produce the smallest practicable model suitable for normal light-weight radio control, allowing as much radio space as possible. The prototype has not as yet flown under radio, having been used as a sport job, but it has been ballasted and subjected to every extreme of trim, etc., and has proved entirely satisfactory. The underlying idea behind every part of the design has been the ultimate installation of a set, and all the known desirable features for successful R/C models have been incorporated as far as possible. The following design points may be of interest to any builder who contemplates fitting this model with a radio outfit.

A fourteen-ounce wing loading was considered the highest desirable for a small job; allowing 15 ozs. for the airframe and 7½ ozs. for radio, this gives a wing area of approximately 1·6 sq. ft. The use of a fairly low aspect ratio enables a compact and sturdy wing of 38½ ins. span to be employed. Because of the resulting large chord and the desirability of using a short moment arm for overall compactness and manœuvrability, a 37 per cent. lifting tailplane is advisable and is therefore utilised. The fuselage is laid out to give ample cabin room and accessibility with adequate strength, and is of sufficient width beneath the leading edge of the tailplane to permit the easy mounting of an escapement. This width also ensures a firm tailplane seating. The C.L.A. is low and sidemounting the motor enables a high thrust line to be employed as well as cleaning up the nose entry. The undercarriage is designed to absorb a vast amount of punishment and also to give trouble-free R.O.G. It is not necessary to hold the model off the ground for starting—an advantage, since the width of the fuselage makes a firm grip difficult. In fact, initial "power-glides" on inadequate power resulted in "Popsie" landing in quite long grass with the motor continuing to run. The rigging angles and sections used give similar climb and glide characteristics and speeds, and the rudder should be about equally effective in power on and off as under power, the wide body produces a blanketing effect on the slipstream. This blanketing gave a little trouble on early flight tests with 7 in. airscrews, but this was overcome by using a slightly larger prop. Turns of 100 ft. diameter can be made in either direction without loss of height, and recovery from "unusual positions" is good. A Mills ·75 c.c. was used for sport flying with the prototype and it is recommended that an E.D. Bee is used for radio work. Fully detailed building instructions are supplied with the plan.

Three-quarter rear view shows sturdy but clean lines of the prototype. Close-up of fuselage gives indication of the ample cabin space.







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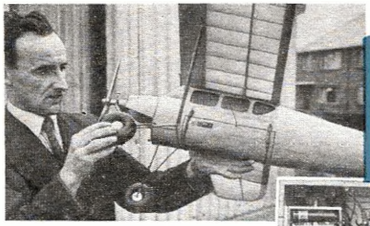

Author displays the neat detachable radio compartment, contents shown at right.

H.V.450 R/C Conversion

By S. F. WALKER

ONE of the most attractive cabin designs in the A.P.S. range, is that robust six foot streamliner by Henri Varache, the HV.450. First featured in April 1947, we have since despatched innumerable full-size plans for this very attractive design to all parts of the globe, and have had equally innumerable letters in praise of its outstanding performance by return. Now, Stan Walker, of " Tekni-flo " propeller fame introduces his novel conversion of this smart model for radio control operation.

Over to you, Stan.

" Before presenting this conversion I would just like to remark that in my humble opinion the HV.450 makes an excellent R/C job, its light weight and rugged construction being ideal for using the lightweight radio gear now on the market, and in the case of my particular '450 the weight comes out at just under three lbs.

The Rx in my job is a Tele Trols set and the batteries for it are housed in boxes so that changing them involves no soldered connections whatsoever and fresh batteries, both H.T. and L.T. can be fitted in a matter of seconds.

It will be noticed from the plans accompanying this article that the Rx, switches, potentiometers, batteries, are all housed in a detachable section of the fuselage and the whole lot can be removed for inspection, tuning or what have you, simply by removing a couple of rubber bands and unplugging the aerial. Connections to the Servo mechanism are broken automatically and are remade in the same manner on replacing the radio unit.

The aerial on my '450 is housed *inside* the port wing and is connected to the Rx by means of a small plug and socket. The Servo mechanism was designed expressly to fit in existing '450 without any major modifications ".

Full instructions for the complete conversion are supplied with each full size reproduction of the conversion drawing, shown here. The original plan for the HV.450 is available through A.P.S., price 7s. 6d. per copy, the model is suited to all engines from 2·5 to 5 c.c.

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UNDER £1 send 1/– for Postage and Packing.
C.O.D. orders welcome.
OVERSEAS ORDERS TAX FREE.

BUD MORGAN

Extends Xmas Greetings

to all Aeromodellers at Home and Overseas

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HANDICRAFT ANNUAL 2/6

JETEX SCALE KITS (for 50)

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K.K. MIG 15	3/6
K.K. Grumman Panther	3/6
K.K. Sabre	3/6
K.K. Attacker	3/6
Avro 707b	7/–
Veron Sea-Hawk	4/6
Veron Thunder-Jet	4/6

JETEX (50) KITS

Hot-Dog	4/3
Vampire	7/–
Meteor	7/–
Flying Wing	7/–
Jeticopter	7/–
Min-o-Jet	4/3
Fouga Cyclone	6/1

NEW—THE "ZYRA" SPACE-SHIP

Powered by JETEX 50 motor.

KIT COMPLETE with JETEX MOTOR, three FUEL PELLETS, WICK, etc. Only 13/4

KIT without motor ... 7/–

Plastic Race Car with Jetex motor. Price 18/11

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Jetex 350	52/9
Jetex 50 motor only	9/2

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FULL RANGE OF THE POPULAR KEIL KRAFT 3/8 FLYING SCALE MODEL KITS IN STOCK.

X-ACTO KNIVES AND TOOLS

No. 1 Knife, complete with No. 11 blade	3/–
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No. 5 Heavy Duty Knife	6/6
No. 51 Set with 6 blades	5/6
No. 52 larger Knife and 6 assorted bladas	6/9
WOOD CARVING SET No. 77	23/–
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TOOL CHEST No. 82. A comprehensive kit in polished wooden cabinet. All three knives and a full range of cutting blades. Price	30/–
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ENGINES

Frog 150	49/6
E.D. Bee, 1 c.c.	52/6
E.D. 2.46 Racer	72/6
Elfin 1.49 c.c.	59/6
Elfin 2.49 c.c.	70/–
D.C. 350	87/6
Mills, 75 c.c.	60/9
Mills with C/o	66/9
Frog 500	75/–
Amco, B.B. 3·5	115/–

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K.K. P. Super Cruiser, K.K. Cessna	170
K.K. Luscombe Silvaire—all at 22/8 post free.	
Monocoupe 64"	66/–
Monocoupe 40"	26/7
Stinson Voyager	26/7
Chrislea Skyjeep	26/7

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Frog Cirrus for 2·5 engines, 50"	29/6
Frog Fox, 42"	21/–
Powavan, 47"	25/–
Ladybird, 41"	22/8
Jnr. Mallard, 34"	14/4
Mallard, 48"	22/4
Skyskooter, 48"	30/6
Frog Vixen	15/–

For FULL RANGE OF KITS send for MY price list, 3d. post free.

RUBBER MODELS

Frog Witch, 36"	12/10
Frog Stardust, 40"	12/9
Pixie, 23"	4/11
Gypsy, 42"	12/10
Senator, 32"	6/9
Ace, 30"	6/1
Contestor	20/8
Sentinel	12/10

CONTROL LINE

Frog Vanfire for 5 c.c. motors	25/6
Vandiver	15/–
Mercury Monitor, 39"	22/4
Mercury Musketeer	24/9
Jnr. Musketeer	20/10
Veron Kits.	
Focker-Wulf	23/10
Panther, 41"	30/6
Philibuster, 28½"	28/8
Bee-Bug, 22"	14/–
Midget Mustang, 24"	25/8
Minibuster	18/4
Keilkraft Kits.	
Scout Team Racer, 20"	27/6
Skystreak, 26"	11/7
Skystreak, 40"	12/10
Ranger	12/10

GLIDERS

Mercury Martin, 40"	8/3
Verosonic, 46"	12/10
Coronette, 26"	4/3
Norseman, 64"	24/9
Chief, 64"	22/8
Soarer Major, 60"	14/1
Soarer Minor, 48"	9/9
Soarer Baby, 36"	6/1
Invader, 40"	7/11
Cadet, 36"	4/11
Cub (also Jetex 50)	3/1
Frog Diana, 36"	9/–
Prince, 60"	25/–
Aeroscout, 113"	71/6

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The above kits are complete with ready carved hull, silk screened coloured panel printed sails, rigging, paint, varnish and cement, anchor, and name plate.

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22 & 22a CASTLE ARCADE

CARDIFF

The BRITISH CHAMPIONSHIPS AND UNITED KINGD

1951 saw the introduction of two new top line events which will, I am sure, soon establish themselves as probably the high lights of annual contests in Great Britain, with the possible exception of International selection trials.

The British Championships were held at R.A.F. Digby on the 16th September, with entry confined to selected teams from each of the constituted Areas, and proved to be a highly interesting event. Three classes of contest were held, namely, for rubber, glider and power, and points were awarded on a sliding scale in each event, computed from the times of the best four in each Area team (teams in all cases being limited to a maximum of six in each event).

It is to be regretted that the weather was not kinder to the flyers, for the persistent high, gusty wind and intermittent rain squalls spoiled what could have been a most enjoyable day. We are bound to couple with this a black mark for the somewhat haphazard organisation of a top line event, as a result of which it has been agreed by the S.M.A.E. Council that future organisation of centralised events will be the responsibility of the Area within whose precincts the airfield lies.

Flying started with the rubber event in which the Wakefield class of model predominated, and the London flyers showed fine ability in securing a total of some 6½ minutes more than their closest rivals, the North Western Area. Gorham proved the best individual in the rubber event, although we must confess he was rather lucky on his third flight, the job stalling all over the place for the first few seconds before settling down and getting away to a fine duration. (Johnnie nearly caught the model once during a tail slide and must have congratulated himself a few minutes later when the model had completed its high duration!) Ted Evans of the Midland Area was only a few seconds behind Gorham for individual honours, and we must further record our appreciation of Eric Smith's (South Midland) Wakefield which climbed with amazing stability in the rough conditions.

The power event saw the East Anglian Area on top, and very fine efforts by P. S. Jacobs (Ipswich) in this and the glider event brought him top honours as the best individual in both classes.

We foresee a bright future for this class of contest, and trust it will receive its due share of attention from now onwards, for after all it is not very often that one has the opportunity to see the top class men from each district competing on level terms in this manner.

* * *

Three weeks after the Championships saw us up in Scotland to witness the first of the United Kingdom Challenge Matches. The inception of this event, the provision of a fine trophy and the proper conduct of flying goes to the credit of the West of Scotland Area, which, although only in existence a brief year, has already shown itself to be well organised in spite of fewer members than some of the better known Areas.

In this event competitors were restricted to a maximum of 12 from each of the countries forming the United Kingdom, these teams being split up into four each in power, rubber and glider. We

AREA	POINTS			
	Rubber	Power	Glider	Total
1. London	20	7	10	37
2. North Western ...	14	14	7	35
3. East Anglian ...	5	20	5	30
4. Midland	7	5	14	26
5. East Midland ...	2	2	20	24
6. Northern	10	10	3	23
7. South Eastern ...	3	3	4	10
8. South Midland ...	4	4	1	9
9. North Eastern ...	1	1	2	4
10. Southern	—	—	—	0

INDIVIDUAL CHAMPIONS P. Jacobs, (Ipswich), Power & Glider. J. Gorham, (Ipswich), Rubber.

Top, Gig Eifflaender of Macclesfield starts his very clean looking power job at Digby whilst left, we have a new style in contest fashion by maestro Ted Evans. Ted, who apparently objects to water in his turn-ups, piles the turns on his geared Wakefield.

CHALLENGE MATCH

must congratulate the Northern Ireland contingent, headed by Norman Osborne of Belfast, who ran themselves ragged with six men trying to do the work of 12. They proved, however, that proxy flying by team members already engaged in flying their own entries does not pay dividends.

With Wales a non-starter (no reasons given) the contest developed into a ding-dong struggle between England and Scotland, with England proving eventual winners, taking top points in both rubber and power with a fair margin in hand on both contests. Both Tubbs and Evans lost their No. 1 models on first flights.

J. Finlayson of Scotland proved the best individual in rubber with a total time of 7 : 02, ably backed up by his compatriot, Peter Montgomery from Kirkcaldy. Although prepared to fly his reserve model it was not necessary for Tubbs to make his second and third flights.

In the power event England undoubtedly had the upper hand, although the Scottish team were unfortunate insofar as McMaster and Strachan made a nil score in the first round owing to well over-stepping the starting time rule. Alec Watson proved the best of the Scots in this section of the contest, McMaster of Glasgow failing to reach his expected form.

The glider section proved most interesting and brought a fine day to a climax with A. Aitken requiring only 1 : 46 to enable Scotland to win the event. His flight of 2 : 15 was greeted with loud cheers from all and sundry and gave Scotland a very close win. A surprising feature of the glider event was the fact that Monks, Hanson and Wheeler of the English team all broke their lines on the first flight.

Wheeler appeared all set for a good duration when the line snapped half-way up and, his auto rudder being operated by the ring on the tow hook, this remained set for straight flight and the model just batted down wind at top speed to disappear from sight after only 55 seconds! Ray Monks regained his medals in the third round by making the top flight of the day with 3 : 18, but the Irish lads were well out of the picture, only getting four flights out of the requisite twelve.

Mrs. Hicks, wife of the Commanding Officer of Heathfield Aerodrome, presented prizes at the end of a very interesting day.

Subsequent to this meeting it has been agreed that a fixed four year rota will operate for this Challenge Match, and it will take place in England 1952, Northern Ireland 1953 & Wales 1954. C. S. R.

UNITED KINGDOM CHALLENGE MATCH
HEATHFIELD AERODROME, AYRSHIRE, SCOTLAND
7th September, 1951

ENGLAND	13 points
SCOTLAND	11 points
N. IRELAND	6 points

RUBBER		GLIDER		POWER	
England	22 : 23	Scotland	18 : 36	England	18 : 04
Scotland	21 : 32	England	18 : 07	Scotland	15 : 44
N. Ireland	12 : 15	N. Ireland	3 : 51	N. Ireland	7 : 33

Top photo shows the victorious English team: on right J. Hickerstaffe adopts a novel "starting stance". Below, "Paddy's Corner", featuring Gordon Drew with the power job.

FROG Super

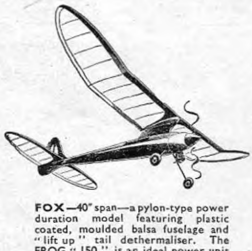
TRADE MARK

It's a well-known fact that FROG kits have that extra "something" to make their construction easier and more pleasurable. The cut-out and shaped wood parts, the beautifully made accessories, the masterly drawings and step-by-step instructions all play their part in making FROG super kits the finest you can buy.

And as for flying performance—every day we receive letters telling us of successes in every corner of the globe . . . of contest wins by FROG motors . . . of record breaking flights by FROG models . . . of amazing reliability in the most extreme climates . . . and many other fine achievements.

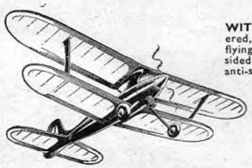
There is nothing better than a FROG product—visit your local dealer today to see them all !

DIANA — 36" span lightweight contest sailplane, specially designed to provide younger enthusiasts with a simple model capable of flying to contest standards **9/-**



FOX—40" span—a pylon-type power duration model featuring plastic coated, moulded balsa fuselage and "lift up" tail dethermaliser. The FROG "150" is an ideal power unit for this model **21/-**

POWAVAN—48" span—the perfect model for duration and ratio contests with a soaring glide of high-efficiency sailplane characteristics. Its rate of climb exceeds 2,000 ft. per minute and in combined with absolute stability in all weather conditions **25/6**



FIREFLY—36" span—a semi-scale power biplane for all-weather flying with a "150" power unit. It features a crash-proof wing assembly and "knock-off", rubber mounted engine unit **22/6**

WITCH—36" span—a neat, rubber powered, high wing monoplane for contest flying. Special features include a multi-sided fuselage for reduced drag and anti-spin fins for spiral stability **12/9**

FROG "RED GLOW" FUEL. Developed in the Shell Laboratories in close co-operation with the FROG engineers, this fuel has proved the best of all for Red Glow motors.
½ pt. can **2/6**

FROG POWAMIX Etherless DIESEL FUEL. Modellers cannot do better than use this "power-plus" fuel for their diesels. It comes, like the "Red Glow" fuel, in pressure feed cans with retractable nozzles.
½ pint can **2/6**

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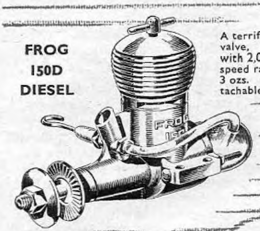
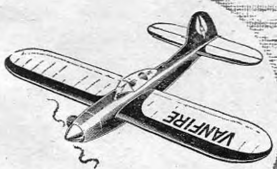


FROG 150D DIESEL

A terrific 1·49 c.c. rotary-valve, high speed diesel with 2,000 to 15,000 r.p.m. speed range. Weight only 3 ozs. Complete with detachable free-flight tank **49/6**



VANFIRE—40" span—a magnificent, semi-scale, fighter-type control-line model for the FROG "500" power unit. It is fully aerobatic to the highest contest standards at speeds of 70-80 m.p.h. **29/6**

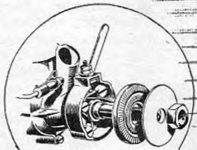
GOBLIN—24" span—Specially designed to be absolutely simple to construct and certain to fly far and well. The ideal model to start your modelling career **5/6**

31/6

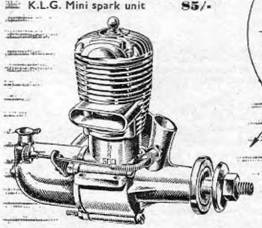
FROG "45"—45" span—a high efficiency model with a remarkable contest record and renowned for its reliability. The FROG "150D" motor is the ideal power unit for this model

VIXEN—36" span—a "simple-to-build" semi-scale, power model, designed to provide a stable "first model" for newcomers to power flying and an all-weather sports type for experienced fliers **15/-**

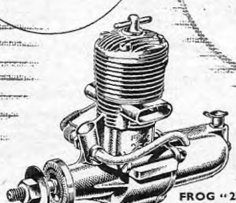
FROG "500" P.E. Spark ignition version of this famous motor specially developed for Radio Contol Models. Fitted with a precision built contact-breaker unit and K.L.G. Mini spark unit **85/-**



PRINCE—60" span—a magnificent model which leaves nothing to be desired and closely resembles the latest, full-size, high efficiency sailplanes. Eminently suitable for all contest work **25/-**



FROG "500" R.G.—Tough, reliable and perfectly controllable at all speeds up to 15,000 r.p.m., the "500" has proved itself to be outstanding 5 c.c. power unit for all types of free-flight and C/L models **75/-**



CIRRUS—48" span—specially developed for duration and ratio contest work, the "Cirrus" is representative of the latest "semi-pylon" type of power model layout. For FROG "150D" or "250" **25/6**

FROG "250" DIESEL—another super diesel of 2·49 c.c. capacity, ideal for every type of free-flight or C/L model. Its terrific power has not been achieved at the cost of flexibility. 2,000 to 10,000 r.p.m. speed range. Total weight with tank 5½ ozs. **72/6**

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LINES BROS. GROUP

SOUTHERN COUNTIES RALLY

Reported by BILL DEAN

John Singleton and Wee-Bipe. American mag. design powered by O.K. Cub. 12 in. span, 6 ozs. Smallest C/Liner at the Rally.

THE Sixth annual Southern Counties Rally was held on Battle of Britain Sunday (September 16) at Thorney Island R.A.F. Station, Hants—by kind permission of the C/O, Group Captain D. J. Eayrs, C.B.E., D.F.C. Eight events were included in the programme, the highlight being a class "B" team race for the Portsmouth City Council Challenge Cup. Sixteen racers were entered, with "Stoo" Steward flying Ken Marsh's (ETA 29—"Saint") and Bill Morley's (McCoy 29—"Fruit Nose")West Essex entries to victory, in two of the four-in-a-circle heats. Winning models in the remaining heats were "Skipper" Rowes latest "Red Lightning" (Amco 3·5) and S. Bint's (of Stant props) Miles 5 c.c. powered Mercury Mk. I racer. The final was won at 56·2 m.p.h. by S. Bint's model (flier S. Bosley and mechanic D. Birkenhead) with the other three models unfortunately getting tangled up in the closing laps.

Ian Dowsett (R.A.F. St. Athan) cleaned up in Open Rubber and Jetex (only four entries) by taking first and second places (same models—competitors were allowed to enter as many times as they liked, on payment of appropriate fee) in both events—flying the same models with which he won similar contests at the recent R.A.F. Championships. Open Power went to R. Law (W. Middlesex) who scored 147 out of a possible 200 points (twice engine run being deducted from the duration of up to 100 seconds) with an original Elfin 1·49 design. Alton model shop proprietor, P. Gregory, won the Precision Power event with his Forster 29 powered "Southerner"—having only 2 of the alloted 50 points deducted for flight faults. Scale stunt attracted only three entries—C. A. Taylor, (W. Essex) flying his prototype "Boomerang" (Amco 3·5) design to top place with 404 points (max. possible 575). In spite of far from ideal conditions, winning times in Glider and Rubber were both near maximums—being 9·37 (R. G. Brookes—Grange M.F.C.) and 8·58 (Dowsett) respectively.

Total entries were 166 (from 25 clubs)—the most popular events being Glider (35) and F/F Power (25). We were surprised that no Class "A" team race was included in the programme, but it appears that the organizers—Portsmouth M.F.C.—had no more trophies or prizes left for such an event!

RESULTS

GLIDER		
A. J. Brookes	(Grange M.F.C.)	9 mins. 37 secs.
J. F. Allen	(Chichester)	8 mins. 8 secs.
R. A. Dodd	(Petersfield)	7 mins. 56 secs.
RUBBER		
I. V. Dowsett	(Pharos)	8 mins. 58 secs.
I. V. Dowsett	(Pharos)	5 mins. 44 secs.
K. Nicol	(West Middlesex)	5 mins. 17 secs.
PRECISION POWER (3 entries)		
P. Gregory	(Alton)	48 points
H. L. Vincent	(Bournemouth)	47 points
SCALE STUNT (3 entries)		
C. A. Taylor	(West Essex)	404 points
Benham	(Godalming)	206 points
POWER (maximum possible 200)		
R. Law	(West Middlesex)	147 points
G. Phillips	(Portsmouth and District)	127 points
B. Neal	(West Middlesex)	124 points
JETEX (4 entries)		
I. V. Dowsett	(Pharos)	13·8
I. V. Dowsett	(Pharos)	12·4
White	(Thorney Island)	4·8
TEAM RACE (16 entries)		
S. Bosley	(St. George's Ht.)	56·2 m.p.h.
D. W. Rowe	(Country Member S.M.A.E.)	52·2 m.p.h.
NOVELTY CONTEST (sealed time 58 secs.)		
P. Gregory	(Alton)	56·2 secs.

Bernard Taylor, left, and his 30 in. span Rudderbug. Scale rib spacing, etc. ·2 Kemp diesel. Flies very well—quite fast. Centre, Derek Ridley and Jetex 50 assisted glider. 40-in. span. Towed up while thrust is developing. Member W. Middlesex Club. Right, Anna Smith holds husband Phil's latest "Cardinal" F/F Sheet-sided cabin model of 36-in. span. Amco ·87 power.

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STINSON 105.
11" to 1 ft. F/F Scale. **26/7**
De-luxe Kit.

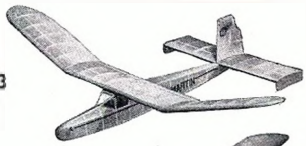
STINSON 105 CAME 1st AND 2nd ALL-BRITAIN R.A.F. F/F SCALE CONTESTS

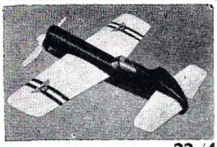
Look how Mercury caters for the widest possible range of serious modellers. Look at the quality of Mercury Kits and the superb models they build into. See how Mercury lead with one triumph after another—so be sure to make it known that the Xmas present you want is a MERCURY KIT.

E.D. RADIO CONTROL
We are wholesale stockists for this excellent equipment (and E.D. Engines).

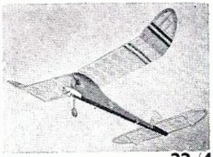
MONOCOUPE
64" 11" to 1 ft. 1·5-2·5 diesels. Ideal for Radio Control. **66/–**
40" 11" to 1 ft. 0·5-0·87 diesels. **26/7**

MARTIN SAILPLANE
Intermediate 40" low-line model. Ideal for pre-contest trainer. **8/3**





MK. I. TEAM RACER. **22/4**

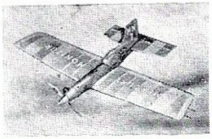


MALLARD **22/4**
JUNIOR MALLARD **14/4**

CHRISLEA C.H.J. SKYJEEP
11" to 1 ft. model of a popular British light plane. 0·5 to 1·0 c.c. **26/7**

MK. II. TEAM RACER. **17/6**
MIDGE (SPEED C/L). **6/5**

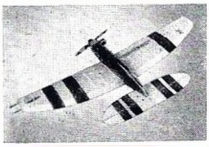
MAYBUG. 32". Rubber. **9/6**



MONITOR
48" C/L Stunt. 3·5-5 c.c. **22/4**
JUNIOR MONITOR
(2·49 c.c.) **17/5**

NORSEMAN. **24/9**

MAGPIE. 24". Glider. **4/11**



MUSKETEER
48" C/L Stunt. (5 c.c.) **24/9**
JUNIOR MUSKETEER
(2·49) **20/10**

GILI CHOPPER. Sailplane. 40" **15/–**

Trade Distributors: H. J. NICHOLLS, LTD., Wholesale, 308, HOLLOWAY RD., N.7
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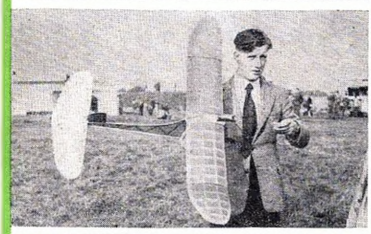
I.C.I. CHALLENGE TROPHY

FAIRLOP SEPT. 29th



IF ever that misnomer " Still air " could be used to describe contest conditions, the 1951 Jetex event for the I.C.I. Challenge Trophy would be the right occasion. For in the faint sunshine and truly autumnal weather, only one flight in sixty managed to catch a thermal, and even then it took three pellets in a 350 unit to find the elusive lift.

Each of the thirty finalists, who had qualified through the eliminating period, travelled to London's Fairlop at the expense of the sponsors (from parts afar as North Wales and Eastern Essex). An international atmosphere was provided by the two Belgian entries from the Tournai Aviatic Club, flown by René Tournois.

Directed by the staff of Messrs. Wilmot Mansour, who eliminated all chance of a last minute cry for timekeepers by nearly outnumbering competitors with administrators, the finals were very well run and terminated in a result that was satisfactory to all.

For there was no question that W. Houghton, the farthest travelled of the British competitors, was the justifiable winner. His first flight of 3 min. 4 secs., using a single pellet in his " 100 " unit, gave him the highest ratio of the day. And just to prove that this was no exceptional flight, he almost repeated the duration on a second try. Not that this was the longest flight of the day, in fact it happened to be the sixth longest : but this was a ratio contest, with strict set allowances for the power half of the ratio, according to unit used.

Heading photo shows young P. Lambert of Kentish Town, who was best performer with a Jetex 50 unit. Next, René Tournois from Belgium awaits his turn to fly. Mr. Butler, at left, acted as interpreter.

Largest entry looked like a converted low C.L.A. contest power model, using a high mounted Jetex 350. Flown by P. Snudin of Northampton, it failed to climb higher than 50 feet.

Mrs. Butler presents the magnificent I.C.I. Challenge Trophy to W. Houghton, for his well-deserved win. He also collected a cheque for £20.

Right. Top to Bottom. *Victorious W. Houghton of Rhyl and Presiatyn, with the Trophy and his '100' powered model. The unit is attached beneath the triangular section fuselage. Note pointed nose and flat tailplane. Next, Surbiton clubmen favoured mid-mounted units and R. Baskell shows his particular '200' version here. Special demonstrations by the twin 350 Jetex Helicopter with built-up rotors, and an extra long power run, were made during the day. To left, Ray Jessop lights up his '200' entry. Brother Norman came fourth with a similar model. At Bottom. Bill Henderson, winner of the S.M.A.E. Jetex contest, awaits the extra power of the second and third charge in his 350, before releasing 'Vindscreenwiper.'*

Half the finalists were using the " 200 ", because of its advantage in power as against its duration of 28 seconds with two pellets. Among the " 200 " fans were acknowledged Jetex experts, Ian Dowsett, Dick Twomey, Ray Jessop, and last year's winner, P. Allaker ; but though their power selection put the models up to good heights, they failed to click with lift and could not match the 10·22 ratio of Houghton's fast climbing model.

Another quarter of the entries chose " 350 " power and using three pellets for a 32-second power run, young C. Hussen found the only thermal with almost the last flight of the day to go out of sight in the haze at 4 min. 5 secs. As top Junior and second in the contest, Hussen collected the same prize money as the winner—£20. His loudest congratulatory clap came from younger P. Lambert who, as second best junior, was leader in the small group of " 50 " supporters.

With such an assortment of power units in the first three places, it is obvious that no particular size of Jetex unit has any great advantage over the others when the manufacturers' fixed " duration of power " times are applied. If one is to attempt such a selection and try to beat the handicap, so to speak, a slide rule and log table will be essential.

Of one thing we are sure, that the hardest struggle is for the baby in the range, the " 50 " unit, as witness the remarkable achievement of a certain well-known aeromodelling crazy cartoonist who established himself well and truly at the bottom of the list with a best duration of 10·8 secs. ! Some downdraught, some Ma(e)lmstrom ! !

R.G.M.

RESULTS

(Best of two flights)

			Unit	Ratio	Price
1.	W. Houghton	(Rhyl & P.MAC.)	100	10·22	£20
2.	C. Hussen	(S. Birmingham)	350	7·65	£15 plus £5*
3.	P. Allaker	(Surbiton)	200	7·15	£10
4.	N. Jessop	(Zephyrs)	200	6·92	£5
5.	R. Tournois	(Belgium)	350	6·91	£5 special prize
6.	L. Barr	(Pharos)	100	6.87	—

* Best Junior (under 16)

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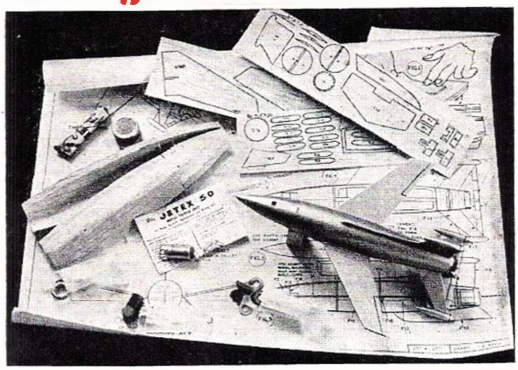

Just as the atomic age has begun, so the day when man first leaves the earth and travels to the stars is nearly with us. Already rockets have travelled 250 miles away from the earth's surface, and although latest developments are shrouded in official secrecy, the fact that the Americans have a Government sponsored project for projecting and building a space platform which will assume its own orbit round the earth, shows that it is already within the immediate bounds of possibility to overcome the earth's gravitational pull. When this is done, there is every reason to believe that within a few years, rockets piloted by radar will sail away into space, orbit the moon, and return to earth with sufficient data to enable us to begin building the first man-carrying space ship.

In view of this, films like the Paramount picture "When Worlds Collide" and models of space ships based on available technical data, will help to bring to the public new vistas opening to the whole of mankind.

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2nd. (£15) to C. Hussen. S. Birmingham.

3rd. (£10) to P. Allaker of Surbiton.

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DAVIES CUP FINALS

FAIRLOP SEPT 30th

S. BIRMINGHAM WIN CLASS A AND WEST ESSEX CLASS B

Brian Hewitt with S.B'h'm. sheet-wing racer he flew to victory. In spot, is the "Saint" (ETA 29) class B winner. For the Davies finals it had a new cabin to comply with regulations

SEVEN hours of continuous team racing, with eighteen races for Class A and B Area representatives, provided an exciting close to the 1951 team race season. Supported by teams from as far apart as Glasgow and Worthing, the meeting ran well over the normal 7 o'clock S.M.A.E. curfew and finished so much in the dark that the Class B finalists could have done with landing lights!

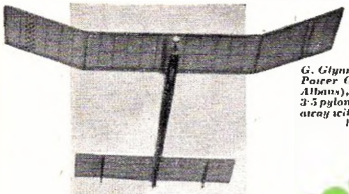
Class A heats ran off first, with both the High Wycombe teams in first places, and Godalming, Bushy Park, W. Essex and S. Birmingham winners of their respective races, and after the buzzing whirligig of those six races, the roar of 5 c.c. Class B entries provided more entertainment with six fast heats, two of which went to Godalming, and the others to Bushy Park, W. Essex, Sheffield, and Birmingham.

After their rest, the Class A winners flew off in two semi-finals to provide the four finalists. Both semi's were eventful, the first for an unfortunate fluff on the part of a lap counter, and the second for the closest finish yet seen. Marsh, flying "Stoo" Steward's "Flash Perce" led Brian Hewitt by only 15 ft. to win by a split second. With these two closely matched models, and multi-winner Edmonds of High Wycombe and experienced R. F. Bourne of Godalming to give stiff competition it was obvious that the final would be hectic.

Marsh and Bourne had Elfin 2·49's and Hewitt and Edmonds E.D. 2·46's. They were away to a very snappy start, literally tearing up the Fairlop air into little strips as they buzzed like a beehive in the still air. So close were these four very fast models, that even after each had completed two pit stops, it was difficult to discover who was in the lead. The third stop counted, when Alan Hewitt despatched brother Brian after a first flick start, and the others fluffed. One thing is certain—line length will have to go to 52 ft. 6 ins. now that airspeeds have become so high.

"B" finalists also passed through two semi's to get to the last 5 miles of the day, or to be strictly true, early night! Both the Godalming racers, the W. Essex and Bushy Park were in this late race, though again to be strictly true, it was W. Essex's from the start to finish. As the tent and p/a were packed in the light of car headlamps, we agreed with that stout gent known as Stoo, that it was, as he said, a very good "Tate ah tate". R. G. M.

Top to Bottom, at right: The queue for processing: in foreground are L. to R. the profile of "Stoo," Mackness, Glasgow Barnstormer Taylor, and winners Hewitt and Marsh. Next: Bourne, West and Redman from Godalming. All 3 models are West's and reached finals. Next, Sheffield contingent, Poole, Swift, Wilkinson, and Shirt, Smith and Boal. All very tired after the rail journey! Bottom, Mitchell, Ward and Jones from Birmingham with "Scramble."



G. Glynn, London Area Power Champion (St. Albans), gets his Amco 3·5 pylon contest model away with a clean hand launch.

TRIMMING FOR FREE FLIGHT POWER

JIM FULLARTON *analyses*

THE tremendous increase in power/weight ratio of modern motors has posed some tough, but interesting problems for free-flight modellers. In recent years the application of these racing motors to lightweight models, has resulted in an unprecedented wave of crashery, which has evoked adverse comment from the model aeronautical press all over the world; and indeed, many were beginning to have grave fears for the future of this type of flying.

The dyed-in-the-wool free-flighters, however, have proved to be a hardy and resilient breed, and, undismayed by the untidy heaps of wreckage which littered the flying fields, they have set to work and hammered out a real science of trimming for high-powered models. As a result of this work, there are now a number of distinct systems of adjustment which may be applied with success. Judging by the efforts one sees on any contest day, however, there are many modellers who remain in sad ignorance of this hard won knowledge. Hence, it is the aim of this article to summarise the more outstanding of these systems, bearing in mind that the whole subject is still in rather a fluid condition, and there is obviously much more yet to be learned.

Before one can hope to have any success with trimming, it is necessary to understand thoroughly the forces acting, and the reasons for the general behaviour of the model in flight, and these will be dealt with first. Incidentally, when we say "Left" or "Right", it is assumed that one is behind the model, looking forwards along the line of flight, and also, we assume that the model in question has the normal right hand propeller. (Clockwise, looking from the rear).

Torque Reaction is first item on the list. The motor tends to rotate the model in an opposite direction to the propeller, causing a roll, and consequently a turn to the left. With small capacity, high revving motors, torque is slight, and has an almost negligible effect.

(2) **Slipstream Effect.** The propeller imparts a rotary motion to the slipstream, which can have very important effects, particularly on the popular pylon type of design. Here, the rotary motion causes the slipstream coming over the top of the fuselage to strike on the left side of the pylon, which then becomes, in effect, a forward rudder set for a right turn, as shown in Fig. I. If the pylon is of the flat sheet type, and of large area, this effect will easily overcome torque and cause a sharp right turn, or even a spiral. The slipstream will also have some effect upon the rear fin surfaces, but this is liable to be less pronounced, as it will have lost much of its force by the time it gets back there. The normal cabin model, with side areas disposed more or less equally about the thrust line, will not be affected in the same way. This effect would explain the behaviour of Frank Bethwaite's variable thrust line model (February, 1951, AEROMODELLER).

(3) **Gyroscopic Force.** This was very fully dealt with by Mr. R. Musgrove in the September '50 AEROMODELLER, and it will be sufficient for our purposes if we remember that this force causes a model to nose up in left turns, and to dive in right turns. The force developed depends on the rate of turn, weight, diameter, and revolutions of the propeller. Because of this force it was once commonly believed that all right hand turns were dangerous, but as Don Foote points out, the revs. of the motor and hence the gyro force are fairly constant, and provided that the existence of the force is allowed for, right turns can be safely made.

(4) **The Looping Tendency.** Any stable model trimmed for the flattest possible glide will inevitably tend to loop when dragged through the air at several times the gliding speed. This is a normal part of the stability set up, for otherwise, how would a model pull out of a dive? For a model trimmed to fly straight, downthrust must be used to prevent looping, and the faster it flies, the

more downthrust will you need. Looping may be reduced, but not eliminated, by moving the centre of gravity back, and reducing angle between wing and tail to about one degree, or even to zero in extreme cases. (Longitudinal dihedral, or decalage). The general trend of modern contest designs is to balance at about 80 per cent. of the chord back from the leading edge. As we saw above, the straight climb needs liberal downthrust and this produces a serious state of affairs when the motor cuts. At this point, the model is in a near vertical attitude, and going up at full speed, so that when the restraining influence of the thrust is suddenly removed, the result is a violent stall and great loss of height; a thing that cannot be tolerated by the power/ratio contestant.

(5) **The Spiral Climb.** There is one other way of beating the looping tendency, and that is to direct the model into an upward spiral, which is nothing more than a sort of side-on loop, combined with an upward roll, as pointed out by Frank Bethwaite. The exact motion is rather complex to visualise, but it is something akin to a spring-board diver doing a one-and-a-half with a twist. Despite slight loss of efficiency due to the centrifugal force produced by the turn, this does appear to be the best way to climb, and when the motor cuts, the model is usually in a handy position to slip straight into the glide without losing an inch.

(6) **The Spiral Dive.** This is the No. 1 killer of free flight machines, and articles sufficient to fill a library have been written on the subject. Without wishing to appear too dogmatic on such a highly controversial matter, it seems to the writer that trying to cure spirals by design methods alone is barking up the wrong tree. According to some authorities, all that one has to do is to correctly position the Centre of Lateral Area, and the thing can't possibly spiral. Anyone who puts his faith in this alone is in for a nasty shock.

Having seen vigorous spirals executed by models of all shapes and sizes over a number of years, the writer is very much inclined to the view that there is no such thing as absolute spiral stability, that any model which is directionally stable will be capable of spiral diving, and that the remedy is to be found, not in design, but in the method of adjustment.

To start with, *the spiral is not a spin*, in fact, the two are just about opposites. The spin is a rather slow descent, in a partially stalled condition, and about the only time one sees a model in a true spin is when the fin has fallen right off, or through faulty operation of a tail-pop-up D/T. The basic cause of spirals is excess speed, and indeed, the problem did not attain serious dimensions until the high powered, limited motor-run type of model was introduced. When a model enters a turn, centrifugal force causes it to skid outwards at first. Now, it is the function of dihedral to prevent either slipping or skidding, and it reacts in this case by banking the model over until the lift force balances the resultant of the weight and centrifugal force, as shown in diagram. In high speed turns, the angle of bank becomes very steep, and, as any flying instructor will tell you, we then experience reversal of controls; the rudder becomes the elevator, and vice versa. If the turn had been initiated by use of rudder, then this will now be acting as down elevator, the speed will rise, the angle of bank will increase, and so on, into that all too familiar spiral dive.

This gives us the golden rule—"*Never use the rudder for power turns.*" If you remember this, and keep your model spiral resistant by using generous dihedral and minimum fin area, then the spiral dive will have lost most of its terrors for you.

(7) **The C.L.A. Theory.** No treatise on spirals would be complete without touching on this well known theory, which has been propounded by some authorities for many years. Briefly, it is based on the assumption that a model skids outward in a turn; then, if the centre of lateral area is high, air pressure on it will cause the machine to overbank and spiral in. But, as we have just seen, the dihedral will have the very same effect, and it is my guess that it will be far the more powerful of the two forces. So, if we are going to abide by the theory, and use a low C.L.A., to really be consistent, we should also use little or no dihedral to ensure spiral stability! This result is against all practical experience, which confirms that dihedral and plenty of it, is one of the surest safety measures.

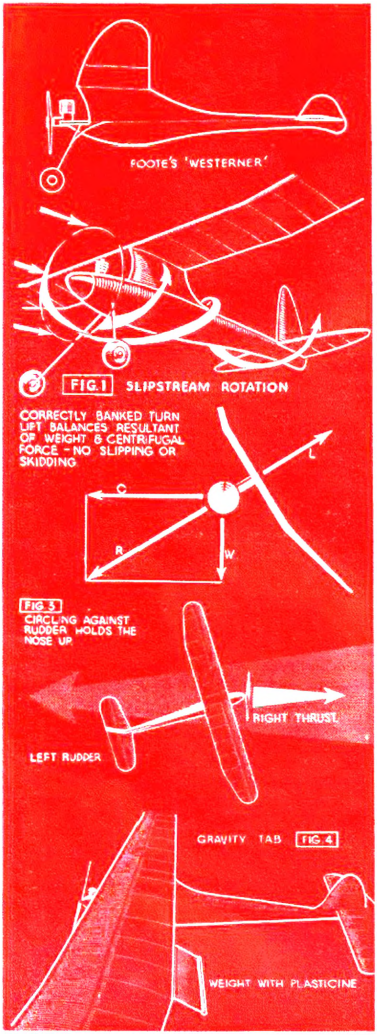
The whole theory hinges on the question "Does the model really skid outwards and upwards throughout the turn?" As far as I can see it does not, for the dihedral will soon check the skid, unless excessive rudder is being used, and that brings us back to where we started from: Don't turn with the rudder.

(8) **Aspect Ratio Effect.** Experience has taught that models with low A/R wings present the least difficulties in trimming, and can be coaxed into a tidy flight pattern with little effort. On the other hand, high A/R jobs, with their larger wingspans, are apt to be bull-headed, and seem to take especial delight in gliding dead straight, usually downwind.

By this time, readers will no doubt be getting impatient for some facts, so, without further theorising, I will set forth the various systems of trimming which may be used, and the relative merits and demerits of each.

(A) **The L.G.H. or "Natural"** method. Some modellers do not hold with trimming at all, and prefer to launch their models, (usually on a full tank, and with no name or address), in the hope that, with assistance from a merciful providence, it will discover its own natural flight path. Surprising to relate, the system sometimes works, and contest winners have been trimmed in this

* Let go and hope.



way; but the odds are heavy against success. Too often, the natural flight path terminates under the ground.

(B) **Left Thrust — Right Rudder.** This gives a left power turn with a right turn in the glide, and is a very safe set up. Under power, the rudder tends to hold the nose up and should a gust start the model into a dive, the extra airspeed on the rudder will cause it to straighten out rather than spiral in. This system is excellent for cabin type sport flying models, but is not applicable to pylon types, which, owing to slipstream effect, are very reluctant to turn left under power.

(C) **Right Thrust — Left Rudder.** (Fig. 3). The opposite to the above system, this is well suited to pylon contest models, giving right power turn and left glide. Slipstream effect may easily be strong enough to provide the necessary turn without use of sidethrust, and, in some cases, a little left thrust has even been used to prevent the right circle from becoming too tight.

Both above methods have one drawback, as they involve a change of direction from climb to glide which is usually accompanied by a stall, and loss of some height, and it is to cure this that the next system was evolved.

(D) **Foote Adjustment.** The aim of this system, originated by noted U.S. designer, Don Foote, is to achieve the same direction of circle in both climb and glide, so that a smooth transition from one to the other may be made. The turn may be in either direction, and is obtained by using a wash-in of 2 to 3 degrees on one wing, and countering it by sidethrust. For example, wash-in in the left wing, and left thrust will give a left turn throughout the flight.

The warp must be locked in the wing while doping and has an interesting dual effect, increasing both lift and drag on that side. Under power, with the model flying fast and at a fairly low angle of attack, the extra lift is predominant, and keeps the inside wing up, acting as a valuable anti-spiral corrective. On the glide, with the wing near the stalling angle, the extra drag takes over, and pulls the model around in a gentle turn. On no account should a model with, say, left hand trim be allowed to fly straight, or to the right, or the wing warp will roll the machine into fatal spiral turns. The method is best suited to designs similar to Foote's "Westerner" and "Foote Racer," which have a minimum of fin area and keel surface at the rear. The left hand trim seems to give a looping tendency, due to gyro force, and I prefer the right hand turn.

(E) **The Gravity Tab.** Using this ingenious device, the "San De Hogan" design has achieved sensational success at major U.S. contests. The small, freely hinged tab is suspended from the trailing edge out near the left wing tip, and is weighted to drop when the model is gliding, so that the drag causes a left turn. At high speeds, such as on the climb or in a dive, the tab blows

straight back, and has little effect, thus affording a valuable measure of safety. Glide circle is varied by weighting the tab with modelling clay or plasticine (Fig. 4).

Other adjustments, used by designer Denny Davis on his "Hogan," are as follows: wing—2 degrees positive incidence, stabiliser at zero; slight right and down thrust, and a little left rudder, to act as a corrective force in the right hand climb.

(F) **Tail Tilting.** Though unorthodox in appearance, the theory underlying this adjustment is sound enough, and it has proved very popular on the small American ½A models. When the stabiliser is tilted, its lift is similarly offset, as shown in Fig. 5, and the resolved part of this lift then produces a turning moment on the rear end of the fuselage, so that if the left tip of the tailplane were raised, a left gliding turn would result.

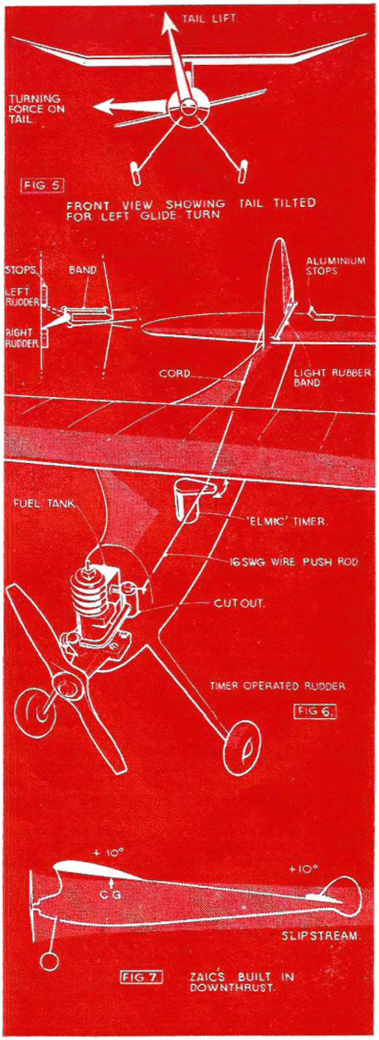
The effect will be greatest when the stabiliser is giving its maximum lift, as in the glide, and will fall off or even reverse in a dive, when there is little lift or even a down load on the stabiliser, so that a model so trimmed will dive straight rather than spiral.

The climb is usually to the right, using the slipstream effect for turn, augmented by side thrust only if necessary. One point which could possibly count against this system, is that there is not the same positive anti-spiral corrective force as in methods (C) or (D).

(F) **Timer Operated Rudder.** This is my own personal favourite, and I have used it on several contest models over the last 18 months with considerable success. I am not at all sure as to just where the idea originally came from, but it is simply a matter of connecting the rudder and the fuel cut off to the same timer arm, so that when the arm moves to stop the motor, it also pulls the rudder over, giving an effect which is the next best thing to radio control.

As shown in Fig. 6, the timer arm is connected by a wire push rod to the cut-off, and by a length of fishing line to the rudder horn. Two adjustable stops limit the travel of the rudder, which has extra free silk hinges, and is restrained by a light rubber band, the tension of which must be carefully balanced against the strength of the timer arm spring. Fishing line is used rather than wire, as its flexibility permits adjustments to be made to the rudder without having to alter things at the timer end. On my models I used modified Austin timers, but the Elmic diesel timer will do the job quite satisfactorily.

This device may be used in different ways. For instance, the rudder may be left neutral for a straight climb, and then moved either for a right or left turn on the glide. This was how I originally tried it, but could never eradicate the stall when the motor cut. The system which I now use is to have slight thrust and left rudder on the climb,



changing to right rudder on the glide, thus achieving the constant right turn throughout the flight, as in the Foote adjustment. About ⅛ in. rudder movement will usually suffice, and the right wing should be given a slight wash-in to prevent any tendency for a spiral to develop on the glide.

(G) Frank Zaic's Latest. After many experiments, this well-known modeller has evolved a theory for procuring a straight climb without looping. (Fig. 7) Both wing and tail are set at 10 degrees to the thrust line, with the tail positioned in the direct blast of the slipstream, so that the extra lift thus developed neutralises the looping tendency.

That brings us to the end of the list of systems which can be recommended, and in case the reader is feeling a little bewildered by all this information, I will make a tentative summing up as follows. For the newcomer to free flight, methods B, C, or F are the simplest to get right, while for the keen contest flyer, fighting for the last decimal point on his ratio, the choice would seem to lie between the timer rudder, the Foote method, and the Hogan tab, in that order.

Before rushing off to the flying field, there is one more job that must be done, and that is a thorough pre-flight rigging check. A few minutes spent here will pay off handsomely later on. Denny Davis attributes much of this success to accurate construction and careful rigging, and that means really getting down to it and measuring angles of incidence, thrust offsets, etc., not just guess-timating them. The vital points to check are the C.G. positions and difference between wing and tail angles, and here the " San De Hogan " settings, previously quoted, will serve as a guide for any pylon model with tail areas between 35 and 40 per cent. of the wing. Give the wing a good once over for unintentional warps—these may be steamed out—and check its alignment with the tail. Surfaces should be keyed on so that they cannot twist, but are still free to fly clear in the event of a crash.

Thrust line should be adjustable in all directions; oversized holes in the motor bearers are a help here. Many a good model has come to an untimely end because the motor was so tightly cowled that field adjustments were impossible. Finally, an absolute essential is some positive form of motor cut-out, one that can be relied upon to give consistent motor runs as short as 5 seconds. A short run will often mean the difference between a prang and a sigh of relief in the testing stages, and it just cannot be achieved by trying to run the tank dry.

Test Flying.

Test flying may be divided into three distinct stages, the first being hand gliding, the next, low power flying, and then the final stage when the throttle is opened wide. The initial gliding tests are simply a matter of letting the model lift from the hand as you run into wind and catching it again, which will reveal any extreme maladjustment. Little more can be learned from hand gliding on to flat ground, and to really get correct gliding trim, tests should be made down a slope, so that the model covers 50–100 ft. before touching down. All trimming should be made by altering the angle of the tailplane, or of the wing, whichever is more convenient. Ballasting nose or tail should not be needed, as the C.G. position is best regarded as a fixed feature of the design. At this stage the turn should be very slight, as it is surprising how it will tighten up at altitude.

When the glide is really right, all packing pieces may be cemented in and settings permanently located; from now on it should be possible to do all power-on trimming by varying the thrust line only. First power flights should be on about 8 seconds motor run, and at reduced engine speed. As most engines refuse to run smoothly at low speeds, it is a good idea to reverse the propeller, which will effectively kill excess thrust.

The whole secret and art of successful trimming is to learn to watch the model in the air and to use your experience to anticipate any possible dangerous tendencies which may be developing. Many beginners become so excited over their first good flight, that they cannot even remember the direction of circle. The good free flight man watches each flight with critical eye, always on the lookout for that slight stall which may become a loop under full power, or for the dipping wing, so often the forerunner of a vicious spiral. Like a doctor, the flyer must first diagnose the trouble before he can hope to make a cure.

Naturally, there is a strong temptation to open the throttle and give her a go at this stage, but it is a wise modeller who bides his time until all is in readiness. Now is the time to make all the corrections; you may not get a second chance when the power is on!

A point to remember here is that side thrust and down thrust are, to a large extent, interchangeable and complementary. For example, extra side thrust, rather than down thrust, will often prove to be the best cure for a stalling tendency. On the other hand, if side thrust is increased to tighten the climbing turn, then it may be necessary to reduce downthrust at the same time, lest the combination of the two produces a spiral.

Of the full power testing, there is little to be said. Cut the motor run to 5 seconds, turn the motor on full bore and hope for the best. This is the climax of all your efforts and the acid test of your workmanship and, if you have done all the preceding work and testing faithfully, there should be little to worry about. From now on it is just a matter of " Fly, fly, and fly again ", piling up the flying in good weather and bad, until you are thoroughly familiar with the model. Then, when the big competition comes around, you can enter with a feeling of confidence and an excellent chance of bringing home the bacon.

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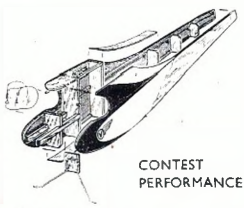

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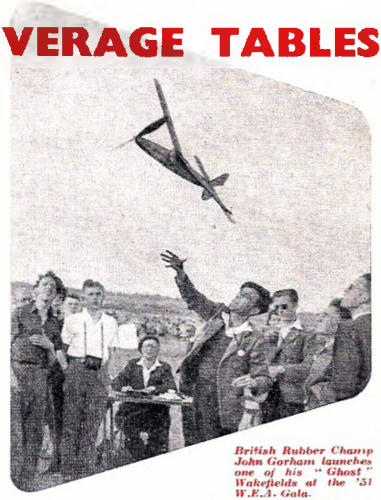
1951 CONTEST AVERAGE TABLES

AT the end of last flying season we presented, for the first time, tables giving average performances of various individuals over the major competitions, based on the lines of cricket averages. It was an experiment. It involved a lot of work. But we were so pleased with the response that we have again computed similar tables for the 1951 season. As we go to press the flying season is actually not completed. There is still one major rubber contest (The *Flight* Cup), one power contest (Hamley), and the United Kingdom Challenge Match. The glider table covers all the major glider contests, but the power duration table does not include results of the "Under 1·5 c.c." and the International Power Duration (Whitsun) meetings, or the Hamley Trophy, still to be flown. Rather than hold the tables up for these late results, we have gone ahead with our analysis. Possibly later we shall be able to publish final tables as these additional results affect the top placings. We had to omit the two power contests mentioned above which *have* been run for the reason that, in the rush to meet the press date, we were unable to obtain the full results list in time. In passing, too, we must record our thanks to the Competition Secretary of the S.M.A.E. for giving us access to all the official results sheets.

Now as to the actual results themselves. These make very interesting reading. Somehow the inescapable impression remains that it is in the rubber field that the individual contest spirit is most keen and the list is more freely sprinkled with "known" fliers. These contests, too, are somewhat easier to analyse for most of the rubber fliers are specialists in that particular line alone. Glider contests are productive of more entries, numerically, but the "experts" are scattered throughout the list rather than grouped in a bunch at the top. It would seem easier, in other words, to break into the top rank of glider fliers than achieve a similar distinction in the rubber contests.

The power contests are not easy to analyse. For one thing they are less numerous, and another they include "ratio" as well as "overall duration" competitions. We have reduced the ratio contests to flight times, as possibly the simplest solution. Here, if only on account of the smaller number of contests involved, we would say that the table is less representative of true merit.

Perhaps it would be as well to make this point quite clear. "Average tables" are not the be-all and end-all of assessing merit. They are partly an interesting sidelight and partly a guide to "form". Cricket teams for test matches are not picked solely on the results of average tables. But average tables do most certainly tend to favour the consistent flier and it is here, possibly, that they are the most interesting. We feel that they *could* have a definite use when a matter of team selection arises, for example.



British Rubber Champ John Gorham launches one of his "Ghost" Wakefields at the '51 W.E.A. Gala.

At the same time, "averages" can be upset by unusual circumstances. There were very few good flying days during 1951, for example. In the rubber contests there was one day—the Farrow Shield—which was near perfect in many areas. Most modellers who flew in this, boosted their averages and gained on those who flew in contests with poor conditions where even winning times were relatively low. You could only get *true* comparative averages with everybody flying in the same contests under the same conditions.

There is also the point of missed flights. A model may be lost, or damaged, and the flier does not bother to complete his three possible flights. We have had some "internal argument" amongst ourselves as to whether or not, this should be reckoned in the averages or not. Majority opinion was that it should be the actual contest flight average which should count, ignoring the lowering effect of lost flights or flights not taken. We have, however, included a separate column giving the *actual* flight average based on the actual number of flights taken. You can take your choice!

Now to examine the results in more detail. First, the rubber contest table. Here the amazing consistency of J. Gorham of Ipswich shows up with a flight average well above that of his nearest rival. He also flew in a maximum number of contests which renders his performance even more meritorious.

You may remember the 1950 contest average tables published in the February 1951 issue of the AEROMODELLER. Top average last year was 3

1951 CONTEST AVERAGE RESULTS

Position	Name	Club	No. of Contests	Flights Possible	Flights Made	Total Aggregate	Actual Flight Average	Maxi-mums	Contest Placings 1	2	3	Contest Flight Average
1	J. GORHAM	Ipswich	7	20	19	76 : 13	4 : 00	2	2	1		3 : 49
2	J. B. KNIGHT	K. Nomads	5	14	14	50 : 31	3 : 36	3			1	3 : 36
3	R. ATKINSON	Ipswich	6	17	17	55 : 07	3 : 14	4		2		3 : 14
4	R. H. WARRING	Zombies	6	17	17	53 : 47	3 : 10	1	1		1	3 : 10
5	F. HOLLAND	Swansea	5	14	13	43 : 51	3 : 22			1		3 : 08
6	H. TUBBS	Leeds	7	20	19	62 : 08	3 : 16	1		1		3 : 06
7	J. TANGNEY	Croydon	4	12	12	37 : 06	3 : 06	2			1	3 : 06
8	E. SMITH	Icarians	6	18	17	53 : 14	3 : 08					2 : 57
9	R. COPLAND	N. Heights	6	17	17	49 : 51	2 : 56	3		1		2 : 56
10	H. REVELL	Northampton	5	15	15	42 : 41	2 : 51					2 : 51
11	P. BROWN	St. Albans	4	12	12	34 : 01	2 : 50					2 : 50
12	W. ROCKELL	Gainsborough	6	18	18	49 : 43	2 : 46	1				2 : 46
13	F. SEATON	Northampton	4	12	12	32 : 57	2 : 45					2 : 45
14	T. DUNKLEY	Northampton	4	12	12	32 : 19	2 : 42					2 : 42
15	E. MUXLOW	Sheffield	5	15	15	40 : 18	2 : 41					2 : 41
16	E. W. EVANS	Northampton	5	15	13	40 : 15	3 : 05					2 : 40
17	N. MARCUS	Croydon	5	14	14	37 : 11	2 : 39	1				2 : 39
18	F. ADAMS	Northampton	5	15	13	39 : 41	3 : 03	2				2 : 38
19	D. SUGDEN	Loughborough	5	15	13	38 : 09	2 : 56					2 : 32
20	J. ROYLE	Littleover	5	15	15	37 : 49	2 : 31					2 : 31
21	R. WOODHOUSE	Whitefield	5	15	15	37 : 46	2 : 31					2 : 31
22	K. RUTTER	Leeds	4	12	12	28 : 56	2 : 25					2 : 25
23	I. DOWSETT	Pharos	5	15	15	37 : 01	2 : 29					2 : 24
29	E. NORTH	Halifax	6	18	18	42 : 27	2 : 22	1				2 : 22
25	F. BOXALL	Brighton	6	17	17	40 : 17	2 : 22		1			2 : 22
26	B. HAISMAN	Liverpool	5	15	15	35 : 04	2 : 20					2 : 20

Position	Name	Club	No. of Contests	Flights Possible	Flights Taken	Total Aggregate	Actual Flight Average	Maxi-mums	Placings 1	2	3	Contest Flight Average
1	P. JACOBS	Ipswich	3	8	8	28 : 54	3 : 37		1			3 : 37
2	S. WADE	Loughborough	3	9	9	32 : 15	3 : 35		1			3 : 35
3	R. GEESING	Croydon	5	14	14	47 : 34	3 : 24	5		1		3 : 24
4	M. HANSON	Solihull	6	17	16	52 : 56	3 : 19	5			1	3 : 07
5	D. SMITH	Loughborough	4	11	11	33 : 03	3 : 00	2				3 : 00
6	J. HANCOCK	Surbiton	5	14	14	41 : 40	2 : 59	4				2 : 59
7	B. WHEELER	Birmingham	6	16	16	47 : 43	2 : 59	3	1	1		2 : 59
8	T. BOOTLAND	Scunthorpe	5	14	14	41 : 16	2 : 57	1			1	2 : 57
9	J. LAMBLE	Chorleywood	4	10	10	29 : 12	2 : 55	2	1			2 : 55
10	W. BAILEY	Wellingborough	4	12	12	34 : 09	2 : 51	4		1		2 : 51
11	M. THOMAS	Blackpool	5	15	15	42 : 40	2 : 49	2			1	2 : 49
12	E. NORTH	Halifax	6	17	15	47 : 04	3 : 08	2				2 : 46
13	E. FARRENCE	W. Yorks	6	17	15	46 : 32	3 : 06	2				2 : 44
14	R. MONKS	Birmingham	6	18	16	48 : 59	3 : 04	5				2 : 43
15	R. ASKEW	Cheadle	5	15	14	40 : 02	2 : 52	3		1		2 : 40
16	P. BROWN	St. Albans	4	12	12	31 : 52	2 : 39	1				2 : 39
17	R. J. NORTH	Croydon	5	14	14	38 : 51	2 : 39	3				2 : 39
18	R. YEABSLEY	Croydon	7	19	18	49 : 17	2 : 44	2		1	1	2 : 35
19	J. MARSHALL	Hayes	3	9	9	23 : 11	2 : 34	1				2 : 34
20	P. GILBERT	Pharos	3	9	8	23 : 01	2 : 52	1			1	2 : 33
21	R. HINKS	Luton	3	9	9	22 : 05	2 : 27					2 : 27
22	D. YEABSLEY	Croydon	6	17	16	40 : 04	2 : 30	3				2 : 21
23	R. CLEMENTS	Luton	3	9	9	20 : 50	2 : 19	1				2 : 19
24	M. KING	Belfairs	6	17	17	38 : 24	2 : 16					2 : 16

Position	Name	Club	No. of Contests	Flights Possible	Flights Taken	Total Aggregate	Actual Flight Average	Maxi-mums	Placings 1	2	3	Contest Flight Average
1	N. BUTCHER	Croydon	2	5	5	21 : 53	4 : 23	3	1			4 : 23
2	R. BUSKELL	Surbiton	3	7	7	24 : 12	3 : 27	1				3 : 27
3	J. CHINN	Ipswich	4	11	11	35 : 57	3 : 15	4	1			3 : 15
4	P. WYATT	Ipswich	4	10	10	31 : 41	3 : 10	4	1		2	3 : 10
5	R. LADD	Croydon	2	5	5	15 : 36	3 : 07	2				3 : 07
6	N. MARCUS	Croydon	5	13	13	39 : 51	3 : 00	1			1	3 : 00
7	R. WARD	Croydon	5	13	13	39 : 51	3 : 00	4			1	3 : 00
8	J. B. KNIGHT	K. Nomads	2	4	4	11 : 57	2 : 59	1			1	2 : 59
9	P. JACOBS	Ipswich	4	11	11	32 : 16	2 : 56	1	1	1		2 : 56
10	J. BICKERSTAFFE	Accrington	3	8	7	21 : 11	3 : 02			1		2 : 39
11	J. GORHAM	Ipswich	5	13	13	33 : 51	2 : 36	5				2 : 36
12	E. LORD	Accrington	2	5	5	12 : 36	2 : 31	1				2 : 31
13	C. MAYES	West Essex	3	8	8	20 : 02	2 : 30	1				2 : 30
14	G. PERKINS	Croydon	3	8	8	19 : 43	2 : 28	2		1		2 : 28
15	H. J. KNIGHT	K. Nomads	2	5	5	11 : 57	2 : 25					2 : 25
16	H. TUBBS	Leeds	3	8	8	19 : 07	2 : 23	1				2 : 23
17	I. LUCAS	Brighton	3	7	7	16 : 11	2 : 19					2 : 19
18	R. C. MONKS	Birmingham	5	13	12	29 : 17	2 : 06					2 : 15
19	J. LAMBLE	Chorleywood	4	10	8	21 : 14	2 : 09					2 : 07

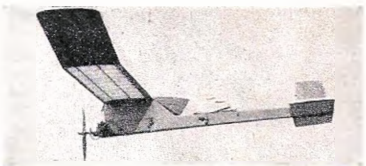
minutes 34 seconds or slightly lower than the top 1951 figure. Even more significant, though, is that this year there is a marked increase in the number of fliers with contest averages between the two and a half and three minute mark. The standard appears undoubtedly to have risen. Ten men who consistently do over three minutes actual (average) flight time in all contests—*in all weather*.

Perhaps notable, too, is that the top four men in the 1951 table failed to gain a place in the Wakefield team. An *average* flight of 3 minutes 34 seconds at the Trials would have gained a place. Gorham and Knight both have that *overall* average (Knight was prevented from flying in the Trials due to University examinations), but the other did not. Quite a lot of the top men in the table, in fact recorded their worst times of the season at the Trials and pulled down their overall average!

Now compare the rubber averages with those of the glider fliers. As a general rule, winning times in glider contests are somewhat higher than those in rubber events. The contest flight averages, however, are somewhat lower all down the list. This, as we interpret it, means that the element of luck plays a somewhat greater part in glider contests. Note also the greater number of "maximums". You are just as likely to make a poor flight as a good one and on a season's flying, good and bad luck tends to average out.

Seldom, it appears will you get the same names at the top of the glider list each year. Yeabsley, Marshall, Bootland and Gilbert—one, two, three and four last year—have all dropped their places in 1951. Only Geesing and Hanson of the top six this year, appeared at all in last year's list. A higher standard of flying throughout the glider contests is indicated, however, for this year every man in the table has a flight average well in excess of two minutes whereas in 1950 the tenth man had dropped to this level.

Now for the power contest table. This, as we have noted, is rather less reliable as a source of true comparison. Average flight times at the top of the table are up on rubber and glider events—most probably on account of the smaller number of contests registered, not necessarily because the power model is inherently capable of a better duration. At least one of the five possible contests



included was flown under almost perfect conditions and Butcher did, in fact, register three maximums on this occasion—to which he largely owes his high flight average.

Probably the most striking feature of this table is that the top places are literally swamped by the Croydon and Ipswich clubs. The Croydon club, in particular, appear largely to have concentrated on power duration this year. In contrast to Ipswich they have a large membership which undoubtedly gives them a considerable pull in competitions. The Ipswich club's success relies largely on their more limited number of fliers taking part in all types of contests. Gorham's influence is again apparent here. Wyatt and Jacobs in the listing flying his designs. Gorham himself manages eleventh place in the power duration rating.

It is the exception rather than the rule to find the same name cropping up in the top of two or more average tables. There are more "exceptions" this year than last. Jacobs of Ipswich topping the glider table, also manages ninth place in power. J. B. Knight, second in rubber, rates eighth in power.

Just to round off our analysis we have prepared another little table grouping 1950 and 1951 contest averages, awarding points according to placing in each year. The final table gives, virtually, consistent performance over two year's flying—or the men to watch in contests! If you are keen on contest flying you can get a lot of pleasure, and no little information, out of all these facts and figures. Our personal feeling is "Thank heavens we shall not have to work them all out again until the end of 1952!"

1950-51 COMBINED TABLES

Position	RUBBER Name	% Rating	1951 Average Compared	GLIDER Name	% Rating	1951 Average Compared	POWER Name	% Rating	1951 Average Compared
1	F. HOLLAND	93	= :17	M. HANSON	89	= :41	P. WYATT	94	+ :22
2	R. COPLAND	90	— :27	T. BOOTLAND	89	— :02	N. MARCUS	93	— :11
3	R. WARRING	89	= :11	R. GEESING	86	+ 1 :24	R. LADD	86	= 1 :16
4	J. B. KNIGHT	89	+ :28	B. WHEELER	81	+ 1 :09	J. B. KNIGHT	85	+ 1 :02
5	B. SMITH	84	+ :13	R. YEABSLEY	81	— :56	J. GORHAM	84	+ :29
6	E. W. EVANS	80	+ :02	J. MARSHALL	79	— :26	E. LORD	80	+ :39
7	J. TANGNEY	78	+ :19	P. GILBERT	76	= :09	—	—	—
8	H. REVELL	74	+ :21	R. MONKS	73	+ 1 :27	—	—	—
9	N. MARCUS	69	+ :22	R. HINKS	70	+ :02	—	—	—
10	F. ADAMS	65	= :29	—	—	—	—	—	—

Seasons Greetings

GREETINGS
And the b
Hiccup ! The
brew, and it w
we noticed it
thirsty engine
inspiration, th
friend Phil has

But back t
alright in the
is A. C. Thom
Soft snow last
Beckenham wa
picture 1. Paul
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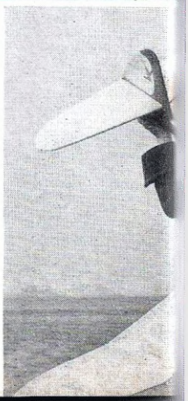
J. Reay of Alt
trailing edge

Kazuo Kosa
his rubber pow
pic. 3. He mus

MOD



to our Readers

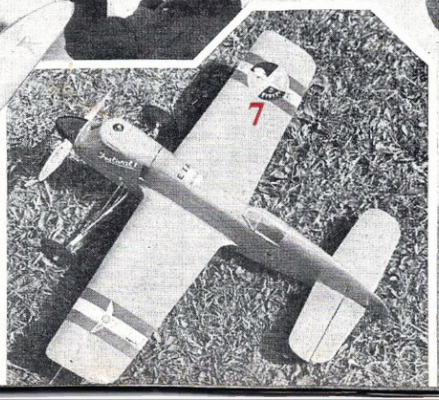
S one and all, from your one and only Fliar Phil, Hic! best of luck for the Festive season and coming year. hics and hiccups are the result of not looking at one's wasn't until the whole bottle had been drained that was old Ivor Howler's specially doped glow-juice for es! Now every time we look mirrorwards for e F.P. facial features take on a triangulated look—s been "delta" speedy blow!

o the cold, sober, serious, folks—and, brhh, it's cold Model of the Month pic! Snowbound up to the axles mpson's A.P.S. Sopwith Pup, fitted with Frog 180, t winter was perfect for the initial test flights, down ay. So it was, too, up north at Rotherham, where, in l Banks fiddles with an Allbon Javelin fitted to an old ral stooging. Just below (2) is a delta controliner by rincham, complete with buried engine and swept-back he must have been sampling glow-juice, too!!

ki from faraway Geisha land, Japan, is about to launch ered autogiro in t have foreseen the long fuselage trend in Wakefields when he designed this one—how about a 'giro-Wake? From rotating wings to rotating models, this time in pic. 4, where Bill Dean's Pacer Class "B" racer shows off its grown-up Ranger look. With Class "A" E.D. 2·46, it flies at 62 m.p.h.; but will, of course, be much faster with a 5 c.c. motor. Number 5 should be easily identified as yet another of those popular A.P.S. beginner's power jobs, the Tomboy, this time by Junior C. A. Clarke. Mmm! Margaret Pullen of Ilford displays Dave Pettet's eight-footer to advantage in pic. 6. The fuselage is a very neat piece of monocoque work . . . the model . . . of course!

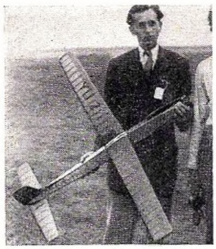
Another good-looker comes in pic. 7 where Charles Hollowood's (Crewe D.M.F.C.) special Festival year trainer, with team racer lines, rests between flights. Using a drop-out undercart, it averages 95 m.p.h. but did on one occasion register 104·6 m.p.h. to make a record for the N. Western Area. Wing area is 80 sq. ins., span 24 ins., weight 20½ ozs., and prop a 7⅝ in. × 10 in. pitch on an ETA 29. And so to No. 8, and Ilford's Kit Carson in action with his 58 secs. rubber powered 'giro at Fairlop. At this rate (three 'giro's in this issue!) we shall all be going round in circles, Hic! Ah, that's where we came in! Merry Xmas, Bods! And keep off the glow-juice!

EL NEWS



1951 F.N.A. CUP

DESCRIBED BY THE EDITOR



Right, is Fresl the individual winner and extreme right, the victorious Italian Team with their models.

PROBABLY the newest International Contest is that for the F.N.A. Cup, a magnificent trophy purchased by the F.A.I. and competed for the first time in 1950. The initial contest was held in France and a team was sent from Great Britain to do battle with other countries, final victory going to Holland.

Following standard practice therefore, the 1951 contest was held in the Netherlands, but unfortunately, owing to the heavy losses already incurred in sending British teams to International events, no fliers from this country were available.

The venue of the contest was a military aerodrome at Gilze-Rijen in the southern part of Holland, and the facilities placed at the disposal of the Royal Dutch Aeroclub by the Commanding Officer, Lt./Kol. van Rest, were remarkably adequate, including a whole block of buildings for the processing of models and general control.

The weather was far from promising, and a high wind was accompanied by overcast, threatening skies.

In spite of this, models were soon being launched, and clearly demonstrated the ability of the Wakefield type to " take it ". The majority of the best flights were timed o.o.s., and the average for the first round of 2 : 33 gives a fairly accurate indication of the maximum flights possible.

Morisset provides a typical Morisset expression as he piles on the turns whilst in the background Ferber takes the strain for a Belgium compatriot.

Di Pietro of Italy made the best flight in Round 1 with a beautiful 3 : 37, closely followed by Lippens (Belgium) 3: 11 and Aribaud (France) 3 : 21. Half a second behind came Fresl of Yugoslavia.

Not so the Italians, Fea and Faiola! Both these left it till too late before attempting their initial flights, and in spite of continuous warnings over the Public Address left it till the round had been closed before running out in a panic with their models. Much gesticulation followed, but van Hattum was firm, and the round was closed.

Round 2 saw the weather gradually improving, and fortunately the high wind started to abate. With the lesson of earlier disqualifications fresh in mind, the Italian team were early on the job in an endeavour to maintain their first round lead. (The contest is a team event, based on the best four in a team of six.) Times, as was to be expected with the improved conditions, were better in this round, and the average went up to 2 : 40. Nearly everyone improved on first round times, though surprisingly enough only Fresl (4 : 13) and Lippens (3 : 48) scored over the 200 second mark.

Good flying by the Belgian team put them at the head in this round, and the contest began to get really exciting as the starting time for the final effort was announced.

Fresl still further improved his times with a fine 4 : 34·7 and secured the honour of best individual with a total of 12 : 08. This chap is a very fine modeller, and will be a definite threat in future Wakefield contests.

Both Lustrati (Italy) and de Vries (Holland) secured maximums in the final round, and with Kannenworff, Di Pietro and Maina getting in fine flights, the final results gave Italy as the winners over Holland (2nd) and Belgium (3rd). With only a three man team, the Yugoslavians were handicapped, as were the French who had four men.

RESULTS

Team	secs.
ITALY ...	1857
HOLLAND	1591
BELGIUM	1578
YUGOSLAVIA	1546
FRANCE ...	1290

	Individual		
1.	Fresl	Yugoslavia	12 : 08·4
2.	Lustrati	Italy	10 : 41·9
3.	Kannenworff	Italy	10 : 26·8
4.	Stojadinovic	Yugoslavia	10 : 02·6
5.	de Vries	Holland	9 : 55·5

The YUGOSLAVIAN POWER CONTEST

AN INTERNATIONAL EVENT FOR THE CUP OF THE AERO-NAUTICAL UNION OF YUGOSLAVIA

BY H. G. HUNDLEBY

HELD on the Sunday following the A/2 final, this contest although providing a very pleasant day's flying, did prove to be something of an anti-climax. In the main this was due to the relatively low standard of power flying which one could not help but compare with the very high standard witnessed during the A/2 event. Few countries had sent actual power teams, but had merely doubled-up, as did the British contingent. Of the British team, only Ray Monks and Pete Holland competed.

Most of the foreign flyers seemed to be flying models that were very much underpowered.

Excellent take-off boards were provided and also very strict timekeepers who were quick to disqualify those who failed to take off the required three points specified by F.A.I. rules, and those who made any semblance of a follow through when launching.

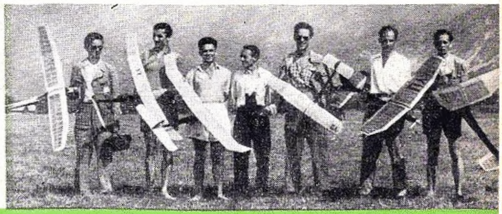
A tense finish was provided by Emil Fresl of Yugoslavia who made his last flight in the rays of a setting sun. He was the only man capable of beating Morisset and there was great excitement amongst the Yugoslavs as his model took off. However, a Yugoslav victory was not to be and our old friend Jacques was the man who received the silver trophy.

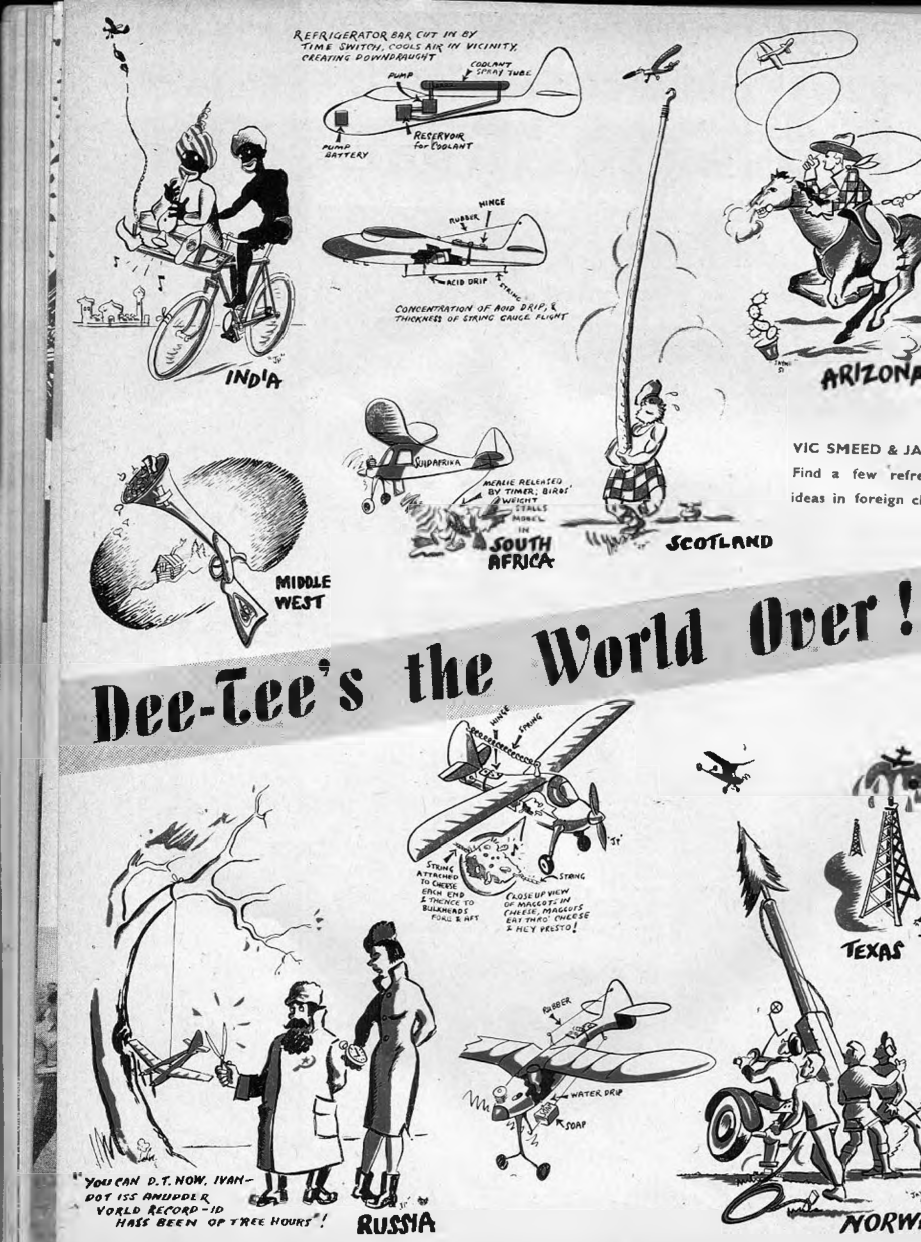
Morisset of France receives from Major General Ambrosie the beautiful filigree silver trophy. Below, right, is firstly the Yugoslav team with Fresl the second place man on the extreme right, and bottom, the Austrians whose power models are nearly as unorthodox as their A/2's.

RESULTS

	Competitor	Country	Round 1 points	Round 2 points	Total of points
1.	Jacques Morisset	France	183	203	686
2.	Emil Fresl	Yugoslavia	168	300	600
3.	Vladimir Pracek	Yugoslavia	155	287	570
4.	Raymond Monks	England	168	212	551
5.	Dragan Prohaska	Yugoslavia	167	140	487
6.	Dragan Hristic	Yugoslavia	103	105	481
7.	Hugo Leppert	Germany	—	177	477
8.	Kurt Barth	Germany	208	148	447
9.	Pierre Serres	France	86	300	386
10.	Francois Jongers	Belgium	131	104	338
11.	W. Schramme	Switzerland	103	115	334
12.	A. A. Teunissen	Holland	253	33	325
13.	F. Maibach	Switzerland	76	132	312
14.	Jean Galenne	France	—	300	300
15.	Maurice Ferber	Belgium	60	110	296
16.	P. Holland	England	166	42	292
17.	Jean s'Jongers	Belgium	84	107	284
18.	Lina Schratten-berger	Germany	91	110	283

Left, Leppert of Germany prepares to release his E.D. 2·46 powered job. Below, is the British team with Bob Gosling in the centre. Both the British boys flew Elfin powered jobs.




REFRIGERATOR BAR CUT IN BY TIME SWITCH, COOLS AIR IN VICINITY, CREATING DOWNDRAUGHT
PUMP
COOLANT SPRAY TUBE
RESERVOIR for COOLANT
PUMP BATTERY
HINGE
RUBBER
ACID DRIP
STRING
CONCENTRATION OF ACID DRIP, & THICKNESS OF STRING CAUSE FLIGHT
INDIA
ARIZONA
VIC SMEED & JA
Find a few refre
ideas in foreign c
SOUTH AFRICA
MEALIE RELEASED BY TIMER, BIRDS' WEIGHT STALLS MODEL IN
SCOTLAND
MIDDLE WEST
Dee-Tee's the World Over!
HINGE
STRING
STRING ATTACHED TO CHEESE ERIN END & THENCE TO BULKHEADS FORE & AFT
CLOSE UP VIEW OF MAGGOT: IN CHEESE, MAGGOTS EAT THRO' CHEESE & HEY PRESTO!
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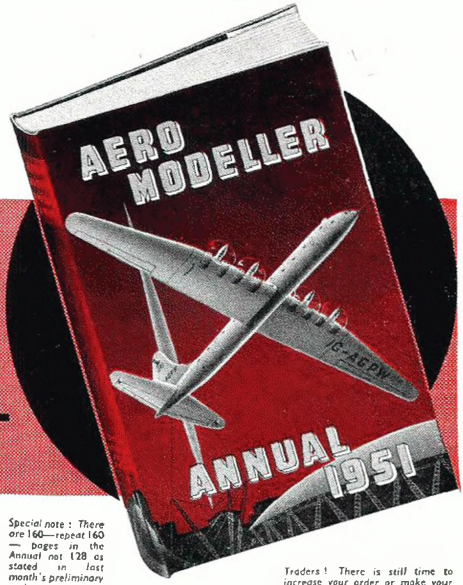

★ *Special note: There are 160—repeat 160 — pages in the Annual not 128 as stated in last month's preliminary notice.*

Traders! There is still time to increase your order or make your first booking!

HERE ARE SOME OF THE PRINCIPAL CONTENTS :—

● Cyril Shaw Team Racer "Half Pint" ● R/C from U.S.A. "The Little Ship" ● Morisset's Jugoslav Cup Winner "Attila III" ● Russian Power World Record Holder ● "Humming Bird" Seaplane from Japan ● A new Coasby Stunt C/L "Pagan" ● P.38 and Tigercat Twin Engined Scale C/L. ● Pylon Power Models from U.S.A., Italy, Jugoslavia ● Low wing scale "Bebe Jodel" light aircraft and highwing scale "Praga Baby" ● Jetex Designs ● Famous Italian "Bolide" fin-at-front power model ● In all over sixty plans from all over the world ● Articles include Harry Hundleby's Radio Control Review—most practical ever on R/C ● Phil Smith gives the secrets of designing Scale Jets with Jetex ● Ron Warring on Gears for Wakefields ● Ron Moulton with More Team Racing ● Multi-engined Control Line Models ● Broggini foremost U.S. expert on Flying Wings ● All the usual features: Engine Analysis in brief ● Contest Results at Home and Abroad ● Model Shop Directory, etc., etc.

EVERY year we aim to produce an ANNUAL with a little more of what the aeromodeller wants, more plans, more gen, more of everything, so that the problem is getting it all in rather than filling it. Festival Year sees us offering more plans than ever, authentic articles on up-to-the minute aspects of the hobby and something for everybody. Specials for 1951 include Harry Hundleby on the most practical ever Radio Control Feature; Phil Smith the Veron designer tells you how with Jetex; Ron Warring tackles Wakefield Gears; Ron Moulton brings Team Racing up-to-date. Then the plans—they cover as wide a range as ever with models from France, Belgium, Italy, Yugoslavia, Norway, Japan, Germany, Austria, Spain, Poland, Czechoslovakia, Holland and of course Gt. Britain and U.S.A.

★ *160 pages size 8¼ × 5½ ins. on high quality paper. Over sixty plans, many diagrams, numerous halftone illustrations. Bound in cloth and card with gilt blocked title on spine and face. Three colour dust cover featuring model Arabazan at the Festival. Price 10/-. (Or by post from the Publishers, 10/9 post free.)*

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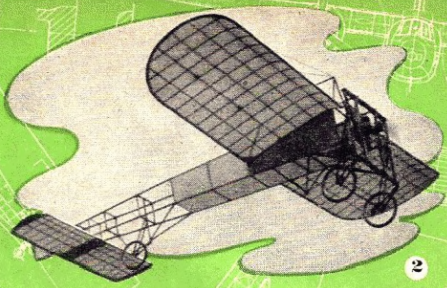

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Aristocrats

CAMERA ARTIST ED. STOFFEL IS RESPONSIBLE FOR MOST OF THESE SHOTS OF FLYING SCALE MODELS—A BRANCH OF AEROMODELLING IN WHICH BRITISH ENTHUSIASTS LEAD THE WORLD

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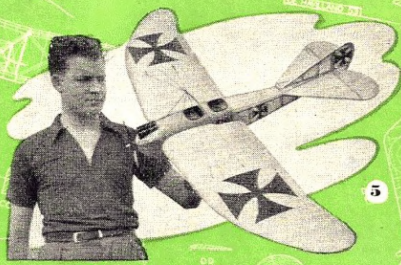

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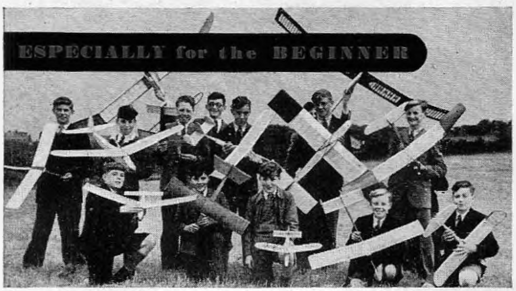
# of Aeromodelling

1. *There's 18 month's work in Bob Hutchinson's 50½", 33 oz. perfect scale Percival Proctor V, which is an exact replica of the aircraft he services.*
2. *84" version of Bleriot's Channel crossing monoplane is by M. T. Mitchell. Micron 10 c.c. petrol engine turns a 20" prop at realistic slow revs.*
3. *Wave Stuka ! 45" J.U. 87b by G. V. Potterton brings back unwelcome memories as its Elfin 1·49 screams it round in a tight turn over Fairlop.*
4. *A favourite old-timer, the AVRO 504K, this time 54" span and powered by Mills 1·3. R. W. Gray is happy owner despite damage to skid and wires.*
5. *Unusual choice is D. Bryant's 54" Rumpler Taube. Choosing a version without the familiar scalloped trailing edge is a great aid to construction.*
6. *Control-line 44" Grumman Tigercat by Donald Deeley has twin E.D. Comp. Specials. A veteran of many flights, now smashed after a double line break.*
7. *Bob Ormorod tackled a subject with many balance difficulties in this 50" F.E.8. Powered by Reeves 6 c.c. petrol engine, it weighs 44 ounces.*
8. *Low-wing scale subject for Bob Woollett is the D.H.53 Humming Bird with Mills ·75 or E.D. Bee Power. 1½" to 1' scale makes it almost 46" span.*
9. *7 old Mills 1·3 cylinder fins, plus one pukka engine, go to make the dummy nose unit on Bill Steemson's 57" converted APS B.E. 2 c. rubber job.*
10. *Amphibious 8' span Grumman Seabee by Arthur Marshall is radio controlled and has three-speed control on its 10 c.c. Super-Cyke engine.*
11. *A well known giant is Peter Holland's four-Elfined Brabazon. Huge proportions of the 120" model are emphasised by Pete, no midget himself.*
12. *Cream and blue Piper Cub by D. Fernandez is from a Sportsmecca 52" kit. Mills ·75 c.c. provides just the right power to give 60 ft. take-off run.*
13. *Ten pounds of Fortress depress airwheels realistically in this low angle shot of Albert Briggs' 78½" span model which uses four E.D. MK. IV's.*
14. *Caught in action is John Ashford's Stinson Sentinel. 48" span, it flies beautifully—and the cabin ripens tomatoes between flights !*

PART XXII By the

REV. F. CALLON



THIS month's heading photograph shows some of the members of the Upholland College M.A.C., a club which, although it does not get around and about in the contest world, still manages to enjoy itself no end at home. The picture was taken recently before a glider competition for the longest individual flight, won by J. Rawsthorne's Walthew A/2 (just right of centre) with a first-class o.o.s. effort.

First Model At the time of writing another group of raw recruits are awaiting initiation into the club, and to any other *real* beginners who have just started to take the AEROMODELLER may I say that your first couple of models are the most important you will ever build. If you start with something which is too difficult the chances are that you will be most disappointed with the results and be tempted to give up the hobby altogether. Your first effort should be a small, solid balsa chuck glider, such as the Keilkraft "*Polaris*", and this should be followed up by a very simple built-up glider of about 30 in. wingspan, which is just big enough to give good results without being too complicated or expensive. Such a model is the Walthew Glider, for which the plan and full instructions are still obtainable from the AEROMODELLER Plans Service. In fine weather this model flies excellently, and has been known to stay up for as long as half an hour on occasion.

And at the risk of boring those who know this fact so well, may I remind beginners of the importance of studying the plan and instructions most carefully before starting to build, and when building does commence, of working slowly and methodically over each stage of the process. If warps in the wing and tailplane are to be avoided —and they *must* be—then particular care has to be taken to see that the tissue is laid evenly and squarely over the framework, and after doping, these units must be pinned down to the workboard over greaseproof paper to dry. Leave them overnight if possible.

A Novel Soldering Jig After the publication of the article on soldering in the August number a reader from Leicester, S. Limming, sent in the following suggestion. When two or three units have to be soldered together at some particular angle it is often very difficult to hold them in place while the solder is applied, and for this job a (literally, for once!) common or garden potato makes a first rate clamp. One slice with a knife provides a flat base and prevents wobbles, and then it is the simplest job in the world to push a wire into the top at the required angle, where it will stay put. "Small parts," writes Mr. Limming, "may be stuck into the potato, which serves as an ever cool handle even better than pliers. With a little ingenuity pieces may be cut away from it to allow the building up of any complicated design of several individual units fitted to each other before soldering. The final soldering process is then easy and quick with little fear of slips . . . Needless to say, all parts to receive solder must be clear of the potato (and its juice) during the soldering process".

Sheeting In For the slightly more advanced beginners a few suggestions about sheeting in wing leading edges may be of interest. This is only employed on fairly large models where the extra weight entailed does not make so much difference, but as far as increase in strength is concerned it is worth its weight in gold. A wing which has been built in this way will take some incredibly hard knocks without being damaged.

Plans sometimes recommend 1/32 in. sheet for the job, but in almost every case it is far more worthwhile to use *soft* 1/16 in. sheet, which is far easier to work with, not *very* much heavier, and a great deal stronger. For power models which are only intended for sport flying, and when a rocketing contest climb is not aimed at, it is a good idea to employ a sheeted leading edge even though this is not mentioned on the plan. The extra weight will doubtless slow up the model's climb and increase its flying speed slightly, but what does this matter if it is going to remain airworthy for three seasons instead of three weeks?

Shaping the Ribs The wing should incorporate a top spar, 3/16 in. sq. or at least ¼ in. sq., about 25 per cent. of the chord back from the L.E., up to or on top of which the sheeting will go. Now since the top of the sheeting must not stand up above the level of the wing surface, the top of each rib (on which it is to lie) must be lowered by 1/16 in. from the L.E. to the top spar, and this must of course be done when the ribs are being cut out, not

left till they have been cemented in place! Fig. 1 shows aerofoil section with the sheeting shaded; in A the sheeting reaches up to the top spar, while in B it is cemented onto the top of it so that the notch for the spar has to be cut 1/16 in. deeper.

Cutting the Sheet to Size This is really the only difficult part in the process of sheeting in a leading edge, and if care is taken with it then a neat, strong job is assured. The sheet has to be cut very accurately to reach from the top spar to the L.E. all the way along, with a separate piece for each dihedral level. Use a balsa knife or razor blade and *metal straight edge* to cut the pieces very slightly on the large size to start with, and then rely on your sanding block (which should be large and perfectly flat) for smoothing off the extra wood, trying them frequently in their place as you go along, until an exact dry fit is achieved. Where two ends meet at a dihedral joint, see that they *both* rest along the top of the rib which occurs there. If the ends are cut at a perfect right-angle the joint will not be a good one, for it must be remembered that the two pieces are curved and are not lying in the same plane. Fig. 2—which exaggerates things slightly for the sake of clearness, shows how the ends of the sheets must be cut slightly curved inwards if they are to meet quite flush all along the joint.

Cementing the Sheet The total length of cemented joints which has to be made when sheeting is applied may add up to as much as five feet! So it is out of the question to run the cement tube along all of them and expect the first ones to remain tacky by the time the last ones are finished. One effective method of overcoming this difficulty is as follows. First, pre-cement the tops of all the ribs, the edges of the piece of sheet, and those parts of the L.E. and top spar with which the sheet will come into contact. Wipe off all surplus cement as you go along; there is no need to hurry. Next, run a line of cement right along that edge of the sheet which goes against the L.E. and another along the top of the inside of the L.E. itself, and push the sheet down against it. Secure this joint properly by pushing in pins slantwise every inch or so all the way along, through the sheeting and into the L.E. Fig. 3 shows a cross section view of the process, with the balance of the sheet standing away at an angle from the rib tops and the top spar. Once again there is no particular need for great hurry, for as we shall see it will not matter if the cement has not taken at every point, and for the time being the pins will secure the joint quite adequately.

Now run another line of cement along the top

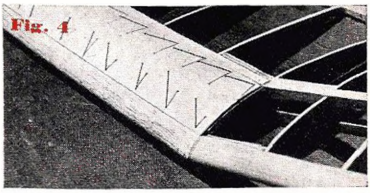


Fig. 4

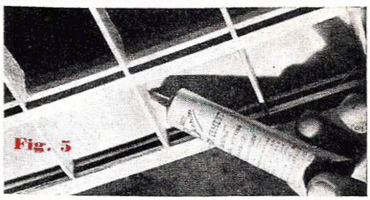


Fig. 5

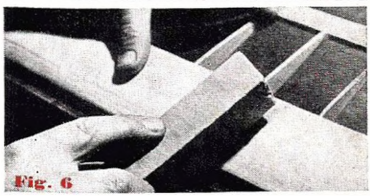
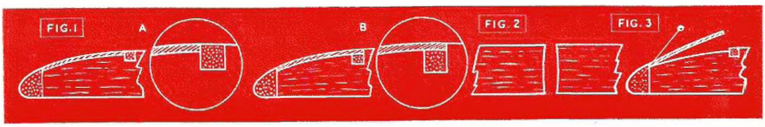


Fig. 6

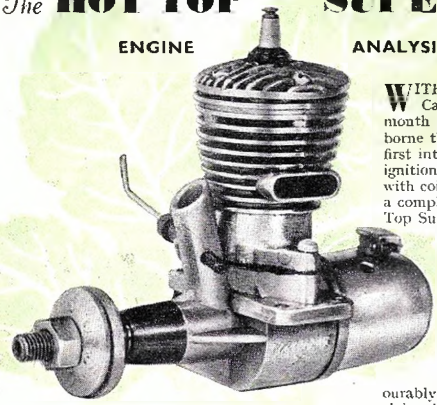
spar and the edge of the sheet which is to meet it, and bend the latter down firmly over the tops of the ribs into position, once more working your way along with plenty of slanting pins through the sheet into the spar. Fig. 4 is a photograph of the job at this stage. The wing is now turned over, and a miniature gusset of thin cement—*Baron* is very suitable—is run into the underside of all the joints, i.e., the angles between the ribs tops, L.E. and top spar and the sheeting. (Fig. 5.)

The other section (or sections) of the wing is dealt with in exactly the same way. Thin cement runs well into the joints and draws them into close contact as it dries. When this has taken place all that remains to be done is to remove the pins and use a sanding block of generous proportions (the one in Fig. 6 is a little on the small side) to sand everything down to the smooth contour of the true aerofoil surface.



The HOT TOP SUPER HURRICANE ENGINE

ANALYSIS No. 42 by L. H. SPAREY

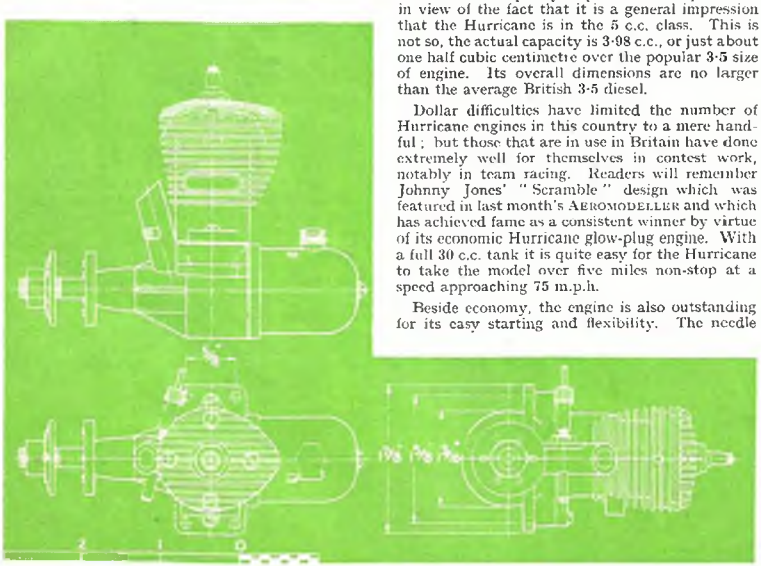


WITH recent news-focus on the Royal visit to Canada, it is fitting that our subject for this month should be an engine which has proudly borne the stamp " Made in Canada " since it was first introduced in January, 1946. Then a petrol ignition engine, with separate tank, and supplied with coil and condenser, it has recently undergone a complete re-design, and now appears as the Hot Top Super Hurricane glow-plug engine. In place of the make and break unit there is a heavy thickness streamlined bush ; the compression ratio is up to 10·2 and a metal tank comes integral with the sump cap. A Champion V.G.2 glow-plug completes the external change, for all the neatly die-cast parts remain the same as before. Internally we have reason to believe that improvements have been made, for the power curve of the engine compares favourably with others of similar capacity and which claim the distinction of being the very latest in design.

Mention of capacity requires more explanation in view of the fact that it is a general impression that the Hurricane is in the 5 c.c. class. This is not so, the actual capacity is 3·98 c.c., or just about one half cubic centimetre over the popular 3·5 size of engine. Its overall dimensions are no larger than the average British 3·5 diesel.

Dollar difficulties have limited the number of Hurricane engines in this country to a mere handful ; but those that are in use in Britain have done extremely well for themselves in contest work, notably in team racing. Readers will remember Johnny Jones' " Scramble " design which was featured in last month's AEROMODELLER and which has achieved fame as a consistent winner by virtue of its economic Hurricane glow-plug engine. With a full 30 c.c. tank it is quite easy for the Hurricane to take the model over five miles non-stop at a speed approaching 75 m.p.h.

Beside economy, the engine is also outstanding for its easy starting and flexibility. The needle



valve is not at all critical, though there is a slight time lag between needle movement and actual r.p.m. change which is another pointer towards economy. Similarly, one choke is sufficient for quite a lengthy burst of power, so cylinder priming has to be effected with care.

This is the first engine we have analysed that calls specifically for a petrol based nitro-propane fuel. The tests were made using a standard commercial methanol fuel, and we doubt whether the petrol/propane would give better results, except perhaps even greater economy. (Though not on the operator's pocket ! !)

Test

Engine : Super Hurricane "24" Glowplug Version ("Hot-Top").

Fuel : Mercury No. 5. **Starting :** Excellent.

Running : Good at all tested speeds. Needle control not critical.

B.H.P. : At a speed of 11,600 r.p.m. a maximum output of ·279 b.h.p. was obtained, but no sudden fall in power was noticed until speeds of around 12,600 were reached. The curve shows that at this speed the output was still as high as ·249 b.h.p., although at 13,000 r.p.m. it was down to about ·200 b.h.p. At 4,000 r.p.m. an output of ·090 b.h.p. was indicated.

Checked Weight : 6·4 ozs. with tank.

Power Weight Ratio : ·697 b.h.p./lb.

Remarks : The "streamlined" cylinder head finning does effectively cool the rear part of the cylinder and also improves the general appearance.

General Constructional Data

Name : Hot Top Super Hurricane.

Manufacturer : Hurricane Engines, 28½, Adelaide St. East, Toronto.

Retail Price : $16.50 (£5. 7s. 6d. approx.).

Type : Glowplug.

Fuel : 1 to 2 parts Nitropropane, 5 parts S.A.E. 70 Oil, 13 parts Gasoline (petrol).

Capacity : 3·98 c.c., ·24 cu. inches.

Advertised Weight : 5¼ ozs. (bare).

Compression Ratio : 10·2. **Mounting :** Beam.

Recommended Airscrew : F/Flight, 11×6; Stunt, 9×8; Speed, 8×8.

Recommended Flywheel : 5 ozs.

Tank : Aluminium Alloy.

Bore : 11/16 ins. **Stroke :** 21/32 ins.

Cylinder : Mechanite, with die-cast Alloy fins.

Cylinder Head : Separate die-casting.

Crankcase : Pressure die-cast. Light alloy.

Piston : Plain baffle type.

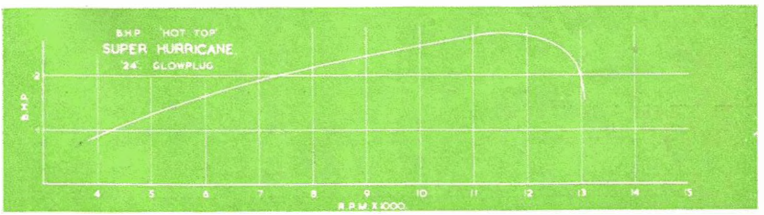
Connecting Rod : Aluminium Alloy.

Crankshaft : Tool steel, hardened and ground.

Main Bearing : High speed bronze bone fitted.

Induction : Rotary valve on crankshaft.

Special Features : Torque maintained at high r.p.m.



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D. H. Chipmunk	3/8
Fairey Junior	3/8
Fairey 17	3/8
Auster Arrow	3/8
Fokker D-8	3/8
Stinson Flying Station Wagon	3/8
Eco Ercoupe	3/8
Piper Cub	7/4

Aeromodels

Hawker Fury	6/8
Lysander	9/2
S.E.5A	6/8
Miles Magister	6/1
Leopard Moth	6/1
Proctor	20/9
Messenger	20/5
Auster	18/7

Skyleada

Junior Series	2/–
16" Series	2/6

JETEX

Vampire 50	7/–
Vampire 100	10/7
Meteor 50	10/7
K.K. Sabre (50)	3/8
K.K. MIG15 (50)	3/8

Veron (Jetex 50)

Sea Hawk	6/8
Thunder-Jet	6/8
Attacker	6/8
Sabre	6/8
Avro 70 B	7/–

POWER FREE-FLIGHT

Mercury

Monocoupe 40"	26/7
Monocoupe 60"	66/–
Stinson 105	26/7

Keilkraft

Piper Spr. Cruiser	22/8
Cessna 170	22/8
Luscombe Silvaire	22/8

Aeromodels

Autocrat	42/9
Proctor	42/9

CONTROL LINE

Veron

Focke Wulf 190	23/10
Spitfire 22	33/7
Sea Fury X	27/6
Wyvern	28/8
Midget Mustang	25/8

Skyleada

Curtiss-Hawk	19/–

GLIDERS

K.K. Chief 64"	22/8
K.K. Invader 40"	7/11
K.K. Minimoa 50"	8/7
K.K. Soarer Baby 36"	6/1
K.K. Soarer Minor 48"	9/9
K.K. Soarer Major 60"	14/1
K.K. Cadets 30"	4/11
K.K. Cub 20"	3/1
Mercury Gilli Chopper	15/–
Mercury Norseman	24/9
Mercury Magpie 24"	4/11
Frog Prince 60"	25/–
Veron Versonic 46"	11/7
Veron Coronette 26"	3/11
Halfax Roma 40"	9/–
Frog Diana 36"	9/–

RUBBER-POWERED

K.K. Playboy 20"	4/–
K.K. Orion 23"	4/3
K.K. Achiller 24"	4/11
K.K. Eaglet 24"	5/6
K.K. Ajax 30"	7/4
K.K. Ace 32"	6/1
K.K. Competitor 32"	8/7
K.K. Senator 32"	6/9
K.K. Gypsy 40"	12/10
K.K. Contester 45½"	28/8
Mercury Mayflyg 32"	9/6
Frog Goblin 24"	5/6
Veron Rascal 24"	5/6
Veron Goblin 20"	3/11
Veron Sentinel 34"	12/2
Veron Fledgling 24"	8/3
Frog Witch 36"	12/9
Frog Saturn "30"	12/10
Frog Venus 38"	17/6

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Veron Skyskooter 48"	30/6
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Veron Streaker 37"	24/1
Veron Cardinal	17/8
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Frog Janus 44"	17/6
Frog "Powavan" 47"	25/6
Frog Firefly (Biplane)	36/21/6
E.D. Radio Queen 84"	85/–
Halfax Javelin 50"	27/6
K.K. Pirate 34"	14/8
K.K. Bandit 44"	27/8
K.K. Outlaw 50"	27/6
K.K. Slicker Mite 32"	11/7
K.K. Slicker 42"	21/5
K.K. Slicker 50"	30/6
K.K. Super Slicker 60"	42/9
K.K. Southerner 60"	48/11
K.K. Southerner Mite	12/10
K.K. Ladybird 41"	22/8
K.K. Junior 60 60"	48/3
K.K. Falcon 96"	131/5
Mercury Jnr. Mallard	14/4
Mercury Mallard 48"	22/4
Mercury Christlea Skyleap	26/7
Frog Cirrus 48"	25/6
Frog Vixen 36"	15/–

CONTROL LINE

K.K. Phantom Mite 16"	14/1
K.K. Phantom 21"	22/8
K.K. Scout Team Racer 20"	27/6
K.K. Skystreak 26 26"	11/7
K.K. Skystreak 40 40"	12/10
K.K. Stunt King 36"	22/8
K.K. Stunt Queen 40"	25/8
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Mercury Jnr. Monitor	17/5
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Mercury Mk. I Team Racer 24"	22/4
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Mercury Musketeer	24/9
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Veron Midget Mustang 24"	25/8
Veron Sea-Fury 25½"	27/6
Veron Wyvern 25½"	28/8
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7"	5½"	6/1
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TEAM RACE REVIEW

AN ANALYSIS OF THE FAULTS IN 1951 TEAM RACING, AND USEFUL ADVICE FOR ORGANISATION IN 1952

by

CYRIL WEST

LIKE all branches of our fascinating pastime, Team Racing has gained in popularity steadily since its introduction to this country at Brighton, Easter, 1950. Progress has been rapid, both in the performances put up by winning teams and also in the matter of organization.

In the latter respect it is true to say, however, that there is room for a fair amount of improvement. A little thought put into the way in which races are run can make this event more enjoyable for not only the competitors but the spectators also, who, after all, are the ambassadors of public opinion.

Much of the criticism of team race organization heard from time to time has been unwarranted, but it is felt that some will bear investigation for the betterment of the sport.

The main complaints which can be remedied with little trouble, will be dealt with in the following order :—

1. Wrongly or inadequately marked course.
2. Slackness in processing and in judging for semi-scale appearance.
3. Poor methods of starting and time-keeping.
4. Lack of control over foul flying.

Before proceeding we must be quite fair to organizers of previous races by admitting that, without their pioneering spirit and willingness to "have a go" there would be no basis on which to improve. It must be agreed that practical experience will always show best where snags lie.

Course Marking

1. Firstly, it is disturbing to see how many races have been flown on an incorrectly marked course. Surely, the exact definition of the track or circuit is a fundamental necessity to any type of racing.

At one important meeting, a centre circle of 12 ft. radius had been marked, giving the pilots a vast area in which to wander; almost enough room to fly individual circuits. How anyone could misread the S.M.A.E. Handbook, or a tape measure to the extent of 100 per cent. error is beyond comprehension.

By far the greater number of meetings have erred in the other direction by providing a 6 ft. diameter centre circle instead of 12 ft. diameter which is plainly called for in the Handbook.

Among these was the all important control line championships at Wembley where absolute chaos reigned in the Class B T.R. final, with five pilots struggling vainly to maintain control over five fast models, at the same time stepping on and off two loose boards in the ridiculously small circle; the whole thing resulting in an unwarranted confusion of concentrated prangery. Hardly a fit exhibition to the lay public of aeromodelling's premier spectator appeal event.

An all too frequent omission is the provision of an outside safety circle; even the Handbook is vague on this point. It is not sufficient to assume

that, if the pilot places his control handle outside the centre circle and the pit crew draw the model out until the lines are straight, said crew are safe from being hit by or obstructing airborne machines. It has been proven many times that they are not, since a pilot's reach may account for at least 2 ft. 6 in. extra to line length, and several good models have been wrecked with resulting loss of the race due to accidents caused in this way.

Furthermore, there is a risk of pit crews cutting across the flight path when running round to refuel their machines. A line marked at 62 ft. radius would enable the referee to ascertain whether a collision between one model and pit crew of another was caused by (*a*) the pilot stepping out of the centre circle, or, (*b*) the crew trespassing inside the circuit.

Thus the blame could be lodged with the proper party and a penalty, if as in case (*b*), applied.

It is fully realized that all this makes work for people who may already have much to do. When a team race is one among a number of events comprising a Rally or Open Day it is suggested that a body of three or more people be detailed to see that things are in order beforehand if possible. Having no other responsibilities they should find no difficulty in correctly preparing the course.

A useful addition which takes little extra trouble is the provision of a rectangle marked near the circuit, in which waiting teams may park their models with the lines already attached.

Processing

2. To pass on to processing, this is looked upon as a necessary evil by most organizers and if not efficiently carried out can turn the race into a complete farce. It only becomes necessary because the odd smart fellow, who would try to gain an unfair advantage as an easy means to an ill-gotten win, turns up at nearly every meeting and, of course, there is always the chance that an honest sportsman might at some time make a mistake.

Left: The Author knows what he is talking about, and proved it by winning six of the eighteen races in the Davies Cup Finals with his three racers shown here (Elfin 2·49, Frog 500 and Amco powered 3·5)

The author and his club colleagues have flown in a good many races, but never yet had a model's wheel diameter or fuselage depth checked. Indeed, when the present rules were introduced, a perfectly good model was scrapped when only just completed and tested, in favour of a new "job" to comply with the new rules, only to be flown against non-conforming machines.

As an aid to checking wing area on some of the more unusual models, an 'ALLBRIT' compensating Planimeter would be an expensive, but useful aid to organisation. The half wing plan could be quickly transferred to a pad of cheap paper by using the wing itself as a template.

There seems to be no agreed way of judging whether or not a model can be classified as semi-scale. Obviously, functional requirements must influence design to some extent, but there are too many weird and horrible contraptions finding their way into contests, which no self respecting modeller would try to pass off as bearing any resemblance to full-size racing craft. It now has to be seen whether stricter judging in future will raise the standard. Here again it might be argued that the prestige of the movement in the eyes of the public is at stake.

Tank testing, while being a messy business is fairly efficient already; it might be a good idea however if officials checked tanks at random during intervals in order to discourage "swopping."

Racing Etiquette

3. Race starting seems to be a vague affair, there being no set procedure to which competitors might become accustomed. Often the starter stands in a position where one or more crews cannot see him, and are blissfully turning the motor when they suddenly realize that the race is already one or two laps old. A method introduced by the author's club involves the use of a whistle which, it has been found, can be plainly heard by crews above the engine noise. The whistle is blown when the referee, who acts as starter, wishes to attract attention and precedes the starting signal by a few seconds ensuring that nobody is unwarned.

This method of attracting attention can also be used to good effect during the race, when the referee might have occasion to caution a pilot or crew not properly observing the rules.

If possible it is desirable that a time-keeper, in addition to the usual lap counter, should be stationed opposite the point at which each model starts. All time-keepers will start their watches as the flag falls; each will also be responsible for raising a coloured finishing flag and stopping the watch simultaneously, at a signal from his lap counter, who will call out the last few laps as they

are ticked off on the score card. The total time from fall of flag to end of last lap is ten entered on the score card and signed by both officials. In this way a complete record of the performance of each machine in the race can be easily kept and there need be no doubt as to who won.

To enable spectators to know a little more about the progress of the race, pilots may be issued with coloured wrist bands to be worn on the flying arm, and being the same colour as the flag being held by their respective time-keepers, who would be responsible for the issue and collection of same.

In conjunction with this it is a good idea to give a running commentary on each race by means of the Public Address System.

The above outlined method of starting and scoring has been used and went off properly first time, some of the officials having no knowledge of it until being briefed half an hour before.

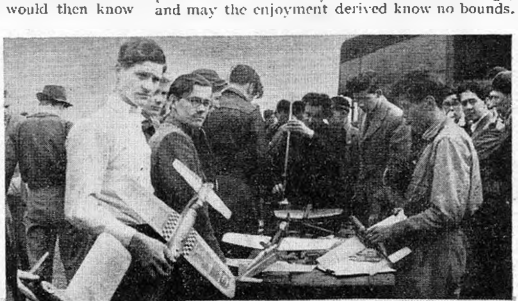
4. The final bind is about foul flying; things happen quickly in a team race and at times it is difficult to see just who is at fault when fouling takes place. Many referees seem to close their eyes to faults which should be discouraged.

When it comes to a question of high flying, for instance, is the high flyer always to blame? Many times it has been due to the fact that a slower model was so erratic in flight, that the faster man was obliged to stay at a safe height, in order to maintain his chances of completing the race with a whole model. In such a case the whistle could come into play and the pilots would then know that someone was breaking the rules. Having had their attention drawn to this fact, they should then be able to rectify things between themselves. If, however, erratic flying should continue, the referee might have the offender withdrawn at his next pit stop.

Drawing the machine out of the flight circle for refuelling is often forgotten in the excitement. A short blast on the whistle, followed by a hand signal, could keep things in order here and prevent those cases of needless pranging which tend to make some modellers revert to chuck gliders.

There are other eventualities which could be controlled quite easily and it is the responsibility of a referee to familiarize himself with these, in order that he might quickly recognize what is taking place, and take appropriate action without unduly hampering the progress of the race.

Yes, a great deal depends upon an efficient referee, and it is hoped that in future races such officials will realize that their responsibility does not end with the dropping of the flag, but that a measure of discipline must be maintained throughout, as in a football match, so that each and every competitor might have a fair chance, at the same time feeling that the careful construction and finish put into his model was worth while. Reduce the element of luck and promote team efficiency with sound model design, and may the enjoyment derived know no bounds.



Strict processing will keep the appearance standard high. Here, racers queue for wheel, fuselage and tank capacity check at the Davies Finals. Many wheels were undersize.

Top photo shows Concours at the Godalming meets, which forms the basis for this article. Winning Concours model, also won the class B final.

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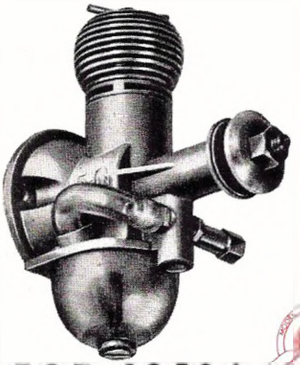

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Knokke Surmer Open Stunt—1st: Alan Hewitt.
"Shipol" Amsterdam—1st: Class III Speed: E. K. Reulin and L. K. Suls.
3rd May, 1951—**Swedish Contest Record**—Model Race Car, "Alfa Romeo" powered by Elfin 2·49. Speed 104 km./hr.

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SEEING THE SPRAY

by Gen. H. J. PARHAM

THAT great designer and pilot, Anthony Fokker is credited with the remark that designing aeroplanes would be easy if only you could " see the spray ", as the ship designer can.

Now in December 1938, Dr. Lippisch, the noted German aerodynamist, gave a most exciting lecture to the Royal Aeronautical Society in which he showed slow motion films of the airflow round wings, as shown by the smoke filaments in a new kind of Wind Tunnel which he had evolved. The flow was slowed down to slow motion from a film taken at about a thousand frames a second and it was one of the most fascinating lectures one could possibly imagine, for one *could* " see the spray ".

In May 1945, only a day or two after Germany's final collapse, and when I was B.R.A. 2nd Army, I was visiting a gunner regiment at Lauenburg on the Elbe and found them in a Nazi Youth Air Training Centre. This place was beautifully equipped and containing literally tons of model making materials. But the real discovery, for me, lay under a heap of plaster dislodged from a Laboratory ceiling. It was a simplified and easily portable edition of the Lippisch Smoke Tunnel !

Recently I thought I'd try and make one. I hadn't any serious hopes of succeeding, being a very moderate workman. I also had only my memory to rely on.

Owing to the prevailing difficulty of getting materials, and to the desire to be as little out of pocket as possible, the machine is, though I say it with blushes, quite a masterpiece in improvisation. Yet it works, looks quite well and costs about £2, without the electric control box.

The function is to show airflow past models of wings, or of sails of boats, by making the air visible. It will NOT measure any lift or drag forces. It does, however, give a clear picture of whether the airflow is smooth or not.

Before starting work it is essential to obtain a small electric blower (centrifugal fan). This must somehow be made to run *slowly* off the house current. A variable speed control is very desirable.

My blower was obtained (disposals stock) from a shop in London for 15/–. It is American, and requires 27 volts to go " flat out " ; but for our purpose it idles at 6 volts.

Having obtained this blower and made (or, as I did, got a more competent friend to make) the electrical box of tricks with which to step down, rectify and control the current, you can set to work on the Tunnel itself.

Now the principles on which it works are as follows :—

(i) A " Venturi " concentrates the flow of air (air is *sucked* through the tunnel by the way) between a black back plate and a glass sheet placed 1 inch ahead of it. This constitutes the " working section " whose cross section is $1\frac{1}{2} \times 1$ in.

(ii) Because of its narrow depth (1 in.) the tunnel only shows flow in two dimensions, i.e. with a wing it shows what happens say half way along the semi-span, where there is no " sideways " airflow. It is possible, however, by using a small model wing which does not reach as far as the glass, to get a good wing tip vortex, i.e., three dimensional flow.

(iii) The smoke is introduced at the point of highest airspeed, i.e. just at the throat of the Venturi. Here also the pressure is least and this helps to draw the smoke from the smoke box. This smoke flow is also assisted by " bleeding " a little air from the exhaust pipe just downstream from the blower and leading it into the smoke box to build up a slight positive pressure there.

(iv) White smoke is produced in the smoke box by the simple device of heating up ordinary motor lubricating oil with a spirit lamp. This gives the same effect as an overoiled exhaust and so you must arrange for the tunnel to exhaust through a slightly open window. (Note : Though this smoke is very smelly, it is not harmful as it does not contain carbon monoxide.)

(v) The smoke " cut-off " enables the smoke flow to be stopped and started instantaneously.

(vi) Models (of thin cardboard or balsa) of chord around 3 in. can be used. Slots, flaps, etc., can be shown in action in model form.

Construction The framework is made entirely from $6 \times \frac{1}{8}$ in. hardwood planks and $\frac{1}{4}$ in. 3-ply. (See Fig. 1.)

The Venturi is to be located at the left, between the overhanging planks. The smoke box and its lamp are to be located between the right hand overhanging planks.

The main airflow is from left to right. The smoke arrives at the venturi via a pipe along the top of the framework, not shown in Fig. 1.

The two sides of this venturi can be made from celluloid sheet, or sheet aluminium, or even of smooth cardboard. Each sheet (2) must be exactly $12 \times 8\frac{3}{8}$ in.

The Venturi curve, given on the plan, must be accurate.

The Smoke Box : You need a seamless, metal container with a flat top and with a flange. A very suitable vessel is one of the aluminium food containers carried by long distance push cyclists on their handlebars (Fig. 2.) The lid is of course removed.

It is held to its position by a wooden collar and is retained by two $\frac{1}{4}$ in. bolts with wing nuts. It is centralised by a tin lid (selected to be just smaller than the top of the smoke box) screwed to the underside of the plank. Between the tin lid and the plank is a flat circular rubber sheet $\frac{1}{8}$ in. oversize which acts as a seal. It will stand up to the heat quite well. Of course both tin lid and rubber sheet must have holes through which the three smoke or oil pipes pass.

continued on page 764

E.D. CONQUERS CHANNEL

Model Boat Fitted with E.D. 4·5 c.c. Diesel successfully Radio Controlled from Dover to Calais in 9 hours

AMAZING FESTIVAL YEAR ACHIEVEMENT

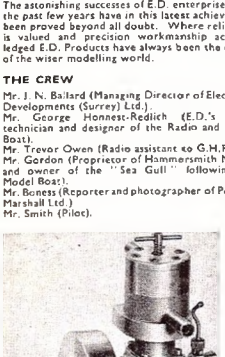
Exercising their usual flair for spectacular achievement Electronic Developments have provided one of the high lights of the Festival Year by making the first model boat Channel crossing.

This gargantuan project was undertaken primarily to prove the exceptional performance of the prototype Mk. V 4.5 c.c. diesel and the new Mk. IV Radio Control Unit.

Preliminary tests were made over the 15-mile stretch from Richmond to the South Bank Exhibition in conjunction with the Festival authorities, and at the International Model Boat Contest, Fleetwood, where a 9-mile run around the Wyre Lighthouse was successfully negotiated. The astonishing successes of E.D. enterprises over the past few years have in this latest achievement been proved beyond all doubt. Where reliability is valued and precision workmanship acknowledged E.D. Products have always been the choice of the wiser modelling world.

THE CREW

Mr. J. N. Ballard (Managing Director of Electronic Developments (Surrey) Ltd.).
Mr. George Honnest-Redlich (E.D.'s Radio technician and designer of the Radio and Model Boat).
Mr. Trevor Owen (Radio assistant to G.H.R.).
Mr. Gordon (Proprietor of Hammersmith Models and owner of the "Sea Gull" following the Model Boat).
Mr. Boness (Reporter and photographer of Percival Marshall Ltd.)
Mr. Smith (Pilot).



The new E.D. Mk. V 4·5 c.c. Diesel.

Extracts from the LOG of CHANNEL CROSSING as recorded by Mr. J. E. Ballard

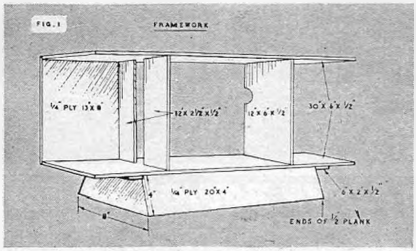
6th September, 1951.

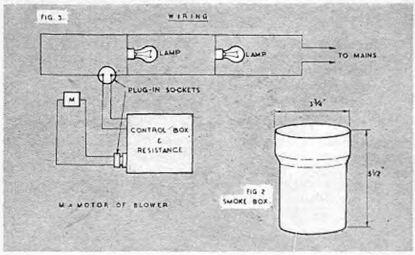
11.30 a.m. The radio controlled model launch is placed in the sea and after check on radio and engine, is started and launched, heading for France at 11.39 a.m. with Redlich at the controls.
11.59 a.m. Crossing the entry of Dover Harbour.
12.10 p.m. We have to steer off course to avoid a steamer "Anthony M" which cuts right across our bows.
1.8 p.m. Met large bed of seaweed, have fears it will stop the model. Gone through O.K. Passing Calais boat "Isle of Thanet."
1.36 p.m. English coast out of sight.
1.45 p.m. Seas rough, losing sight of model in big troughs of waves, but radio operation working wonderfully. After mounting every wave, the model slightly veers to right or left, and has to be put back on course by radio.
1.55 p.m. Model progressing well in rough seas. Compass of the boat following gone wrong. Steering by position of sun.
2.5 p.m. Model did complete circle, as it was swerving round by force of waves, but radio working perfectly and model put back on course.
2.25 p.m. Trevor Owen at controls. Seas very rough. Model negotiating waves like a seagull. Angle of boat more than 45° at times.
2.35 p.m. Sea mist clears, but rough seas still encountered. Difficult to keep model in sight at 250 yds. ahead, as seas too rough. Bring it nearer to 100 yds. ahead. Horizon clear, but still no ship sighted. Nothing but sea. Boness sea-sick.
2.43 p.m. Engine stopped by heavy seaweed. Seaweed cleared and engine restarted in 4 mins. again at 2.47 p.m. Nothing touched on boat.
2.52 p.m. Cross Channel steamer sighted going to Dover. Passing us very close. People on board getting excited at seeing this most unusual sight. Ballard at controls.
3.15 p.m. Mail Boat from Belgium sighted.
4.8 p.m. Tramp steamer from France passing close to us.
5.5 p.m. Compass N.B.G. We are lost. Steering by sun position, but feel we are going wrong direction.
6 p.m. Nothing to see at all but sea. Thinking we must be on the way to Belgium.
6.10 p.m. Sun gone and still not aware of position.
6.45 p.m. Redlich at controls. Model wonderful. Sea little calmer, but "white horses" well in evidence.
6.50 p.m. Land sighted. Looking anxiously for some buoy or lighthouse so that position can be checked on chart.
6.55 p.m. Wreck buoy with light, two crosses and whistle. Sighted position marked as North of Calais near Dunkirk we think—we hope. Model perfect.
7.18 p.m. Redlich at controls.
7.25 p.m. Calais lighthouse recognized which means we are well north off course.
7.30 p.m. The "Lillois" crossing closely at our stern. Sailors very interested and waving. Model still going fine. Out 150 yds. ahead.
7.45 p.m. Owen at controls, darkness descending. Fears that we shall lose sight of model. Getting nearer, 50 yds. behind model.
8 p.m. Calais Harbour mouth seen. Making direct for it with high hopes and spirits greatly revived.
8.25 p.m. Have to direct model running by our side 20 yds. away. Using torch to keep her in sight.
8.30 p.m. Enter Calais Harbour. Redlich at controls. Model difficult to see.
8.34 p.m. Losing sight of model.
8.35 p.m. Find model in rays of torch still plugging along merrily, enjoying calm sea.
8.39 p.m. Arrived quay side, brought model by side of launch by radio and took superstructure off to stop engine.
8.43 p.m. Model lifted aboard to "Sea Gull".
8.55 p.m. Leave "Sea Gull" for shore. All very tired and happy.

The Boat : "Miss Eedee" 5 ft. long 2 ft. beam. weight 70 lbs., police launch type.
The Engine : A 4·5 c.c. water-cooled new E.D. engine. Internal water tank fitted, syphon system for cooling, direct drive. R.P.M. approx. 6,500.
The Radio : The new E.D. 3-channel 3-reed unit.

George Honnest-Redlich at work on the boat he designed for the Channel attempt.

Safe and sound in Calais Harbour.





continued from page 761

The Smoke Tubes

Entering the smoke box are three tubes :—

(*a*) A filling tube, diam. about ½ in. (inside). Into this a very small quantity of motor oil is dropped every 15 minutes or so. A *loose* wooden plug with a flange at its top serves to seal this tube, but yet acts as a species of safety valve in the rare event of a " flash " caused by the heated oil exceeding its flash point.

(*b*) An air inlet tube ¼ in. i./d. from the " bleed " in the exhaust pipe. This reaches nearly to the bottom of the smoke box.

(*c*) A hole up through the plank and into the " box spar " tube, through which the smoke rises on its way to the comb. Diameter about ⅜ in.

(*d*) Along the top of the apparatus is a box spar with ends blanked off by wooden blocks. A hole registers with the hole referred to in (*c*) above, and at the far end, a similar hole, but at least 1 in. diameter, registers with a short length of tubing built into the top left hand plank overhang, and projecting 1 in. below it.

The Comb : The bottom end of the tube referred to in (*d*) above must be a good working fit in the main tube.

The main tube, or base, of the comb is blanked off at its bottom end with a wooden plug. From the tube sprout twelve smoke tubes, each made of an economy label rolled (sticky side out) round a ⅛ in. dowel former. Each tube is inserted in a ¼ in. hole drilled in the main tube. The whole array of tubes is set in sealastic, a very useful rubber/putty composition.

The comb can be rotated a few degrees to get smoke flow accurately positioned between the glass the velvet covered back plate. It can also be raise lowered very accurately by means of the screw adjustn shown on the main sketch. This enables any g streamline of smoke to be adjusted exactly so that, it *just* flows through a slot of a slotted wing. This eleva nut should be on an " insert " in the lower left pl overhang so that by unscrewing the insert from the n framework the entire comb can be dropped out if neec

The Back Plate of ¼ in. ply, must be an accurate p fit (from the back). At its centre is a spindle on w models can be mounted and rotated to the desired a of attack. Meccano pulleys come in handy here. Need to say the face of the pulley which is inside the worl section of the tunnel, must lie flush with the backplat

The models (chord about 3 in.) can be of cardboar balsa, stuck (or set in Sealastic) to small pieces of ply or cardboard with two holes which can be pushed two prongs which stick out from the inner face of spindle pulley. The backplate must be smoothly cov with black velvet (glued on) which shows up the sm streams admirably.

Lighting *from the top and bottom* is needed. former is from a 40 watt bulb (with a metal shade it) ; the latter from a 60 watt. To stop this bulb hea up the Perspex window and so spoiling the airflo sloping piece of glass (with a small air space betwee and the Perspex) is fixed into position directly over bulb.

The wiring diagram is shown on Fig. 3.

The variable resistance control referred to earlier i a separate " plug in " box.

Final Hints

(*a*) The baffle downstream from the model is portant. It should be made removable so that you try various varieties of hole sizes and spacings till get the best and smoothest smoke flow.

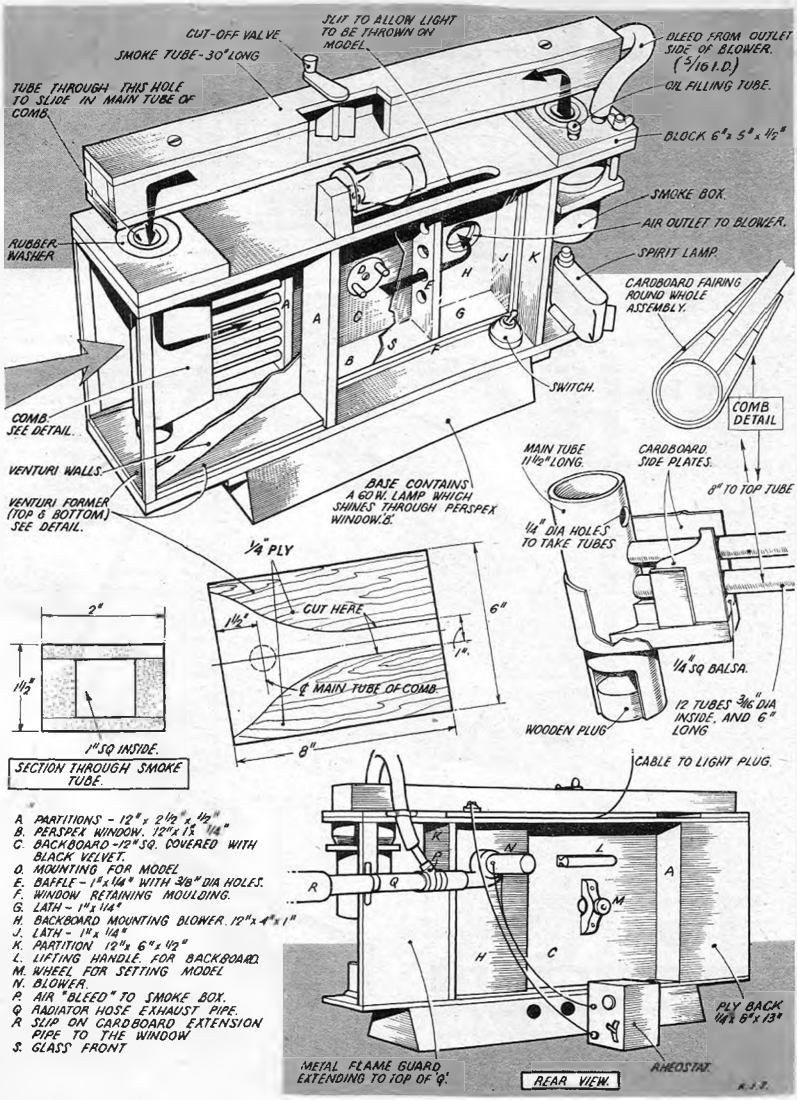
(*b*) A fairly good flame is needed under the smoke but after a while it is advisable to lower the flam trifle to avoid " flashbacks ".

(*c*) The gaps between the twelve tubes of the co where these emerge from the cardboard fairings are fit in and streamlined off with Sealastic.

(*d*) If you find your smoke cut-off will not, in fact, off the smoke cleanly (due to the workmanship perhap you can fit, directly over the top of the smoke t which runs down into the comb, a plunger type va rubber seated, whose plunger is mounted in a pack protruding through the top of the box spar tube. Push down, or lifting up this plunger will then shut off admit smoke instantaneously to the comb. The origi butterfly cut-off valve can be retained as a very conveni regulator of the *quantity* of smoke.

(*e*) With no model in the tunnel the 12 streamlines smoke should move steadily across behind the gla keeping practically parallel and undistorted.

Experiment with various motor speeds and quantit of smoke till you achieve this before starting your " S ing the Spray " experiments. There is no limit to application of this useful device, which would be asset to any club.



A. PARTITIONS - 12" x 2 1/2" x 1/2"
B. PERSPEX WINDOW. 12" x 1 1/2" x 1/16"
C. BACKBOARD - 12" SQ. COVERED WITH BLACK VELVET.
D. MOUNTING FOR MODEL
E. BAFFLE - 1" x 1/16" WITH 3/8" DIA HOLES.
F. WINDOW RETAINING MOULDING.
G. LATH - 1" x 1/16"
H. BACKBOARD MOUNTING BLOWER. 12" x 4" x 1"
J. LATH - 1" x 1/16"
K. PARTITION 12" x 6" x 1/2"
L. LIFTING HANDLE FOR BACKBOARD.
M. WHEEL FOR SETTING MODEL
N. BLOWER
P. AIR "BLEED" TO SMOKE BOX.
Q. RADIATOR HOSE EXHAUST PIPE.
R. SLIP ON CARDBOARD EXTENSION PIPE TO THE WINDOW
S. GLASS FRONT

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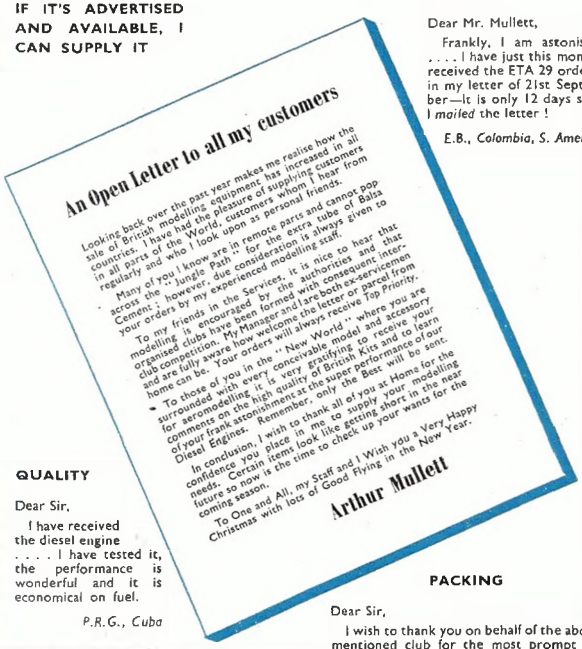

An Open Letter to all my customers

Looking back over the past year makes me realise how the sale of British modelling equipment has increased in all countries. I have had the pleasure of supplying customers in all parts of the World, customers whom I hear from regularly and who I look upon as personal friends.

Many of you know I am in remote parts and cannot pop across the "Jungle Path" for the extra tube of Balsa Cement ; however, due consideration is always given to your orders by my experienced modelling staff.

To my friends in the Services, it is nice to hear that modelling is encouraged by the authorities and that organised clubs have been formed with consequent inter-club competition. My Manager and I are both ex-servicemen and are fully aware how welcome the letter or parcel from home can be. Your orders will always receive Top Priority.

To those of you in the "New World" where you are surrounded with every conceivable model and accessory for modelling, it is very gratifying to receive your comments on the high quality of British Kits and accessory of your frank astonishment at the super performance of our Diesel Engines. Remember, only the Best will be sent.

In conclusion, I wish to thank all of you at Home for the confidence you place in me to supply your modelling needs. Certain items look like getting short in the near future so now is the time to check up your wants for the coming season.

To One and All, my Staff and I Wish you a Very Happy Christmas with lots of Good Flying in the New Year.

Arthur Mullett

QUALITY

Dear Sir,

I have received the diesel engine . . . . I have tested it, the performance is wonderful and it is economical on fuel.

P.R.G., Cuba

SPEED

Dear Mr. Mullett,

Frankly, I am astonished . . . . I have just this moment received the ETA 29 ordered in my letter of 21st September—it is only 12 days since I *mailed* the letter !

E.B., Colombia, S. America.

PACKING

Dear Sir,

I wish to thank you on behalf of the above-mentioned club for the most prompt and satisfactory manner in which you attended to the orders . . . I must congratulate you on your packing, for everything we have received from you has arrived in perfect condition.

S.H., R.A.F., B.A.F.O.

ARTHUR MULLETT
16 MEETING HOUSE LANE
BRIGHTON - SUSSEX - ENG.

IT must be marvellous to be clever with figures—and I mean that in the purely scientific sense. Then, without dispute you can prove that your new model is just so much better than the next chap's. You don't have to build the model to prove anything; in fact it is usually wisest *not* to go to such lengths. The main thing is to *design* your model and by "design" I mean really work it out. That's what formulae are for—or are they?

Let us look at the problems linked with the "design" of a model—and pay a personal call on some of the experts to check on how they go about the process. The most satisfying method is the process of "working backwards", when you start with the answers and work backwards to the beginning of the calculation. This method holds good throughout life. The simplest way to solve mathematical problems at school is first to get hold of the book containing the answers, relate these to the appropriate questions and then fill in the gaps between the end and the beginning of the sum. Odds are the master, in any case, will be too busy to check whether the intermediate working is nonsense or not. If he sees that the answer is right he will tick it—and pass on. The same with model design; as long as the answer is right you can fit a beginning to it, and provided you make the intermediate working as complicated as possible, nobody will be able to follow it—and you've proved your point.

Some of the real experts excel at this type of thing, of course, they even give a lot of diagrams to illustrate various points and many are the dodges they adopt to fit the figures to the facts (as they want the facts to appear). The gravitational pull of the weight of a model, for example, which always acts vertically downwards, is cunningly inclined away from the vertical to balance things out properly. The "lift" force, which is always resolved at right angles to the direction of the airflow, can suddenly sprout at right angles to the ground, or even to the propeller, if necessary, just to emphasise that—you never know with models.

There is really nothing to designing an A/2 glider with a five minute still-air duration. Towline length is 328 feet and required flight time is 300 secs. Obviously all that one needs is a sinking speed of 328/300 feet per second, which, as everyone could calculate, is "one and a bit" ft./sec. The "bit" does not matter. We can even afford to be generous here and allow a safety margin and work to 1 ft./sec. rate of sink, although it is far more impressive to transform the "bit" into decimals and quote the answer to four or five figures, viz., 1·0933 ft./sec. (approx.). That (approx.) is important. It can be a useful let-out.

The rest is easy. Every aeromodeller knows that the initial hand-launched trimming tests of his new model show that the sinking speed is "less than one ft./sec.". Ever since somebody claimed that figure in the club years ago nobody has ever dared to admit that *their* new model is inferior.

Continued overleaf,

. . . *marvellous to be clever with figures* . . .

. . . the classic proof that two equals one . . .

Why is that performance not realised on the flying field ? Theoretically, again, there are two definite reasons—downdraughts and timekeepers' eyesight. The latter is a factor which has only recently been discovered and the complete theoretical solution—to be incorporated in the design calculations—has still to be worked out. It will come in time, for this is an age of progress—and mathematical analysis. Your simple performance equation of duration = height/sinking speed will become more complicated, allowing for " factor A " (downdraughts) and " factor B " (timers). Models will be referred to as having a " high (or low) factor A (or B) " and a treatise will be written accordingly.

What about all the intermediate workings ? Well, they do not matter a great deal. Take the geared Wakefield, for example. When Ellila first won the Wakefield, even the most dense of practical designers could be convinced by their more intelligent theoretical counterparts, that gears must have a certain amount of friction and thus, there would inevitably be a certain amount of power lost in driving the gears round. In other words, in formula again, geared motor power = single skein power minus gear losses. Unfortunately, somebody then went and discovered that, for the same length and weight of rubber, he got a longer motor run and better climb with gears than with a single skein motor. Not that this could fool the experts. It was simply a case of the wrong " sign " in the original formula. It was not a " minus " loss, it was a " plus " loss and so by one stroke of the pen, the original formula still held good in practice. Purists who care to quibble at a frictional loss becoming a gain in power can leave the room !

. . . some modellers are really first-class flyers . . .

Actually, I checked up on geared Wakefields with one of the experts who really sticks his neck out by writing about models, and then goes out and flies them as well. I asked him how he found his new wing position, to balance out the weight of the gears in the rear of the fuselage, and he confirmed that he had, in fact, calculated where the wing should be by working out the centre of gravity position. " But ", he went on, " The layout did not *look* right, so I moved the wing another ¼ inch back on the drawing, and that proved to be absolutely correct ".

I spotted at once, of course, where he had gone wrong. He had worked the orthodox or " start at the beginning " sort of sum. He should have guessed the wing position in the first place and *then* produced the calculations. Another very useful dodge in lengthy calculations is to introduce one of the " classic " proofs of " two equals one". Some of these are so good that you even begin to believe them yourselves, and, if you ring the changes enough times, you can prove that anything equals anything else you want.

Scorn the practical man who merely builds his model and flies it. He never knows where he is and whether he is progressing or not. After all, is it not now accepted that flight results recorded by timekeepers are now so unreliable as to be virtually meaningless ? The only basis of comparison must be " theoretical performance ", with the practical proof of flights made under thermal conditions, timed by ones self, and ignoring anything under five minutes duration as obviously unreliable, as the model was evidently influenced by a terrific downdraught.

Possibly some good would come if the two schools of thought were to get together occasionally. The practical man is just as lost in theory as the purely theoretical man is " hopeless " on the flying field.

The fact that some modellers are really first class fliers and head and shoulders above the general average, does not necessarily mean that they are more intelligent beings. It means, mainly, that they have a *flair* for producing a model, trimming it and making it behave. It is that natural ability, plus a lot of hard work, which has put them at the top, whether they happen to be the local dustman or the lord mayor's son. It is significant what a diversity of types constitute a typical British team, with probably just the one thing in common—a love of aeromodelling.

AT this time of the year, it is traditional for aeromodellers, old and young, to look around at model markets for something to build through the winter months. Usually, they pick upon the newest item off the counter and there is always a batch or new designs and kits ready for this Christmas-time demand. For 1951, there is a distinct change, since, if we are to take the newly produced kits as a measure of the trend in demand, then over 90 per cent. of Britain's aeromodellers will be building scale models this winter! We know this figure is by no means true; but the fact remains that, among 26 kits sent to us for examination and test, all but two are scale designs.

Other news from the trade corners also concerns scale models, and it is that the famous line of AERO-MODELS kits, which have been missing from the shops for a while, are now back in production by Messrs. MINIKSCALE of Liverpool, who are also the makers of those neat model railway buildings, bungalows, etc., in the ANORMA range.

Often specially specified by our contributors for places where extra strength is essential, RAWLPLUG Durofix and Duroglue are slower drying than ordinary Balsa cement, but make a real joint of the job. Dry in 15 minutes and hard in 6 hours, we can recommend Durofix wherever hardwood is specified. RAWLPLUG Plastic Wood is another companion product, as is Durofix Remover. The latter is a boon to all harassed aeromodellers' wives and mothers, for it is the *only* solution we have found for removing cement from one's best pair of trousers—and without a mark, too!

Another little-appreciated RAWLPLUG associate is NAYLOR'S Brushing Belco, an extra high quality colour finish that many scale modellers have already discovered to their advantage. Available in twenty-six different colours plus undercoat and special filler, the range strangely omits a really bright blue.

Mercury Stinson 105. "Voyager" 26/7 (inc. P.T.)

Wing-span, 42 ins. Overall length, 28 ins. Our weight, including Mills ·75, 13¼ ozs.

Packaging. Usual stout Mercury box, with model photo-illustrated on label, gives adequate strength to protect contents.

Quality of Contents. Generally excellent quality wood, well graded. We found, however, the ⅛ in. sq. for longerons and the pre-shaped trailing edge were somewhat soft quality; this may have been just an odd point in our particular kit.

Completeness. Apart from wheels and fuel tank the kit was complete. We should like to have seen a little more 1/16 in. sheet; it was impossible to cover all the parts required on plan with sheet provided. Sheets of printed parts are clear and accurate.

Ease of Assembly. The general building instructions and plans offer no difficulty to all but the earliest beginner. We should like to have seen a little more detailed drawing for the undercarriage fittings, i.e., shape of retaining blocks for main leg. Due to soft quality of ⅛ in. sq. longerons it was considered necessary to add cross braces in basic fuselage sides aft of the sheet section; this does considerably stiffen the structure and the weight is negligible. Planking underside of fuselage is a job that requires careful work and we suggest the press-studs should be sewn into strip before fitting. Final sanding to shape and notching of fuselage formers should be left until after assembly to main framework. Building time is approximately 25 hours.

Instructions. Plan generally well detailed and accurate. Instruction leaflet, 5 pages, gives step-by-step building notes, easily followed with the aid of plan.

Value. At 26/7 we consider it excellent value.

Flying. The completed model makes a fine scale job of attractive appearance and proportions. Crash-proof wing and strut fittings are quite sound and do not detract from the appearance. The *sprung* undercarriage legs are efficient and with the air-wheels we have fitted should take care of most landing difficulties.

Our test job was subjected to first flights on the occasion of the B.B.C. visit to the Eaton Bray Sportsdrome "FFF" Day, for experimental models. That it should have provided much of the background noise for that excellent broadcast programme should be proof of the success of the model. In weather that discouraged other modellers from flying well-tried machines, the Voyager made many flights of inspiring realism which we are sure will give it that rare reputation for being a good scale model that *really* can fly.

(*continued on page 771*)

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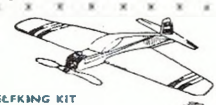

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Comet Mk. I. Receiver only	75 –
ECC950A, Receiver only	87 6
E.D. Mk. III Transmitter and Aerial	114 9
Comet Mk. I Transmitter and Aerial	87 6
E.D. Mk. I Escapement Clockwork	58 11
E.D. Mk. III Escapement Rubber	22 11
XFG1 Valve 21/4	DCC90 Valve 36/6

RADIO CONTROL KITS

Veron Skyskooter for 1–1·5 c.c.	30 6
K.K. Southerner 60 for 1·5–3·5 c.c.	48 11
K.K. Junior 60 for 2·5–5 c.c.	48 3
K.K. Falcon 108 for 7·5–15 c.c.	131 5
Mercury Monocoupe 66 for 1·5–2·5 c.c.	66 –
E.D. Radio Queen 84 for 3·5–5 c.c.	85 –

NECESSARY ACCESSORIES

Mills Throttles 8/3	Fuel Tube, 1 ft. 6d.
Fuel Cans 3 –	Pkt. Rubber Bands 6d.
E.D. 2·46 Glow Head 8 –	1" × 4" Rubber Bands 1d.
Baffle E.F. Tank 1 9	Venner Accumulators 1·5v. 22 6
Baffle Small Stunt 4 –	Dope Brushes, 6d., 10d., 1/3
Baffle Large Stunt 4/11	Elmic D. T. Timer 6 9
Glow Plug Spanner 1 –	Garnet Paper, 7 sheets 6d.
Britfix Cement 6d., 10d., 1/6	Steel Lines, 150 ft. 2/6
Brytulose Dope, all sizes—2 oz. clear 1/3, 2 oz. colour 1/6	All sizes of Balsa. Plywood—Bearers. Rubber, Dunlop 6010. Wire—All gauges. Props—Trucut, K.K. Cored Spider 6d.
Plastic Balsa Wood 9d.	Transfers—Mercury— Kaylee 'Cuties' 7½d.
K.L.G. Glow Plugs 7/4	Team Race Pilots, 2, 7 and 3/1
Champion Spark Plugs 7/4	
K.K. Rubber Wheels— 1½" 1/6 2" 2/5 2½" 3/8	
Veron Sorbo Wheels— 1½" 3/8 2" 5/2 2½" 7/11	

PERSONAL CALLERS ARE WELCOMED BOTH AT ST. HELENS AND AT MY BOLTON SHOP AT 397, CHORLEY OLD ROAD, BOLTON

★ NEW ENGINES ★

Mills P.75 c.c. Diesel	60/9
Mills S.75 c.c. with Cut-out	66/9
Amco .87 c.c. Diesel	72 6
E.D. Bee I c.c. Diesel	52 6
Elfin 149 1·49 c.c. Diesel	59 6
Frog 150 1·49 c.c. Diesel	49 6
Reeves 1·8 c.c. Diesel	62 6
Mills 1·3 c.c. Mk. II Diesel	91 8
E.D. Comp. Special 2 c.c. Diesel	60 –
Elfin 249 2·49 c.c. Diesel	70 –
Frog 250 2·49 c.c. Diesel	72 6
E.D. III Racer 2·46 c.c. Diesel	72 6
D.C. 350 3·5 c.c. Diesel	66 8
D.C. 350 3·5 c.c. Glowplug	65
Amco 3·5 c.c. Diesel	97 6
Amco 3·5 c.c. Glowplug	97 6
Amco 3·5 c.c. B.B. Diesel	115 –
E.T.A. 19 3·2 c.c. Racing Glowplug	124 5
ETA 29 5 c.c. Racing Glowplug	149 5
Yulon 49 8·2 c.c. Glowplug	124 5

★ CONTROL LINE KITS ★

Veron Wyvern Scale Stunt	28 8
Veron Panther Stunt	30 6
Veron Midget Mustang Team Racer	27 6
Veron F.W. 190 Scale Stunt	25 8
Veron Philibuster " B " Team Racer	28 8
Veron Minibuster " A " Team Racer	18 4
Mercury Musketeer Stunt	24 9
Mercury Junior Musketeer Stunt	20/10
Mercury Mk. I Team Racer " B "	22 4
Mercury Mk. II Team Racer " A "	17 6
Mercury Junior Monitor Stunt	17 5
K.K. Ranger " A " Team Racer	12/10
K.K. Scout Team Racer "B"	27 6
K.K. Stunt Queen Stunt	25 8
Frog Vanfire Stunt	29 6

★ FREE FLIGHT POWER KITS ★

K.K. Piper Super Cruiser, Scale	22 8
K.K. Cessna 170, Scale	22 8
K.K. Luscombe Silvaire, Scale	22 8
Mercury Monocoupe 40, Scale	26 7
Mercury Chrislea Skyjeep	26 7
Mercury Stinson Voyager	26 7
Frog Janus, Duration	17 6
Frog Powavan, Duration	25 –
Frog Vixen, Duration	14 6
Frog Cirrus, Duration	25 6
Mercury Junior Mallard, Duration	14 4
K.K. Slicker Mite, Duration	11 7
K.K. Ladybird, Semi-scale	22 8
K.K. Pirate, Duration	14 8
Veron Screaker, Duration	24 1

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May your engines never falter
May your models never stray.

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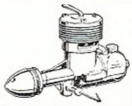


THE D.C.350 3.5 c.c. DIESEL NOW 66/8

This popular Diesel has now been reduced in price to 66/8.

D.C.350 GLOWPLUG ENGINE NOW 65/–

★ JAP SILK ★

Stocks of this superior covering material are getting low and I advise you to obtain your future requirements now.

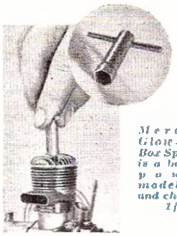
Panels containing 11 sq. yds.	4 –
Complete 'chute of 16 panels	60 –

SECOND-HAND ENGINE BARGAINS

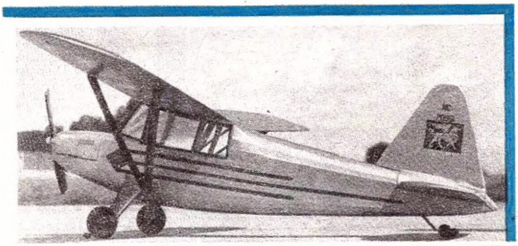
Frog 160 1·66 c.c. Glowplug	22 6
Frog 180 1·66 c.c. Diesel	30/–
E.D. Comp. Special 2 c.c. Diesel	35/–
Mills 1·3 c.c. Mk. I Diesel	27 6
Elfin 1·49 c.c. Diesel	45 –
Elfin 2·49 c.c. Beam Mount	47 6
Amco 3·5 c.c. Diesel	60/–
Amco 3·5 c.c. Glowplug	47/6
Mills 2·48 c.c. Diesel	47/6
Frog 250 2·5 c.c. Diesel	47/6
D.C. 350 3·5 c.c. Diesel	50 –
Yulon 29 5 c.c. Glowplug	47 6
Yulon 30 5 c.c. Glowplug	47/6
Yulon 49 8·2 c.c. Glowplug	60/–
Vulture 5 c.c. Diesel	35/–
McCoy 19 Standard Glowplug	65/–
De Long 30 5 c.c. Petrol	60/–
Forster 99 16·2 c.c. Petrol with 2-speed points. Brand new	240/–

BOOKS

" ABC of Model Aircraft Construction "	5/–
" Stunt Control Line Models "	10/6
" Aeromodeller Annual 1952 "	10/–
" Radio Control for Models "	8/6
Special Assorted Parcel of Six Books on Model Aircraft. Worth double	5/–



Mercury Glow-plug Box Spanner is a boon to power model users, and cheap at 1/-



Comet Elfking 12/6 (inc. P.T.)

26 ins. span, 15½ ins. length, 136 sq. ins. area. Our weight, with Frog 150, 8 ozs. Produced by Roland Scott of St. Helens, the Elfking Kit is a well-packed, completely pre-fabricated kit with high quality balsa. We cannot claim that the final product is strikingly realistic; but as a stunt model for any of the now very popular 1·5 c.c. diesels it fills the bill perfectly.

Ease of Assembly is so easy as to be child's play. *Every* part is pre-cut to exact size, and even the wire parts are bent to shape. The tank is supplied ready for use, and bolts for the engine come in a thoughtful package. It is so easy to make, that the airframe was ready for covering within three hours of starting the model! Only tape, dope and an extra tube of cement are needed to finish the job.

Plan and Instructions are perhaps too simple and leave a lot of room for improvement, though for the price one cannot afford to grumble! They are ample to enable one to build the Elfking; but beginning aeromodellers will certainly have a few questions for their dealer, and this is a pity, for here is a perfect beginner's kit.

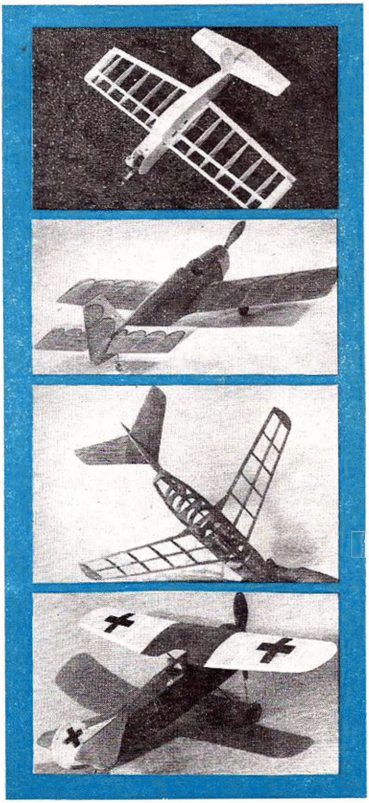
Value is the best we have yet seen. Our own pricing of the kit gives Mr. Scott a negative profit margin!

Flying. Roland flew the prototype at the Radlett eliminations (to choose the stunt man for Knokke), and in fierce wind, flew remarkably well, though somewhat battered by the elements. Our model repeated the same performance, and proved itself a good all-rounder for any weather and any stunt. Addition of a wingtip weight is advised.

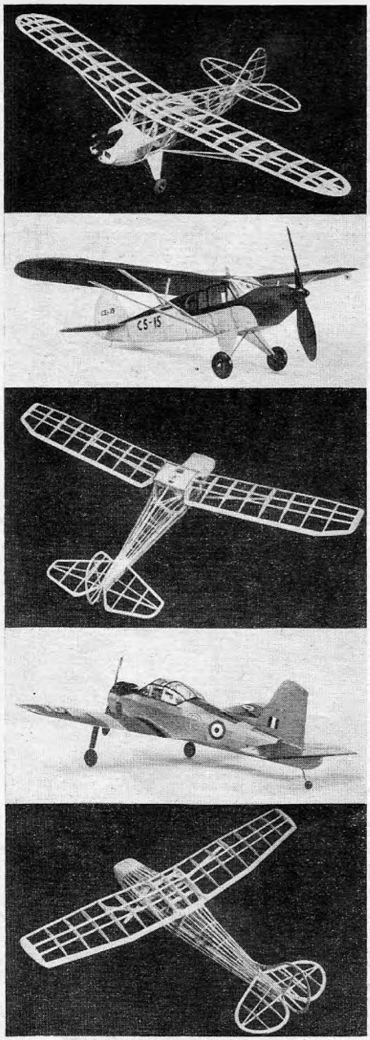
KeilKraft 3/8d. Series

Eighteen different scale models, varying from 15 in. to 21 in. span, and one beginners duration model, the Elf. For rubber power, or in case of jets, for Jetex 50. (Other models have since been added to the range.)

This new range brings to mind those pre-war 9d. scale kits of American origin which so many of our now expert modellers can remember with pleasant reflection. They are perfect for the beginner, much better value than their counterpart of 12 years ago, and are capable of turning in some nice flying, which we proved with a representative six from the series. We congratulate the KeilKraft company for having produced so attractive a selection at such a low price, which will surely give a fillip to the trade and fill a blank in the kit market that has been evident for some time.



Review models, top to bottom: Mercury Stinson 105, Comet Elfking, KeilKraft Fairey Junior, Mig 15, and Fokker D.8, also featured in heading.



Packaging of the series is first class, each printed carton box is neatly filled by its well packed contents, and even more striking is the fact that each box is of different colour, making 19 different tones.

Quality of the wood (in some kits Obeche is supplied instead of balsa) is good. In two kits we ran up against the problem of soft wood; but knowing the KeilKraft service, we have no doubt that soft parts would soon be exchanged without question if returned through the dealer. Strip wood is supplied in die-cut "sheet" form, plastic props are provided for the rubber models, and cockpit canopies for the jets. Wheels are also included, and like the propeller, are cast in light plastic

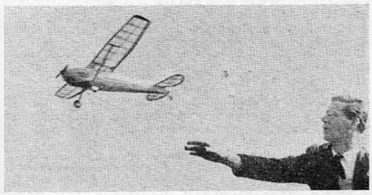
Completeness is a very good point in the series, each of the kits has a surplus of strip wood, and some, though not all, can be completed with the tube of cement supplied. Jets have an ample supply of tissue paste to take the place of missing wheels. Rubber is not included. As for **Ease of Construction**, we can best emphasise this by recommending any of the range to beginners. Average building time is 11 hours, helped considerably by the high standard of accuracy on the printed parts. Some of the models were given extra sheeting around the wing root to ease covering; but otherwise, each model was assembled to plan without the slightest doubt as to procedure.

Plan and Instructions are accurate in detail in every case. Each model is very near to perfect scale, and in nineteen plans, we were able to find only one error. (M.I.G. 15, former 7 on plan is actually No. 8.) Each model has a small cut-out mascot on the plan (a Chipmunk for the "Chipmunk," Sabre for the "Sabre") plus a perspective view in some cases, adding thoughtful detail and proving that no matter what the selling price, the high standard of KeilKraft drawings is maintained.

Value is remarkable at 3s. 0d. plus the extra 8d. for purchase tax. We say "remarkable" for as each finished model came into the editorial offices, the builder made a point of remarking on the value.

Flying models of such small wing area after being used to larger proportions, came as a pleasant novelty to us. Using four strands of 3/16 in. rubber, the short motor run will give a flight of approximately 75 ft. with attractive realism. The Tipsy Jr. and Percival P.56, were in need of extra elevators for trimming; but on the whole, these little jobs fly "straight off the board". Catapult launch for the jets is a point we have mentioned in other trade reviews, and is well applied to the Sabre, M.I.G., etc. It gives a terrifically fast climb just like the real thing, then a high speed glide.

Review KeilKraft kits at left, top to bottom: 22/8 Piper Super Cruiser, 3/8 version of same, 22/8 Luscombe Silvaire, 3/8 Percival P.56, 22/8 Cessna 170 and below, the Cessna in action over Eaton Bray.



KeilKraft SUPER SCALE kits (22/8d. inc. P.T.)

Cessna 170—36 in. span; 156 sq. in. wing area; our weight with Dart, 9 oz.

Silvaire—40 in. span; 178 sq. in. wing area; our weight with Dart, 9¼ oz.

Super Cruiser—40 in. span; 231 sq. in. wing area; our weight with Amco '87, 10 oz.

These three scale kits of American light planes have been produced with the full co-operation of the manufacturers and are therefore accurate to the last detail. For performance, the Piper Super-Cruiser gives greatest promise with its extra wing area and for appearance, the Luscombe Silvaire took our eyes, so for a happy medium (though all three were built and tested) we shall report on our extensive analysis of the Cessna 170. All three kits are identical, so whatever is said for the Cessna may be taken as an opinion of the others also.

Packaging. Attractively labelled stiff card boxes, which should survive the roughest of postal handling.

Quality of the contents is of the highest order, printed parts are clearly marked, strip wood is all of hard or medium grade, there is ample tissue of good quality—even the instructions are printed on high grade art paper with fine block illustrations, and in two colours!

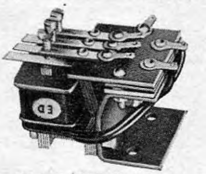
Completeness extends to the provision of a smart plastic cowling, and a shaped, but not bent, Dural undercarriage. The kits are "dry", in that cement, tissue paste and wheels are omitted; but otherwise there is no more than enough to complete the job, with a surplus which comes in handy for trimming.

Ease of Construction is best shown by the short building time of 16 hours. Parts go together exactly, the cowl fits perfectly and detachable wing fittings are perfectly positioned. We had some difficulty getting the cowl to adhere firmly; but after roughing the edge and thoroughly pre-cementing, it went on for good and has not since detached itself.

Plan and Instructions are really first class, they leave nothing open to query and provide detail of both diesel and rubber power. We doubt whether there will be a great following for the rubber version, especially since it needs additional ballast to bring the C.G. into the correct place; but the performance with an Allbon Dart should be enough to convert many a rubber fan to diesel power. The instructions give full data on correct decoration and very good advice on the approach to first trimming flights. Though the plan states a final weight of 10 oz., our Cessna was built quite normally and came out at 9 ozs.

Flying was the most revealing part of our review, for it contradicted many a prediction, and even scoffed at the designer's statement that "scale models lack power stability" (para. 6—Flying instructions). Preliminary glide tests showed the need for packing under the tail T.E. and slight right rudder, and that remedied, the 7×4 in. prop on the Dart had a smart flick—and the first power flight started. On relaxed power, the Cessna climbed, dropped a wing to the left, and then spiralled tightly. This was the end we thought: but no! It recovered in a tight turn and continued at a 60 degree bank only a few feet off the ground. Subsequent tests proved the Cessna virtually impossible to spin *to the left*. We can thoroughly recommend the model to anyone interested in cabin power models, for although an accurate scale model, the Cessna 170 has a performance akin to the famous "Tomboy".

We paid a visit to Messrs. Electronic Developments a few weeks back and had an interesting preview of the new equipment they have in store for radio control enthusiasts during 1951. We also examined with interest "Miss E.D." the radio controlled boat fresh from its exertions in crossing the channel. Besides being a grand demonstration of the reliability of E.D. radio equipment this venture also spoke well for the company's new Mk. V 4·5 c.c. diesel which we understand will also be produced for aircraft use.



Top, the Mk. II Transmitter. Above, the new Reed Unit.

The radio equipment used for the channel crossing was the new **E.D. Mk. IV unit** which comprises a tuned reed, 3-channel receiver (no connection with the watery channel!) and a new type transmitter with control box for reed operation. Hard valves are used throughout with a life of 3,000 hours. This equipment was in constant use for the 9-hour channel crossing which is proof enough of its reliability and there is no doubt that it is just the job for the man who intends to take his radio flying seriously by using multi controls. Price of complete outfit is £25, £15 for the receiver and £10 for the transmitter plus control box. They are of course sold separately, as is the **Reed Unit** itself price £5, which can be supplied in three frequency ranges giving up to 9 channels for the man who wishes to incorporate it in his own equipment.

Another new addition to the same stable is the **E.D. Mk. II "Miniature 3" Unit** which comprises both transmitter and receiver. The receiver uses three hard valves of unlimited life and is of the positive feed back type with a grid bias circuit following the original Mk. 1. However, the weight and battery consumption drawbacks have been completely eliminated in this new miniature which, complete with batteries weighs only 10½ ozs. and gives 3 hours continuous running from a standard pack. The transmitter is wired for both carrier and modulated receivers and its price is £7. Receiver price is £11 making a total of £18. 10s. 0d.

One item that particularly took our fancy during the visit was the smallest escapement that we have yet seen. It occupies only half the area of previous escapements and is therefore eminently suitable for the smaller R/C job. Weight is 7/8th ozs. and the method of fixing (one single bolt with Simonds nut) neat and most effective. Price of **E.D. Compact Escapement** is £1. 2s. 11d. and we recommend it to all as a thoroughly reliable piece of equipment.

The Balloon Race

BY ARCHIE PELAGO

IT was the sort of day that the organisers of fêtes must dream about. From an intense blue sky, the sun beat brassily down until the marquees and stalls danced in a shimmering haze of vibrant heat. A barely perceptible breeze did little to relieve the rush on the ice-cream vendors, and it was noticeable that the side-shows requiring less violent exercise were busier than the coconut shies and the try-your-strength outfits. As I stood there, clutching my programme-cum-entry-ticket, and wondering vaguely why on earth I'd promised to look in on the fête although, of course, I hadn't expected it would turn out a perfect flying day—my eye was drawn to a pink, polished sphere which lazily floated up from a point on the far side of the ground.

The balloon drifted upwards and unconsciously I started to tick off mental minutes. Released near a fringe of tall elms and sheltered by them from the tiny breeze, the bladder rose straight until clear of the trees, when its angle of ascent changed to about 45 degrees. Three or four hundred feet up the true wind caught it and it shot off down-wind at a merry rate. I watched it until it disappeared—roughly a maximum, I reckoned, five minutes o.o.s. and at about two thousand feet. I found myself wondering at what height it would burst, and trying to recall if I'd ever heard of a Young's Modulus for toy balloons and what pressure was required to burst a balloon at sea level . . . I'd got as far as icing indices and Lincolnshire when the St. John Ambulance man touched my shoulder and enquired after my health. Reassuring him, I brushed speculation from my mind and strode forth.

Standing by a manually-operated children's roundabout, I idly watched a brawny character and a lad winding on the handles to start the thing turning. Dizzy, I looked away—to behold a procession of multi-coloured balloons gaily following the same skyward path. In that moment a notion bestirred itself in the back of my mind, and, I headed for the balloon-race stall.

At my request for two balloons, the faintly repulsive gent in charge turned to get them, but when I asked for one to be only half-filled he turned back to me with raised eyebrows. "Won' go up, guv," percolated through his walrus moustache. "Doesn't matter", I replied, "Half full'll do me". He shrugged his shoulders and served up my order. With amusement he watched me fill up the labels, and took the torn-off halves with a smirk. His brows knitted, however, as I tied the two globes together, and his semi-shaven face registered comical curiosity as I released the "mother and child" and they drifted slowly up.

"Woss the idea o' that, guv?" he queried. "Well," I said, "Look at the speed they're going up at. They'll take twice as long to reach bursting height, won't they?" "Ar, I s'pose so" he said. "But," I continued, "They're subject to about the same wind, aren't they?" His "Yeah" was more cautious this time. "In that case," said I, "They'll blow twice as far before bursting, and only the big one will burst then. The other will be expanded under the reduced atmospheric pressure and will be capable of sustaining the weight of the burst balloon and the labels, so it will still be blown on." "Gor," said the vendor. "With a constant decrease in vertical pressure," I continued, "The half-filled balloon . . . etc."

I had reached and was warming to adiabatic lapse rates when change came over his visage. "'Ere," he demanded, a gleam of suspicion in his eye, "Joo mean that sendin' orf them balloons tied up like that means they'll be blowed farver?" I raised my eyes to the heavens. "Yes," I said, His walrus moustache vibrated. "Well," he erupted, "Of all the rotten, mean, dirty blinkin' tricks! Cruel, I calls that. Yer come 'ere, wiv yer lah-di-dah talk abaht tap rates . . ." He went on and on, despite my interjections. When he got to "Stealin' the bread . . ." I turned and walked away. "An' don' you come back 'ere" he yelled. "Grindin' the fyces've the poor, I calls it". Distance tapered his words off to a low rumble, and I wandered over to inspect the sideshows.

An hour later I heard a small girl shrill "Coo-Mummy, look at that!" and glancing, stood amazed to see two tied balloons, one half-filled, wafting slowly skywards. I hesitated a moment, then set off for the race-stall. Another pair floated up. I reached the stall—it was unoccupied. Puzzled, I walked round the side.

There, tying a third pair of balloons together, was the character with the walrus moustache.

AIRCRAFT DESCRIBED
NO. 46
By G. A. CULL

The 1912 BLACKBURN MONOPLANE

OLD Warden Aerodrome in Bedfordshire is the home of the three oldest aeroplanes in this country which still fly. Of these veterans of the "stick and string" era, the Blackburn Monoplane is the most energetic member of the trio.

She was designed and built at Leeds in 1912 and the machine still flying was the fourth to appear. No. 1 had a four-wheel undercarriage and high wing, and No. 2 and 3 differed from the fourth in having different engines, one piece elevators and two triangular rudders which were embodied as the top and bottom panels of the rudder on No. 4. The Blackburn was an original design which broke away from the much copied Bleriots and Farmans.

Blackburn No. 4 eventually fell derelict on a Lincolnshire farm and lay decaying for many years under a haystack supported on posts, her engine in a barrel along with some spares! The Shuttleworth Trust, however, heard of this with the result that in 1948 this same old timer was completely overhauled and restored to her present and widely admired pristine condition. This tremendous task was accomplished by L. A. Jackson, A.R.Ae.S. and his staff, and the calibre of their achievement is only realised on considering the rotting and corroding relic which arrived at Old Warden and which, after hours of perseverance, was eventually made fit to be rigged again, and this from a photograph!

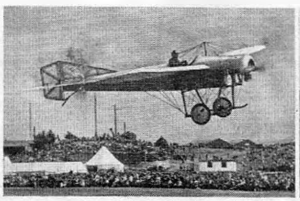
After her resurrection her debut was staged at nearby Hendon at the 1949 "Battle of Britain" display, and the Blackburn has performed unfailingly at every R.Ae.S. Garden Party ever since. In 1950 she flew in the R.A.F. display and her last 1951 performance was, appropriately, at Hendon in the "Fifty Years of Aviation" display. This year the Blackburn has flown with greater vigour than ever, making complete circuits at 60 m.p.h. before landing in a distance not worth mentioning. Flights are kept short so that the precious 50 h.p. seven cylinder Gnome rotary engine may be conserved for many future years.

S/Ldr. G. Banner, D.F.C., is the pilot who, undaunted by the cross bar linking the rear wing spars which clamps across his lap, flies the Blackburn with great zest with the help of the two instruments: a rev. counter and a pair of oil pulsator glasses. The controls consist of a conventional rudder bar and joystick topped by a 12-inch diameter mahogany wheel. This warps the wings for lateral control by pulling on two cables which run from the fuselage to pulleys on the undercarriage rear legs. Each cable here, divides into three which run to the rear spars. From the top surface of the rear spars, corresponding cables run up and over the ash kingpost and perform the duty of the balance cable of ailerons which, in 1912, had yet to gain fashion. Lift wires and landing wires brace the front spars.

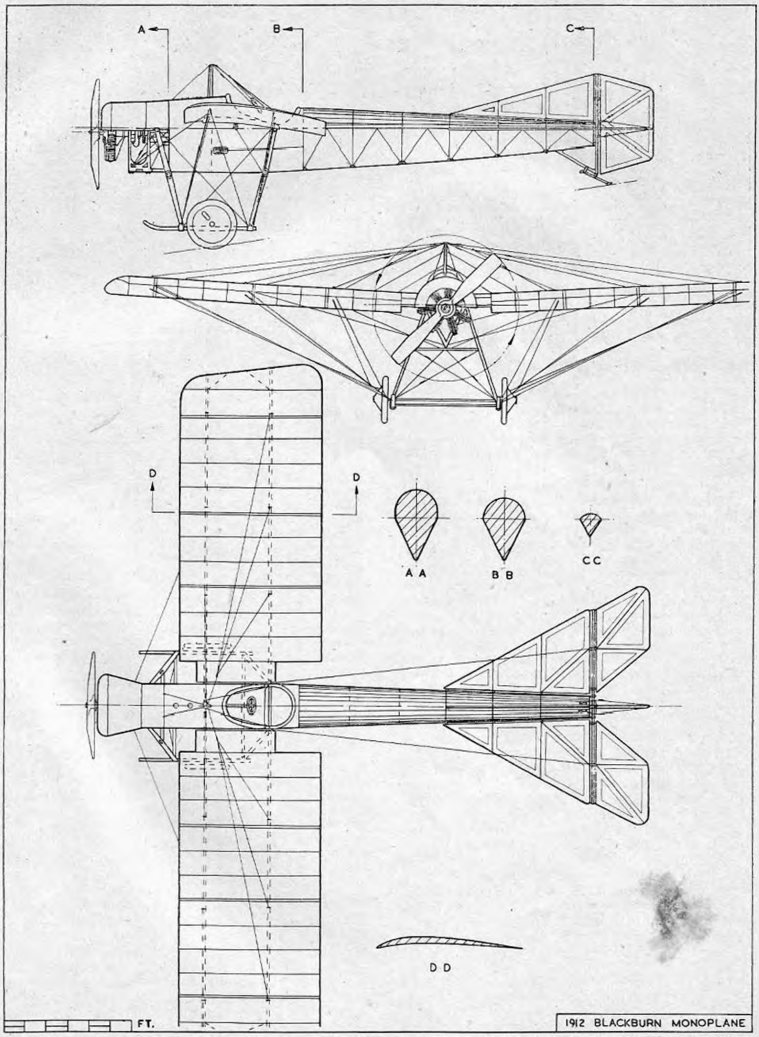
Colour. All fabric is cream, aluminium is dull. Polished mahogany propeller. Undercarriage varnished ash, with black metal nttings.

Dimensions. Span 32 ft. 1 in. Length: 26 ft. 3 ins.

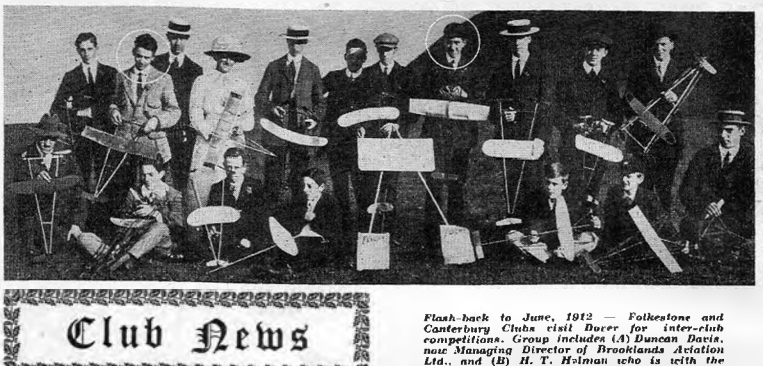
Construction. Triangular section fuselage has three ash longerons with spruce struts. Decking is faired to semi-circular section by eleven stringers. Aluminium sheeting extends to rear of cockpit. Wings have two spindled ash spars and built-up cottonwood ribs. Tail surfaces are single surfaced and both movable and fixed surfaces are attached to separate 1 inch dia. steel tube spars. Undercarriage frame of ash, streamlined between joints with two streamline steel tube spreader bars.



Above, the Blackburn in full sail with her framework showing through the translucent covering. The dark, diagonal lines are seams in the fabric which is laid on the bias. Left, the working end with the massive propeller and some of the many-stranded bracing wires and turnbuckles in evidence. Extreme left, another flying shot which will surely make the flying scale modellers reach for their drawing boards. (Photos are by courtesy of "Flight".)



This is a 1/72 scale reproduction of the 1/48 scale drawing which is available price 1/- post free from Aeromodeller Plans Service.



Flash-back to June, 1912 — Folkestone and Canterbury Clubs visit Dover for inter-club competitions. Group includes (A) Duncan Davis, now Managing Director of Brooklands Aviation Ltd., and (B) H. T. Holman who is with the Publications Branch of the Ministry of Supply.

Club News

WELL, with the last contest of the season behind us, what do we find on looking back over the past year of flying ? I doubt if many clubs or individuals can express much satisfaction with the weather, for as usual it seems to have saved the worst for week ends, and model flying has been seriously handicapped on many Sundays during 1951.

NORTH WESTERN AREA news gives notice of a Winter Rally to be held on January 13th next. These winter " do's " are fun, and it is surprising what good weather can be found during the off months. E. Lord, of Accrington, is the Area power record holder for 1951 with a time of 11 : 11, and J. O'Donnell of Whitefield takes honours in both the rubber and glider class with times of 12 : 16 and 11 : 58 respectively. Good luck to Ernie Currington, former comp. sec. to the Area, who has gone to Montreal to work for Canadair, to be joined later by Phil Joyce, formerly of the Midland Area. Ernie, ever a radical, was never parochial in his views, and did a lot of good work for the North West.

The Ipswich boys continue to dominate affairs in the **EAST ANGLIAN AREA,** and again placed top in the district comp. for the Farrow Shield, Pete Wyatt also carrying off the Scale Power event.

Probably the most successful **SOUTH MIDLAND AREA** meeting held in 1951 was the Rally held at R.A.F. Halton, in conjunction with the Aylesbury and District branch of the R.A.F. Association. Weather was perfect, and what little wind there was even blew in the right direction ! Both the rubber and glider events were very well supported, the former including both the Farrow Shield and Battle of Britain Cup.

Congratulations to the **WEST OF SCOTLAND AREA** for showing the rest of the country how to get cracking. Their organisation, especially in connection with preliminary details, was top class, and the success of the meeting (reported on page 724) was a just reward for their efforts.

News from London being conspicuous by its absence these days, we remain up North with reports from the **NORTHERN AREA.** The Scarborough C/L was a success, despite doubtful weather and an awkward wind. Sheffield won the Class A Team Race, and R. Cooke of Rotherham beat Midlander R. Buck of Five Towns for the Stunt event, the meeting ending with a speech from the Mayor, who promised that the grass would be cut and rolled for next year's event ! !

Aeromodellers living in West Birmingham will be interested in a new club formed there, the **WEST BIRMINGHAM M.A.C.,** who hold meetings every Thursday evening at 7.30 p.m. in the Four Dwellings School. Try looking them up.

After some two years of comparative inactivity, the **BUCKSBURN A.T.** has woken up, and is now moving ahead at a fair speed. The club is purposely small, and all members fly for the club rather than for themselves, an ideal that could be commended to some other groups. Top club record is in the T.L. Glider class, U. Wannop being the holder with a time of 7 : 10. Club Sec. C. M. Christie asks our help in contacting the spectator who photographed him winding his model at the Balado meeting on the 19th August, organised by the Edinburgh club. As the model flew o.o.s., and was a complete wreck when found, Christie would like to get a copy of the print as his only record.

FIVE TOWNS M.A.S. report the return to their flying field for the winter months, and free-flight interest is literally soaring ! The first day out saw two power jobs and a glider lost, the two engined jobs being still missing. C. Oakes fatal flight was a test flip with a new Elfin 2 49 pylon—16 : 38 on a 7-second run. Two members flew at the Scarborough meeting, A. R. Buck placing second in stunt, and E. Clutton collecting the booby—as usual !

" Get together " meetings have been held by the **RUGBY M.E.S.** with the local R.A.F. club, and the Coventry & D.M.A.C. Sixteen members of the latter club turned up in spite of unfavourable weather, which alternated between a thunderstorm, gales and sunshine, but despite this, times were good.

BRISTOL PHŒNIX M.F.C. had a stiff task this season, absence of a flying field being their biggest drawback. However, odd spots of flying have been indulged in, and some good durations resulted. To

date this club has had a reputation for C/L flying, but, aeromodellers being what they are, a full circle has been completed, and members are currently trying out F/L Scale, Jetex and R/C. Co-operation with a local cinema produced a fine and successful exhibition.

Members of the **NORTH SHIELDS M.A.C.** turned up in force for the N.E. Coast contests held on August 19th, and were rewarded with a first in both Rubber and C/L Stunt. R. C. Pollard in winning the former event picked up a thermal from about 50 ft. off the deck, and went o.o.s. after 6 minutes. Chief successes other than this event have been in Team Racing, and they had the satisfaction of beating Pete Russell and Bridget McCann at the Darlington Rally, though due regard is paid to the bad luck experienced by the Worksop contingent.

Messrs. Hancock, Wallis and Buskell of the **SURBITON M.F.C.**, who went to the Nats. at Swansea, would like to thank the local chaps for what was unquestionably their best meeting so far—particularly the hot meals ! Pete Allaker won the Class B event at the South Coast Gala, and followed this up with a win in the London Area Championship rubber event.

The **WORKSOP AEROMODELLERS** have again had a good season, Pete Russell's " Monitor " winning the stunt events at the West Essex Gala, the Wembley Championships, and the Darlington Rally, plus thirds at the Nationals and the Scarborough Meeting. Getting tired ! Team racing exponent Bridget McCann has had disgusting luck. With one exception she has led every race entered, until some small snag put her out. Her jinx let up at the Sherburn meeting when her E.D. 3·46 job won and also put up the fastest heat—in spite of racing engines owned by the opposition. The club hopes to sponsor another Boxing Day meeting, and hopes the surrrounding clubs will turn up and fly as at previous meets. Venue to be announced later.

WEST ESSEX believe in being well on time, for they announce that their 1952 Gala will take place at Fairlop on Sunday, 15th June.

WHITEFIELD M.A.C. keep up their tight schedule of flying in all weathers, and many fine flights are reported this month. In the Rootes Trophy, an event conducted between the North Western and Northern Areas, the Manchester boys finished only nine points behind Sheffield, the winners with 1,500 points. H. O'Donnell qualified for the Jetex Finals, but brother John (who flew proxy for him) could not manage better than a 5·17 ratio, not enough for a place. J. O'D. had his troubles when, having lost his glider, it was reported as having been found and hidden in some long grass by a company of hikers. When the retrieving party got to the scene, said grass had been mown—also the model !

The last of the 1951 comps. in the **REGENTS PARK M.F.C.** was flown on the 30th September, this being a power event won by R. Bennett. This club expresses its disgust at the poor Fairlop co-operation shown by many clubs in the London district.

The **ILFORD & D.M.A.C.** contribution to the town's Festival Arts and Crafts Exhibition appears to have been a great success, over 9,000 people visiting the show during the week, many making more than one visit. Models were of all types ranging from an 11 ft. 6 in. glider to 15 in. flying scale, and r.t.p. flying of all classes of model on 9 ft. lines kept the crowd interested. A great deal of free-flight was also carried out, the crowd being vociferously appreciative when the models missed the ceiling obstructions !

LOWESTOFT & D.M.A.C. report an increase in numbers, but a rather disappointing apathy among their juniors to take advantage of assistance and advice offered to them. Instruction classes on various subjects produced little interest, and " quizz " nights were not very successful, those juniors who " know all the answers " actually knew very little ! In an effort to bring about a better state of affairs the committee has placed all members, irrespective of age, on probation for four months, during which period the member must make four flights of at least 60 seconds. It is hoped that this will dispose of the " criticise but never fly " section.

The **LEICESTER M.A.C.** gala day was held under very mediocre conditions, but in spite of this much enthusiasm was shown, particularly for the power event. H. Hart won the " Everard Cup " with a three-flight ratio of 15·3 and P. B. Tarratt aggregated 2 : 20 to win the " Aeromodeller Cup ". The glider contest was abandoned after two of the three entries crashed without recording any flight times !

The past season has, unfortunately, afforded but little flying to the **R.A.F., ODIHAM & D.M.A.C.** due to a combination of bad flying weather and " exercises " by the Royal Air Force. A visit to Greenham Common Aerodrome to compete against Newbury and District and Basingstoke M.A.C.'s was marred by appalling weather conditions that kept all but the most intrepid aviators grounded.

The **FOLKESTONE & D.M.A.C.** held its second Open Day on September 30th after a previous attempt had been washed out. Canterbury Pilgrims and Dover each sent a small contingent, and though numbers were small, a good time was had by all. Results were :—

Glider :	**A. Gaines**	**(Folkestone)**	**6 : 41**
	E. A. Rigden	**(Pilgrims)**	**4 : 31**
	—. Green	**(Pilgrims)**	**3 : 39**
Rubber :	**—. Ashby**	**(Pilgrims)**	**2 : 25**
	R. A. Woodruff	**(Pilgrims**	**1 : 20**
	F. Walder	**(Folkestone)**	**: 47**
Power :	**—. Powell**	**(Pilgrims)**	**6.01 ratio**

Shades of summer ! The weather man has smiled upon the **SWINDON M.A.C.** for three consecutive dates, the latter two being the occasion of the club's A/2 and open glider comps., and the Swindon-Trowbridge challenge match held at Wroughton Aerodrome. Good flying was witnessed in the glider events as reflected by the results, despite a fairly stiff wind. M. Greenwood won the A/2 class with an aggregate of 9 : 32, followed by L. Coker 9 : 18 and R. Offen 6 : 33, the open event going to L. A. Rogers with 8 : 12, J. Bunting 7 : 28 and A. Tichener 7 : 25. The inter-club match proved a most enjoyable affair, and notable for the high standard of sportsmanship and team spirit shown by both clubs. After a close fight Swindon came out on top with the score sheet showing 2,735 seconds against Trowbridge's 2,501.

Being in possession of a new clubhouse, the **BROUGHTON (Lancs.) & D.M.C.** got down to trying to improve attendance at flying meetings. An immediate success followed raising the weekly subscriptions slightly, the extra going into a prize fund

" He's got his Mother's lose C.L.A. and his Father's dihedral."

CLUB NEWS . . . ***Lady de Zeil and the Curate kindly agreed to throw the first two Chuck Gliders to mark the opening of the All Glogiug Rally.***

awarded on a monthly basis. The first Sunday saw the best attendance yet, and both the club power and glider records went for a burton. Pays dividends apparently.

Though not much has been heard from the **WEST YORKS M.A.S.** lately, the club has been thriving. W. Farrance won both the rubber and glider events at the Wakefield meeting, and followed up with a second place in the club's all-in contest, flying his A/2 for over 11 minutes. Winner was H. Preston who came top with an aggregate of 13·47 flying his own designed power job.

EXETER M.A.C. received much valuable publicity —and over £100 net profit for club funds—as a result of their Exhibition at the Devon and Exeter Trades Fair. Main attraction was r.t.p. flying on 13 ft. lines, with outside-the-circle control effected by Sam Hecker's cunning contraption. Some 60 models were on show in the static section, and the club is now in a position to implement many plans which have hitherto had to be shelved owing to lack of finance. A novel note was struck by the inclusion of two realistic 7 ft. long airships (built by G. Rogers and L. O'Callaghan) moored to a high pylon forming the centre piece of the static show.

In spite of small numbers, the members of the **SOLIHULL M.A.C.** are bringing their club well into the limelight. This club won the national Model Engineer Cup, and members have represented England at the U.K. Challenge Match, and the Midland Area in the British Championships.

YORK M.A.S. announce that, owing to Clifton Airstrip being taken over by the Air Ministry, model flying is now banned at that field. Individuals from other clubs are asked not to fly there as this may affect future developments. York therefore flew the final round of the Northern Area knock-out event at Baildon, beating Halifax in the finish. H. Johnson put up the fine score of 11 : 01 in the " Flight Cup " contest, in " still air ".

With an average attendance of over 50, flying meetings of the **FORESTERS (Nottingham) M.F.C.** are very popular, and there is hardly a dull moment. Chuck gliders are enjoying a revival of interest, and one has to be careful not to be on the receiving end of a sharp pain in the neck ! Best power job in the club is currently Dave Bainbridge's 1½ size " Lil Aud " with an Amco 3·5 aboard, the glide being better than many an A/2. Doug Bolton and Jimmie Weston placed 2nd in the Taplin Trophy at Digby, and are hard at work mass producing their " working man's radio " to satisfy would-be club R/C fliers.

After a lull in balsa bashing by the **AINTREE M.A.C.**, interest is on the upswing, and membership has shown a healthy increase. These lads wonder if other clubs experience the " new order " regarding junior introduction to the hobby. Time was when it was considered absolutely imperative that a junior should graduate through glider and rubber stages before even looking at an engine. These days, however, most youngsters' first experience of aeromodelling is the handling of a power unit ! Do clubs consider this a good change ? Aintree's new clubroom is in the Aintree Institute, Walton Vale, Liverpool 9, and meetings are at 7.30 p.m. on Friday evenings.

BRISTOL & WEST M.A.C. made the most of a lovely day on the 14th October at Lulsgate Aerodrome. " Flight Cup " entries were headed by G. Woolls, closely followed by " Profressor " A. H. Lee flying a bitsa featuring an 11 in. geared-up prop, and having a two-minute motor run. A very welcome return was made by C. S. Wilkins who flew with his usual consistency. An experimental rubber-driven flying wing by G. Woolls is making consistent flights of around 75 seconds, and later versions may be expected to show an improved performance. Howard Boys 1939 record may soon be in danger ! Indoor meetings will be held during the winter months at the Moravian Hall, Upper Maudlin Street, commencing November 8th. All are cordially invited.

Team racing having been introduced into the **ESTUARY POWER MODELLERS** club, the resulting high speeds have caused a swing to pure speed flying, from the previous prevalent stunt. Main interest is in G. Yaldham's ETA 29 powered " Whirlaway ". Other members maintain their interest in Wakefield and general free-flight, the recent acquisition of excellent new club premises giving an added boost to enthusiasm.

Now that the season is over, the **THAMES VALLEY M.A.C.** boys are settling down to their winter schedule of dodging the trees in Bushy Park with sports models, chuck gliders, etc. Current building includes Wakefields and large span gliders, housing for which is being pursued in a hunt for a permanent clubroom.

The **RUNCORN M.A.C.** has regretfully been disbanded owing to falling off in membership and the general rise in material costs.

A newcomer to aeromodelling, who didn't know how important it is to have one's name and address on a model asks our help in tracing his lost blue and fawn " Slicker 42 " (powered by Mills Mk. II No. 27172), last seen going up after crossing the railway at Fairlop. As the engine was his sole Xmas and birthday present it is quite a large loss ! Finder please contact R. J. Whitelam, 92, Blenheim Gardens, Brixton, S.W.2.

I end this month's reports with a notice from a German club which wishes to start a correspondence with a British counterpart. They are able to communicate in English, and the address is Berliner Verein fuer Segelflug e.V in D.Ae.C., BERLIN-Schoeneberg, Bozener Strasse 9.

With which I say goodbye till the new year, and here's hoping you get all you want in your Xmas stocking this time !

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FSP 425	Prestwick Pioneer by R. Burns	52" "	5/6
FSP 434	Miles Hawk Speed Six by D. P. Golding	52" "	6/–
FSP 441	Sopwith Camel by F. C. Saunders	42" "	6/–
FSP 445	Fokker FVIIB 3M by H. Parrish	40" "	4/–
FSP 453	Fokker Triplane by P. E. Norman	40½" "	6/–

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PET 414	Phoenix by Bob Woollett	72" span	7/–
PET 419	Clubman by Gus Gunther	50" "	3/6
PET 424	Snorky by G. A. Rae	36" "	3/6
PET 427	Jaded Maid by Norman Marcus	60" "	5/6
PET 431	Wyvern by Geoff. Dunmore	28" "	4/–
PET 432	Binkie Mk. IV by W. M. McCormack	35½" "	4/–
PET 438	Hell's Belle by Vic Smeed	60" "	5/–
PET 439	Harpie by Vic Smeed	50" "	4/–
PET 440	Huzzie by Vic Smeed	40" "	3/–
PET 448	Lil Aud by J. A. Gerlach	40" "	4/–
PET 451	Fledgling by Cyril Shaw	33½" "	3/–
PET 460	Popsie by Vic Smeed	38½" "	6/–

CONTROL LINE

CL 411	TK 4 by R. G. Moulton	30½" span	3/6
CL 412	Lindy by Fred Guest	15" "	2/–
CL 417	Hopit by E. Higlett	36" "	3/6
CL 421	Icarus, Jnr., by J. W. Cosshy	42" "	4/6
CL 422	Icarus, Snr., by J. W. Cosshy	67" "	5/6
CL 428	Lazy Daisy, Mk. III by Pat Wheeler	28" "	3/6
CL 433	Wackett Boomerang by C. A. Taylor	38" "	4/–

CONTROL LINE—cont.

CL 437	Bumblebug by Les Howell	28" span	4/–
CL 454	Scramble by J. Jones	27" "	4/–
CL 457	Ambassador by Alan Hewitt	35½" "	4/–

UNORTHODOX MODELS.

U 407	Maux Arrow by C. S. West	66" span	2/6
U 429	Pete's Plank by Pete Wyatt	51" "	3/6
U 435	Ghoul III by M. M. Gates	48" "	4/–
U 436	Ascender by Jim Fullarton	39" "	4/–
U 443	Welshman by A. R. Lucas	72" "	4/–
U 456	Ro-Dart by D. Neale Rotor	23½ diam.	3/–
U 458	Sparrow by R. W. Roeser	83" span	6/–

GLIDERS AND SAILPLANES.

G 409	Nord II by J. G. Joyce	50" span	5/6
G 415	Revenge by Roy Yeabsley	62" "	5/6
G 420	Walthew A2 by Roland Scott	60" "	3/6
G 442	Windrush II by Henry Jones	70" "	6/–
G 450	Ursa by D. C. Smith	60" "	6/–

RUBBER-POWERED MODELS.

D 416	Hereward by Norman Marcus	42" span	3/6
D 420	Topsy by N. Osbourn	44" "	5/6
D 430	Trump Card by Draper and McClean	30" "	4/–
D 449	Junior Miss by Vic Smeed	20" "	3/–

JETEX.

J 413	Little Stinker by P. B. Allaker	30" span	3/6
J 448	Twizzler by Dick Twomey	28" "	3/–

FLYING BOAT.

WP 423	Aquarius by W. B. Heginbotham	52" span	5/6

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(2) First Appointments in the Royal Marines.
(3) Entry to the Royal Military Academy Sandhurst.
(4) Royal Air Force Cadetships.

A combined competition will be held, commencing on 19th February, 1952, a centre in Germany (British Zone) will be included in the list of centres for the written examination.

AGE LIMITS :

Naval Cadetships (Special Entry)—17 years 2 months–17 years 10 months on 1st March, 1952.

First Appointment in the Royal Marines—17 years 2 months—18½ on 1st March, 1952.

Entry to Royal Military Academy Sandhurst—17½–18¾ on 1st March, 1952.

Royal Air Force Cadetships—17½–19 on 1st March, 1952.

Applications Forms and Conspectus of the competition may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1, quoting No 1001/52. Completed Application Forms must be received by him by 6th December, 1951.

2585

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