AERO MODELLER

FEBRUARY, 1952

D. P. GOLDING'S "COMPER SWIFT" ● RONNY WARRING'S LIGHTWEIGHT "FLIP-FLOP" ● KEN MARSH'S WINNING RACER "SUPER SAINT" ● FULL SIZED PLANS FOR ALL-SHEET SPORT FLIER "KALPIE" ● SPECIAL SCALE FEATURE

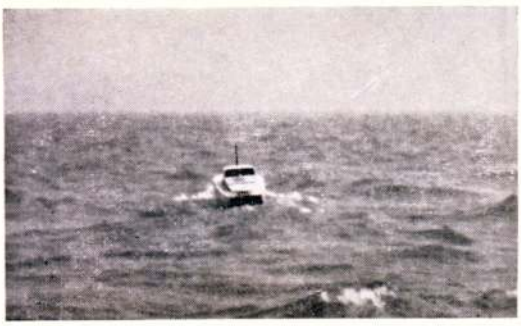
1/6

MISS "EEDEE"

The Channel-conquering Lady with a 2 ft. beam

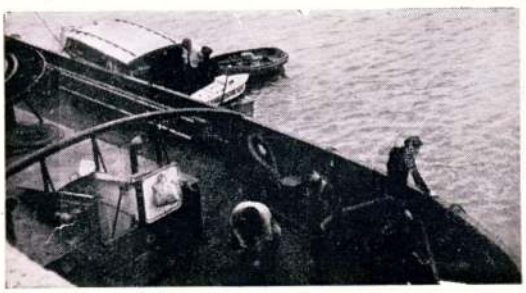
Specially designed by our Electronic Designer, George Honnest Redlich, for the Channel project, Miss " Eedee " is 5 ft. long with 2 ft. beam and weighs 70 lbs. After preliminary trials from Richmond to the South Bank Exhibition and at the International Model Boat Contest at Fleetwood, the model was successfully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

who responds readily to Radio Control . . .



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

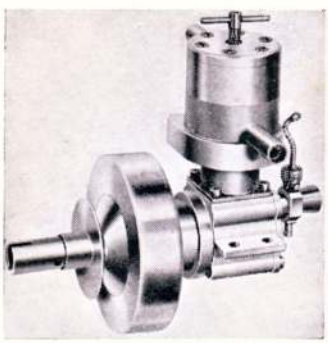
and has made amazing advances with a 4·5 Diesel



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

The 4·5 c.c. watercooled new E.D. Engine, designed by our Engine Designer, Basil Miles. Internal water tank fitted, syphon system for cooling and direct drive. R.P.M. approximately 6,500.

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



VERON

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And now . . . a RANGE OF 1/72 SCALE SOLIDS, FEATURING BRITISH, U.S. and RUSSIAN MODERN JET FIGHTERS and BOMBERS

VICKERS 510 2/6 *inc. P.T.*

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Goblin	4/7	Nipper	12/10
Rascal	6/8	Bee-Bug	14/8
Skylark	6/1	Speedee	22/7
Snipe	6/8	Stunter	23/10
Fantail	6/8	Sea-Fury	28/8
Spearfish	9/2	Wyvern	28/8
Fledgeling	9/2	Philibuster	28/8
Sentinel	12/10	Minibuster	18/4
Hi-Climber	30/6	Spitfire	33/1
Jetex Propelled		F.W.190	25/8
Min-o-jet	4/3	Panther	30/6
Air-o-jet	9/2	Midget Mustang	27/6
Cirro-jet	12/10	**Hand-Throw Gliders**	
Fouga-Cyclone	6/1	Wren	3/8
Sabre	6/8	Tomtit	1/10
Attacker	6/8	Swift	2/1
Thunder-jet	6/8		
Sea-Hawk	6/8		
Gliders		**Power Duration**	
Buzzard	16/6	Stentorian	84/11
Wagtail	6/1	Skyskooter	30/6
Verosonic	12/10	Martinet	25/8
Coronette	4/3	Streaker	24/1

The above prices include Purchase Tax

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Modernistic in appearance and a "good-looker"—here you have just the model for those who wish to make a start in powered flight. A really grand little plane with outstanding performance. Easy construction from shaped parts. Wing span 37 ins. Length 27 ins. Area 188 sq. ins. Weight (less engine) 6/7 oz. Suitable for small Diesel and Glowplug motors up to and including 1 c.c.

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Photographs by courtesy of "Flight".

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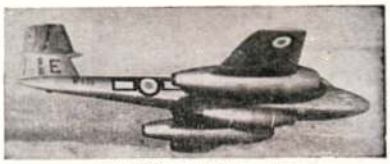

METEOR 8 4/3 *inc. P.T.*

★ **If you have any difficulty in obtaining Veron Kits write to us for the name of your local dealer.**

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KIT PRICE **44/-** (*inc. P.T.*)

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Length 26 ins. Beam 7½ ins. Construction kit suitable for powering with small Diesel motors up to 2 c.c. or with electric motors. Many die-cut and pre-fabbed parts. No shaft or propeller unit enabling you to fit the propulsion unit of your own choice.

VERON

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ESTABLISHED 1935

AERO MODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

VOLUME XVII
NUMBER 193
FEBRUARY 1952

"Covers the World of Aeromodelling"

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READERS' SURVEY

RESPONSE to our Readers' Survey questionnaire published last month has been extremely gratifying to date, and we take this opportunity of thanking the many thousands who have co-operated.

However, we realise since that we have not given enough time for a full return to be received from our many thousands of overseas readers, whose opinions are invaluable. It has been decided therefore to keep the lists open for a further month, and the final closing date will now be January 31st, 1952. It is hoped that this extension of time will further stimulate those hardy types who always leave things till the last minute!

A rough sifting of the replies received to date indicates an extremely wide variety of tastes, but we have no hesitation in confessing that our experimental publication of the "strip cartoon" series meets with almost unanimous disapproval—though even here it is interesting to note the degree of preference given to this feature according to the age group of the reader. Take heart, however, for "Fixit Wright" has made his first—and last—bow in our pages.

The amount of work involved in recording and analysing the Survey is enormous, and will take our staff many weeks to complete, but we can assure our readers that much relevant information will be passed to the Model Aircraft Trade Federation for their consideration, for statistics gleaned from such a wide poll of opinion will be invaluable to the manufacturers of kits, etc., and you, the readers, should benefit in return.

A pleasing feature of this survey is the number of readers who have taken the opportunity to write and make constructive criticisms, coupled with a very large number of worthwhile suggestions for the improvement of the magazine. Whilst it is natural for the majority to tend to flog their personal preferences, there are nevertheless a number of ideas that we feel sure will increase the value of the AEROMODELLER to its readers, and we take this opportunity of thanking the many keen readers who have taken the trouble to put their thoughts on to paper. It is obvious that our readers take a very personal interest in their magazine, and these frank expressions of opinion are of enormous help in maintaining and improving the standards of our contributions.

One ever-recurring suggestion is that we co-operate with our (friendly) rivals, *Model Aircraft*, in eliminating the duplication of contest reports and other topical matters—one reader suggesting that we could arrange to publish, say, the Wakefield Finals in the AEROMODELLER, and the A/2 Finals in *Model Aircraft* and so on. Of course, apart from being commercially impracticable, the suggestion assumes that all readers buy both magazines, which is far from being the case. We can visualise the reaction of our "one magazine" readers when it came to our turn to miss reporting a particular event in which they are interested! It would be comparable to one daily newspaper not carrying news of a third World War, and allowing another unopposed rights to such a scoop!

May we stress that, whatever your views on the various subjects that go to make up an aeromodelling magazine, please let us have them, together with the questionnaire, for it is from such invaluable expressions of opinion that we can better gauge the preferences of our readers.

Cover Picture . . . .

This beautiful model of the S.P.A.D. was entered in the 1951 R.A.F. championships at Coningsby Aerodrome, Lincs. With it is Cpl. Edwards who is to be complimented on his constructional skill.

The Aeromodeller

J. KINLEY

Lo! The Aeromodeller.
He riseth early in the morning and upsetteth the whole household.
Mighty are his preparations.
He goeth forth with a great hope in his heart.
And when the day is far spent, he returneth smelling of fuel and dope and the truth is not in him.

(With apologies to the Psalmist, who could hardly have anticipated this modern phenomenon.)

Attention Scale Enthusiasts

We have frequently been taken to task by scale enthusiasts both flying and non-flying, for not giving them all the latest aircraft in our " Aircraft Described " series. Our answer has invariably been that insufficient information could be published of structural details owing to security regulations. This preventing us from giving the accurate and comprehensive drawings for which this series is renowned.

With jet aircraft forming the bulk of the latest types released, the situation from the flying scale point of view is changed, as so many of these modern prototypes are unsuitable as flying scale models. They are, however, still of great interest to the solid modeller who invariably does not require detailed internal structure, but only external outlines and fittings. We therefore present in this issue the first of a new series entitled " Aeroplanes in Outline " which will alternate with the present series " Aircraft Described ". This new series will give an accurate G.A. drawing to 1/72nd scale, showing all external details, and will be accompanied by photographs, history and constructional information ; in other words, sufficient " gen " for the building of an accurate 1/72nd scale " solid ". For those who prefer to build larger, 1/48th scale drawings are available from A.P.S. in the usual way.

Thus we shall have " Aircraft Described " catering for the flying scale enthusiasts and those who prefer the old timers, and " Aeroplanes in Outline " offering the latest prototypes for the solid enthusiasts, and " Jetex " fliers where practicable. We say " where practicable " as it is an unfortunate fact that the more full size design progresses, the more unsuitable the aircraft become from the flying scale enthusiast's viewpoint.

Finally, we invite scale enthusiasts everywhere to write and let us know the aircraft they would like to see featured in these articles. We shall do our very best to comply with their wishes.

Dopes in High Places !

The latest squeeze—believe it or not—that Purchase Tax Collectors are inflicting on the unfortunate aeromodeller is on his cement tube ! Auntie Mabel can buy the selfsame stuff to mend that present from Margate with their taxfree blessing, but once the wicked aeromodeller touches it to stick a wing, hey presto, and the official hand is outstretched. The same applies to cellulose dopes if used for model aeroplanes under an appropriate label, though the chromium of the fast crumbling family car may be freely patched with the same material bought from the oilshop round the corner.

We are credibly informed that, not content with imposing this ridiculous demand, they are seeking to recover back-tax from 1950.

This sort of thing gives us considerable sympathy with some of the aboriginal tribes in more distant places who reputedly eat their more unpopular tax collectors—the consequent indigestion might well be worth it.

International R/C Meeting

Radio control enthusiasts who have rightly felt their branch of aeromodelling somewhat neglected in the International sphere will be delighted to learn that 17th August, 1952, has been tentatively fixed as the date of an International R/C Meeting to be held at Woodford by the International Radio Controlled Models Society, with the sanction of the S.M.A.E.

The Ambassador

We omitted to mention in the article in our December 1951 issue describing Alan Hewitt's outstanding control line stunt model, that the design was published by arrangement with Chuck Doughty, who as readers will know, produces a kit of the same model. Our apologies to Chuck, who we bet finds little time for aeromodelling now he has gone into the model business as a business !

Butlin's Support Aeromodelling

Thanks to the initial efforts of our London representatives we are happy to announce that arrangements are under way for a series of aeromodelling meetings to be held next summer at each of the famous Butlin Camps sited all round the country in spots where sunshine can be expected if not guaranteed. Prizes will be generous and special reduced charges made for competitors. The S.M.A.E. has agreed to organize these meetings so that excellent flying under competent control can be assured.

In addition, subject to a satisfactory report on the site, the S.M.A.E. propose to hold Wakefield and A/2 Sailplane Trials at Butlin's Skegness Camp.

The movement as a whole should be very grateful to Butlin's Ltd. for their enterprise in making these arrangements possible, so that the idea of aeromodelling holiday camps inaugurated by AEROMODELLER many years ago will now have a chance to blossom and expand under the finest possible conditions, backed by an organization with a worldwide reputation for making holidays fun all the time.

Flying Ban Hits U.S. Modellers

Club secretaries and others who have suffered from local restrictions on their flying will be interested to learn how the powerful American hobby trade has reacted to a *single* ban in that country. Appropriately enough the setting is North Carolina in the thriving township of Charlotte where flying was banned and the ban enforced by the local police. Immediately the trade organized protests from all over the country which deluged newspapers and officials of the offending city.

This was backed up by authoritative statements in support of aeromodelling by national leaders, including Lt.-General Laurence S. Kuter, Head of Military Air Transport Service, Secretary of the Navy, Francis P. Matthews, General Hoyt S. Vandenberg, Chief of the U.S. Air Force, and finally President Harry S. Truman made the following statement : " I understand that approximately two-thirds of all pilots in the U.S. Air Force, the Navy and Marine Corps, were modellers in their younger days. Building model planes and acquiring the skill to fly them calls for the full resources of the modellers, and in the case of young boys, provides them with a hobby which directs their energy into a useful employment of their leisure hours."

Merchandising News, which is the trade journal of the hobby trade in America publishes a long article on the subject of how their trade members and other interested bodies can combat the issue not only at Charlotte, but wherever such a ban is likely. One happy phrase appeals in particular : " You know—and your local Chief of Police knows—that the boys who are your customers are not his customers . . . You don't find model plane builders in the police line-up for dope addictions, mugging or car stealing . . . "

The result of this high pressure campaign is not as yet known, but British aeromodellers will join with us in wishing them the best of success in their spirited efforts to defeat bureaucracy in the land of the free.

(*Our American expert translates " mugging " as a form of alcoholic team race round the local taverns with an indefinite number of pit-stops.*)

Aeromodeller Annual 1951

Our Trade Distributors report that by December 14th the whole of the print of *Aeromodeller Annual* 1951 had been taken up by their wholesalers and retailers. This means that copies remaining unsold in model shops and booksellers are the only source of supply for those improvident enough not to have secured their copies early. Our own limited stocks for customers by post have also been exhausted ; in fact we have barely managed to retain our necessary office copies. If you still lack a copy there is only one thing for it, you must comb the model shops until you strike lucky.

We are glad to find that even in these days, when money—as the pundits say—is " tight ", there is still a ready market for the right sort of product. We sympathise with disappointed would-be readers, but no one can say we did not warn you !

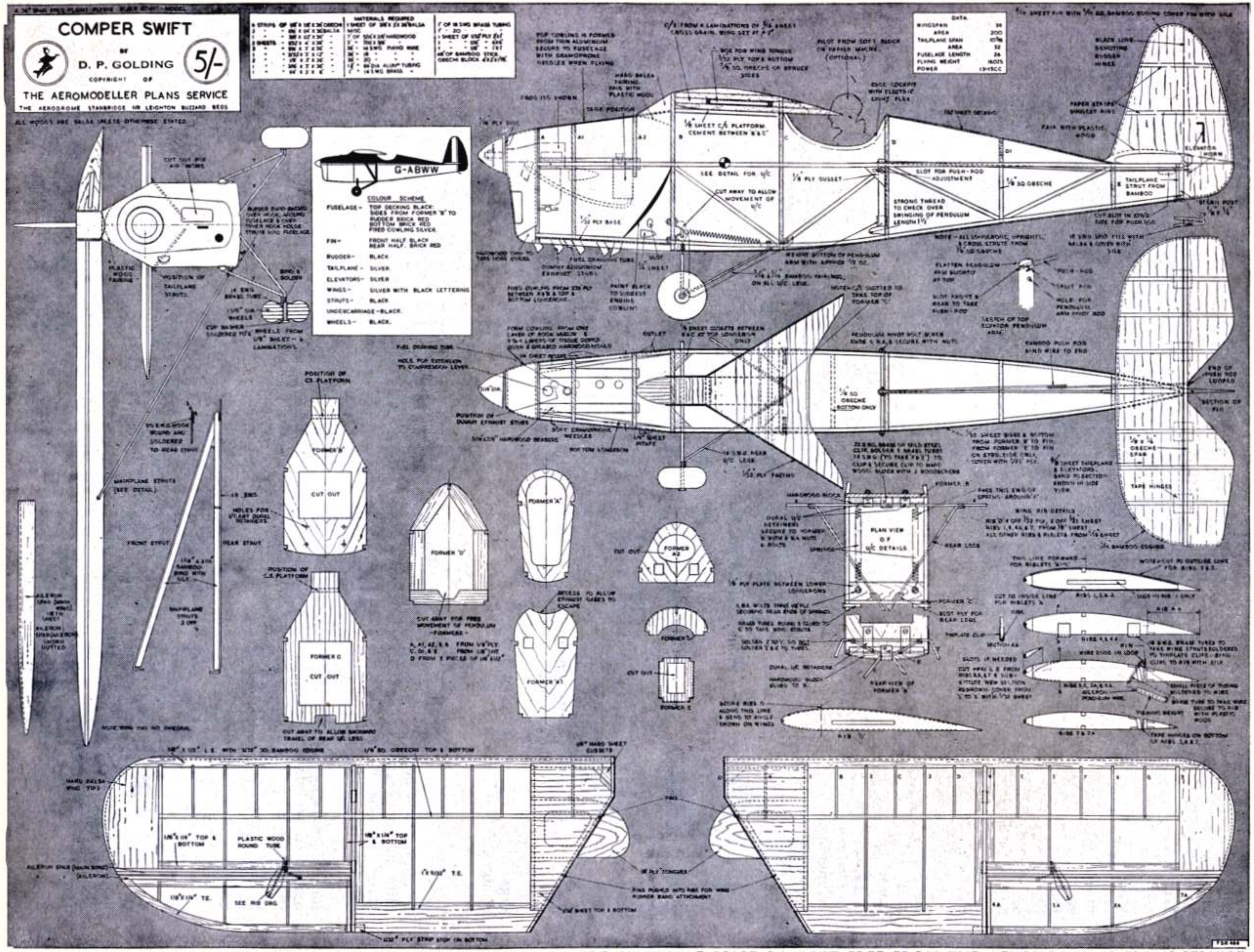
Fair Deal for Fairlop

The Ministry of Civil Aviation has now taken steps to stop admission of all unauthorised persons at Fairlop—so that aeromodellers can enjoy their flying unhampered or endangered by would-be racing motor-cyclists. All entrances have now been blocked with the exception of those at Barkingside and Aldborough Hall, which will have Police Constables on duty, instructed to refuse admission to all drivers, especially those with motor-cycles, who cannot show that they are bona-fide players or spectators proceeding to the Ilford Borough Council playing fields, or members of Model Aircraft Clubs authorised to use the aerodrome.

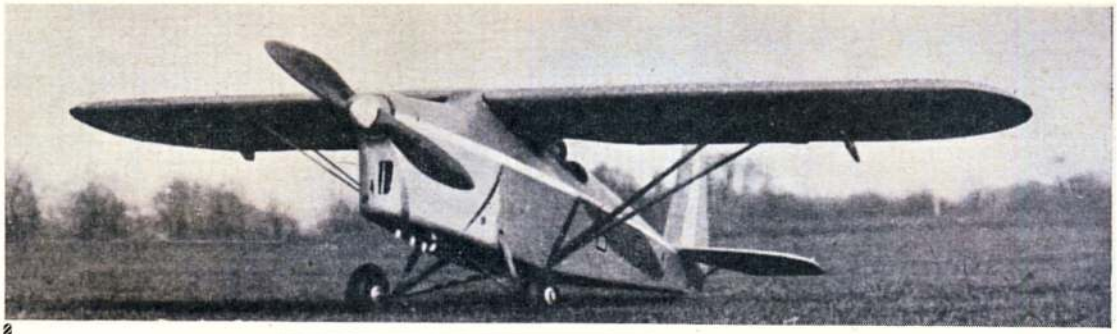
When we were down there recently on the occasion of the Anglo-American Contest, reported elsewhere in this issue, the improvement was truly remarkable. Our only criticism is that the Ministry, in its determination to root out this unofficial motor-cycle race-track has laid heaps of earth at approximately 150 ft. intervals, which are now constituting some hazard to all but the most perfectly controlled radio models.

Any Problems?

May we remind readers that we are always prepared to deal with their aeromodelling problems, providing their letters are accompanied by a stamped and addressed envelope.



THIS IS A 1/5 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 5/- POST FREE FROM THE AEROMODELLER PLANS SERVICE



A 36" SPAN

COMPER SWIFT

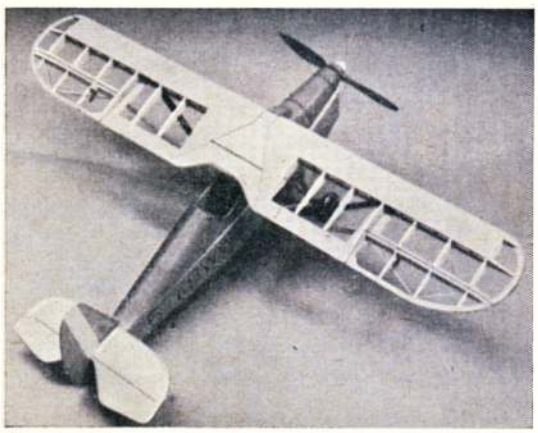
by

D. P. GOLDING

35 years old . . . . artist by profession . . . . married, with one son . . . . . member South London (Scale) M.F.C. . . . . main interests King's Cup aircraft and jets . . . . . other hobbies, photography and drawing.

ONE of the few British aeroplanes to be designed specifically for racing, the Comper Swift is an unique little craft of considerable renown. Designed and built by Nick Comper in 1930, there were two versions of the Swift, one with the radial Pobjoy engine, and the more powerful, 40 m.p.h. faster variant, using the De. H. Gipsy III Major engine.

D. P. Golding has quite naturally chosen the in-line engined Swift " Major " as a subject for modelling, for its simple cowling and longer nose are by far easier to reproduce. His model is one of the " P. E. Norman " school . . . high wing loading, high flying speed with a high degree of realism, crash-proof fittings, and semi-aerobatic performance controlled by pendulum elevators. The Swift is also fitted with pendulum ailerons, an addition which has proven most useful for automatically stabilising its impressive flight.



Full building instructions for this interesting model run to several pages and are supplied with each full-size A.P.S. plan. As a foretaste of what may be expected from the Swift, we reprint the following excerpt from the trimming and flying section of the designer's notes.

" Now try another flight, gradually increasing revs. and watching altitude—she should fly in about 30-40 ft. circles and straighten out when the power cuts. The glide is comparatively straight and level, though fast . . . should it be on the gusty side, she may turn alarmingly but will straighten out as the pendulum ailerons get to work . . . Remember, if a Mills 1·3 c.c. is used, the engine must work at full revs. I hope to fit an Elfin 1·8 c.c. which should make the model even more aerobatic and the pendulum elevators will do their job of levelling off that power zoom . . . If you don't want quite so much power, the Frog 150 or Elfin 1·49 c.c. should be ideal. N.B.—This is *not* a beginner's model."

We know, from the demand for plans of the Typhoon, Gamecock, Fokker Triplane and the Miles Hawk Speed Six, designed by the P. E. Norman/D. P. Golding school, and already published in the AEROMODELLER, that free-flight fans will enjoy this accurate reproduction of the famous Comper Swift.

FLIP – FLOP

DESIGNED BY
R.H. WARRING.

4/-

THE AEROMODELLER PLANS SERVICE
THE AERODROME STANBRIDGE BEDS

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED

-DATA-

SPAN	36"
AREA	171 SQ. INS.
TAIL SPAN	19"
TAIL AREA	72 SQ. INS.
LENGTH	30"
WEIGHT. ALL UP	3 3/16 OZS.
MOTOR WEIGHT.	1 7/8 OZS.

-MATERIALS REQUIRED-

STRIP
STRIPS OF 1/8" X 1/8" MED. BALSA.
" " 1/8" X 1/16" " "
" " 1/4" X 1/4" " "
" " 1/4" X 1/8" " "

SHEET
1 SHEET OF 1/32" X 3" HARD BALSA
1 " " 1/16" X 3" MED. "

BLOCK
1 BLOCK OF SOFT BALSA 7 1/2" X 1 3/4" X 1"

MISC.
6" OF 16 SWG. WIRE
9" " 18 " "
4" " 20 " "
SMALL PIECES OF 1/8" & 3/32" SHEET
" " " 3/32" DIA. BAMBOO.

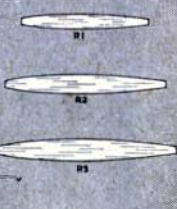
-WING RIBS-
5 OFF. 1/16" SOFT SHT
12 " 1/32" HARD "
RIBLETS.
14 OFF. 1/32" SHT.

-TAIL RIBS-
10 OFF. 1/32" HARD
3 " 1/16" SOFT

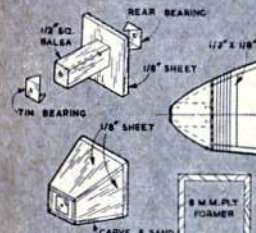
NOTE HOW T.E.'S ARE ROUNDED OFF & NOT CUT DOWN TO SECTION

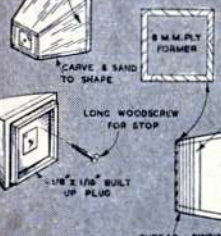
FIN OUTLINE IS LAMINATED FROM 4 STRIPS OF 1/8" X 1/32" BALSA. CEMENT FIN TO TAIL BEFORE COVERING.

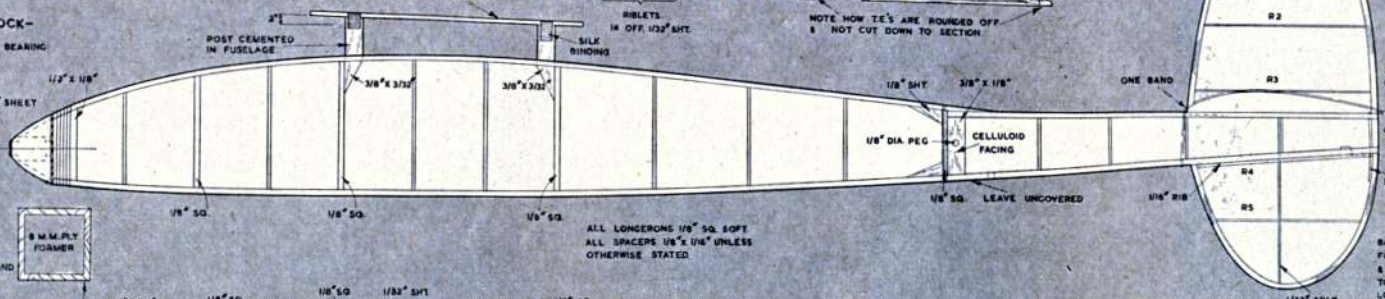
-FIN RIBS-
CUT FROM 1/32" SHT



-NOSEBLOCK-

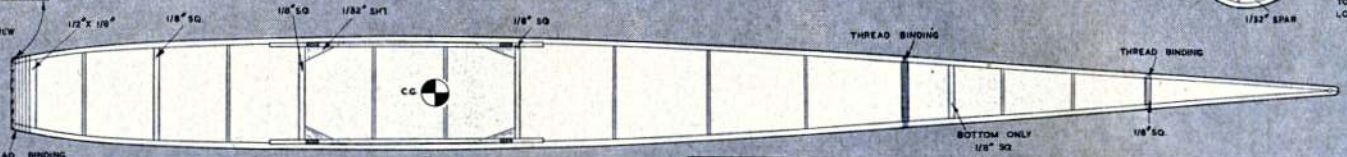


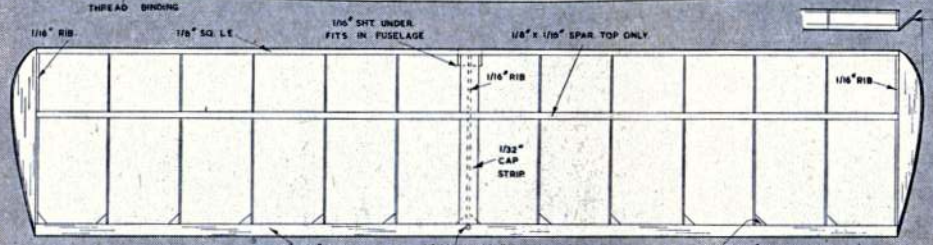




ALL LONGERONS 1/8" SQ. SOFT
ALL SPACERS 1/8" X 1/16" UNLESS OTHERWISE STATED.

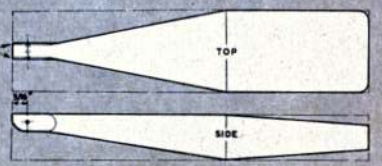
BAMBOO STRENGTHENS FUSELAGE / U FIN JOINT & PROJECTS ABOVE TOP LONGERONS TO LOCATE TAILPLANE

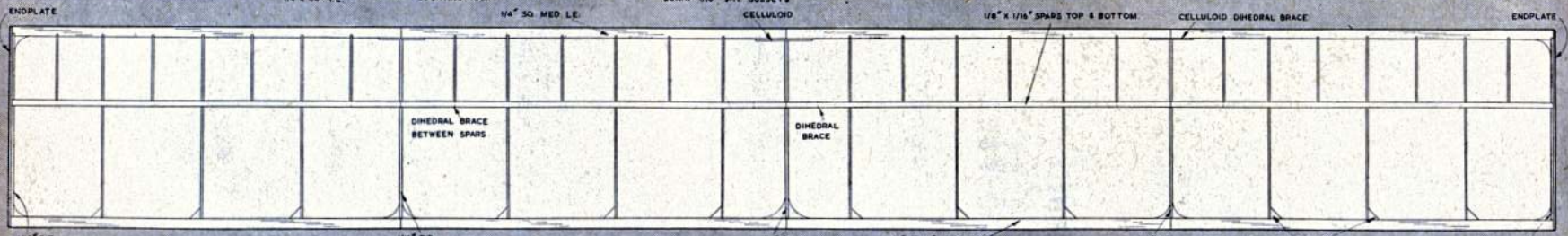




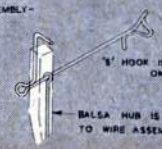
WING TIP ENDPLATES OF 1/16" SOFT SHEET OR QUARTER GRAIN 1/32" SHEET

-PROPELLOR BLANK-
POWER- 8 STRANDS 1/4" X 1/24" STRIP 36" LONG

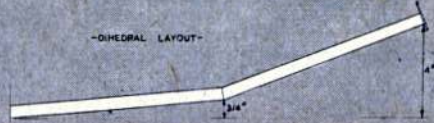




-PROP ASSEMBLY-



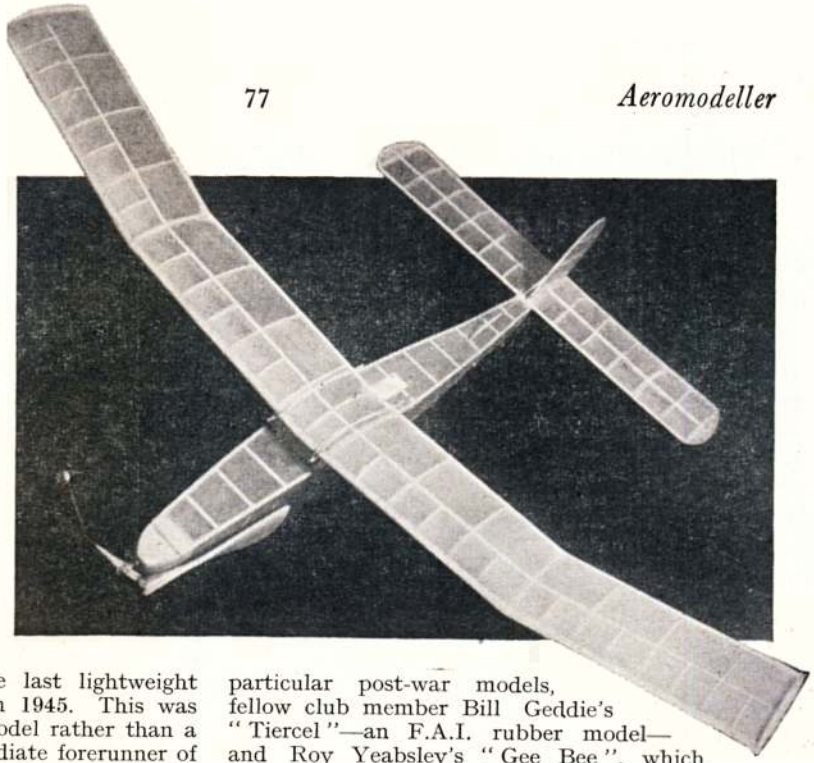
-DIHEDRAL LAYOUT-



D. 463.

● RON WARRING'S
36 INCH LIGHTWEIGHT
CONTEST RUBBER MODEL

FLIP FLOP



Tip fins, parasol wing, single blade folding prop, and under-cambered wing section are design features of this latest Warring Lightweight. Mr. and Mrs. R. H. W. are caught in the process of winding-up for a test flight, in the bottom photo.

PRIOR to " Flip-Flop " the last lightweight built by the writer was in 1945. This was really a " medium weight " model rather than a true lightweight and the immediate forerunner of the *Zombie* Wakefield design. The era of this type of " heavy " lightweight was past, however. With freewheeling propeller and long, slow climb they were, perhaps, more consistent than the orthodox post-war " lightweights " but had a noticeably higher sinking speed on the glide.

" Flip-Flop " was built in late 1950. Since then it has had various outings, none in competitions, and undergone one or two developments. The design layout has been largely influenced by two particular post-war models, fellow club member Bill Geddie's " Tiercel "—an F.A.I. rubber model—and Roy Yeabsley's " Gee Bee ", which won the 1950 Bill White Cup. It includes a number of the best design features of these two models, with the addition of some further ideas.

One of the main differences between " Flip-Flop " and its contemporaries is that it has a very long power run—eighty to ninety seconds on full turns. Initial climb is quite fast, after which " Flip-Flop " plods along in a steady climb for almost the whole of the power run, reaching a very good height. Normal duration should be in the region of $3\frac{1}{4}$ to $3\frac{1}{2}$ minutes without benefit of rising air currents. For most of the power run the propeller appears to flop around, generating just that extra amount of thrust necessary to take the model upwards.

Power trim is obtained by adjusting sidethrust to give a reasonable right-hand circle. No down-thrust should be needed, provided the model balances where shown on the plan. Adjust the wing fore and aft for glide trim if necessary.

On the glide, with propeller folded, the model should then fly straight. The ideal trim is to have a left-hand circle on the glide and this is achieved by sticking a length of $\frac{1}{8}$ in. square balsa under the trailing edge of the port wing, just outboard of the tip dihedral joint. Adjust the length of this strip until the required turn is obtained. The presence of this strip will scarcely affect the power trim.

A possible trouble is that the long motor may show a tendency to bunch at the rear anchorage. Use a bobbin here and bind the motor close up to the bobbin. The motor should comfortably take a thousand turns.

Building instructions are included with each full-size copy of the $\frac{1}{4}$ scale reproduction opposite, which can be obtained price 4/– post free from the Aeromodeller Plans Service.

SUPER SAINT

DESIGNED BY KEN MARSH.

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THE AEROMODELLER PLAN SERVICE

3/-

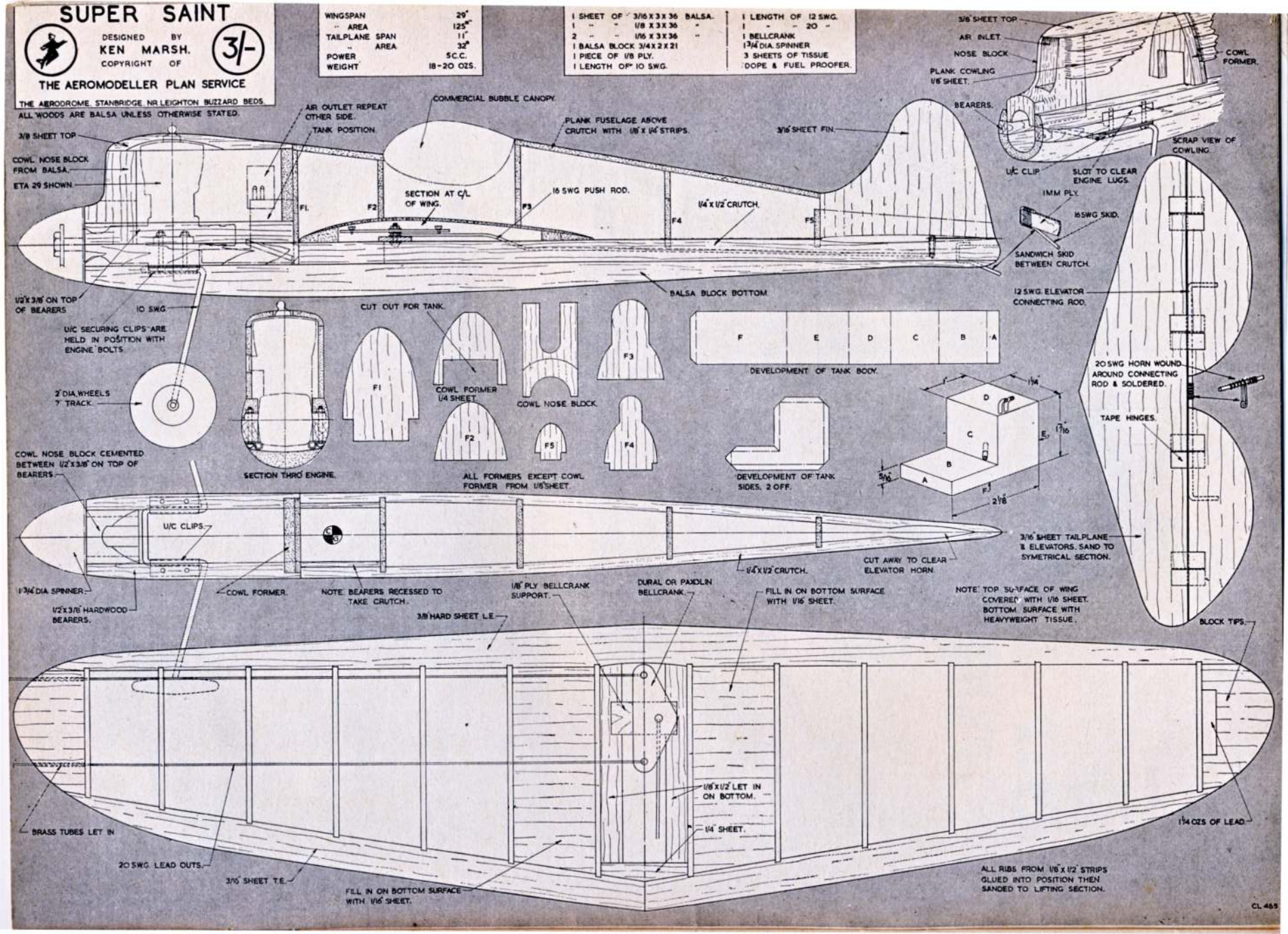
THE AERODROME, STANBRIDGE, NR LEIGHTON BUZZARD BEDS.

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED.

WINGSPAN	29"
" AREA	125"
TAILPLANE SPAN	11"
" AREA	32"
POWER	5 C.C.
WEIGHT	18-20 OZS.

1 SHEET OF 3/16 X 3 X 36 BALSA.
1 " " 1/8 X 3 X 36 "
2 " " 1/16 X 3 X 36 "
1 BALSA BLOCK 3/4 X 2 X 21
1 PIECE OF 1/8 PLY.
1 LENGTH OF 10 SWG.

1 LENGTH OF 12 SWG.
1 " " 20 "
1 BELLCRANK
1 3/4 DIA. SPINNER
3 SHEETS OF TISSUE
DOPE & FUEL PROOFER.



CL 465

● WINNER OF THE 1951 CLASS B DAVIES CUP

SUPER SAINT

by

KEN MARSH

Member West Essex Aeromodellers .... Estate Agent .... Age 26 .... Main interest is control-line stunt, team racing and speed .... also a keen motorist and photographer

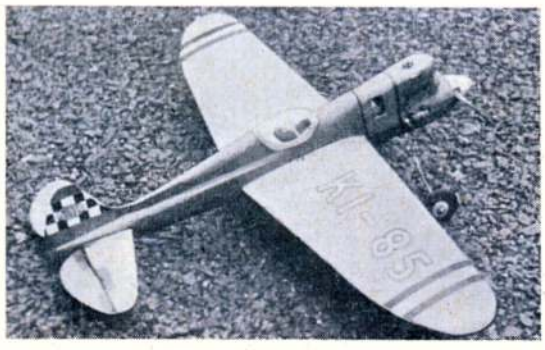
THE original " Saint " was designed in August, 1950, and at that time very few team races had been flown, but to Ken Muscutt and myself it seemed likely that the diesel powered racers would eventually be outpaced by racing type glo-motor powered models.

The " Saint " was flown in several races before it actually won a first place, but in most races where a second or third place was gained, the " Saint " had been leading until it suffered some snag or other. The first actual trouble-free race gained a first place in the Davies Finals. " Super Saint ", powered by an ETA 29, won its heat, semi-finals and the finals, all without a hitch.

CONSTRUCTION

Wing. Cut leading edge from hard $\frac{3}{8}$ in. sheet and taper to plan view, then taper lower surface from centre section ribs to tips to produce slight dihedral. Trailing edge is from 3/16 in. medium sheet and ribs are strips of $\frac{1}{2} \times \frac{1}{8}$ in. sanded to a lifting section. Wing tips are from soft $\frac{3}{8}$ in. balsa. Install ply bellcrank platform and support, mount bellcrank and controls in centre section, fit push rod but leave bed for control horn till later. Check controls for full movement, then cover top of wing with 1/16 in. sheet (two 3 in. sheets butted together). Add weight to outer wing tip.

Fuselage and Tail Assembly. Select 2 pieces of $\frac{3}{8} \times \frac{1}{2}$ in. ash for motor bearers, and splice on $\frac{1}{2} \times \frac{1}{4}$ in. balsa longerons. Carefully mark and drill motor bearers for engine. Bend undercarriage from 10 S.W.G., taking extra care with width of bend in front of engine. The bends for u/c track and axles are not made at this stage. Make tin clips as in plan, then assemble u/c and clips and mount engine on bearers to ensure clearance of u/c wire around engine, do this with the engine well tightened down on bearers, solder heads of engine bolts to tin clips. Mark and cut $\frac{3}{4}$ in. block to plan outline, and mark positions of engine bearers on same, drill two holes where u/c passes through, and then Durofix engine bearers to the block while drying.



Temporarily pin wing and tailplane in position, and make final bend in push rod for control horn link. Remove pins and then permanently Durofix wing and tailplane in position. When dry, mark out position of fuselage formers and cement in place, also attach fin. Plank top of fuselage with $\frac{1}{4} \times \frac{1}{8}$ in. strips and sand smooth. The lower fuselage block is then carved to the side view outline, and then to a half round section and sanded. Make bends in u/c wire for track and axles. Install dummy pilot and fit cockpit cover.

Cut out cowl former and lightly cement to No. 1 fuselage former. Two pieces of $\frac{3}{8} \times \frac{1}{2}$ in. are then fitted on top of the engine bearers after making clearances for engine lugs and bolts, etc. (engine should be bolted in position). A piece of block is then fitted between the two pieces of $\frac{3}{8} \times \frac{1}{2}$ in. and over the engine crankshaft housing.

The front of the block is then shaped so that when the planking from the block to the cowl former is laid, it just clears the sides of the engine. A sheet top is added after carving away the inside to clear the cylinder head. When dry, carve block and planking to smooth surface and cut air exit holes which should coincide with tank filling tubes. Air inlet is as on plan. Cowl is held on by two wire hooks cemented on each side and rubber band passed under fuselage.

Climbing and Gliding

by K. F. P. RUTTER

THE trouble with most principles of flight textbooks, which the average modeller with an inquisitive turn of mind might be expected to consult from time to time, is that they begin by saying, " when an aircraft is flying straight and level . . . ". Of course, the whole object of contest flying can be stated as avoiding level flight altogether, and if a contest model does fly straight and level there are doleful groans (from the owner) and braying laughter (from his contest opponents) all round.

What we are trying to achieve is a rapid climb for as long as possible, followed by a glide at the minimum sinking speed.

Taking the climb first, the forces on the model can be shown diagrammatically as in Fig. 1. Simple, when you look at it, but there are just a couple of points. Point one is that Lift and T.L. between them balance Weight, and so Lift must be less than Weight. In other words, in a climb there is less lift from the wings than there is in straight and level flight. The balance is made up from Thrust. Fig. 2 shows a high angle of climb, and Fig. 3 a low angle of climb, and from the three diagrams it should be plain that the amount of thrust available, over and above that required to equal drag (D), decides the angle of climb. If the speed for the moment is considered a constant, the thrust will determine the rate of climb.

Point two follows on from this. If you have less lift from the wing in a climb than you have in level flight, you must be either going slower or operating at a lower angle of attack. All free flight aeromodellers trim as near the stall as possible so the models must be flying slower in a climb than they normally would in level flight.

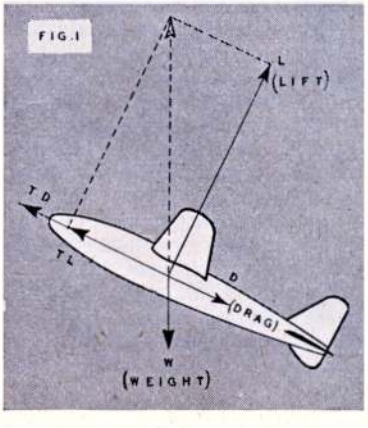
This isn't just " guff ". It is a well known fact in full-size flying that the stalling speed or minimum speed is lower engine-on than it is engine-off. It really amounts to the fact that you're using part of the thrust as lift and so need less from the wing, so the minimum speed is decreased.

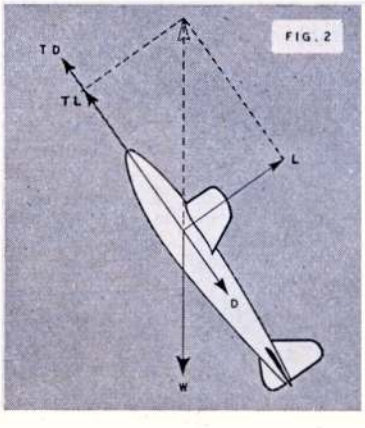
In practice, however, a lot of modern engine-driven models " helicopter " upwards with the wing at practically zero lift. Rubber models have an " initial burst " which accelerates them to a high speed at first. In the latter part of the power run, however, they do appear to be moving slower than on the glide.

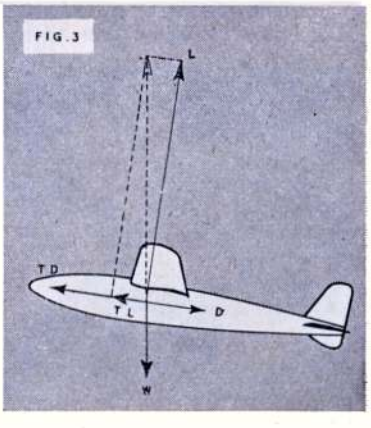
Academically speaking the rate of climb can be calculated by the familiar $\frac{\text{excess H.P.} \times 33000}{\text{W (lbs.)}} =$ rate in ft./sec., which is all very well. The snag is that neither total H.P. nor Drag (lbs.) are known *on a model*.

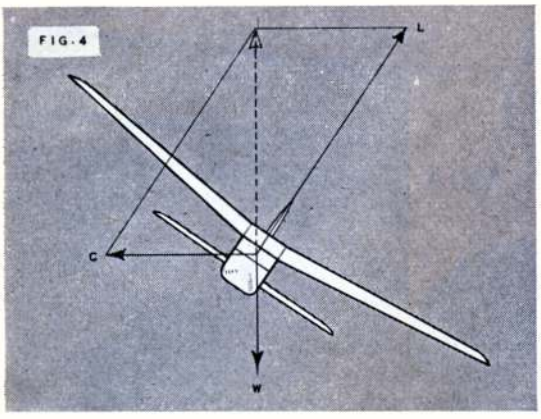
The best angle of attack for climbing is governed by the properties of the airfoil section used, or in particular its Lift and Drag coefficients. These are figures which can be combined with the wing area, the fluid density of the air, and the square of the speed, to give a definite amount of Lift and Drag in pounds or ounces (just try it !). Obviously the wing is most efficient when the Lift coefficient is greatest in proportion to the Drag coefficient—L/D maximum—and one might suppose that this point would be the angle of attack for maximum climb with a given amount of Thrust.

L/D maximum usually occurs at a low angle of attack, however, where both the coefficients are small, and so, although the Drag coefficient here is lowest in relation to the Lift coefficient, the speed









may be quite high. Since Drag varies with the square of the speed, it will in fact be possible to achieve less *Drag* by using a higher *Drag coefficient* and a lower speed.

Without going into it mathematically, partly because the average reader would not understand and partly because the writer wouldn't either, it can be said that the best angle of attack for climb is where $\frac{L^{1.5}}{D}$ is greatest. This expression is called the Power Factor and on models it usually occurs at a high angle of attack, sometimes even just beyond the stall. This is why some models trimmed with a slight stalling undulation do not appear to suffer in duration.

Circling Flight

Most models are trimmed for circling flight, and it might be as well to see what effect this has on the climb. Fig. 4 shows the forces on a model in a turn and it will be evident from this diagram that Lift (L) has to be greater than Weight (W), because it is not acting vertically upwards when the wings are banked. Gravity, of course, always acts vertically downwards whatever the attitude.

Obviously the greater the angle of bank, the greater the Lift force has to be to counteract gravity. To put it another way, it is as if the weight were increased in a turn, and looking at it like that, for a model weighing 8 ounces the effective weight in a 35 degree bank will be $9\frac{3}{4}$ ounces. At 45 degrees it will be $11\frac{1}{2}$ ounces and at 60 degrees of bank the effective weight will be 16 ounces or twice the actual weight.

To sum up then, rate of climb depends on Excess Thrust, which depends in turn upon the total thrust available and the drag. An increase of weight to the airframe will necessitate an increase of either speed or angle of attack, both of which will increase the drag and reduce the Excess Thrust. Turning flight will in effect increase the weight, so that the turn should be kept as wide as possible on the climb, unless it is deliberately intended to increase drag, as in the case of a grossly overpowered engine-driven model.

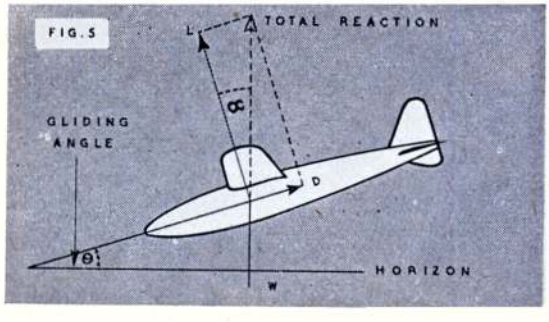
On the Glide

Having reached the maximum height, the model becomes a glider and descends relative to the air until it comes gently to rest in the top of a tree or the middle of a lake or somewhere. On the glide the forces acting on the model are shown in Fig. 5. The total reaction, generated from the wing, is divided for convenience into Lift, vertical to the airflow, and Drag, parallel to the airflow. Angle Q is the gliding angle, and angle α is fixed by the relative sizes of Lift and Drag. The two angles are the same. (If you want proof, see Euclid.) It follows that the flattest gliding angle is where Lift is greatest in proportion to Drag, which brings us back to L/D maximum again.

We are not in a contest for flat gliding, however. What we want is not necessarily the flattest glide but the slowest sinking speed. Although the Drag is lowest in relation to Lift at the angle of attack where L/D is a maximum, neither Lift nor Drag is very high at this point and it is in fact better, as with the climb, to operate at a higher angle where the Power Factor is highest. As has been stated, this point is very near the stall.

The effect of turning on the glide is the same as on the climb in that it increases the effective weight of the model, which makes it require more lift. Since it has already been trimmed near the stall, an increase of lift can only be obtained by increased speed, which increases the drag. This steepens the rate of descent. To summarize, the sinking speed depends primarily on drag, which is a matter of the cleanness of the airframe and its weight. Minimum sinking speed will be achieved at the angle of attack corresponding to $\frac{L^{1.5}}{D}$ which for all practical purposes is as near the stall as you can get.

It might be remarked that the prime conflict between climbing and gliding requirements occurs in Wakefield model design. For a fast, long climb we need a lot of rubber, which increases the weight. Increasing the weight produces a higher sinking speed. It seems likely, however, that with careful construction an increase of weight due to rubber would give rise to more advantage on the climb than disadvantage on the glide, and if that is so, possibly Wakefields will get heavier and heavier in the future.



YOUR MODEL SHOP No. 3

Above, " 308 " : on the left Henry rings up a packet ! Below. " Now I 'ave here . . ." Centre " Let me tell you, sir . . . " Bottom, Shop Manager Bill Morley, centre, and Australian Adrian Bryant—the " walker "—left, in a comparatively quiet Saturday moment.

"FIRE One, Fire Two, Fire Three." These were the commands that emanated from a certain Major Nicholls during the Hitler War, plus a considerable amount of Intelligence work in the later stages. Well, came demob., and there was that gallant major, ready for anything, complete with a B.Sc., and the urge to really do something. We suppose that " Chopper " Phillips, some time L.C.C. instructor in aeromodelling, has a lot to answer for in launching " our Henry " on a professional aeromodelling career at " 308 ". At any rate, there must be literally thousands of aero-modellers all over the world who have reason to bless the day that Henry started his career.

When Henry opened up in Holloway Road, mail order business was just a branch of the aero-modelling trade. He soon had that changed to a really personal service, where his customers from Lands End to John o'Groats considered a London trip ill-spent until they had actually contacted the maestro in his den ! This was a good thing—as 1066 authors and others were wont to say—it brightened up the whole approach to mail order business until virtually every other exponent of this side of the trade must raise their hats to Henry for making it just as live as ever the counter business was.

Let's hark back to the beginning. There was Henry J. roaring to go, with a bomb-blitzed shop at his disposal—which, by the way, he had selected as the hub of the London trade by studying maps of the metropolis in conjunction with known centres of the craft—he was stocked up with as many kits as his war gratuity plus the confidence of a good neighbour would supply. (It was not until later that he commenced that happy association with war-time colleagues Majors Gold and Yates). With his own hands he provided a model shop to be proud of, using oddments of timber, a lot of skill, and heaven knows how many midnight hours. Just recently professional shopfitters have refurbished the exterior, but old friends will always remember the bright spot of a blitzed area that was Henry's offering to the movement.

Well, the years have passed, and Henry J. is a name to conjure with in the forests of Malaya or the runways of Fairlop. Our pictures show famous " 308 " in the midst of the usual Saturday afternoon assault. Those unfortunates who have never met the maestro must start saving the odd halfpennies for a trip to London—life isn't complete without a Henry in it . . . and there we can happily call on London's traffic to start again, and ring down the curtain on . . . shall we say, " The 'Tache ".

Build this all-sheet power model for ·3 to ·5 c.c. motors direct from full-size parts and dimensions given overleaf

KALPIE

BY J. T. ROBSON

Chairman, Sunderland & D.M.A.C. . . . Age 37 . . . Married . . Started modelling in '27 . . . Qualified Glider and Power Pilot . . . Flying instructor O.C. 38 G.S. Usworth . . . builds all types of model aircraft, all own design.

SIMPLICITY is a keynote in aeromodelling today, and when we are able to present plans for a power model that can be built by the rawest beginner in a few evenings, at a cost of not much more than five shillings for materials, then we can really say we have the simplest of models. Moreover, this little all-sheet " boxcar " has no trimming vices, for the elementary reason that it needs no trimming ! Just start up the motor and let the model go !

Ugly ? Well, we concede that point, for though it's no good-looker, Kalpie is a tough, practical model that any Kalper owner will find as docile as he could wish. Not that this model is limited to the one type of power plant, for any fortunate owner of the tiny American half-A motors could make it into a Torpie, or perhaps a Cubbie—whilst ·2 c.c. Kemp operators might even create a Kempie. We know, from the number of requests for Messrs. Seymour Hylda's Southwick, Sussex address, after publishing Ray Booth's Kalper powered S.E.5a, that supplies of the hand-made Kalper are struggling to keep up with demand.

For the ·5 c.c. fan, and now that there are several manufacturers working on this capacity, we can expect large numbers of ·5 motors to be available shortly, the designer has a few simple recommendations to take care of the increased power.

" Increase all sizes by $\times \frac{6}{5}$ and do not drill the engine bearers until the engine is placed in the approximate position and slid along the mounts, so that the centre of gravity comes out between one-third and two-fifths of the chord behind the leading edge."

Dimensions for the six-fifth's version are bracketed on the general arrangement drawing, making no extra work at all for the ·5 c.c. owner, who merely has to transfer the measurements shown, on to sheet balsa. The same instructions go for Kalper/Kalpie builders; just study the dimensions indicated on the general arrangement, measure out the same figures directly on the sheet balsa, and you'll need no more of a plan than that. Lack of curves and the fact that everyone of Kalpie's lines are straight, will make light work of this elementary drawing job.

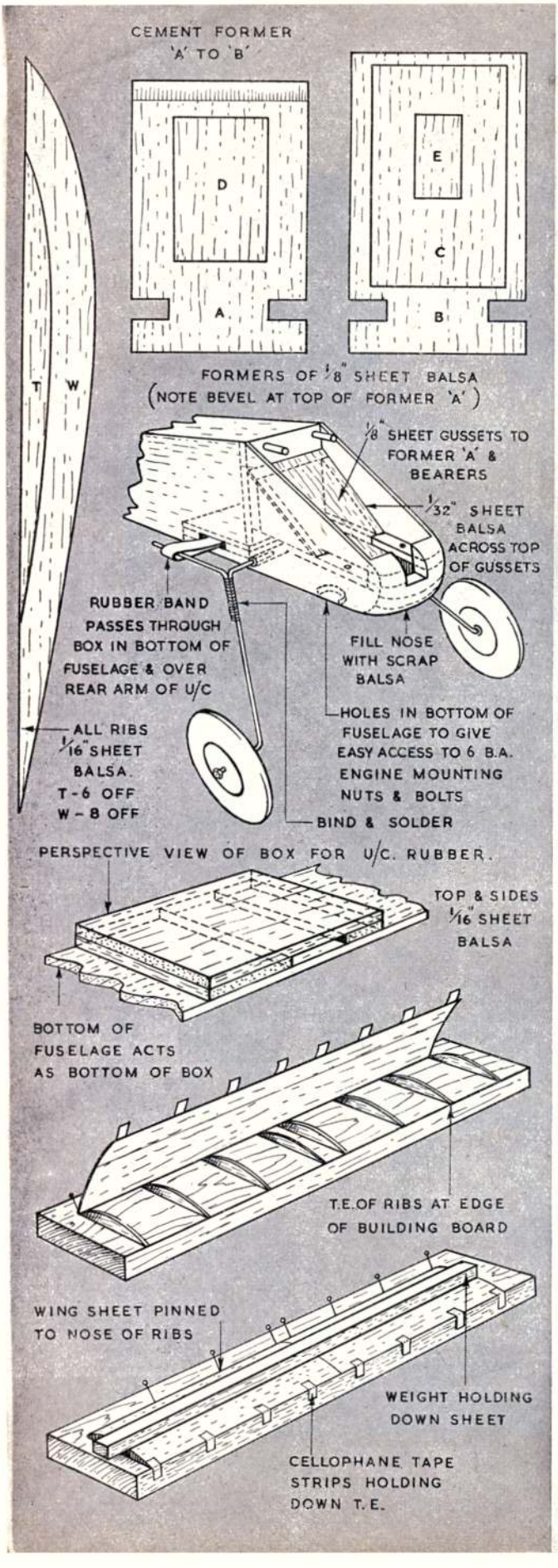
Full-size ribs and bulkheads are given on the drawing overleaf.

PERFORMANCE

Many an incredulous eyebrow will be raised when we claim that this all-sheet model has made several fly-aways and was only just beaten to first place in the Sunderland & District power contest last June by an Elfin 1·8 powered " Sugar Foot ". For despite the single surface wing, this little model can still maintain a performance to match orthodox and more complicated designs. Under full power, Kalpie climbs in steep right-hand circles ; but never spins in.

One reason given by the designer for this exceptional spiral stability, is his theory that the underhanging ribs beneath the wing act as " fences ", rather in the manner of latest jet aircraft design. They give a little extra side area, and do most certainly straighten the airflow, so there is much to support this idea for the single surface wing.

The glide is of the " hanging/floating " type. For example, test hand launches made alongside a standard Sunnanvind, flown by a fellow club member, showed that the Kalpie was well able to hold its own against the specialised well-known Scandinavian sailplane. Further points in favour of Kalpie are the very short building time and the virtually " crash-proof " structure which guarantees a long flying life.



CONSTRUCTION

Fuselage. Mark and cut out two fuselage sides of 1/16 in. sheet balsa and mark the positions of formers and engine bearers. Cut formers of $\frac{1}{8}$ in. sheet balsa and cement in position (note the fuselage sides project 1/16 in. above and below the formers). Cement engine bearers to inside of fuselage sides and through the slots in former AB. Add $\frac{1}{8}$ in. sheet gussets to bearers, former A, and fuselage sides. Cement gussets of $\frac{1}{8}$ in. sheet to sides and formers at dowel positions. Cement scrap $\frac{1}{8}$ in. sheet behind top of former B to take front dowels and add $\frac{1}{8}$ in. scrap filling at rear of fuselage for rear peg.

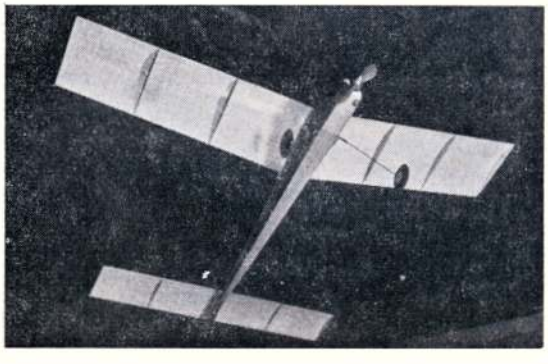
Cement brass tube at bottom of rear side of former B and reinforce with scrap $\frac{1}{8}$ in. sheet, ends of tube project through the fuselage sides. Make 1/16 in. sheet "box" for undercarriage rubber bands and cement across bottom of fuselage behind undercarriage tubing. Cut slots in fuselage sides to allow rubber bands to pass through the box. Cut top and bottom sides of fuselage from 1/16 in. sheet and cement to formers and flush with top of fuselage sides. Mount the engine temporarily in place and fill in lower nose around the engine with $\frac{1}{8}$ in. scrap sheet. Sand the nose to shape. Leave small hole in bottom of fuselage under engine mounting bolts for the maintenance. Cement 1/32 in. sloping sheet across top of engine bearer gussets. Insert wing and tail dowels, and rear peg. Make underfin from 1/16 in. sheet, add 20 s.w.g. wire skid and cement to the bottom of fuselage.

Undercarriage. Legs have independent springing. The legs and rear arms of 18 s.w.g. wire, are bound and soldered. A 10 BA nut is soldered onto the axle to retain wheel.

Wing and Tailplane

Stage 1. Draw plan on building board with T.E. at edge of board. Hold ribs upright in position with spot of cement. Cement and pin the L.E. of wing sheet to nose of ribs.

Stage 2. Smear cement over the top of ribs. Bend the wing sheet over ribs. Place weight along top and hold down T.E. to board with strips of cellophane tape.



Stage 3. When cement is dry, dope top of the wing. Sand lightly when dry. Slide a long thin knife blade underneath the ribs to remove the wing from board. Dope under-surface of wing sheet. Sand when dry.

Stage 4. Cut through wing sheet at centre line. Support the wing tips at required 3 in. dihedral. Sand centre edges to fit and cement wings together at centre line. When dry, fit 1/16 in. sheet between bottom of centre ribs.

Tailplane. This is made as above. (No dihedral.)

Fin. This is cemented directly on to centre line of the tailplane.

The whole model is given two coats of clear dope. Sand lightly after each coat. Then give a final coat of fuel-proof varnish.

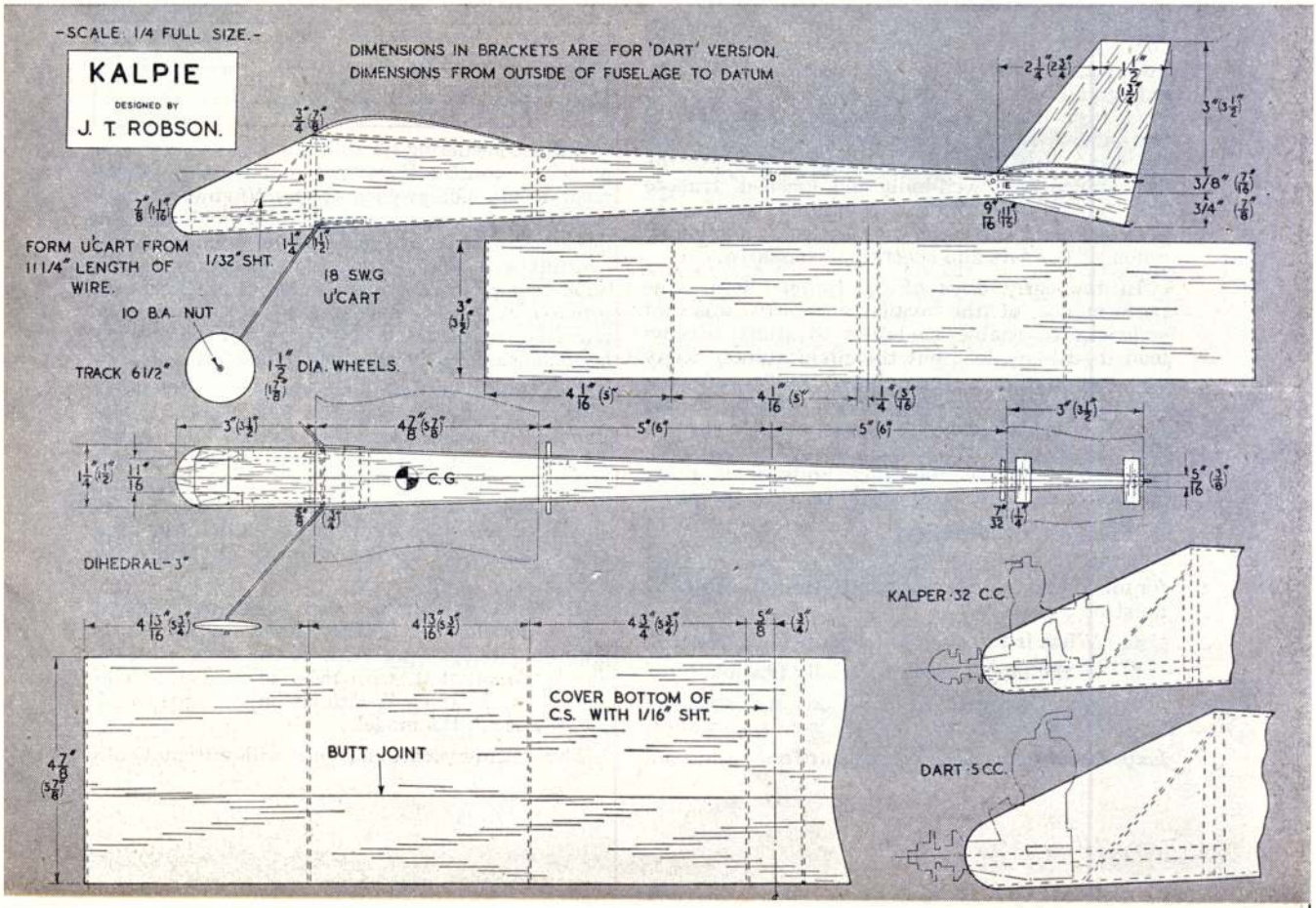
Building Materials

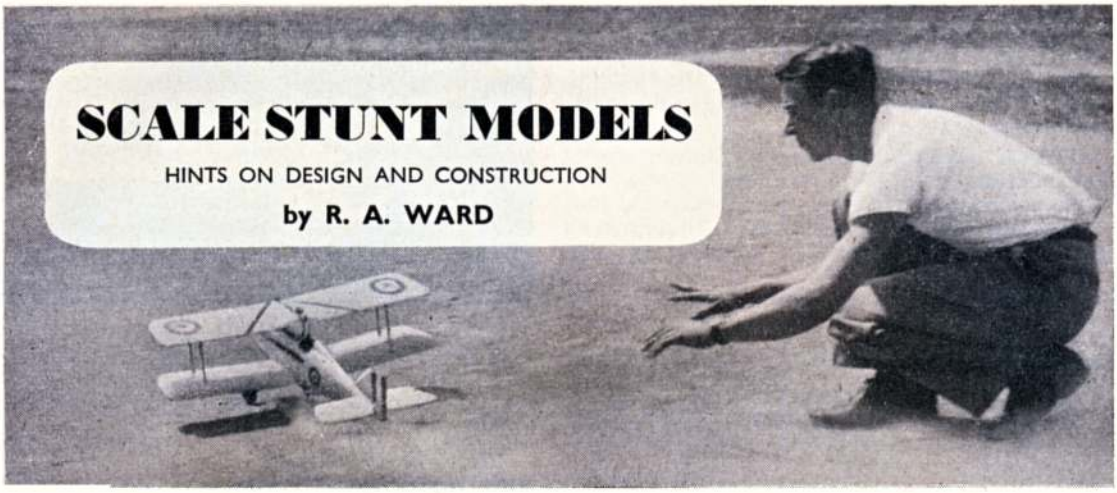
4 sheets of balsa, 36 × 3 × 1/16 in.
12 × 3 × 1/8 in. balsa.
3 × 3 × 1/32 in. balsa.
4 in. of 1/8 in. dowel.
7 × 1/4 × 1/8 in. hardwood.
1/2 × 1/16 in. diameter bamboo.
18 in. piano wire, 18 s.w.g.
1 in. piano wire, 20 s.w.g.
1 1/4 in. brass tube, 18 s.w.g. inside diameter.
1 pr. 1 1/2 in. diameter wheels.

2 10 BA nuts, 2 6 BA nuts and bolts, binding wire, solder, rubber bands, pins, cement, dope, fuel-proof varnish, cellophane-tape, ·32 c.c. Kalper, 6 × 4 in. airscrew.

Trimming and Flying

No special trimming necessary for stable flight. The model should balance with C.G. line approximately as marked. Check alignment of surfaces and test glide. Correct any tendency to stall with small packing under the L.E. of tailplane. If the glide is too steep, put thin packing under T.E. of the tailplane. If turn is required, swivel the tailplane *very* slightly on mounting, to allow fin to act as a rudder.





SCALE STUNT MODELS

HINTS ON DESIGN AND CONSTRUCTION

by R. A. WARD

CONTROL-LINE building and flying has, for some time, appeared to be losing its appeal to aeromodellers. The limitations imposed by its very nature have restricted this phase of the modelling game until its attractions now seem to be on the decline. However, scale control-line modelling always has and always will have a firm attraction for builders and, what is equally important, for spectators. Onlookers very quickly tire of watching pint-sized projectiles hurtle around a circle at very un-scale velocities during a speed contest, and interest is only maintained by the not infrequent mishaps. Stunt contests are more enlivening, but the limit of manœuvres appears to have been reached and the unreal appearance of the models is very unsatisfying to the exacting builder. Interest usually reawakens at the appearance of a well-built and finished, true to scale model, and if this appearance is allied to performance and manœuvrability, popularity amongst builders and spectators is assured.

In the early days of control-line flying, the performance of the available motors was not sufficient to enable modellers to stunt heavily-loaded scale models, but the circumstances today are very different, there being really high performance motors available in all classes. A fair degree of modelling ability is necessary to successfully accomplish the design and building of scale stunters, and the following hints may prove helpful to modellers desirous of tackling the job.

Selection of Design

When deciding which 'planes are most suitable for modelling as scale stunters, the following queries must be considered :—

1. What is the size of the engine available ?
2. Is the model constructionally possible ?
3. Are wing areas and tailplane area sufficient without departing too far from true scale ?

Experience shows that biplanes are not so suitable for the lower-powered motors due to the heavier weight of construction compared to a monoplane of similar wing area. Thus, if using small motors (under 3·5 c.c.) it is advisable to model monoplanes. The following table will serve as a rough guide to wing areas and weights for the various engine sizes.

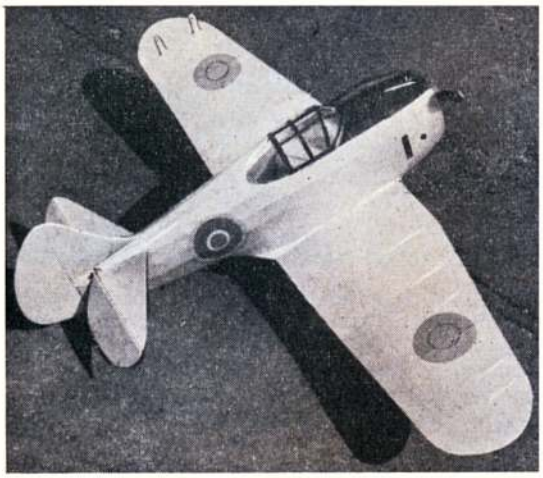
Engine (Diesel)	*Wing Area*	*Weight*	*Type*
1·5–2·5 c.c.	150–190 sq. ins.	10 ozs.	Monoplane
2·5–3·5 c.c.	190–230 sq. ins.	16 ozs.	Monoplane
3·5–5·0 c.c.	230–270 sq. ins.	24 ozs.	Mono or Biplane
5·0 c.c. and up	270–350 sq. ins.	34 ozs.	Mono or Biplane

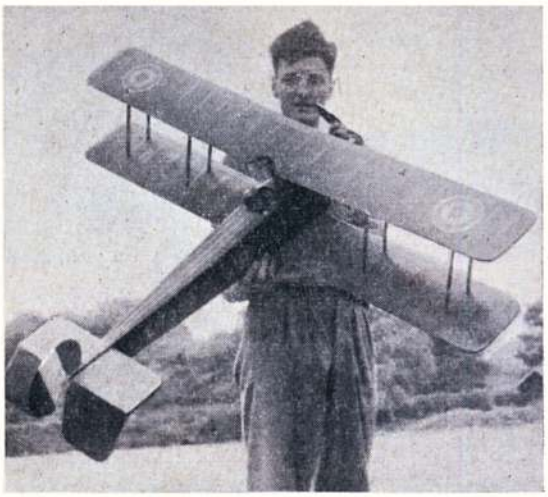
When considering the question as to whether the model is constructionally practical, the builder must decide such problems as :—Whether the nose is long enough to house the motor ; whether the fuselage is bulky enough to accommodate the controls and tanks, etc. ; whether the elevator hook-up is feasible (planes like the Barracuda prove awkward) ; in the case of biplanes and parasol monoplanes, whether the wing fixing can be made sufficiently robust for control-line flying.

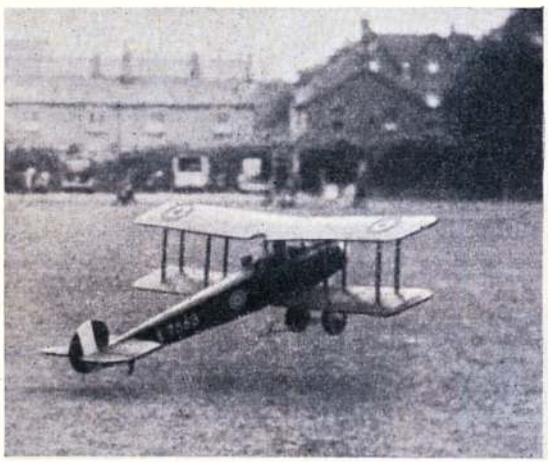
The third consideration of wing and tail areas, rules out such planes as the G.B. Sportster, the Percival Mew-Gull, Caudron Racer, T.K. 4, etc. In other words, heavily-loaded planes will not make successful scale stunters. Their wing area is so small that a large scale would have to be employed to obtain the requisite model wing area, thus making the fuselage inordinately bulky and heavy.

The total tail area, about 35–40 per cent. of which should be elevator area, ought to be approximately 25 per cent. of the wing area. It will be found that, with most planes, these conditions can be fulfilled without impairing the scale appearance of the model.

These three considerations will automatically







Heading photo, opposite, shows Cpl. Hodel releasing T/Sgt Bluemel's S.E.5a at the recent BAFO Vs USAF meeting. Model is from an American "Sterling" kit. Above: Chas. Taylor's contest winning Wackett Boomerang, (Amco 3·5) now in APS, and capable of all stunt manœuvres. The AVRO 504k at right is one of the largest scale-stunters we have seen. With a 10 c.c. Anderson Spitfire it can really "turn itself inside-out" on the end of 75 ft. lines. Roger Reffells of Guildford is the designer.

decide the scale to which the builder must work. Accurate three-view drawings are plentiful, there are over 530 1/72 scale, 450 1/48 scale and 109 1/36 scale drawings in the APS range. Photographs, if obtainable, will also help the more painstaking modellers and can usually be obtained through the manufacturer's publicity department or the photographic departments of *Aeroplane* or *Flight*.

Design and Construction

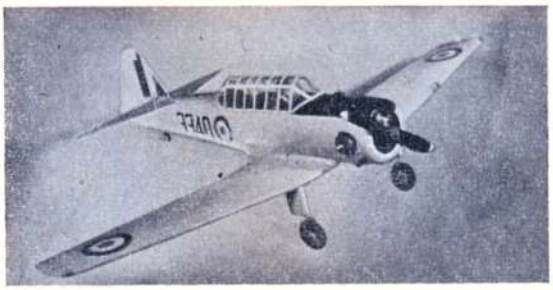
After deciding the scale of the model, the first step is to enlarge the three-view drawings to the size required. Then comes the method of construction. By far the simplest and most effective is the crutch and bulkhead system, allied to sheet balsa planking. Bulkheads are positioned according to undercarriage and wing fixings, taking into account the position of the cockpits. The foremost bulkheads are positioned for the fixing of the undercarriage and centre-section struts. The remaining formers are spaced along the crutch to give adequate support and shape to the planking of the fuselage.

The crutch, which should be approximately half way down the fuselage depth, can be made from $\frac{1}{2} \times \frac{1}{8}$ in. hard balsa. The bulkheads holding the engine bearers, struts, undercarriage, etc., should be of $\frac{1}{8}$ in. thick plywood and the remaining formers of $\frac{1}{8}$ in. thick medium balsa sheet.

Tailplane and fin are cut from $\frac{1}{8}$ in. or 3/16 in. medium sheet, the thickness again varying according to the size of the tail unit; the crutch will form a rigid platform for mounting on to the fuselage. Don't forget to put offset on the rudder.

Control-line models are relatively nose-heavy and experience shows that the theoretical centre of gravity of the original aircraft is the ideal point on which to pivot the control plate. The theoretical centre of gravity can be taken to be a point approximately $\frac{1}{3}$ of the mean wing chord behind the leading edge of the wing, and in the case of a biplane, the centre of gravity is a point midway between the $\frac{1}{3}$ mean chord position of upper and lower wings. Usually the rear plywood bulkhead forms a firm anchorage for the control plate; but if not in a suitable position a hardwood or plywood plate firmly cemented between the crutch members serves the same purpose. While on the subject of the controls, always lead the control lines out through the wing wherever possible. With biplanes and high-wing monoplanes this is not usually constructionally possible, and in these instances tip guides have to be employed; remember to make them as unobtrusive as possible. Thin wire or plastic tube guides bound and cemented to the struts are most suitable.

12 swg. or 10 swg. piano wire is used for the



construction of Vee type or single leg undercarriages; bent to shape they are bound and cemented with linen thread or bolted to the plywood bulkheads to form a most rigid landing gear. Bind all joints with fuse wire before soldering. Copper or aluminium tubing slipped over the undercarriage struts and flattened to a streamline section prevents a fragile, spindly appearance. Larger fairings are made from sheet balsa or block and cemented around the undercarriage legs. Tail wheel forks and skids are formed from piano wire and bound and cemented to a hardwood sternpost. Accommodate the fuel tank between the two plywood formers, so that the fuel outlet is level with the needle jet on the motor.

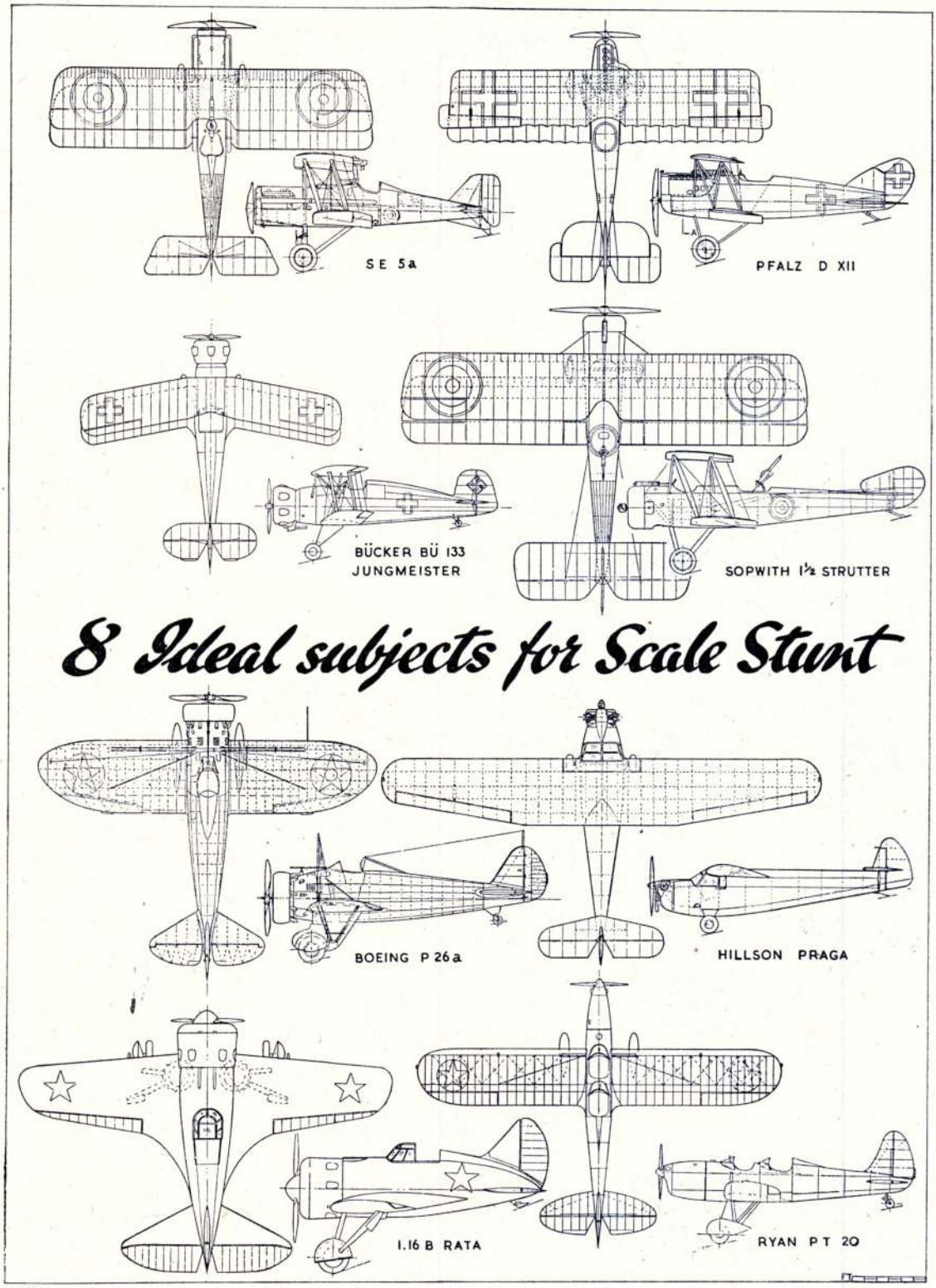
Wings do not present any problems, and are built on the orthodox spar and sheet rib system, using tissue or balsa sheet covering according to the appearance of the original. A departure from true scale must be taken to give the wings a symmetrical section for better stunting. Plywood stiffeners are used to strengthen the spars where dihedral occurs, and the spars themselves are positioned so that they can be cemented directly on to the face of one of the fuselage formers to give a strong rigid fixing. Medium sheet balsa 1/16 in. thick is suitable for wing ribs and these should be sufficiently closely spaced to simulate a scale appearance. This does not apply to models employing a sheeted wing. For strut fixing the ribs are duplicated where the struts occur, the ends of the latter being cemented between the paired ribs, using blocks of scrap balsa for further strength. To facilitate tissue covering, the ribs immediately next to the fuselage and to the struts are best capped. Struts are made from bamboo, or a balsa and 1 m.m. plywood sandwich, sanded to a streamline shape. The lower ends of the centre section struts are cemented into balsa blocks fixed to the faces of the bulkheads.

Top left: Spitfire XIV by J. R. Bishop of Wirral has a drop-off u/c and weighs only 10 ounces for its Elfin 1·8. At right, is the author's N. A. Yale (Forster 29) also with a side-mounted motor. Below: One of the regular demonstrators at the Festival site, was Pete Holland, with his Elfin 1·8 powered Tiger Moth.

Covering and Finish

Modelspan has been found to be the best covering material, both for the wings and for improving the finish of the sheeted fuselage. It is well worth while spending a little time and effort on the finish of the model for the appearance will carry a lot of marks in a properly organised scale-stunt contest. Ensure that colour schemes and letters are accurately copied. To be correct, models of fabric-covered originals should not have a glossy finish, but unfortunately, if a glow-plug motor is used, fuel proofing imparts an unwanted glossy finish. However, this is only a minor point and cannot be helped. "Scotch Boy" or "Sellotape" is a handy medium for producing neat trimming lines or stencilling civil registration letters, racing numbers, etc.

After ensuring that the controls are free and easy, and that the lines are sufficiently strong, choose a smooth take off and landing area. Wait until the engine is running smoothly, and then let her go. Remember that it is a scale model and not an out-and-out stunter, so its "pull-outs", dive recovery, etc., will be more sluggish. Also, it is not a well-tried kit model, so be content with circuits only for the first few flights. A wing-over will show the capabilities of the model. If it goes sweetly and smoothly, directly overhead, with plenty of flying speed and tension on the lines, it will carry on and do all the stunts you can reasonably expect from a scale stunter. Contests for this type of model are becoming more popular and numerous, but even if one is not a competition builder, a well-built and designed, accurate, true scale model will repay the hours spent on design and construction.



1/72nd scale reproductions of each of these aircraft are obtainable price 2d. each, plus 1½d. postage, from the Aeromodeller Plans Service.

Heading shows Cpl. K. L. Leland starting the Forster 29 in his radio controlled Piper Cub. His own-designed equipment uses a 3A5 valve in the receiver. Top left: "Gadget" Gibbs of E. London with his 126 m.p.h. speed model. Above: Pfc. R. W. Cole's 'Jezebel' team racer, minus cowl and engine. Left: Capt. H.E. Walker starts the Forster in his "Fling" speed entry. Bottom left: Korean fur-capped Captain Marvin Glasgow, skipper of the U.S.A.F. party, with his Chief. Below: Lt. O. Tromberg brought a neat little Dart powered free flighter.

U.S.A.F. at

WHEN two Dakota loads of 12th U.S.A.F aeromodellers touched down at Bovingdon and Manston, after icy flights from their bases in Germany on December 15th, they gave the British aeromodeller his first chance to study his counterpart in action.

For there were no international aces among the American contingent that came to fly as a twelve-man team (plus spectators) to fly against the London Area of the S.M.A.E.; this was a representative cross-section of the American aeromodelling movement, the plain "you and me" aeromodellers. And a more genial, co-operative and friendly crowd just could not be possible.

For some time, the "Wings and Wheels" and other modelling groups among American forces in occupied Germany, have turned to Britain for some of their supplies, particularly diesel engines and radio equipment. Through the contacts they gained in the trade, a firm friendship grew between a few British modellers and the American service men. One consequence was the visit our own Harry Hundleby and the ubiquitous Henry J. (who has done most towards cementing this Anglo-American friendship), to the base at Weisbaden.

Then followed another visit by Henry J., this time to the base at Neubiberg, and soon after, first negotiations were made for a challenge match between London and the 12th U.S.A.F. A team of twelve, covering speed, stunt, radio, free-flight power and team racing was to be selected by each country, and the site to be London's now enclosed Fairlop.

Though London arrangements were well in hand right up to the last moment, the arrival of the second part of the American contingent, thanks to a December freeze, was a doubtful factor; but though delayed on their E.T.A., and after much heart-burning on the part of the welcoming committee, the Dakota came to Hertfordshire in plenty of time for the planned supper party and entent cordiale (with more beer and spirits than cordials !) on the Saturday.

Nine-thirty was the time for the start on dim but dry Sunday, December 16th; but in its manœuvres to avoid the clay ridges which now decorate the perimeter track and runways to the chagrin of budding racing motor-cyclists, the coach and party reached a dead halt in the Fairlop mire. The situation was left in the hands of the driver whilst the visitors carried their many models across the field to where the Stars and Stripes fluttered alongside a Union Jack.

Soon, a few square yards were covered by a miscellany of typically bright colour doped American models ranging from a large box-car radio job to Captain Marvin Glasgow's five tier box of magnesium bottomed speed models. Suitcases

FAIRLOP

were opened to dazzle the British onlookers with handfuls of spare props., many of them British made, and a lot of them attached to spare engines. Cans of Dyna-Glow, O. & R., and Super-Nitromic fuels, plus a good quota of Mercury 7, began to empty into the dozens of Glow-plug motors by a means unusual to British eyes. Using a rubber syringe, tanks on speed models were filled before the models were assembled, the vents were then joined by a piece of tubing, and the model fitted together. A tiny hole in the top of the tank allows breathing. Few of the models had vents for outside filling, even the team race entry was missing this feature!

Among the models, many of them with engines detached, were numerous popular American kit designs, the Pitts Special "Little Stinker" scale stunter, the Sterling S.E.5a, Hell-Razors, the Squaw and Chief by Veco, and supplemented by designs published in our American contemporary, *Air Trails*; the San de Hogan, Mac's Robot, Jezebel, Fling, and that novel flying semi-saucer with double articulated elevators which appeared as the *Air Trails* Air-Model design for stunt. Only British kits were the Jr. Mallard and Mercury Mk. 1.

If it could be said that 90 per cent. of the models were kit or published designs, the other 10 per cent. were mostly stunters, with one unusual large speed model and a baby free-flighter. And whilst on facts and figures, the most popular engine by numbers was the Forster 29, followed by the Fox 35, the new K. & B. 29 and 19, Dooling 61 and 29, McCoy 29, and 49, E.D. 2·46 and 3·46, roughly in that order, with singular examples of the O.K. Cub, Frog 500, Atwood, Hornet 19, and Ohlsson motors making up a huge total.

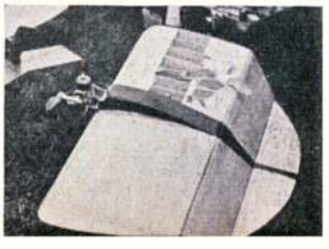
For radio control, the visitors brought a selection of models ranging from a scale Fokker D.7 to an E.D. 2·46 powered Mac's Robot. The equipment, we are informed by British competitors Sid Allen and Sid Sutherland, was definitely top-grade, though spoiled with bulky actuators. A favourite circuit is the popular British Ivy receiver.

One of the first to fly R/C was Cpl. D. Baldwin, who unfortunately ran out of range, the model disappearing into the murk with the owner hot on the chase in John Appi's car. Sometime later the party returned rather mud-spattered, though successful in the chase which finished over five miles from the field. Having done his good deed, John Appi then settled down for a spot of his own radio control: but imagine his thoughts, when he, of all people, should leave the tailplane back in the workshop! However, he could at least act as spectator for a change and witness a series of very nice flights by the two Sids, Eddie Keil, and Bill Tickner, while Cpl. Baldwin re-checked his

Continued on page 122

Above, a view of the model park which certainly presented a diversity of transatlantic desig n. In the foreground are several well known West Essex control line models, with a "Little Stinker" and an S.E.5.a. in the background.

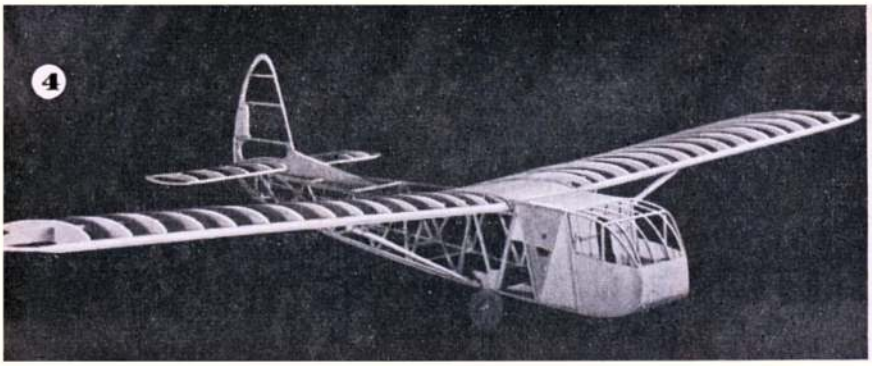
Above: Bill Tucker, the W.E.A. permanent retriever, brings back S/Sgt. W. J. Prahl's San de Hogan. Right: Capt's Glasgow and Hauser with McCoy 60 model. Next: Capt. Walker moves for the handle while the Sgt. hangs on. Below: Cpl. Don Baldwin consults a teammate, his Mac's Robot is in foreground. Next: The articulated elevators on this American desigr were not, unfortu ately, demonstrat...

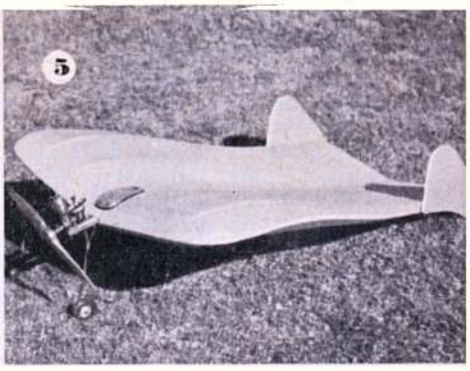


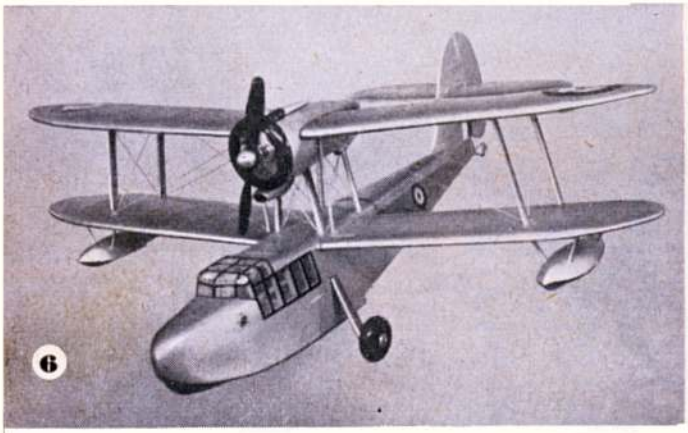
GREETINGS aeromods! And let's hope that you are having as sparkling a time as Fliar Phil did when he conducted the club outing to London's Fairlop flying field. Take a look at our tame artist Malmstrom's masterpiece, and you'll see the electrifying results friend Phil extracted from the Central railway line. A live(ly) time was had by all, when the noble assistant hooked up the third rail with the glowplug. There was amp(le) current to be had—enough to make the whole motor glow!!! For sale:—One de-hydrated Toad 005, very hot; at a reduced price to match new size!

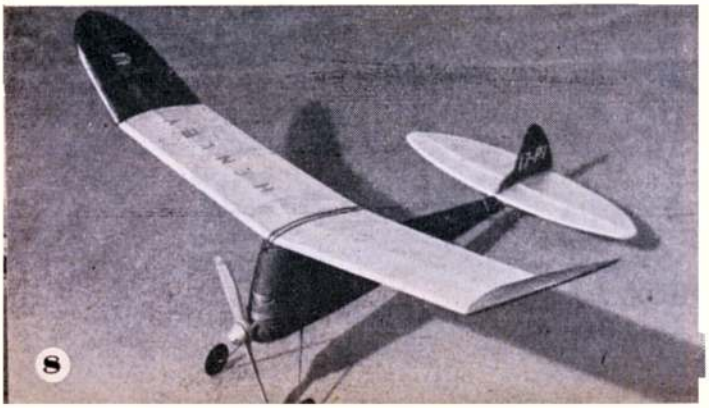
Models of the month come in the plural this time, for the neatly made Wakefield in picture (1), is the work of the attractive young lady seen holding the model. That's Daphne Knight, of the famous flying Knight family in Kentish Nomads. Daphne scored highest points in the '51 Farrow shield, and with brother John, and Pop, plus clubmate Ray Parker, carried off the S.M.A.E.'s largest trophy at the recent prizegiving.

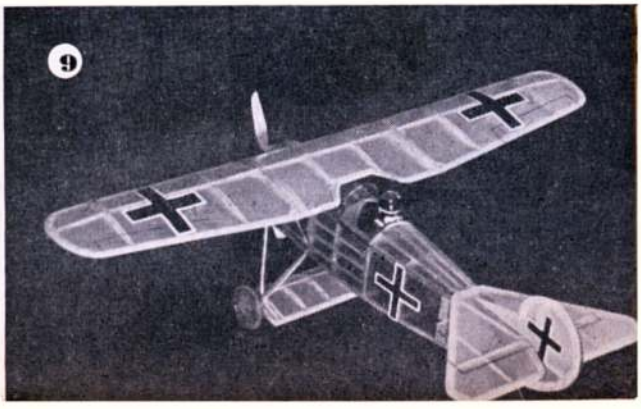
Tailless is no longer a novelty: but Scale Ptero's are very rare birds. J. Coatsworth was caught by the camera on Epsom Downs with his Kalper powered 26 in. all-sheet version of the Westland Pterodactyl (2). It flies with perfect stability. Another good flier is number 3, a contest winning Minibuster belonging to Grimsby's Ron Goddard. Finished blue and yellow, this Elfin 2·49 racer has already won three big races in the East Midlands, including the "Yorkshire Evening News" Festival team event, so we should see more of Mr. Goddard this new year.











MODEL OF THE MONTH

MODEL NEWS

Picture number 4, over on the left-hand page, is of an unusual type of scale job ; a scale glider. Built from A.P.S. plans, this 50 in. version of the Waco Hadrian troop carrier comes from K. N. Crook of Bickerstaffe in Lancs. The photograph was taken by his friend, A. E. Ansfield, and is a most creditable effort at indoor photography.

Another A.P.S. design inspired the next view (5), which R. W. Brown of Thatcham, Berks., made for Jetex power. A " Floating Kidney ", with no less than 427 sq. ins. area, the flying soup-plate had a battery of Jetex units, including two 50's and a 200 ; but has since been modified to take a Mills ·75 c.c. diesel.

Also using the Mills ·75 as a power unit, is a very different kind of model, by J. Bridgewood of Doncaster, who has chosen the Sea Otter as a subject for scale free-flight, (6). This amphibious, exact scale model is built to the scale of $\frac{3}{8}$ in. to 1 ft., which makes the wing span 30·6 ins.

Across to the West Country for number 7, which is none other than Bristolian A. V. Coles' British record holding Class II speed model. Winner at the Festival Championships, the Nationals and the Pt. Talbot meeting, Mr. Coles and his model have really been going places in the 2·5 c.c. class. Their latest official record stands at 99·4 m.p.h. ; but on several tests, the 100 has been broken. Span is $11\frac{1}{2}$ ins., length 12 ins., and weight $9\frac{1}{2}$ ozs. Number 8 is another Zipper—this time one of the Skyleada ilk, and called the Junior Zipper. Modified by builder A. W. M. Cooke of Henley, to have a tip-up tail and fully hinged cowling, the job is fitted with an E.D. Bee diesel and coloured royal blue and yellow.

And so to the last, and the smallest of this month's exhibits, but by no means the least attractive or well made. Number 9 is the work of Leonids Selga, a Latvian modeller, now with the Coventry club—the model being a Fokker D.VII made from a standard KeilKraft 3/8 kit. Leonids arrived in this country in '47 and has been following the AEROMODELLER since the day he set foot on Blighty ; here's offering a big welcome to him from F. P. on behalf of all British aeromods, and to all other immigrant aeromods who have chosen to settle in these isles.

Make 1952 KEILKRAFT

4 REASONS WHY MORE MODELLERS THAN EVER BOUGHT KEILKRAFT IN 1951

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F/F POWER

32" Slicker Mite 11/7
42" Slicker ... 21/5
50" Slicker 50 ... 30/6
60" Super Slicker 42/9

8 foot span FALCON 131/5

41" Ladybird ... 22/8

32" Southener Mite 12/10

52" Outlaw ... 27/6

CONTROLINERS

24" Ranger "A" T/R... 12/10

40" Stunt Queen ... 25/8

20" Scout Biplane ... 27/6

26" Skystreak (Stunt) 11/6

Send stamped addressed envelope for our new ILLUSTRATED FOLDER

NEW! Pacer Class B TEAM RACER

Wingspan - - 30 ins.
Wing Area 126 sq. ins.
Length - - - - 20 ins.
Weight - - - - 16 ozs.

Model builders everywhere have long since acclaimed the RANGER as the top commercial design for class "A" team racing. Its simple construction, easy handling characteristics and "real-aircraft" appearance have made it famous in team race circles and repeated requests have been reaching us for a class "B" design of the same high calibre. The PACER is the answer to these requests—a rugged, easy-to-build "B" size racer that HAS BEEN DESIGNED TO TAKE the Amco 3·5., ETA 29, E.D. 3·46, D.C. 350, Frog 500—and the "big" class "A" E.D. 2·46 and Elfin 2.49 motors. Main recognition features of this distinctive model are the straight tapered flying surfaces, radial type cowl and bubble canopy

GLIDERS

30" Cadet 4/11

36" Soarer Baby ... 6/1

50" Minimoa ... 8/7

40" Invader .. 7/11

64" Chief A-2 ... 22/8

F/F RUBBER POWERED

16" Elf 3/8

23" Pixie 4/11

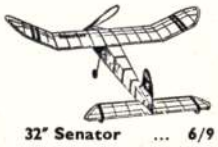
20" Playboy ... 4/-

30" Ace 6/1

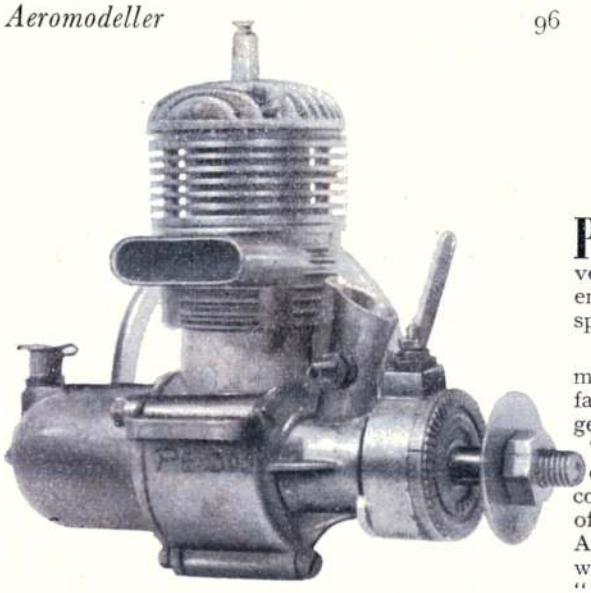
30" Ajax 7/4

24" Achilles .. 4/11

23" Orion ... 4/3



32" Senator ... 6/9



The FROG "500"

SPARK IGNITION

ENGINE

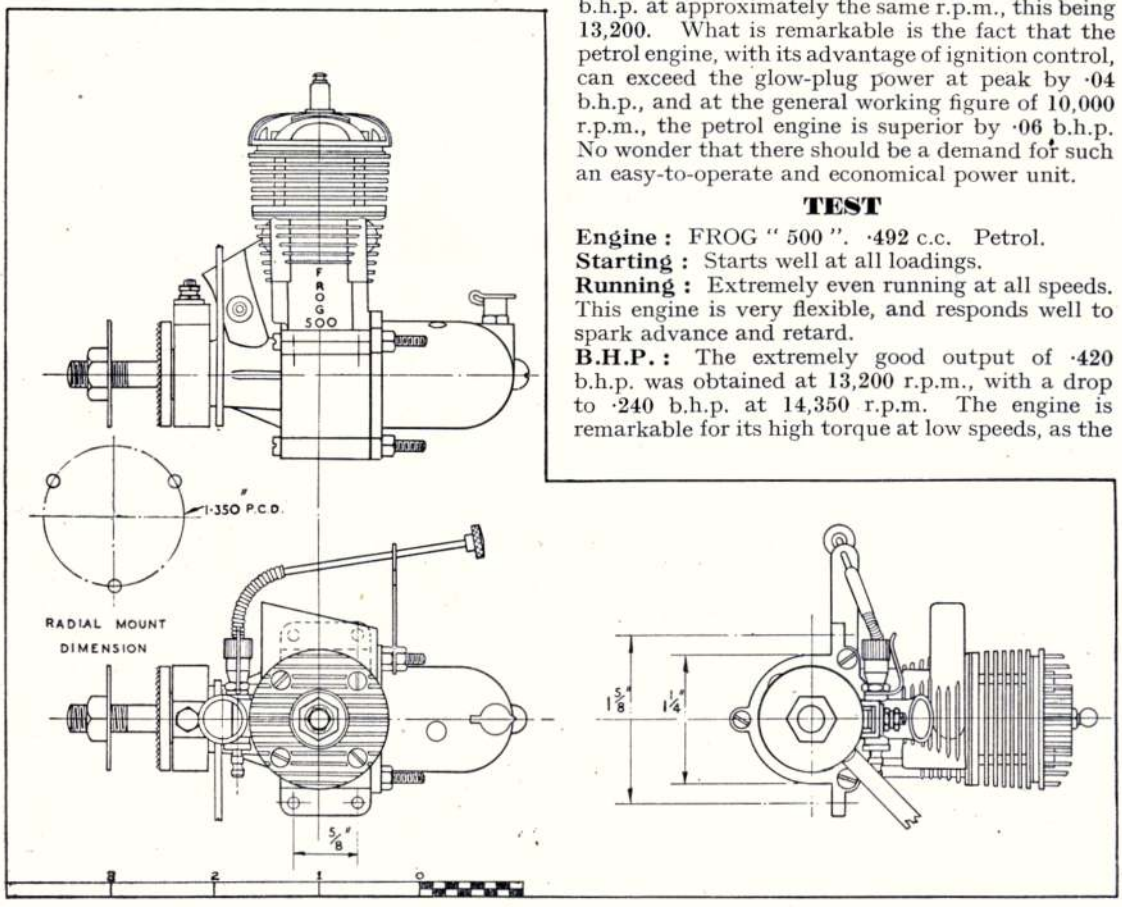
PRODUCED to meet the demands of the many diehard petrol/ignition engine fans, the converted Frog 500 is probably the only production engine to make the unusual change from glow to spark.

The petrol version has been available for several months and has already established itself as a favourite for radio control and sport free-flight. Its general construction remains unchanged from the "Red Glow" version, the modification consisting of machining the crankshaft bearing to take the contact breaker, which, incidentally, employs all of the best fool proof features hitherto seen on American products only. Insulated with fibre washers, and located in a fibre lined square, the "fixed" point in the "make and break" may be adjusted with ease, and without any need for dismantling the assembly—a feature which is noticeably lacking in other petrol engines.

With identical porting, it is not suprising that both Glow and Spark ignition 500's reach peak b.h.p. at approximately the same r.p.m., this being 13,200. What is remarkable is the fact that the petrol engine, with its advantage of ignition control, can exceed the glow-plug power at peak by ·04 b.h.p., and at the general working figure of 10,000 r.p.m., the petrol engine is superior by ·06 b.h.p. No wonder that there should be a demand for such an easy-to-operate and economical power unit.

TEST

Engine : FROG " 500 ". ·492 c.c. Petrol.
Starting : Starts well at all loadings.
Running : Extremely even running at all speeds. This engine is very flexible, and responds well to spark advance and retard.
B.H.P. : The extremely good output of ·420 b.h.p. was obtained at 13,200 r.p.m., with a drop to ·240 b.h.p. at 14,350 r.p.m. The engine is remarkable for its high torque at low speeds, as the

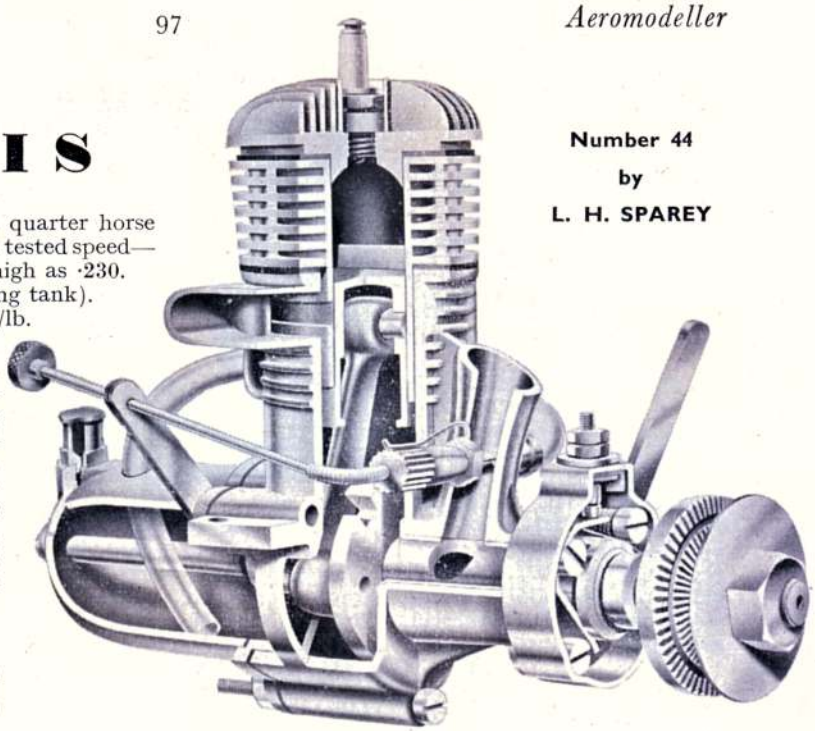


ANALYSIS

Number 44

by

L. H. SPAREY



graph shows a recording of over a quarter horse power at 5,000 r.p.m. At the lowest tested speed—about 4,000 r.p.m.—b.h.p. was as high as ·230.

Checked Weight: 7·8 ozs. (including tank).

Power/Weight Ratio : ·86 b.h.p./lb.

Remarks : The flexibility, good power output, and excellent control which this engine shows reminded me that the petrol engine has features which are sadly absent in most diesel and glowplug motors. In particular, the control given by the spark advance and retard was a delight now seldom experienced. The fuel used was composed of 3 parts Pool Petrol and 1 part Castrol XXL.

CONSTRUCTION DATA

Manufacturers : International Model Aircraft Ltd., Morden Road, Merton, London, S.W.19.

Retail Price : 85s., including Purchase Tax.

Delivery : Ex stock.

Spares : Ex stock.

Type : Spark-ignition.

Specified Fuel : 3 parts Petrol : 1 part Castrol XXL.

Capacity : 4·92 c.c., ·30 cu. in.

Weight : 7·75 ozs. including tank.

Compression Ratio : 8 : 1.

Mounting : Beam or radial, upright or inverted.

Recommended Airscrews : Free Flight : 10×6 ins., 11×5 ins., 11×6 ins. Control line : 9×6 ins., 10×6 ins.

Flywheel : 2×$\frac{7}{16}$ ins. 5 ozs. weight.

Tank : Detachable, universal mounting.

Bore : ·750 in.

Stroke : ·680 in.

Cylinder : Hardened steel, retained by 4 6-B.A. screws deep spigoted to crankcase. 1 transfer port, 1 exhaust port.

Cylinder Head : Diecast aluminium, retained by 4 screws to cylinder.

Crankcase : Diecast aluminium.

Piston : Meehanite. Deflector type. No rings.

Connecting Rod : Forged hiduminium, R.R.56.

Crankpin Bearing : Plain. Drilled for connecting rod retaining pin.

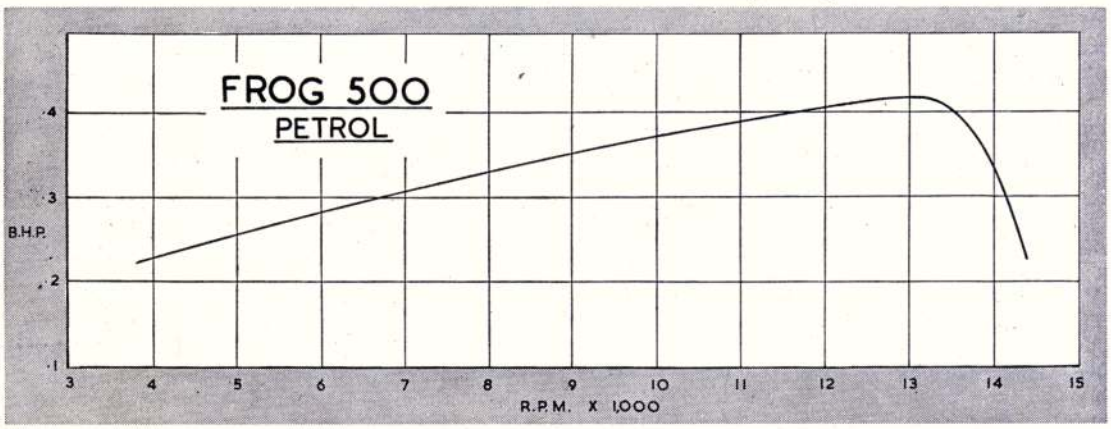
Crankshaft : Hardened steel, ground and honed.

Main Bearing : Phosphor bronze honed.

Little End Bearing : Plain.

Plug : $\frac{1}{4}$-in. K.L.G., " Mini 2 ".

Special Features : Flexibility, with high power output. All parts machined to fine limits to ensure interchangeability.



1951 FINAL

CONTEST AVERAGE TABLES

Croydon's Gordon Perkins holds for Norman Marcus whilst Bob Ladd looks on. All three did well in power in '51.

IN presenting these final contest averages for the 1951 flying season we have been able to include all major S.M.A.E. free flight events, where applicable. The Rubber Table has been completed with the addition of the Flight Cup and the National Challenge Match ; the glider figures by the National Challenge Match individual results, and the power table by the inclusion of the International Power, under 1·5 c.c. duration, the Hamley and the National Challenge Match.

Whilst we have endeavoured to make this final table as *complete as possible* we may, accidentally, have omitted the names of a few aeromodellers whose performances over the 1951 season warrant them a place. The difficulty of checking individual competition lists over a whole year, where entries in each have often exceeded three hundred or more, are enormous. Our final tables, it will be noticed, contain one or two names omitted from our original list. If any more are still missing, we can only express our regrets. These would not, in any case, affect placings in the top half of each table.

The rubber and glider tables have not changed a great deal. Top five places in rubber remain exactly the same, with a slight levelling of the averages. Eight individuals have completed the season with a three minute actual flight average or better, and top contest times are still considerably higher than the normal average times of the top men in the table. This difference is a fair measure of the " luck " element in competition flying.

It will be noticed, too, that the missing of one or two competition flights can pull the contest average down. The figures in brackets in the " Contests entered " column give the actual number of competition flights possible. The column " Contest Flights " gives the actual number of contest flights completed.

It is also interesting to notice the position of team members in the final tables. In rubber, only three of the 1951 Wakefield team maintain a place in the top twenty. The 1951 Nordic team are a little better represented, although scattered.

Using the tables as a basis for finding the best all-rounder, J. A. Gorham rates top with a first place in rubber and a third in power ; closely followed by a first in glider and fifth in power by fellow club-member, P. S. Jacobs. Gorham's performance is all the more remarkable for the fact that it is generally accepted that to do well in rubber demands a degree of specialisation which makes it very difficult to fly in other types of contests as well.

The final power duration table differs considerably from the earlier one. Norman Butcher, who registered a flight average of over four minutes on the first table, fails to qualify for the final table since he flew in only two contests. " Three contests entered " was taken as a minimum for the final table in order to get a truer picture of overall performance. This also ruled out Bob Ladd with a three minute plus average on two contests, and Johnny Knight with a three minute average, also on two contests.

John Chinn now ends up in top place, just heading Wyatt and Gorham. East Anglian area strength in power duration is emphasised by the fact that they fill four of the top five places. Results are somewhat more difficult to analyse with power duration on account of a tendency for individual performances to be inconsistent, and also for the considerable number of competitors who enter just one or two power events.

On a club basis, Ipswich definitely top the overall performances—with firsts in rubber and glider and second and third in power and a third in rubber. It is no great surprise to find the 1951 individual champion and runner-up coming from that club, or for Ipswich clubmen topping the individual lists in the Area Championship events at Digby. Yet this honour has been achieved by the efforts of four men only. In other words, it is not weight of numbers but quality of individual performance which has carried them to the top. Lack of numbers showed up to disadvantage in the team results at the Area Championships, where the strength of the London Area in rubber, for instance, won the Area Championship.

The rubber averages table shows a fairly wide distribution of leading contest fliers over the whole country, whereas the glider table would appear to indicate that the Midland and Northern Areas have a higher proportion of tow-line experts.

1951 CONTEST AVERAGE RESULTS

1951 FINAL AVERAGES — GLIDER

Position	Name	Club	Contests Entered	Contest Flights	Aggregate	Actual Flight Average	Contest Average
1	P. S. JACOBS	Ipswich	3 (8)	8	28 : 54	3 : 37	3 : 37
2	S. WADE	Loughborough	3 (9)	9	32 : 15	3 : 35	3 : 35
3	R. GEESING	Croydon	5 (14)	14	47 : 34	3 : 24	3 : 24
4	D. SMITH	Loughborough	4 (11)	11	33 : 03	3 : 00	3 : 00
5	N. G MARCUS	Croydon	4 (12)	12	35 : 56	3 : 00	3 : 10
6	J. HANCOCK	Surbiton	5 (14)	14	41 : 80	2 : 59	2 : 59
7	T. BOOTLAND	Scunthorpe	5 (14)	14	41 : 16	2 : 57	2 : 57
8	J. LAMBLE	Chorleywood	4 (10)	10	29 : 12	2 : 55	2 : 55
9	W. BAILEY	Gainsborough	5 (14)	12	34 : 09	2 : 51	2 : 51
10	M. HANSON	Solihull	7 (20)	19	56 : 35	2 : 59	2 : 50
11	M. THOMAS	Blackpool	5 (15)	15	42 : 10	2 : 49	2 : 49
12	E. NORTH	Halifax	6 (17)	15	47 : 04	3 : 08	2 : 46
13	E. FARRENCE	W. Yorks	6 (17)	15	46 : 32	3 : 06	2 : 44
14	R. ASKEW	Cheadle	5 (15)	14	40 : 02	2 : 51	2 : 40
15	R. NORTH	Croydon	5 (14)	14	38 : 51	2 : 39	2 : 39
16	P. BROWN	St. Albans	4 (12)	12	31 : 52	2 : 39	2 : 39
17	B. WHEELER	Birmingham	7 (19)	19	50 : 19	2 : 38	2 : 38
18	R. MONKS	Birmingham	7 (21)	18	59 : 06	2 : 35	2 : 35
19	N. NEVE	Brighton	6 (17)	17	43 : 46	2 : 34	2 : 34
20	J. MARSHALL	Hayes	3 (9)	9	23 : 11	2 : 34	2 : 34

1951 FINAL AVERAGES — RUBBER

Position	Name	Club	Contests Entered	Contest Flights	Aggregate Duration	Actual Flight Averages	Contest Averages
1	J. A. GORHAM	Ipswich	9 (26)	25	96 : 37	3 : 52	3 : 43
2	J. B. KNIGHT	K. Nomads	7 (20)	20	70 : 46	3 : 33	3 : 33
3	R. ATKINSON	Ipswich	7 (20)	20	67 : 20	3 : 22	3 : 22
4	R. H. WARRING	Zombies	7 (20)	20	65 : 53	3 : 18	3 : 18
5	F. HOLLAND	Swansea	5 (14)	13	43 : 51	3 : 22	3 : 08
6	E. SMITH	Icarians	7 (21)	21	65 : 45	3 : 08	3 : 08
7	R. COPLAND	N. Heights	6 (17)	17	49 : 51	2 : 56	2 : 56
8	J. ROYLE	Littleover	6 (18)	18	51 : 36	2 : 52	2 : 52
9	H. TUBBS	Leeds	9 (27)	23	76 : 53	3 : 20	2 : 51
10	H. REVELL	Northampton	5 (15)	15	42 : 41	2 : 51	2 : 51
11	E. W. EVANS	Northampton	7 (21)	19	59 : 32	3 : 08	2 : 50
12	M H GILBERT	Flying Saddlers	6 (18)	18	50 : 21	2 : 48	2 : 43
13	W. ROCKELL	Gainsborough	6 (18)	18	49 : 53	2 : 46	2 : 46
14	F. SEATON	Northampton	4 (12)	12	32 : 57	2 : 45	2 : 45
15	J. O'DONNEL	Whitefield	6 (18)	15	49 : 27	2 : 45	2 : 45
16	T. DUNKELEY	Northampton	5 (15)	15	40 : 47	2 : 43	2 : 43
17	P. BROWN	St. Albans	5 (15)	15	40 : 18	2 : 41	2 : 41
17	E. MUXLOW	Sheffield	5 (15)	15	40 : 18	2 : 41	2 : 41
18	R. WOODHOUSE	Whitefield	6 (18)	18	46 : 09	2 : 34	2 : 34
19	D. SUGDEN	Loughborough	5 (15)	13	39 : 08	3 : 00	2 : 32
20	J. TANGNEY	Croydon	5 (15)	13	37 : 27	2 : 53	2 : 30

1951 FINAL AVERAGES — POWER
(Qualification : Minimum of Three Contests entered)

Position	Name	Club	Contests Entered	Contest Flights	Maximums	Aggregate	Actual Flight Averages	Contest Average
1	J. CHINN	Norwich	5 (14)	14	4	47 : 28	3 : 23	3 : 23
2	P. WYATT	Ipswich	5 (22)	22	6	68 :17	3 : 06	3 : 06
3	J. A. GORHAM	Ipswich	7 (19)	19	5	57 : 34	3 : 02	3 : 02
4	P. BUSKELL	Surbiton	5 (13)	11	2	38 : 55	3 : 32	3 : 00
5	P. S. JACOBS	Ipswich	7 (20)	20	1	57 : 53	2 : 54	2 : 54
6	R. WARD	Croydon	7 (19)	19	4	47 : 48	2 : 31	2 : 31
7	C. MAYES	W. Essex	3 (8)	8	1	20 : 02	2 : 30	2 : 30
8	N. MARCUS	Croydon	7 (22)	21	1	54 : 15	2 : 35	2 : 28
9	I. LUCAS	Brighton	5 (13)	11	—	31 : 06	2 : 50	2 : 23
10	J. BICKERSTAFFE	Accrington	5 (14)	13	—	33 : 13	2 : 33	2 : 22
11	S. LANFRANCHI	Halifax	4 (11)	10	—	25 : 28	2 : 32	2 : 19
12	H. TUBBS	Leeds	5 (14)	14	1	32 : 22	2 : 19	2 : 19
13	G. PERKINS	Croydon	5 (14)	12	2	31 : 49	2 : 39	2 : 16
14	J. LAMBLE	Chorleywood	4 (10)	8	1	21 : 19	2 : 39	2 : 07
15	R. C. MONKS	Birmingham	7 (19)	16	1	35 : 41	2 : 14	1 : 53
16	E. LORD	Accrington	3 (5)	6	1	14 : 10	2 : 21	1 : 46

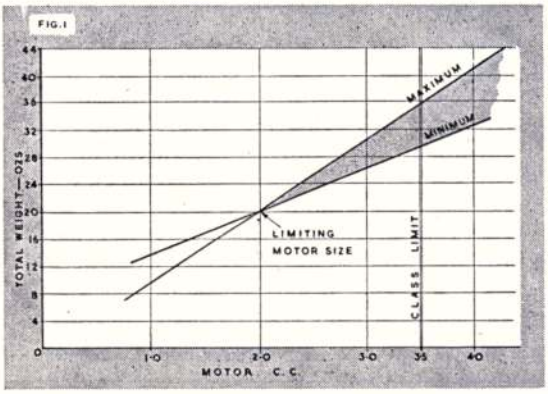
IT'S **DESIGNED** FOR **YOU**

NUMBER SEVENTEEN

THE British PAA-load contest specification is an adaptation of the American Class A PAA-load type designed to accommodate motors of up to 199 cu. in. The British PAA-load class includes slightly larger motor sizes—up to 3·5 c.c.—but in the main the specification is virtually identical.

The model which won the first British PAA-load event was a free-lance design, but essentially based on current American practice. It could be called, in fact, a mixture of a number of standard American designs. Most of the other models were one hundred per cent. American in origin, the most popular prototype being Ray Matthews' *Crowbar*, a consistent winner in the States. A notable exception was a modified *Mallard*, with built-up cabin to enclose the PAA-load pilot.

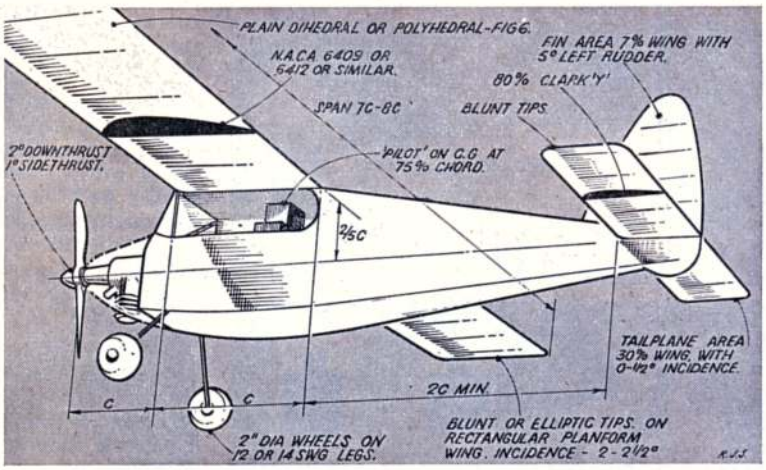
PAA-load promises to be a very interesting specification. Being forced to carry a dead weight of eight ounces, which may be as much as one-third of the total weight of the whole model, PAA-load models do not behave in the same manner as the much lighter, overpowered duration models. The original weight specification appears to have been selected with expert care and just that bit of luck to ensure that the edge is knocked off the pure duration element. Yet the PAA-load model is still definitely a duration machine and must be designed with that end in view. The contest is decided just like any other duration contest—the best aggregate flight time following a limited motor run.



For modellers interested in competition flying here, then, is a new type for their attention. At the same time the resulting model is rather more docile than the average tear-away, high-climb pylon machine and quite enjoyable to fly for fun—with the payload. Remove the eight-ounce dead weight and you are almost back to the standard duration model again—with a difference. The difference is mainly one of appearance. All PAA-load models have to have a glazed cabin area giving the "pilot" a certain specified field of visibility and so the design trend is towards semi-scale appearance. There is yet a further application of the PAA-load design. If successful as a duration model with a dead weight of eight ounces aboard there is no reason why it should not be made to carry an even greater payload—such as radio equipment. The performance of some of the PAA-load models would appear to indicate that many of these designs, in fact, should readily be adaptable for radio control work. Developing a PAA-load model then may open up several other possibilities.

Now, undoubtedly the easiest way of going about building a Class A payload model for the 1951 contests is simply to duplicate an existing American design, like the *Crowbar*, for example. In fact the *Crowbar* seems to be so nicely proportioned for the job and has such an excellent flight performance, properly handled, with a good reserve of stability, that it may be quite difficult to produce an inherently superior design.

Left, well-known American design the "Hogen Hearse" was flown by competitor Waters of the Grange Club in the 1951 Bowden event at Radlett.



There are two factors to offset against this. In the first place it is not good practice consistently to follow some one else's, or some other country's lead. In such cases the other fellow will always be one jump ahead. Since the PAA-load specification was new to us in 1950 it was only natural and fully excusable, that the majority of 1950 British models were essentially American in design origin. With the experience of that contest, however, now is the time to start evolving the *British* PAA-load design. Just as British free flight power design at first followed current American practice and from there went on to develop its own layouts, so should a trend in PAA-load design follow. The Americans had two or three years' start in both types and the transition period in this country would appear to take about the same time. Starting from behind as it were, however, we have the advantage of being able to draw on the experience of American designers in establishing a pattern of design requirements.

A second factor is that the luck element does, and always will, prevail in duration contests, so that what is possibly the best model may not always win. It will, initially at least, stand the best chance, perhaps, but the luck factor is predominant. Luck, and the way the model is trimmed and flown, are the deciding factors. Otherwise how would you account for the fact that with at least five models of the same design in the 1950 PAA-load contest, the resulting performances of each were so different.

The first major point to decide in roughing out the new PAA-load design is the size of the model. Here we can draw on existing data and experience gained in the 1950 contest. Without doubt models of this type come into the heavily loaded class and a good "duration" climb comes only from using the motor wide open and with the rest of the model proportioned correctly with regard to the power available. First we can consider the effect of overall weight.

With all duration models, minimum weight is accepted as a most desirable feature. Where loading rules exist, designers like to work right down to the lower limits permitted, which is only logical. For a given size of model, less weight means greater height under power and a slower sinking speed on the glide, all other things being equal. In the PAA-load specification we are not restricted to size of model, but only to minimum weight and maximum size of motor. In effect this latter factor does introduce its own limits as to model size.

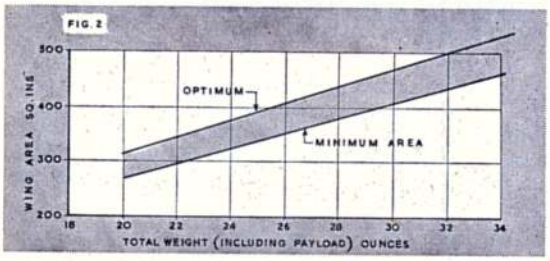
Let us take weight first. The rules call for a minimum weight of 6 ounces per c.c. motor size, plus the 8-ounce payload. The *minimum* weight of a PAA-load model must, therefore, be :—

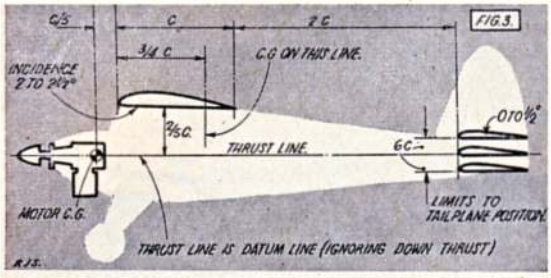
6 × motor c.c. plus 8 ounces.

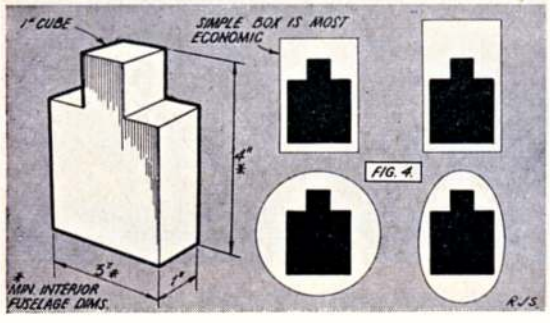
If, now, we can establish a similar simple formula for *maximum* (desirable) weight, we shall have two useful limits which will be of considerable use in design.

To find a figure for *maximum* weight we continued to load up a successful PAA-load model until a definite falling off in performance was noticed. It is interesting to find that moderate weight increases over the *minimum* (as given by the rules) had little appreciable effect, but once the overall weight exceeded 10 ounces per c.c. climb most definitely began to taper off and the glide was appreciably faster. This, then, we can take as the upper limit to which we can work and still retain a "duration" performance.

If, now, these two limits are plotted in the form of a graph—ounces against c.c.'s as in Fig. 1, a very interesting fact emerges. The two lines cross and on the left-hand side of where they cross the *minimum* weight required is *greater* than what is taken as the absolute *maximum* for good duration performance.







In other words, the PAA-load model with a motor of under 2 c.c. is not likely to be as successful as one proportioned for a larger motor. In fact, within the limit of 3·5 c.c. maximum motor size, the larger the motor the greater the tolerance between the minimum weight called for by the rules and the upper limit governing performance. It will be an advantage therefore, to use as large a motor as possible, although above 2 c.c. capacity all models built down to the minimum weight should have a similar performance (ignoring scale effect, which will show an advantage to the larger *size* of model, called for by a larger *motor size*).

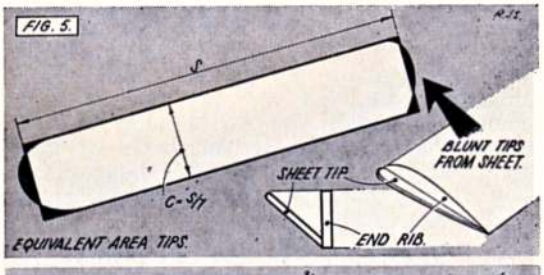
Obviously the motor used is going to be governed by availability. Standard "British" sizes are 2 c.c., 2·5 c.c. and a more limited range in the 3·5 c.c. size. The 2 c.c. motors would appear to be on the marginal size, as determined by the loading graph, and the other sizes would appear to be preferable. The 2·5 c.c. motor will probably be the popular choice although the 3·5 c.c. motors are probably the more powerful, size for size, and would probably produce the best duration performance. The models, in such cases, would be larger. As in all power duration classes, the most powerful motor in its general size is generally best, although too much power can show up instability and introduce trimming troubles.

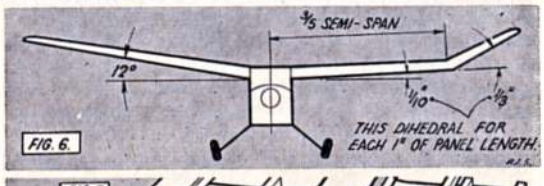
Motor size, determined by availability or personal preference, will govern the total weight and this in turn will govern the overall size of the model. Once these two factors have been fixed the overall design can be analysed. Probably the most efficient way of determining the model size is by reference to wing loading.

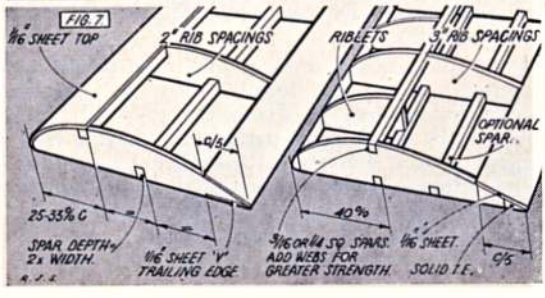
The lower the wing loading, the better the glide. At the same time, if we go on pushing up wing *area* to reduce wing *loading* we increase the overall structural weight (with the larger wing) and the drag. Both will detract from climb performance.

For simple analysis we can adopt a figure of 100 square inches wing area per 6·5 ounces total weight as the minimum limit which will give a good climb without excessive wing area to spoil the climb; and 100 square inches per 7·5 ounces as the maximum wing loading above which glide begins to suffer. Our model size, proportioned according to estimated overall weight (in turn related to motor size) can then be determined between the limits on Fig. 2.

For stability reasons a semi-pylon wing position is desirable, with the wing mounted approximately 40 per cent. of the chord above the thrust line (horizontal component). There is no point in having a shallow fuselage, anyway, for interior height must be at least nine inches to accommodate the payload. Used with an incidence of 2–2½ degrees on the wing (employing a duration type section like NACA 6409 or 6412) and a zero or slightly positive thin lifting section tail plane one-third of the wing area, and tail moment arm 2 × wing chord, the balance point will come at approximately 75 per cent. of the chord. Slight downthrust may be necessary to trim out the power flight. With orthodox construction this centre of gravity position should be realised by locating the centre of gravity of the motor approximately one-fifth of the wing chord in front of the leading edge of the wing. The eight-ounce







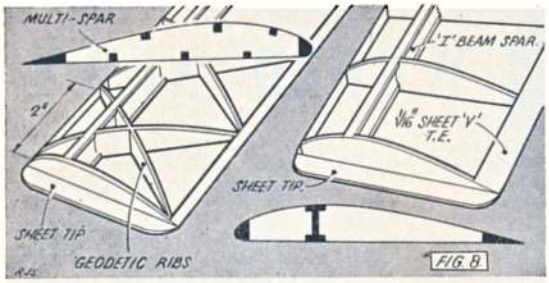


FIG. 8

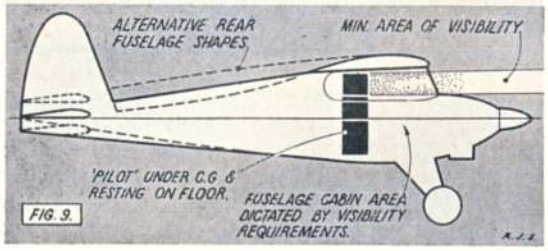


FIG. 9.

payload can then be located approximately under the C.G. position, making provision for slight fore and aft movement for fine trimming. Once the required position has been found for the payload it is imperative that it be located strongly, so that it will not get displaced during heavy landing.

An important feature of the fuselage design is the size of the payload itself—Fig. 2. Overall width of the dummy pilot is three inches, which means that the minimum inside fuselage width is also three inches—wider than current duration practice. This calls for a rather more box-like fuselage than usual, for it would be difficult to accommodate the pilot in a rounded or thin rectangular fuselage without an exaggerated fuselage cross section, at least at that point.

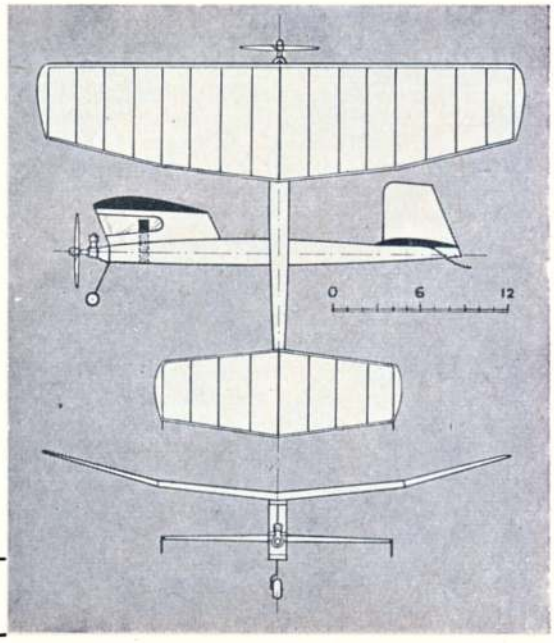
With the disposition of Fig. 3 satisfactorily for stability we can affect a small saving in overall size by increasing the aspect ratio. Fig. 3 applies to wing aspect ratios of from 6 to 8. Structurally the higher aspect ratio is not to be recommended and so an aspect ratio figure of 7 appears to suggest itself as a good compromise, when the whole wing can be proportioned around a rectangular planform for convenience—Fig. 5.

Despite the fact that modern practice is to use very blunt wing tip shapes, aerodynamically and aesthetically we still prefer rounded or blunt elliptic tips, although these are undoubtedly harder to make. A simple sheet tip butted onto the end rib suffices for the " modern " tip and does not appear to introduce much extra drag, whereas theory would indicate that such blunt tips require washout over the outer wing panel to reduce tip drag to a comparable level. The choice, it appears, must be left to the individual.

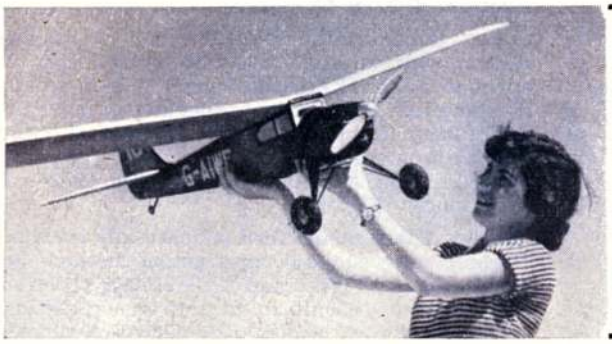
As regards dihedral, there does not appear any reason why straight dihedral should not be adequate. The PAA-load model is not grossly overpowered and straight dihedral is generally quite adequate in such cases. Polyhedral is undoubtedly more effective for ordinary duration flying but will, of course, detract from semi-scale appearance. Fig. 6.

Other details should then fall naturally into line. Possible wing and tail construction methods are summarised in Figs. 7 and 8. Fuselage construction is more difficult to fit into generalisations owing to the variety of side elevation shapes. Normal slabsider construction would appear the easiest approach with any refinements added in the form of rounded top and bottom, given by formers and stringers. Rounded decking would, it appears, best be confined to the top of the fuselage since the bulk of the rectangular cross section will, in any case, be filled by the " pilot ". Windscreen area will be governed by the position of the " pilot " who has to have the degree of visibility outlined in Fig. 9.

A final point as regards trimming. With the layout suggested a turn to the right should be safe under power, a turn to the left possibly dangerous. It is recommended therefore, that right sidethrust be used for a right-hand climbing turn, together with a small amount of downthrust. Slight left rudder offset should be used to hold the nose up in the climb and give a left-hand glide circle. This method of approach will be safer than using wing warping, *e.g.*, wash in on port wing to give R.H. climb and L.H. glide.



Three view is of Frank Ehling's " Payoff ", a PAA-loader that won at the American 1951 Nationals. Straight power climb is used with a tight left turn on the glide.



WORLD NEWS

by

ARIEL

Miss Helen Curmi, sister of aeromodeller George Curmi of Sliema, Malta, holds his Frog 250 powered "Centurion". Colour scheme of the model is Royal blue and silver.

BEFORE presenting this month's collection of items, your compiler has to make both an apology and a request. The former is to those of you who supplied suitable material for this feature which has not appeared during 1951. The reason for these omissions is two-fold ; available space and the arrival of news requiring immediate insertion, such as that concerning important Contests. Some of the items which were sent in during 1951 are still on the files, and will appear during the coming year, others have dated and need replacing. Consequently, the request is for more letters, from old friends and new acquaintances, and interesting photographs will always be welcome, especially the negatives or big black and white glossy prints. We are at the beginning of a new year, so keep in touch with the rest of the world's modellers through these columns.

Germany. Correspondent Hans Pfeil, Bad Pyrmont, includes many short items of interest in his letters and, during the past few weeks, he has supplied the following.

It seems that Western Germany hopes to send teams to major International Competitions in 1952 for the first time since the War. Austria, Switzerland and Sweden are on the books and possibly the F.N.A. Cup, in Holland. Members of this year's teams will be by selection, but it is intended to use the next German Nationals, in the Autumn, as eliminators for the 1953 contests.

In the main, Pfeil reports, German contests will now be run according to the F.A.I. Code Sportif, only the indoor model boys being required to present their own set of rules for the approval of the Model Aviation Committee of the Aero Club.

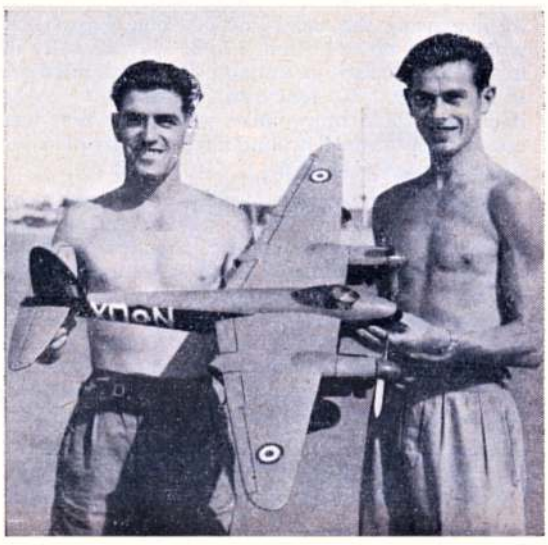
The latest item of international interest supplied by this correspondent, concerns the meeting of the F.A.I. model aviation committee in Holland on December 9th. The President of the modelling section of the German Aeroclubs received an invitation to attend, and, for the first time for more than twelve years, German modellers were to be represented.

New Zealand. Of the several clubs who keep in touch from Australasia, the Hutt Valley Aeromodellers are amongst those who send us their news-sheet. Entitled the " Balsa Butchers' Bulletin ", it is a monthly publication, duplicated and running into four or five pages.

The latest issue received is that of September 1951, which opens with a competition report, written in entertainingly informal style. For example : " The Hon. Sec. was seen at regular intervals to burst into frantic activity and disappear into the unknown (gorse to you !) after various highly efficient and highly exasperating mods. (End of trumpet blowing.) Also his Thunderbird thunderabout thundered about like a thunderbird at last. It flies alright but lands like a dreadnought." And this : " The R.N.Z.A.F. M.A.C. has a very nice line of scale aerobatic Harvards. From the noise, however, I should say that they should balance their props. properly." Anyone who has ever heard a Harvard passing overhead will get the point of that one.

The following masterpiece is the next item :—

Here I sit, broken-hearted,
Goldarned diesel won't get started,
My temper and I will soon be parted—
Life gets tedious, don't it.



Other fellows have fun,
Models floating in the sun,
Get going, you lousy son of a gun—
Anyone want to buy an E.D.?
Flicked all day, cursed in vain,
Should I try just once again ?
Now it's coming on to rain—
Should have took up knitting.
Time to go, I feel a fool,
How can life be so darn cruel ?
Found out I've been using Glow Plug Fuel—
Life gits—aw, go to hades !

In addition to which is a perfectly serious article on Wakefield design, although that closes with " If Ron Warring ever reads this he'll strangle me for breach of copyright."

The last page gives three G.A. drawings of N.Z. Wakefields and closes a very commendable Club effort.

Also in the lighter vein is the October Bulletin of the Wellington M.A.C. known, it would seem, as the " Bull Sheet ". This opens with a fourteen verse parody of " Phil the Fluter ", by " Happy Spring Harold ", concerning a certain meeting at the flying field at Paraparamau. The name's got something, too. There is a moral somewhere in this verse :—

And then a yellow model there,
Stood out against the sky,
You could always see it in the air,
The colour hit your eye.
But when it landed downwind,
The owner with remorse,
Spent half the day a-searching,
In the gorgeous yellow gorse.

Several contests are reported in humorous style followed by a programme of coming events, including Club Nights with lectures on all types of aeromodelling. One meeting is down as Open Forum—an official verbal free-for-all. This club really has itself organised. The final item in the Bulletin is simply headed " Torque ". This is a column of candid comment on club doings and certain members in particular and, no doubt, causes chuckles among those concerned. Anyhow, these N.Z. aeromodellers obviously get a lot of fun out of their hobby.

Sweden. Although news of the 1951 Swedish Nationals has been unavoidably delayed until now, there will be those who are still interested in the results. We have to thank Owe Carlson, of Norrköping, for this information.

Held at Skarjinäck, Stockholm, with perfect weather conditions, these contests were memorable for the high percentage of o.o.s. flights. Conditions were, if anything, too good as thermals caused most of the losses. Börge Börgeson, of Gothenburg, for example, lost three power models and our correspondent had his rubber job fly away in the first round, timed at 12 : 38. He followed it and it was in sight for more than half an hour.

In a rubber contest of high standard, 17 year old Roald Olsson, the Aeroclub Gothenburg, was first with a one second lead over Olle Blomberg. K. Karlsson, of the same club, won the A/2 class, which had the largest number of entries and in which a considerable number of maximums were recorded.

F/F Power, with many crashes and a generally lower standard than that of the other events, was won by Rune Andersson, Cumulus Club, Stockholm, while the highest team points went to the Aeroclub Gothenburg. Second club position went to Gamen, Norrkoping, of which our correspondent is a member.

Norrköping, we are informed, is known as the " Manchester of Sweden " and possesses one of the finest aerodromes in the country. It is on this field that the 1952 Wakefield will be flown.

The city has three model aero clubs, the most active being Gamen (The Vulture), with a membership of twenty-five. Main interest is in A/2, with F/F power and rubber gaining in popularity : Stunt also has a small following and Arne Nilson flies an R/C "Rudderbug", the sole representative of this branch at time of reporting. We are promised further news of the activities of Norrköping's " Vultures " and will endeavour to give them more prompt attention on the next occasion !

Left, more sunshine : Sergeants Joss and Middleton, R.A.F., Shallufa, now home in the U.K., display their 41 ins. span " Mosquito ".

Right, Angus McDonald of Auckland, New Zealand, has a firm hold on his 1951 A/2, a 6 ft. span sailplane. Of elliptical fuselage section, it has dihedralled elevator and timer-operated pop-up tail D/T.

ESPECIALLY FOR THE

By the Rev. F. Callon

FEW beginners realise what an immense amount of theoretical calculation and practical experiment has been necessary in order that they may easily achieve success in building and flying their models. Every time we buy a kit or plan we are getting the benefit of the designer's knowledge and experience, and he in turn has been relying on the hard work put in by the early pioneers of aeromodelling—and indeed of full scale flying.

Starting from the weird, bat-like contraptions of sixty years ago, study and experiment gradually modified the structure and design of aircraft until the streamlined monsters of today emerged. And starting even earlier than this, designers were hard at work on equally weird though much smaller contraptions—the first model aeroplanes. These were not built just for the fun of the thing, but as experiments in flight with a view to the perfection of man-carrying planes. The Wright brothers' plane, for instance, was based on a successful model.

Aerofoils. Once full-sized aircraft had reached the stage when they could be considered reasonably safe, designers were able to concentrate on obtaining greater efficiency as regards climb and glide, and they directed their attention more than ever to the shape, size and position of the flying surfaces. And so were evolved a whole series of aerofoil (or " airfoil ") sections. Now, since for a variety of reasons model aircraft do not behave in exactly the same way as their larger brothers, this range of airfoils had to be modified to suit our requirements. The work which the experts have carried out in this particular field is of vital importance to aeromodelling, for glide depends entirely on the flying surfaces, and a good glide is essential to a successful model.

It is certainly a great help to understand the theory which has gone into the designing of model airfoils, and later on it is hoped to deal very simply with it in these columns. But as far as practical modelling goes, you have the *results* of all the hard work ready at hand in pill form in the A.P.S. airfoil section sheets at 6d. a time. There is only space here to deal with one or two of the most popular sections, but if, of course, your plan recommends any other section, all you have to do is to send off to the A.P.S. for the required sheet, when you will be assured of a really accurate wing and tailplane section for your model.

Clark Y (Sheet S/7.) A steady old favourite, this, with lots of virtues and no vices. Truly an all-rounder which can be used quite successfully for the wing of almost any type and size of model. The fact that there is no undercamber makes for simplicity during the building stage, for there is no need to pack up under-spars, and covering becomes simplicity itself. Could scarcely be bettered for your first " Own Design ".

60% Clark Y (Sheet S/46.) Can be described as the universal tailplane section. It is sufficiently thick to accommodate a full depth mainspar if this is placed about one third of a chord back from the leading edge. Tailplanes using this section are usually described as " lifting " tailplanes as against those using flat plate or symmetrical sections. Not that the latter mentioned do not contribute lift, for they certainly do. It is the fact that some designers specifically use sections such as 60% Clark Y in order to contribute more lift than is usually derived from a normal flat plate or symmetrical section.

Another more recent use for this section is in the realm of Team Racing. Here a low lift, and accordingly low drag section, suitable for high speed flight is required, and again 60% Clark Y is admirable for the job.

BEGINNER Part XXIII

Marquardt S-2 (Sheet S/36.) An ideal section for lightweight gliders when the chord is small enough not to call for any spars. Gives a very slow, level glide.

Eiffel 400 (Sheet S/22.) This was once a rightly popular section for rubber models and heavier gliders. There is plenty of depth for spars, but the tapering trailing edge needs special care.

NACA 6409 (Sheet S/15.) This section appears to be replacing the last-mentioned one in popularity, and is very suitable for heavy gliders or power models, though some prefer the NACA 6412 (Sheet S/16) which, owing to its greater depth, leaves more room for spars and tends to give a slightly slower glide. With light power models NACA 6409 gives a fast and stable climb suitable for contest work.

Some of our more mathematical tyros may be interested in the way the N.A.C.A. series of aerofoils gain their titles. Each, it will be noted, is recognised by a different series of numbers following the letters, which incidentally, stand for " National Advisory Committee for Aeronautics ", an American organisation created by act of Congress " for the supervision and direction of scientific study of the problems of flight ".

The series numbers define the geometric characteristics of the aerofoil, each of which is built up around a centre line. The total thickness of the section is expressed by the last two figures of the aerofoil number, *i.e.*, N.A.C.A. 6409 is 9% thick. The other two numbers define the amount of camber and the point of maximum camber of the centre line. The first digit gives the mean camber of the centre line expressed as a percentage of the chord, and the second digit gives the location of the point of maximum camber, expressed in 1/10th chord lengths. Thus N.A.C.A. 6412 has a maximum camber of 6% of the chord, at 40% of the chord from the leading edge, and is 12% thick.

This sounds a bit involved so if you get stuck consult your Maths Master !

Grant XS (Sheet S/24.) A fine section for large power models which are intended for sport flying, and for Radio Control. Will ride out of almost any stall. The KK Junior Sixty, a very stable model, employs this section.

NACA 0018 (Sheet S/37.) This is one of the " Billy Bunters " of the aerofoil world, used extensively for stunt control line designs. It is symmetrical in shape, and therefore contributes as much lift when inverted as it does when the model is the right way up, which is essential for inverted flying. It is thick enough to accommodate nice deep spars thus giving a really strong wing for surviving those occasions when you gave " up " and it should have been " down " !

How to use the A.P.S. CHARTS

No trouble will be found here. Each chart gives a set of accurately printed outlines of 3 in. to 9 in. chord. The following instructions are given for the sake of those beginners who have not yet constructed a set of ribs from an outline such as is printed on the plan of most models. They refer primarily to even chord ribs, although as we shall see, the same method is used where the wing tapers towards the tips, and the job is just as quick and simple.

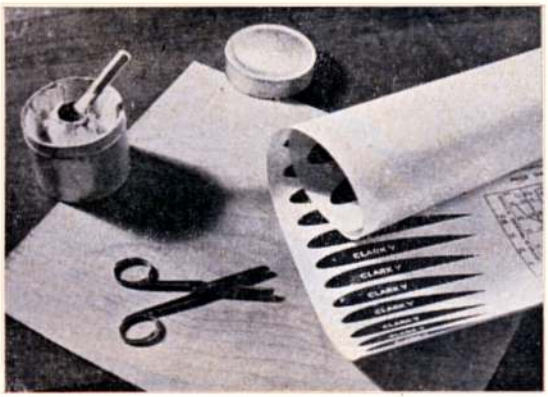


Fig. 1. You will need a sheet of 1/16 in. plywood, scissors and paste—Grip-Fix type for preference, and also a strong sharp knife or a fretsaw for cutting through the ply.

Fig. 2. Choose the size of section which gives the correct chord for your model, cut it out with scissors, leaving a fair margin all round, and paste it onto the plywood. Rub plenty of paste well into the wood before smoothing the printed paper down, and leave to dry for at least a quarter of an hour—otherwise the paper will still be limp and tend to tear.

Fig. 3. Cut right through the plywood, *slightly* outside the black outline of the section.

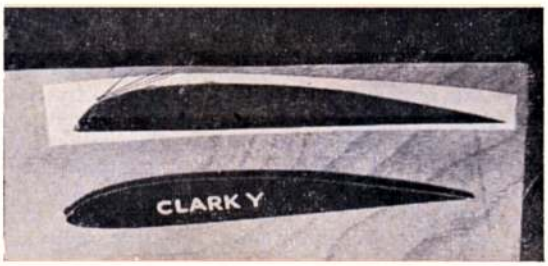


Fig. 4. Sand round the outline right up to the black border.

Fig. 5. Place the cut-out shaped section flat on the plywood, trace round it with a pencil, and cut out this second section. Put the newly cut section against the accurately shaped one, push two pins through them to hold them together, and sand to uniformity. (It should be noted here that the more usual method is to cut out notches from the pair of ply ribs for the spars, and to trim off their ends to take the leading and trailing edges. This should be done if the ribs are only required for one particular model, but since the size and shape of LE and TE and the number and position of the spars may vary from one model to another, this would mean that the key ribs might not be suitable for later plans. Notching and trimming has therefore been left over until the key ribs have been removed (see notes to Fig. 8), so that the ply key ribs can be kept and used again for any wing of this particular chord.)

Fig. 6. Now cut out as many rectangles from the correct thickness of sheet balsa as there are ribs needed. Each rectangle should be slightly larger than the outside measurements of the key ribs. (Four only have been used for the sake of the illustrations.) Sandwich the rectangles between the ply key ribs and pin them together. If it is a thick " sandwich "—more than about ten ribs—you will have to push two pins through from each side.

Fig. 7. Now carve and sand the rectangles down until they conform exactly to the shape of the two outside ply ribs.

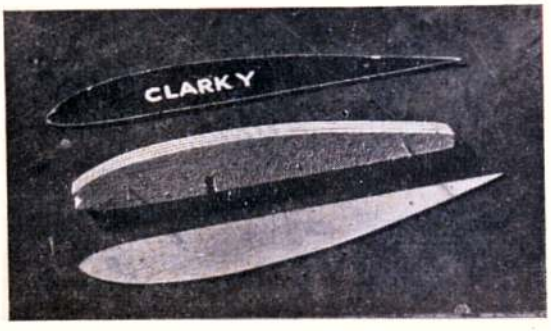


Fig. 8. Withdraw the pins, remove the key ribs, and push the pins back again to hold the balsa ribs together as before. Now trim off the TE to the width of the TE given on your plan. A small hacksaw is ideal for doing this since it will give a straight cut across. Check up on the plan for the correct positions of the spars (if any), and make a double saw-cut across the ribs at these points. The loose bits of balsa can easily be scraped out to leave a miniature trench, the sides and bottom of which can be cleaned up with a thin, flat file. Check to see that the required size of spar is a snug fit inside the groove. Use the hacksaw to trim off the LE of the ribs to suit the shape and size of the LE recommended on the plan.

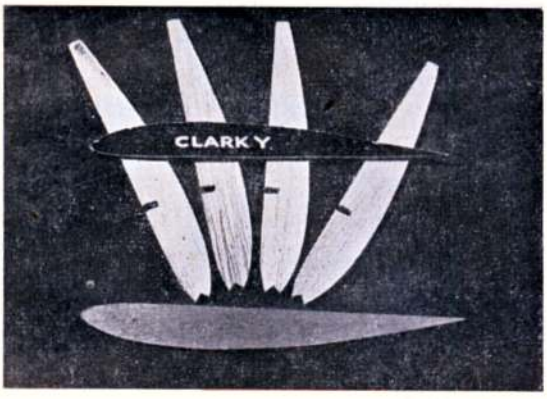


Fig. 9. Now remove the pins, and there are your ribs, all perfectly accurate and uniform, and just shouting to be built into the wing !

Tapered Wings. In the case of tapered wings, each rib from wing root to tip has to be slightly smaller than the previous one. To trace and cut out every rib individually would be a very slow and tedious job, but if ply key ribs are used it becomes just as easy as producing a set of even chord ribs.

Instead of cutting the two key ribs the same size, one must be the size of the root rib (the biggest in the wing) and the other the size of the rib nearest to the tip (the smallest). These two are cut from the chart, pasted on to the ply and cut out. Sandwiching the balsa rectangles, pinning, carving and sanding are all carried out just as before, except that the " sandwich " will now slip down from the root rib to the tip rib, and the whole process must be repeated twice over to produce a set of ribs for each half of the wing in turn.

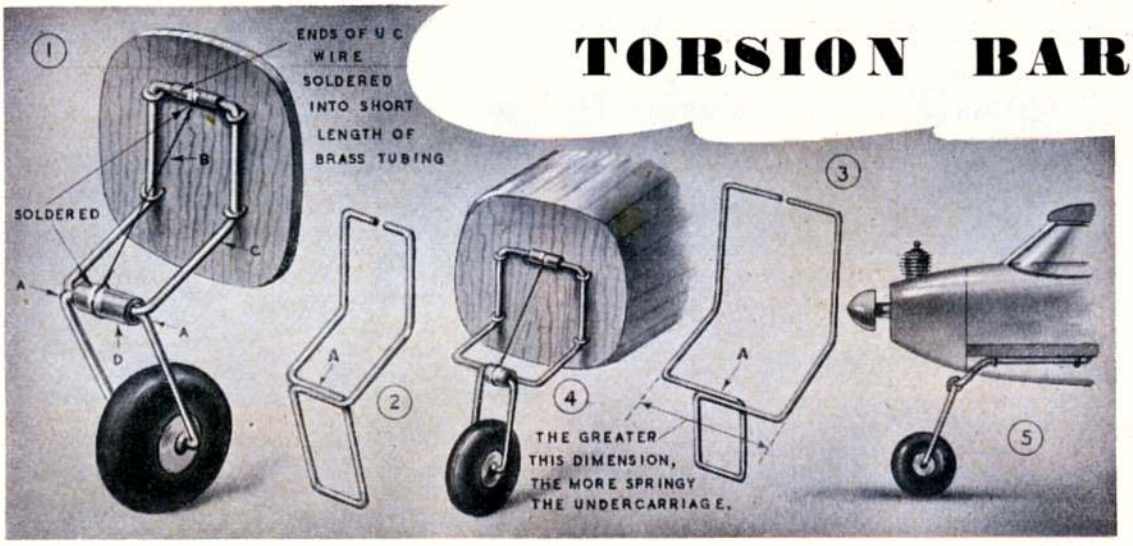
Tailpiece. It is always most encouraging to hear of a really keen modeller attaining some well-earned success. Some months ago 13-year-old Michael Rolls wrote up about some difficulty he had. Quite recently I heard from him again, to say that he had built a KK CADET.

" By the following Monday ", says Michael, " the model was ready for the air. My friend and I took it to the nearest park on the Tuesday, and after trimming it for H/L took it up on the towline. Nothing happened on the front hook, and not much on the middle one. But when I tried the back hook (an extra 1½ ins. further back than shown on the plan)—Oh Boy ! Oh Boy ! It went up as if it were our kitten being treed by an alsatian ! The towline was 200 feet long, and the model got up to at least 150 feet before I cast off. I sat down and timed it. It circled lazily overhead in wide, gentle circles for what seemed hours, and finally disappeared behind the hedge of the bowling green after having flown for 2½ minutes.

" Since that date I have had many more flights of over 1½ minutes than under it, including one of 3 minutes ; but none so exciting and gratifying as that 2½ minute flight on a warm, calm evening "

Nice work, Michael. Keep 'em flying !

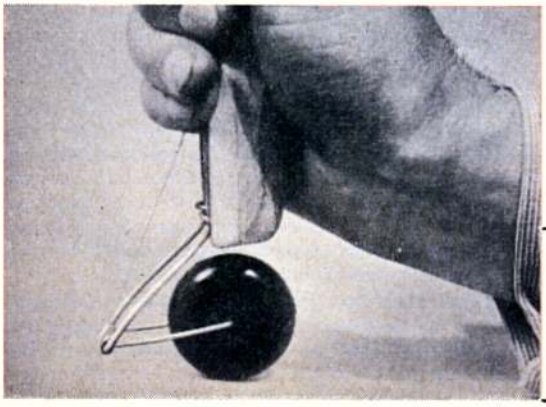
TORSION BARS



By F. BRIAN THOMAS

WHEN I flew my first "Rudderbug" in 1949 I was tremendously impressed by the performance of its tricycle undercarriage. Since then, I have become more and more convinced that this type of undercarriage is immeasurably superior to the more usual two-wheel/tailskid layout, particularly for larger models.

The tricycle u/c model sits on the ground in a nose-down attitude, and during take-off, a high ground speed is attained before the model becomes airborne. Due to this high speed, the initial rate of climb is very rapid and is unaffected by gusts which so often upset a large model that floats lazily into the air. When landing on tarmac, the model drops its nose the moment it touches the ground, the wings assume a negative incidence, and no bouncing occurs. The model rolls for 40–50 yards, without swinging, before coming to rest. Even if the landing is out of wind, the run after touch-down is quite straight.



On many occasions, the veteran "Rudderbug" has landed in the rough. She seldom turns over, but the rigid nose-wheel undercarriage invariably suffers by being bent backwards, sometimes burying the nose-wheel in the under surface of the fuselage. The obvious remedy for this fault is a sprung nose-wheel undercarriage assembly.

Some months ago I evolved a sprung nose-wheel undercarriage which has overcome all the snags. It is easy to make and simple to fit, light in weight, and quite indestructible. Fig. 1 shows the layout. The "springiness" is derived from the transverse "torsion bars" (A). It will be noticed (Fig. 2) that the undercarriage is bent from a single length of spring-steel wire, $\frac{1}{8}$ in. for models weighing 4–6 lbs.). The "torsion bars" are held loosely together by a piece of tin plate wound two or three times round them to form a tube (D). The tin plate tube is soldered so that the layers are bonded together, but the tube must *not* be soldered to the undercarriage wire. The shorter the torsion bars are made, the more rigid is the undercarriage. To increase "springiness" the torsion bars are made longer (Fig. 3). If the undercarriage is shaped as in Fig. 1, a length of thin (24 s.w.g.) piano wire (B) is attached as shown; this prevents the limbs "C" from bending downwards in a heavy landing. This undercarriage is fitted to the "Rudderbug" shown in the photograph. On a recently completed low-wing radio control model the same principle has been used, the undercarriage being shaped as in Fig. 4. If it is desired

Application of the well-known Torsion Bar suspension, already widely used in cars and motor cycles, is displayed in the action view at left, where a test unit is receiving a mighty 'thump' on the editorial desk. Actual deflection of legs is 50° from normal, and the torsional twist on the upper legs is clearly shown. Even after the hardest of knocks, the wheel always returns to normal position.

and TRICYCLES

to fit the undercarriage to a horizontal plywood plate on the underside of a model, this can be done as in Fig. 5. The torsion-bar principle can also be used for the rear undercarriage legs of a low-wing model in the manner I described in " Control Line Commentary " (AEROMODELLER, December, 1947), with the legs raked backwards instead of forwards. (Fig. 6.)

Tricycle track and trim

If a tricycle undercarriage is to work well, several important points must be observed.

(1) The wheels must be lined up so that the model runs straight and true when pushed fast along the ground.

(2) A solid nose-wheel is essential, because a burst tyre cannot be changed without rebuilding the undercarriage. An inflatable tyre *can* be used, if it is stuffed with " fritters " cut from sheet sponge rubber.

(3) The track of the rear wheels must not be too wide, otherwise the model will swing during its ground run. A 12 in. track is quite wide enough for a 6 ft. span model.

(4) The rear wheels should be *just* behind the centre of gravity—not more than 1 in. behind on a 6 ft. span model. If placed further aft than this, the model will refuse to get its nose up, and will not take off.

(5) When resting on the ground, the model should be nose-down in its normal gliding angle. If this angle is correct the model will land on all three wheels simultaneously. If the undercarriage is so rigged that the front wheel lands first, there is a tendency for the nose of the model to be pushed up at touch-down, causing a bounce.

For Team Racers

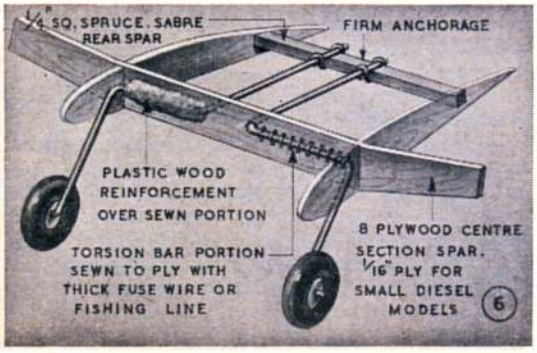
For free-flight and radio control fans, the advantages of a torsion-bar sprung undercarriage are obvious : but there is another application of this idea which is not yet recognised. The single leg in Fig. 6 has good use in a lightly loaded control line stunt model but the point at which the torsion takes place (through the thread-sewn section of the spar) would be weakened during heavy landings of a Team Racer.

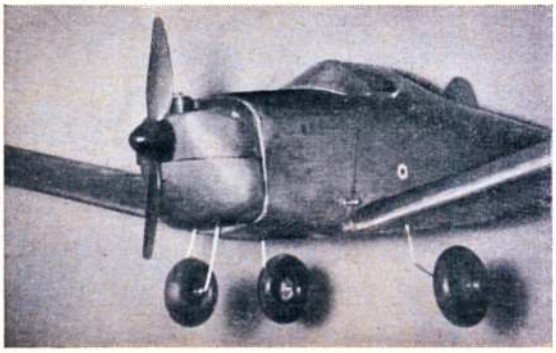
The author's 2½ years old Rudderbug, with E.D. Mk. 1. equipment and Frog 500, has been modified with great success, to have a torsion bar nose-wheel. This model also features a split-rudder as described in January issue.

A unit such as in Fig. 4 and mounted as in Fig. 5, inside a racer wing, would be completely shock absorbing, without undue stress on the wing. Many Team Racer designers have rightly shunned the idea of a wing mounted undercarriage because of its inherent weakness. A hard landing, when transmitted through the normal type of 10 or 12 gauge piano wire leg, can easily fracture wing construction. But even for Class B models, a torsion bar unit needs only 16 s.w.g. wire, which will absorb *all* shock, as is well demonstrated in the photo on the opposite page.

Scale models will especially benefit from this idea. Imagine a Miles Hawk speed six with the " trouser " type fairings mounted on the twin legs ; such an undercart would certainly improve both appearance and landing—it might even, with good streamlining, increase the flying speed.

The 6' 6" low-wing radio-controlled model below, has a torsion bar nose-wheel, with the main legs also torsion suspended as shown in Fig. 6. An Amco 3·5 BB powers the model, which is based on the Ercoupe, and uses an E.D. three valve receiver.





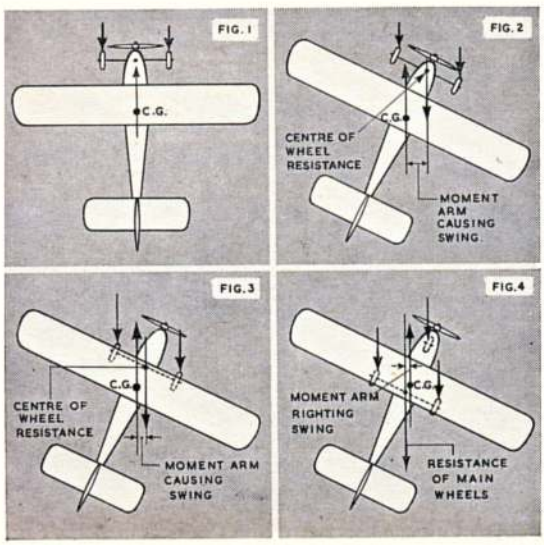
RADIO CONTROL NOTES

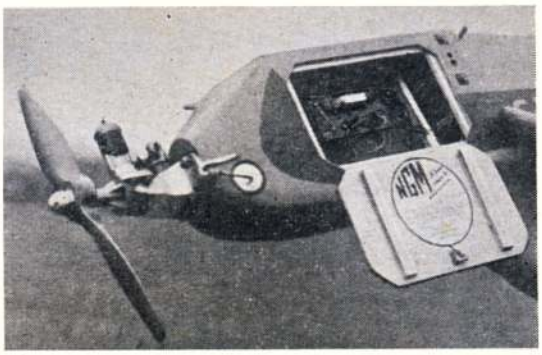
BY HOWARD BOYS

Geoff. Pike's neat little Amco ·87 powered radio model weighs only 16 ozs. for its 43" span. The receiver weight is but a mere 1⅛ oz. and is readily accessible.

AT the Taplin Trophy competition at Digby, there was no run-way which could be used for take-off, and a number of competitors remarked that models were usually hand-launched anyway, and the general impression seemed to be that it was nearly impossible to get good consistent take-offs unless a tricycle undercarriage was fitted. It was stated that a model with two-wheel u/c was prone to swing and ground-loop. The writer experienced this trouble some time ago, but has practically solved the problem due to remembering articles that appeared in aeronautical magazines years ago, when the tricycle as we now know it was introduced to full-size aircraft. The tricycle solves the problem, but the writer remembers hearing complaints about damage to models when landing due to the nose wheel catching in rough ground. Let us then look at the whole problem and see what causes a ground-loop.

Fig. 1 shows an ordinary model aeroplane with the wheels well forward as is usual to hold the nose up on take-off. The resistance to forward movement acts on the wheels, and at the same time the model will pivot sideways on the wheels. If anything causes the machine to swing sideways a little, the C.G. will not be following behind the mid point of the wheel resistance. Since the wheels are now trying to go sideways their resistance increases, and the momentum of the machine acting at the C.G. swings it right round in a ground-loop. See Fig. 2.





The wheels are put forward partly as a protection for the prop. and partly to prevent nosing over, which may also damage the prop. Since flexible props. can be used satisfactorily on practically all models, there is no need to protect them. There is then no need to put the wheels any further forward than is required to prevent the thrust pulling the machine over. The axle will then be about under the wing leading edge, see Fig. 3, and consequently very much nearer the C.G. Any swing now has far less tendency to produce a ground-loop, and is much easier to correct with the rudder. This is the way the writer has overcome the problem, though the fact that proportional control is used may help. Control is such that in calm weather at least, the model can be tipped on to one wheel, and taken off in a slight turn. It has even been tipped from one wheel to the other before getting off. The model most used for this is 45 in. span, powered with a Mills Mk. II and weighs 26 ozs. It is also flown sometimes with a 36 in. span wing when the take-off run is very long and quite a high speed is attained on the ground. A photograph of this particular model appeared on page 534 of the September AEROMODELLER, though unfortunately the rear struts of the undercarriage cannot be seen. It might be mentioned that this model is fitted with plastic wheels that sometimes split due to impact with the tarmac runway, but take-offs are still quite normal even though the wheel is in two loose halves and wobbling all over the place. In the photograph on page 552 of the same issue, the

undercarriage of another model can be seen and its well aft position can be compared with "Sparky" for instance, in the same issue. Experience with scale models had proved that take-offs could be made with the wheels so far back.

With a tricycle undercarriage conditions are rather different. With the main wheels behind the C.G. the tendency is for the momentum to pull the machine straight if it has been deflected, see Fig. 4. It is, however, necessary to have the wheels in line, or a turn on take-off or taxying may tip the model over. The main wheels should not be far behind the C.G. or take-off may be prolonged unduly, causing a zoom and stall. The best position is so far back that if the model is placed tail down, it will just tip forward on to the nose wheel. The height of the nose wheel will also need adjusting for best results for take-off and landing. If the model zooms too much on take-off raise the nose, and if it bounces on landing, lower the nose. Incidentally, the writer's worst take-off trouble was with a flying wing with tricycle undercarriage, through the wheels being slightly out of line. The model can be pushed along the ground to see that it runs straight, and this should be tried after any slightly heavy landing.

Contest Faults and Remedies

The competitions we saw in 1951 were disappointing, the standard of flying having deteriorated, and reliability has not improved. Is it due to lack of preparation? When people have trouble, do they just rectify it, or do they try to find the cause and eliminate this also? What reasons can competitors give for their failures? Will those people who had trouble in any competitions please send along brief details of the equipment used, what went wrong, and the reason for the failure if this is known. Strict confidence will be observed where desired. From the information received we will try to improve this R/C model flying business.

The I.R.C.M.S.

The writer has been a member of the International Radio Control Models Society for about 18 months, and has attended meetings of the Birmingham group. There is always plenty of interest, most members having a new gadget or piece of equipment on show. Bulletins are issued at intervals, and pamphlets are available describing various apparatus from transmitters to actuators. The pamphlets are available to non-members, and as correspondents have asked about these perhaps the address ought to be given. It is: Publications Secretary, D. J. Lea, 63, Church Street, Harpurhey, Manchester, 9. Since there is quite a lot to be gained from membership of the Society by those interested in building their own bits and pieces, here is also the address of the Acting Secretary: C. H. Lindsey, 292, Bramhall Lane South, Bramhall, Stockport, Cheshire.

A Letter From N.Z.

"As the designer of the radio control receiver referred to by Mr. Howard Boys in your May 1951 issue, I feel that the following notes may be of interest to your readers.

I agree with Mr. Boys that the receiver in question is rather expensive. It was more in the nature of a stunt, showing what *can* be done by way of securing reliability, and very light weight, more or less regardless of cost. It is certainly not representative of current practice in this country. Over here, radio control receivers have developed (entirely successfully, it may be added) along different lines, and, we think, better ones, than the simple thyratron receiver.

The leading exponent of R.C. flying in this country is Mr. L. H. Wright, who has been active since 1936, and who has been demonstrating for many years the complete practicability and reliability of the receiving equipment which he has designed. Incidentally, practically everyone who is now interested in the subject, including the writer, owes that interest to the enthusiasm and success of Mr. Wright. His receivers have all used normal miniature valves, either two or three in number, and the cardinal principle has always been to operate a relay that is robust enough to be reliable. Accordingly, his receivers have all employed the original principle of Ross A. Hull, who in 1936 hit upon the idea of distinguishing electrically between the characteristic hiss of a super-regerative detector in the absence of a signal, and the lack of this hiss when a signal is received. With one or two ingenious modifications of his own, Mr. Wright has succeeded in building receivers with a current swing in the relay valve of from four to six milliamps. These sets all work from only 45 volts H.T., and have numerous good features. Above all, they have the most essential characteristics of robustness, ease of adjustment, and reliability. They are in no way critical as to aerial length, or to the state of the batteries. There are absolutely no "fussy" adjustments, and it is their best feature, from the modeller's point of view, that they can be installed in a model and then forgotten, except for a periodical check on the batteries. Mechanical and electrical stability is such that re-running between flights is quite unnecessary. As a result of all this, there is nothing to do on the flying field but fly! It should be made clear, moreover, that the above remarks apply not just to one or two receivers, but to considerable numbers, designed and built both by Mr. Wright and myself for our own use, and that of other modellers who are not radio men.

In aiming at and achieving performance of this sort from the radio gear, we consider that the ideal of a receiver that can be handled easily by anyone, without special technical knowledge, has been approached very closely. Much more closely, indeed, than would appear to have been done by the XFG1 type of receiver. It is recognised that the

Continued on page 115.

Readers' Letters

British Diesels Abroad

DEAR SIR,

Regarding your views on the performance of British diesels and their fuels, I think I am justified in putting forth my views in opposition.

Performance of modern British diesels compares favourably with that of American glow-plug engines. You will notice that I use the word " favourably ". From my own experience and others as well, the diesel will surpass the equivalent glow-plug engine on large props. It is not so, however, on small props. The diesel has the same approximate performance on small props. but not better.

You must agree with me when I say that fuel can make a vast difference. With our " home brew " mixtures the above type of performance can be expected. There have been, however, a few local modellers who have managed to get commercial English fuels such as Mercury and Mills Blue Label. These commercial fuels made a world of difference as regards performance compared with our " home brews ". I might add that these " home brews " are usually the manufacturers' prescribed mixture.

Canada. VICTOR MEIKLE.

Of course, the diesel will not surpass the equivalent gloplug motor on a small prop. No engine will deliver its best at the wrong revs.! Diesels generally deliver maximum B.H.P. at a lower speed than the average gloplug motor, hence the necessity of running them with the correct *sized prop. A gloplug engine is just as dismal a failure on an oversized prop. as a diesel is with an undersized prop. Reader Meikle should study the performance curves given in " Engine Analysis " for the specific purpose of showing aeromodellers the correct speed at which to run their engines for maximum performance.*

Dare we mention too that most manufacturers give in their instruction leaflets the correct props. for their products ! ! ?—(ED.)

DEAR SIR,

In the interests of British miniature compression ignition engines which are exported to Canada, I take this opportunity to endorse the remarks put forward by C. D. Wilson in his letter published in November AEROMODELLER.

Having recently come from England where I saw compression ignition engines operating under favourable conditions, I have no hesitation in agreeing that the *average* Canadian modeller and American modeller have never seen such an engine operating correctly and so have missed the benefits offered by the compression ignition engine—namely cheapness of fuel, cleaner operation, stronger construction, and more positive fuel feed and carburation.

The fault definitely lies in the fuel used. I note that the AEROMODELLER'S note at the conclusion of Mr. Wilson's letter assumes that no sensible modeller will ignore the makers' recommended fuel, and this is quite correct. Confusion on the constituents of the correct fuel for any particular engine arises from the fact that Paraffin Oil in Canada is by no means the same oil as the common interpretation of Paraffin Oil is in England. If Paraffin Oil is asked for at the local drug store a thick mineral oil is received, which is good for lubrication but is no use for supplying the power to the engine and, therefore, a person uninitiated in compression ignition operation is attempting to run his engine on 50% Ether, which is a poor fuel for supplying the power, and 50% Mineral oil, which is vastly overloading the fuel with lubricating oil and no oil for supplying the main power to the engine is present in the fuel mixture at all. This is the fuel recommended by the local model shops, and consequently British engines using the mixture give very poor results.

If, in the makers' recommended fuel formulas suggested for any particular engine, " Kerosene " was substituted for " Paraffin ", the fuel situation would be largely cleared up, the engines give much better performance, and become as popular here as in Europe once the poor reputation they have here has been " lived down ". I note that ED's recommended fuel mixture for engines sold here is Ether, Paraffin (or *lamp* oil) and castor oil, which gives a much more clear indication of the type of oil required. Whilst the expert modeller here may obtain the correct fuel and be completely satisfied with his engine, the *average* modeller relies on information from the makers' recommended fuel or from the local model shop. If this information is misunderstood and the engines perform poorly, a large number of engines are unlikely to be sold.

Canada. P. J. EURIGHT.

The Junior Question

DEAR SIR,

A boy's interest can be maintained and stimulated only by success following upon success. Maintenance of a series of successes can be accomplished only by the provision of work which lies within the scope of the skills mastered by the boy. The moment this scope is exceeded, boredom enters, and the boy becomes " unduly noisy ".

The building of the model involves very complicated co-ordination of muscle and mind, a concentration which the Junior cannot sustain for more than a few minutes.

Simple tasks then ; simple for the boy, but always results ! results !! results ! ! !

Has your contributor tried working backwards ? Start your Juniors on a model almost complete—

one to finish and fly on the same night. The model to be partly dismantled, and rebuilt during another club night. But always the flying !

" The Seniors have offered to put their experience and knowledge at the disposal of any junior at any time ". But have the seniors sat with individual boys and tried to get into the child mind ? Don't " offer to put their experience and knowledge . . . ". The very attitude is enough to make a boy cringe. Why should he lower his dignity in the eyes of his fellows by asking for help ? Don't wait to be asked—go to it when you see it is needed.

" Juniors only " flying sessions, please. No second fiddles ! Of course, Junior won't enter his early efforts after seeing Senior's immaculate model perform.

Why does the committee tolerate " downright ill-mannered " behaviour. Guilty members should be temporarily suspended—their fathers, too, if they are members.

Thus may industry abound with cheerfulness, and the day end well.

Boys are grand beings, worthy of our utmost efforts, and will, in due course, regret the intolerable non-co-operation of Youth.

H. D. ROBERTSON.

DEAR SIR,

As a Junior of under fifteen years I read your Mr. Plank's letter with interest and indignation. A Plank is a bit of wood—and if names mean anything that leads to blockhead—was he born in long pants and grown up ? How does he think Juniors like us are going to learn if " old age " looks on us as just so much noise ? In my club there are, happily, a few greybeards interested enough in the up and coming schoolboy to spare their time to instruct us. We have learnt a lot that way—and, may I add, I don't think these oldsters have failed to gain by the efforts they have put in to make our future more certain.

I am pleased to be able to sign myself

" UNDER FIFTEEN."

RADIO CONTROL NOTES (*Continued from page* 113)

thyratron receiver has done much, by making possible the production of relatively cheap commercial receivers, but it does seem that a considerable measure of reliability and ease of operation has been sacrificed on the altars of light weight and low price. The authority for this opinion is to be found in your own pages, from which it is sufficiently obvious that the XFG1 receivers suffer from a need for critical adjustment, and from non-reproducibility in their characteristics, which aggravates the trouble.

It seems a pity that British writers on R.C. should set a fashion by their preoccupation with cost. Even Mr. Honnest-Redlich, in his excellent book seems to be afflicted by this malady. Such an attitude seems to discourage experiment in favour of the purchase of commercial equipment which in the writer's opinion does not have the reliability or ease of application that the non-radio-versed modeller could well do with, and which he should be entitled to expect. After all, why should cost within reason, be such an obstacle ? A modeller will gladly pay out good money for engines, provided he gets the performance and reliability that he has learned he may reasonably expect, so why should he be asked to put up with commercial radio equipment that suffers from serious limitations ? Should he not be encouraged to use slightly more complex but more reliable equipment, and be told the truth about the thyratron receiver, namely that it is all very well where light weight and low cost are essential, but that it by no means gives the best answer when these two factors are not in control ?

There is much more that could be said on this subject, quite apart from recent unpublished developments by Mr. Wright and the writer, but the above screed would appear to be more than sufficient for a harrassed Editor to cope with for a start."

Yours truly has been given the opportunity to comment on Mr. Foster's letter.

It is quite true that where light weight and low cost are not essential the thyratron receiver is by no means the best, but it is equally true that in this country, they are controlling factors in nearly every case. For those who have the money to spend, there is the E.D. Mk. 1 equipment which should be equal in reliability with Mr. Foster's, and it was the second equipment to be put on the market. The cost of this now is £18 and a suitable engine and model kit about £8. The cost of a thyratron type equipment is £10 and a kit and engine £4 upwards. In the early days, many people started with large models, but have mostly come down in size with the introduction of the thyratron, since the smaller models seem more flyable. Flying conditions in this country may have had a lot to do with development in this direction.

Judging by correspondence, there is not much interest in anything more than one valve. Only one query has been received, and that from a Canadian who thought it would be cheaper than importing a thyratron !

All this is, of course, our defence, but it does not mean that Mr. Foster is wrong. He is just doing things in a different way, and quite an interesting way. It is probably the best way for the flying conditions existing in New Zealand. No doubt quite a number of readers would like to try his type of receiver. We hope he will send us enough information for this.

AEROPLANES
IN
OUTLINE
No. I.

THE NORTH AMERICAN F-86 SABRE

By G. A. CULL

UNIVERSALLY acknowledged as the best United Nations fighter in service, the first Sabre was produced some five years ago designated XF-86, and powered by a General Electric J-35 turbojet. This later gave place to the more powerful 5,200 lbs. thrust J-47-GE-1 unit to become standard in the production F-86A, which entered squadron service with the U.S.A.F. This single-seat fighter featuring swept wings with full span slats and fully swept tail unit, speedily surpassed the F-84's and F-80's already serving. Early last year a standard F-86A Sabre, number 7616, with full military load established a new World Speed Record of 670·981 m.p.h.

As a result of experience with the F-86A's power-assisted controls, made necessary by the supersonic speeds attained, the F-86E has appeared with a completely new control system. This features a " flying tail " wherein both elevators *and tailplane* are moved by the pilot's control column, and this system is irreversible, meaning that no loads are transmitted back to the pilot.

The F-86E is now the most widely used Sabre and this version has done much operational flying over Korea. With Russian-built MIG-15 fighters appearing on the scene, Sabres were rushed to Korea to arrive in mid-December 1950. Whenever possible the Sabres have been used to directly oppose the MIG's, and with their six ·5 in. guns have destroyed fourteen MIG's for every Sabre shot down.

In addition to the parent North American Company, the F-86E is built by Canadair. These equip the No. 410 " Cougar " squadron of the Royal Canadian Air Force which arrived at Luffenham in Rutland in November, '51, and the imminent arrival of two more squadrons of Canadian-built Sabres will complete the R.C.A.F. No. 1 Fighter Wing, U.S.A.F. Sabres are also stationed in this country.

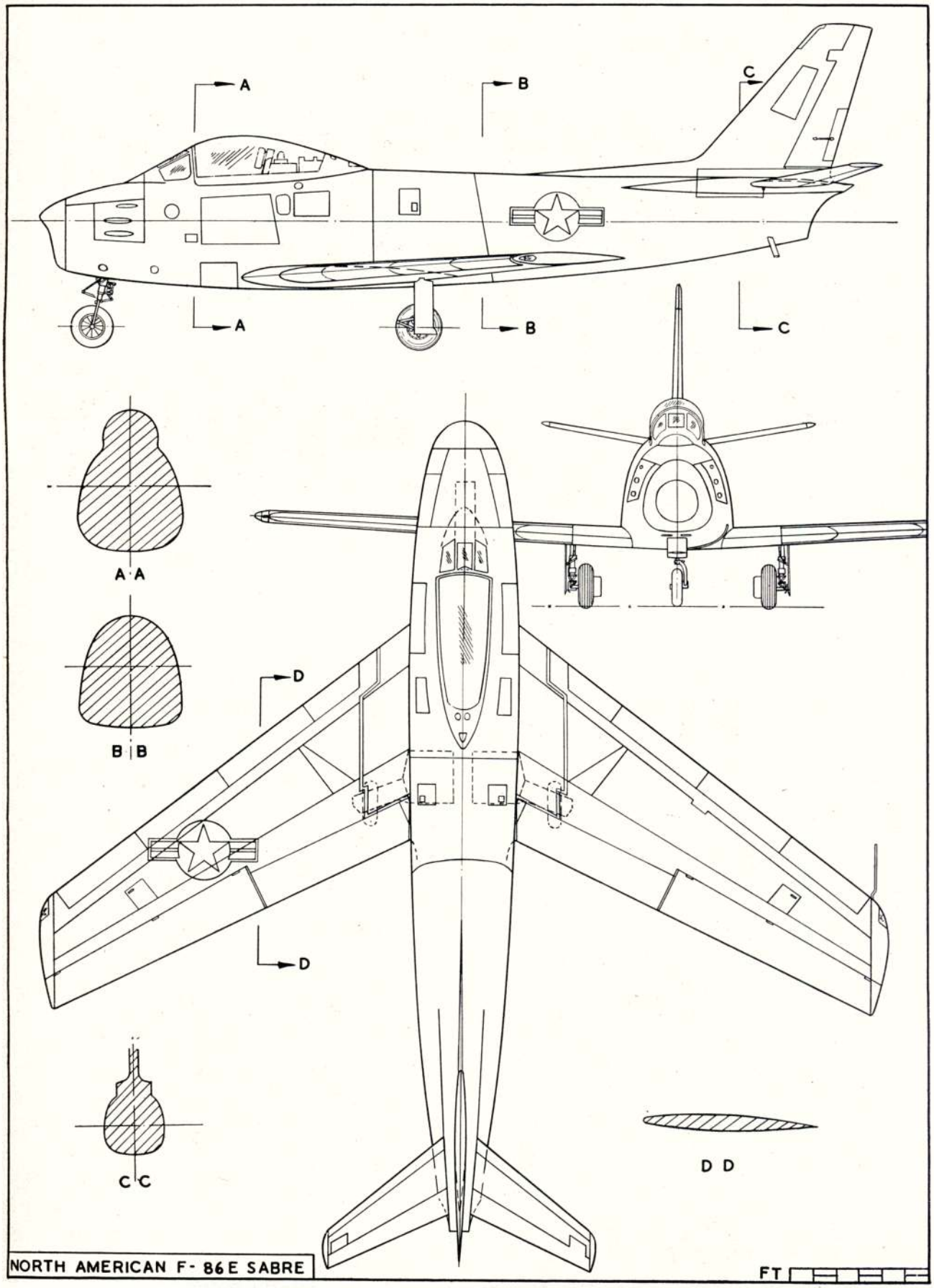
Two Sabres were tested last year at Farnborough and now five hundred airframes are wanted for the R.A.F., possibly to be powered by British Avon or Sapphire jets.

Soon to go into production, the F-86D all-weather interceptor has a modified rear fuselage for an after-burner and a new radar nose.

Specification. Span : 37 ft. 0 ins. Length : 37 ft. 0 ins. Height : 14 ft. 0 ins. Max. Speed : over 650 m.p.h. Combat radius : 500 miles. Service ceiling : over 40,000 ft. Loaded weight : 13,715 lbs. No other details released.

Colour. Natural bright aluminium all over with U.S.A. marking on fuselage sides, upper surface of front wing and lower surface of starboard wing. Star and rectangles on each side are white, disc and outline are dark blue. Central band is red.

Notes for Modellers. Special external features are the flats on the rear fuselage sides against which the tailplane is mounted, and the small curved fillets at the wing root trailing edge. The dorsal fin extension is thin and does not follow-on the thickness of the base of the fin.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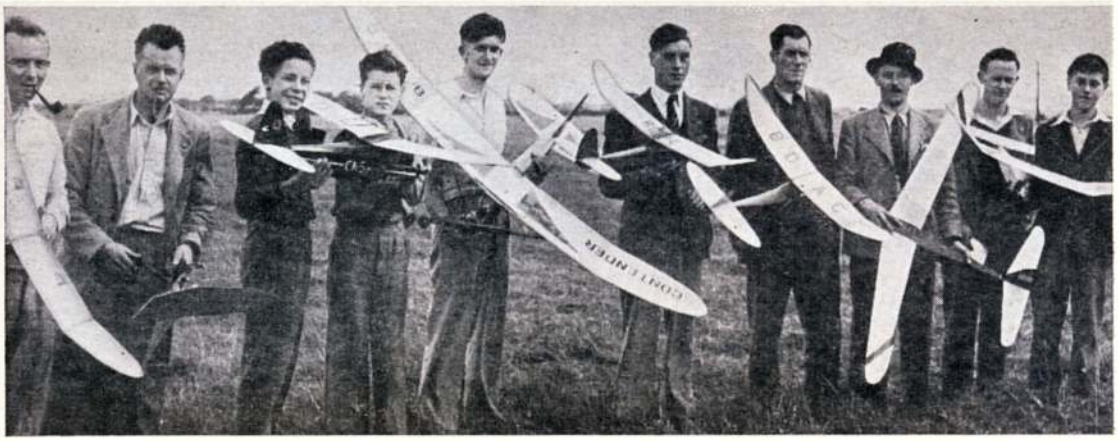

Members of the Boston Club at Butlins Skegness aerodrome for a 1951 rally. With the report that Messrs. Butlins are co-operating with the S.M.A.E. for the 1952 season, this photo is perhaps a happy omen of flying days to come.

CLUB NEWS

WHITHER the Club Movement—by which I mean how can we account for the rather noticeable decrease in the number of clubs in the British Isles during the past twelve months. Even more to the point is the apparent drop in individual club membership—or at least the declared strength when it comes to paying S.M.A.E. affiliation fees etc. ! !

Although the number of clubs that have folded up is fairly small, it is obvious that a very large number of groups are losing members, and though some of these are obviously only a temporary loss due to National Service, the fact remains that many clubs are decreasing in numbers. What about some recruiting drives, or similar means of stimulating interest in Clubs all over the country ?

Seems that the **SOUTH EASTERN AREA** gen writers could do with a spot of regular attendance at Council Meetings, then they might know a little of what goes on. To attend one meeting, and then beef about a change in policy at a later date gets one nowhere, particularly if your own delegate was not present to air the views of his section. As for " dictatorial " practices—surely the Council as such would have justified this accusation had they ignored the recommendations received since the Area Officers' Conference, for it was obvious that some of the decisions taken at that meeting had to be revised in view of later information. As for " short notice of the meeting "—wakey, wakey, S.E. Area—the date of the A.G.M. was known for nearly twelve months, but your absence from this function was nobody's fault but your own !

News from the **LONDON AREA** shows that stringent regulations are now in operation at Fairlop, and flying is compared to operating in a concentration camp ! Apparently some bods were (as usual !) completely unaware of current developments, and were somewhat peeved when they were not allowed access to this " Tom Tiddler's Ground " for London aeromodellers. Perhaps some defaulting clubs will now fork out their due contribution to the facilities provided.

NORTHERN AREA annual general meeting took place at Leeds on the 10th November, when Ron Calvert was again returned as Chairman, and Pete Stringer to Secretaryship. Ken Rutter takes over the reins of Comp. Sec., and will have plenty on his plate with the " Yorkshire Evening News " Rally in '52.

The **SOUTH MIDLAND AREA** have decided to make the annual Halton meeting their Annual Rally—but are currently without a Comp. Sec. to do the necessary work ! A welcome addition to the Area is the Wayfarers Club, who transferred from the London Area into their rightful sphere, thus retaining the services of Treasurer Johnny Lamble for the Area.

Founded in 1931, the **NORTHERN HEIGHTS M.F.C.** is now entering its coming of age (21st) year. The 1952 annual Gala Day will take place again at Langley Airfield on the 29th June—provided the local farmers can be assured that their fields will not be damaged by the crop-crushers. Rules for the Queen's Cup have been altered this time, and this event will now be for powered machines up to 5 c.c. capacity, and having a spot-landing requirement that will earn the lucky competitor a bonus of 50 per cent. Full details of these new rules and other details can be obtained from the club secretary.

Held in wet but calm weather, the " Goodfellow Trophy " of the **BLACKPOOL & FYLDE M.A.S.** looked like being a literal wash-out, but the few stalwarts who stuck it out were rewarded by brighter weather as the day wore on, enabling three maximums to be recorded by the top men. Mike (Yugoslav) Thomas proved the winner by one second over his clubmate M. Davidson, their times being 11 : 12 and 11 : 11 respectively. Mike followed up this success a week later by winning the " Teckni-flo Trophy " with a total time of 4 : 35, runner up S. Newton scoring 4 : 29. It is no surprise to find that Mike is Senior Champ. of the club for 1951, having nearly twice as many points as his nearest rival. R. Morrell is the Junior Champ.

Everyone apparently had a good time at the Annual Dinner of the **CRYSTAL PALACE M.A.C.,** where it was reported that the season finished with several new members, much better models, and higher hopes of good flying in the coming season. George Lister won the " Advertiser Cup " for the second year in succession, also winning the rubber duration and glider prizes. In appreciation of her good work in making members " at home " every Monday evening, Mrs. Suter was presented with a tea service, and the evening rounded off with an extensive film show.

BRIGHTON M.F.C. report the most successful post-war season to date, with members gaining first in the Premier Shield (Wakefield Trials), second, International Power, fourth in the " Model Engineer " Team Glider, and fifth in the Thurston Cup. Although membership has dwindled to 19, there still remains a strong nucleus for the 1952 comps. A/2's and Wakefields are the most popular types at present, and F. Boxall has a new " longer and lighter " model already turning in a regular 3 : 45 in evening air. P. Holloway won the club championship from J. Minshull with N. Neve third. (The Boxall brothers stood down this year.) Will any keen young modellers in the Brighton district please contact A. Mussell, 38, Surrenden Road, as some of the senior members are growing a bit aged !

At the end of October the **CAMBRIDGE M.A.C.** put on a static and flying show at the local model engineers' exhibition, flying rubber and Jetex models. A K.K. Grumman Panther was the star performer, and one bright lad put on a very good exhibit with a Hawker 1067. He cut out all parts and displayed the entire contents of the kit on a large board together with a completed model with sign " From this to this ". A good scheme for any exhibition, and one that would be of interest to the uninitiated.

The **LEAMINGTON & D.M.E.S.** has emerged successfully from a period of the doldrums, and the past season was most promising—probably as a result of securing a permanent home at last, and having a go at the various comps. Rubber, Glider and Scale have the most devotees, with Eddie Wiggins and Eric Barnacle leading the way in the first group. Wiggins raised the National Lightweight record with a " Pinnochio " to 17 : 46, but Eric's " Trump Card " turned up trumps and beat the former duration by 10 seconds—and landed in the same field ! Their juniors are noisy —and *active*, and scored numerous successes in various events, of particular note being Snowy Neale's sixth place in the Scale Power comp. with a dead scale " Stinson Sentinel " (Elfin 1·49) and would have placed higher if he had had a full 20 second motor run. Secretary Kennaugh managed to wangle six awards at various Midland exhibitions with his scale C/L circus consisting of FW190, Fokker Tripe, Sopwith Snipe, and Gee Bee. His latest effort—a Fokker F.3—flew right off the board !

GRANGE M.A.C. recently flew off a team glider contest against the Odiham club in calm winter air, the result being a decisive win for the Farnborough boys who took the first three places. E. J. John scored 9 : 30 for top place flying his lightweight " Super Trojan ", J. H. Blackmore coming not far behind with 8 : 08 and R. T. Fuller 7 : 22. A number of class " C " power jobs are on the boards, with engines ranging from Super Cykes to Fox 35, and the hope is to find kinder timekeepers in the 1952 contests. (One member had an o.o.s. flight at the Nationals recorded as 42 seconds !)

The annual Glider Gala of the **SURBITON D.M.F.C.** will be held on Epsom Downs on March 30th. commencing at 11 a.m. The event will be as in previous years, i.e., unrestricted glider to S.M.A.E. rules. The team event for the " Gala Trophy " will be taken on the top four places from any one club. Entry fees this year will be 1/6 seniors and 9d. juniors, and any profit will be donated to the International Contest Fund.

Though the **BURNLEY SKYRANGERS M.F.C.** only numbers eleven members, ten of them have qualified for their " A " Merit Certificate, including their lone lady member. In addition to this, three also have the " B " endorsement. Though successes in 1951 were not numerous, there are one or two Wakefields that are showing promise, but there is not much serious power flying. In the glider field, the trend is towards larger models, with the Nordic class at about the lower limits for contest work. Club records at present are :

A/2 Glider	**K. Moffatt**	**6 : 20**
F.A.I.	**J. W. Grimes**	**8 : 32**
Lightweight	**T. Bostock**	**6 : 34**
Hand launched	**I. Ellison**	**2 : 45**

Like most clubs, the **BLACKHEATH & HALESOWEN M.A.C.** is feeling the pinch, due maybe to the imposition of purchase tax ! At one time a C/L only club, free flight is catching on fast, and it is hoped to enter teams in many events this season. During 1951, " Staff " Screen captured the club power duration record with a 25 minute flight from a 7 sec. motor run, the model being an Ohllson 23 powered " Mallard ". Secretary Wheldon gained the sailplane record with a 30 minute flight after a towline release at 20 feet, the job being an O/D lightweight of only 240 sq. in. area. Speed merchant Mike Beesley has been doing well with a 90 m.p.h. team racer. A scheme is in operation for the training of juniors ; 24 are at present on roll, with 18 attending regularly. Students pay 6d. to 1/- per week and have all materials provided, and are given instruction in theory, construction and flight. In the new year, it is hoped to procure a diesel, and allow the students to build C/L trainers sharing the common motor. Sounds a good scheme to me, and should certainly keep the " noisy element " busy.

So ends the **KNUTSFORD & D.M.F.C's** second year of life, successful so far as club flying is concerned, whilst lacking in contest successes. Towards the end of the year, two newly acquired shields were competed for, D. Hulme upholding his reputation of being the club's leading power exponent by simply cantering home to victory. A very large entry was on hand for the second event, a scale contest, the winner being D. E. Parmenter with a " Voyager ". After seeing some excellent displays of radio control flying at Tilstock on the 14th October, everyone has become dead keen.

The **EPSOM D.M.F.C.** held a very interesting exhibition during the week November 5th–10th at the local Odeon cinema. Mr. Charles Gardner (see January cover) performed the opening ceremony, recalling his early efforts as an aeromodeller and balsa basher. During the week over 16,000 people saw the exhibits, among the 58 models shown being a 78 in. span scale model of the " Westland Wizard " built by a 14-year-old member, and a 4 in. span Jetex speed job capable of well over 100 m.p.h. Other interesting models included the fifth prototype of the " Flying Square " (or Greenhouse) which caused a great deal of wonder—and not a few rude remarks !

J. Holt of the **UPTON M.F.C.** was presented with the club Champion Shield by Dr. Thurston at the recent club prizegiving and social, runner-up P. Carpenter receiving the Silver Shield. Other silverware went to the successful members for 1951, the evening being rounded off with dancing and other entertainments provided by the members themselves—even the dance band being " home-made ". Outstanding club successes in 1951 were the setting up of a British record by J. Mace, and Mrs. J. Holt's second place in the Women's Trophy.

Poor weather has restricted the activities of the **LEICESTER M.A.C.** in recent months, though a few hardy members turn up in all weathers to try out new jobs, mainly A/2 gliders and the odd pylon power job. One member has been consistently flying a 7 ft. span

semi-scale job which stooges around at 15–20 feet if launched hard enough with the wind in the right direction. Interest in C/L has almost ended, except for special " do's " when old, fuel soaked models are produced which—if still whole at the end of the show (which isn't often) are hurriedly hidden away again ! Winter indoor meetings are proving quite popular, and it is hoped to commence r.t.p. flying very shortly. The recent A.G.M. produced a reshuffled committee, and the steadily decreasing membership and increasing expenses were viewed with some alarm. However, with a silent prayer for good weather they press on !

S.M.A.E. Chairman Mr. A. F. Houlberg and Mrs. Houlberg were the guests of honour at the **SOUTHERN CROSS A.C.** dinner and prize-giving recently, when 28 members and guests had a very good time. A. F. H. recalled that it was at Brighton that he attended one of his first model contests, and wound up with a plea for more co-operation with the light aeroplane clubs in accordance with the Whitney Straight report. Doug Lane, Bill Gravett and Grahame Gates were well applauded when they collected their trophies from Mrs. Houlberg, thus rounding off a very pleasant evening.

The **DAGENHAM M.A.C.** held a very popular Jetex Scale comp. though it was found fairly difficult to trim the jobs. Flying was preceded by a concours, won by Stan Midwinter (what an appropriate name for a winter contest !), and points were scored on the best of three flights. D. Adams proved top man with a total of 30 points. Since their last report, three club records have gone the way of all things, the open glider honour now being held by Stewart Jackson with a time of 13 : 10, and he also scored 1 : 35 with a chuck glider. C. Woods raised the open rubber figure to 5 : 22.

Formed at the beginning of October, the **ABERYSTWYTH M.C.** has been honoured by the acceptance of the presidency by the Mayor. An initial indoor meeting staged on the 21st November proved very interesting, winner being A. Millichamp with a time of 45 secs., just one second better than the runner-up, D. Poole.

The aeromodelling section of the **DUBLIN S.M.E.S.** celebrated the 50th anniversary of the club's foundation in a rousing fashion. In spite of an active aeromodelling membership of only six, the boys put on a good show at the Leinster club's championships, being placed in all four classes. Work is now going ahead for the M.A.C.I's exhibition, which is to be held in the Mansion House, Dublin, during the first week in January.

A winter club comp. programme has now been decided by the **WHITEFIELD M.A.C.,** and should include a sufficient number and variety of contests to suit everyone. The first of this intensive programme was an unrestricted glider contest for the " Normac Cup " held on December 2nd. Weather conditions were peculiar, varying from flat calm to strong wind, from sun to pouring rain (and vice versa) in a matter of minutes. Winner was J. O'Donnell with three 3-min. max's flying the inevitable " Miolnir "—a design which is almost the club standard model. Very close behind came his young brother, Hugh, with two maximums and 2 : 53 (flying the high A/R Nordic with which he won the Frog Junior Trophy). A. Wrigley and A. D. Bennett came next with scores of 6 : 39 and 6 : 16, flying a 9 ft. " Miolnir " and an Odenman Nordic.

The **BUSHY PARK M.F.C.** wishes to report a successful season, including two Continental R/C wins by Ted Hemsley. The team race members, thinking over last year's near misses (two seconds and three thirds) have decided that a 10 mile race is not really long enough to allow for any slight mishaps, and are therefore intending to run (if enough support is forthcoming) a 100 mile Grand Prix. If you are interested get in touch with them at 150, High Street, Teddington.

The **THERMALEERS M.F.C.** have now obtained a new meeting place at Oliver Goldsmith's School, and meet every other Saturday. Enthusiasm is high, particularly for " high climb " ships, and Bob Annenberg is helping all he can to trim jobs ranging from ½A size to his own Dooling 29 job. R/C is also receiving attention, and it is even whispered that Dave Posner is thinking about an R/C " Dream Bogey ".

The **FORESTERS (Nottm.) M.F.C.** winter C/L contests are under way, and Sec. Dick Noble leads the field in the first round of stunt. (The result is based on the best in two rounds, so he may yet come unstuck !) Speed is worked on a complex sytem of calculations to even up the classes, and as only their pet " electronic brain " can work out the result, it is not to be wondered at that he leads the event with his diminutive Elfin 1·49 powered machine. Hopes of obtaining a building hut to supplement the other many and varied Tollerton activities are fading as all buildings have been " frozen " temporarily until the powers that be decide who is to own the 'drome.

I end up this month's news with pleas from two Czechoslovakian readers who want to correspond with modellers over here, so if you would like to take up the pen in the interests of international amity, here are their addresses :—

V. Koukal. Prague XI. Mladonovicova 3, Czechoslovakia.

Ludik Hrubisek. SPD–LET, Kollarova 617, U1. Hradisti, Czechoslovakia.

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CEAR URFA M.A.C.
N. C. Pyne, 18, Pine Avenue, Cleadon Park Estate, South Shields.

ABERYSTWYTH M.C.
Mrs. P. Walker, " The Anchorage ", Penyranchor, Aberystwyth.

SOUTH LONDON SCALE M.F.C.
W. G. Lilleystone, 325, Upper Elmers End Road, Beckenham, Kent.

SECRETARIAL CHANGES

WOODLANDS M.F.C.
D. Threlfall, 136, Bentley Road, Doncaster, Yorks.

SOUTH BRISTOL M.A.C.
J. G. Phillips, 48, Bellevue Road, Easton, Bristol, 5.

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

GRANGE M.A.C.
E. J. John, R.A.E. Apprentice Hostel, Farnborough, Hants.

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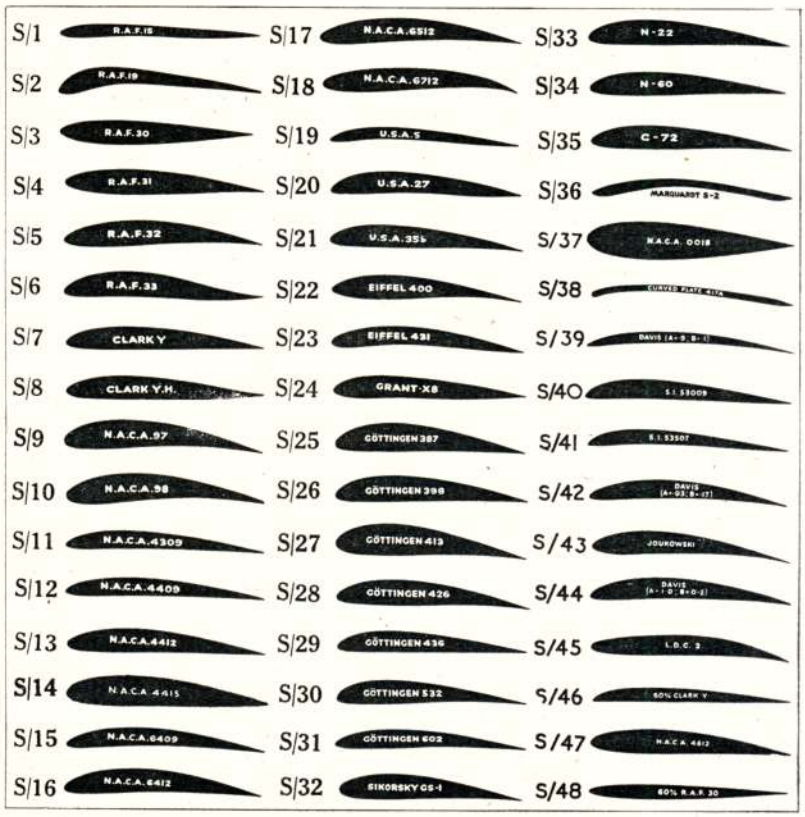

U.S.A.F. at FAIRLOP *Cont. from page 91*

Aerotrol equipment and despite slight over-power and ballooning tendencies, made a nice flight to gain a tie for second place.

First to fly at the speed circle was Pete Wright, with his beautifully made 2·5 c.c. job flying on 52 ft. 6 in. lines at 89 m.p.h. followed later by a smooth 120 m.p.h. from his British class IV record holder. Other British entries made an unusually good number of take-offs, the most notable flight being 126 m.p.h. by Raymond "Gadget" Gibbs of East London, with his Checksfield/McCoy 60 model. But though the British speed efforts were good, they could not catch fur-capped Capt. Glasgow, with his Dooling 61 job, which exceeded the British record with a magnificent 134 m.p.h. in class VI. His associates were less fortunate, and spent the day dogged by what we may presume to be called "engine malfunction". Captain J. Hauser made one spectacular tarmac-splitting prang, wrapped up his lines and returned to the pits to be enlightened with a "Say brother—take it easy—you have an airplane on the line". This and many other quips like "What hit it?" . . . "Waal, t'prop bloo up, and t'ship went with it!" plus the constant aroma of best Havana and similar outsize cheroots, helped to set the scene.

In stunt, where experts Alan Hewitt and Norman Butcher efficiently judged Kenneth's Muscutt and Marsh, Chas. Taylor and "Stoo" Steward, all of whom are creditable representatives, victory went to Capt. Hauser with his Fox 35 "Squaw". Good points must also have gone to Capt. Glasgow and his Fox 35 powered Chief. Both the latter models were silk covered, very well constructed, and were able to "turn on a dime", thanks perhaps to their peculiar wing section and generous flap area.

Free-flight was our victory, for Messrs. Marcus, Mayes and Glynn made good ratio flights in spite of the poor conditions for duration. Norman Marcus in particular, amassed an aggregate ratio of 41 : 1. Placing third, with a ratio of 24·6, S/Sgt. Prahl was top man for the U.S.A.F., flying an Ohlsson powered San de Hogan. Its steady climb was capped by a floating glide that will probably influence several London area designs for the '52 season!

Of the team race, we should say little, for "engine malfunction" reared its head in the U.S.A.F. entry to make it a two-British plane race with the Super Saint (see page 78) winner by four laps from "Fruit Nose" by W. Morley.

The results? Well in *fact*, more friendships have been made and we arrived at the following viewpoint:—Our U.S.A.F. counterparts are just the same as the "you and me" British aero-modeller at heart. They are certainly more liberal with the colour dope, perhaps a trifle less attentive with the sandpaper and cement; and they have much more equipment; but they have just the same troubles with their engines and their lines! And in *figures*, the results were:—London 103 points; 12th U.S.A.F. 33 points. R.G.M.

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