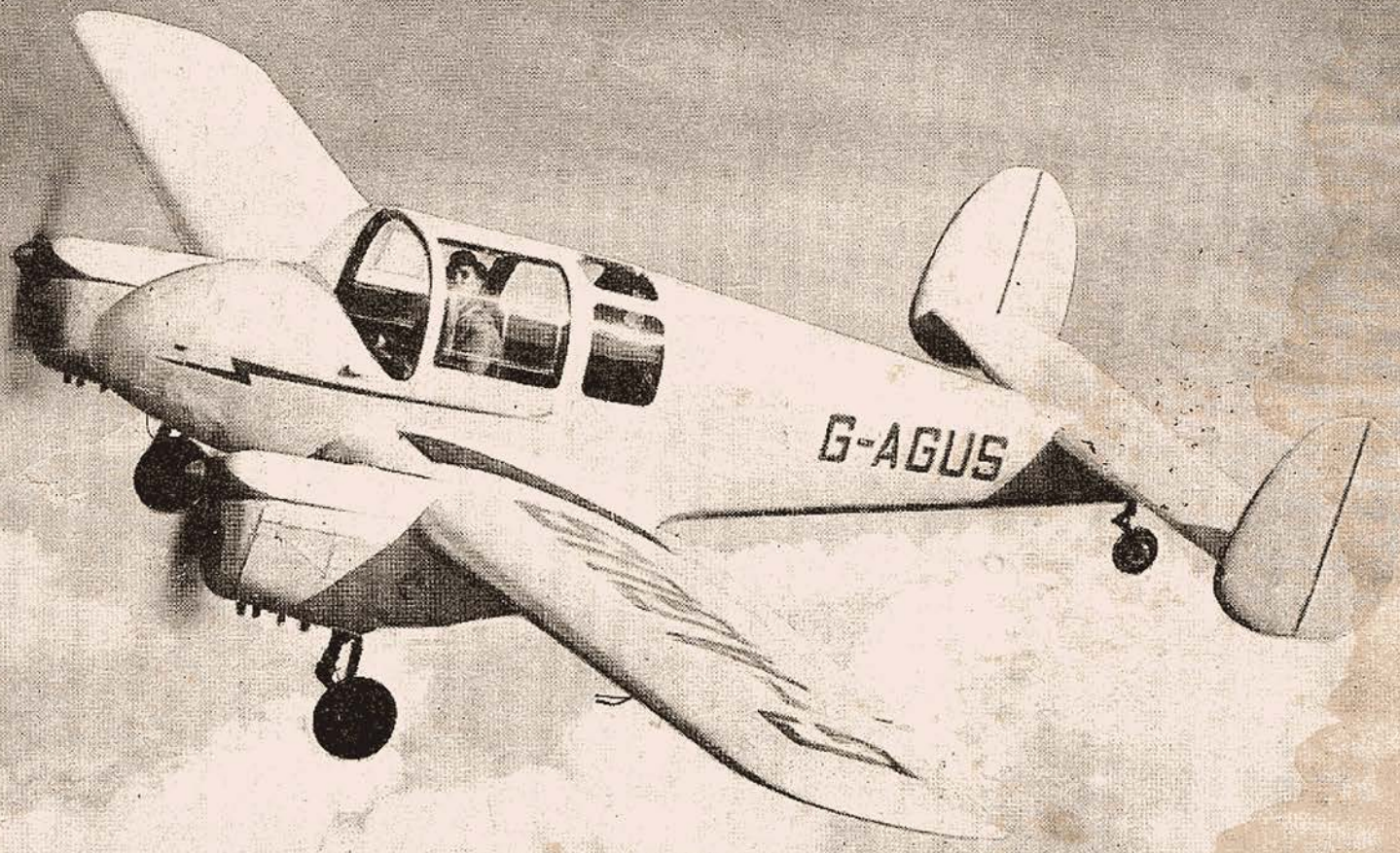
MODEL AIRCRAFT



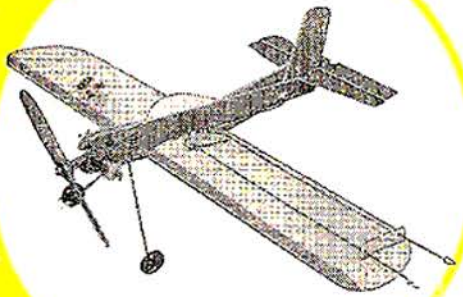
Build a scale control-line model of this Miles Gemini

1'6

OCTOBER
1955

Skyleada

ALWAYS ON TOP FOR REAL VALUE



20" CRACKERJACK

A NEW CONTROLINER FOR ½ TO 1 c.c. ENGINES

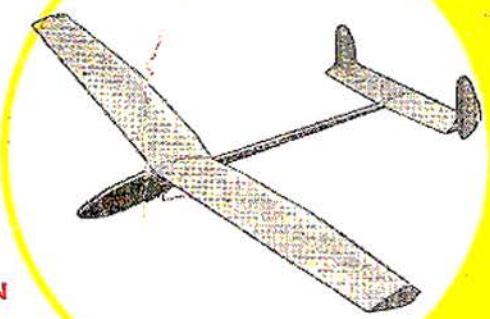
20" Span CRACKERJACK,
TOP VALUE at only 8/9 inc. P.T.

90 per cent. of the parts pre-cut to shape making the model very simple to construct. A high performance fully aerobatic model which will stand plenty of knocks makes this kit ideal for the modeller who wants plenty of flying fun with the minimum of trouble.

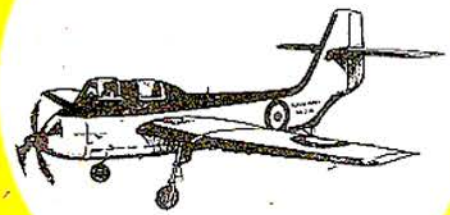
A-1 SPECIFICATION 48" SPAN CONTEST GLIDER

"ALBATROSS"
10/11 inc. P.T.

Twelve Star Exclusive features giving Advanced Design yet simple construction. A pictorial building plan gives twenty easy to follow step by step stages. A real winner for competition work or pleasure flying.



48" ALBATROSS

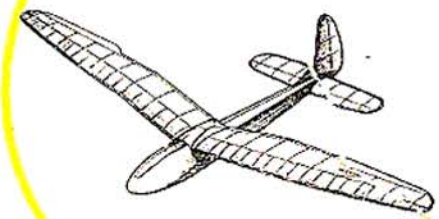


24" SHORT SEAMEW

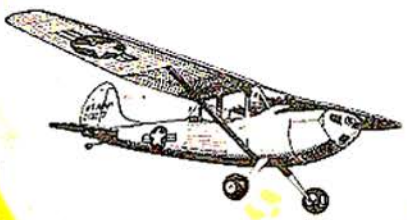
FIVE ADDITIONS TO THE FLYING SCALE STAR SERIES

RUBBER POWERED
24" Span CESSNA BIRD DOG
24" Span SHORT SEAMEW
SAILPLANE GLIDER
32" Span SEAGULL

These big wingspan models have been carefully designed for performance. New style plans show detailed illustrations of each building stage, making models very simple to construct.



32" SEAGULL

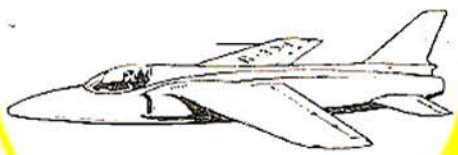


24" CESSNA BIRD DOG

JETEX 50 POWERED
16" Span PERCIVAL JET PROVOST
12" Span FOLLAND GNAT

Two kits which make realistic flying models of these popular jets. Kits contain our usual accurate scale cockpit covers.

ALL FIVE KITS 3/6 each inc. P.T.



12" FOLLAND GNAT

NOTE: All Skyleada kits contain specially selected balsa (inc. ready cut strip) cut by experts in our own mills.

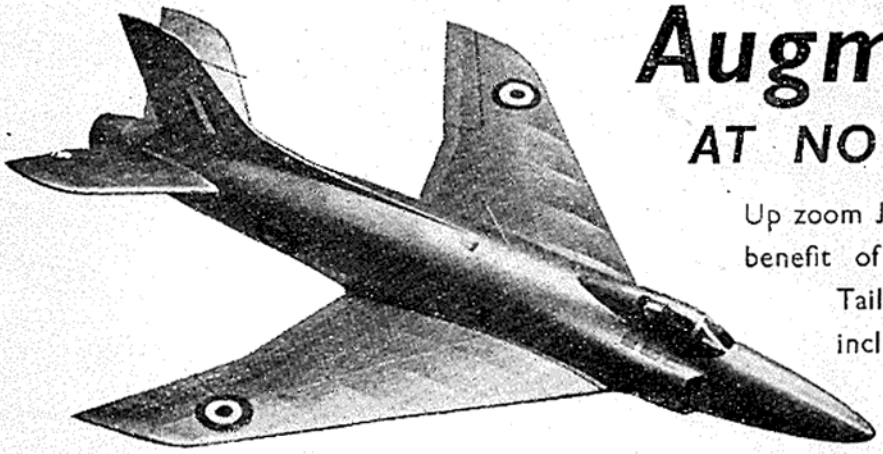
Ask to see the complete Skyleada range at your local model shop or send 2½d. stamp for illustrated leaflet to

BRITISH MODEL AIRCRAFT MFG. CO. LTD. 180 LONDON ROAD, MITCHAM · SURREY

World's easiest Flying Scale Kits now include

Augmenter Tubes

AT NO EXTRA COST !

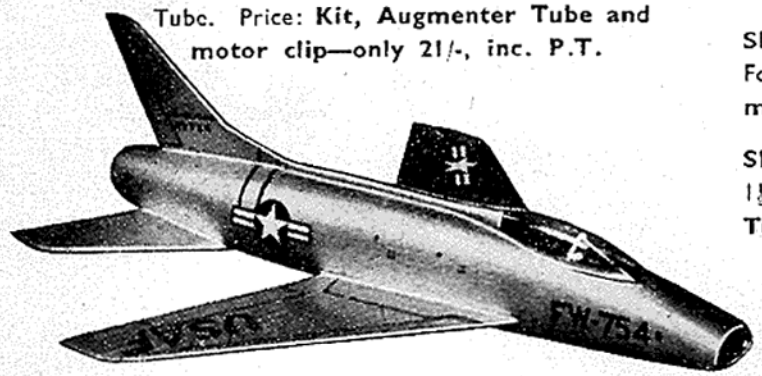


Up zoom Jetex sales and down come costs to the benefit of every Jetex modeller. Every Jetex Tailored Kit of a flying scale model now includes an Augmenter Tube and motor clip, representing a wonderful saving. Take advantage of it now. Get one of the "Jetex Tailored" Kits illustrated. All parts are cut to shape, ready to assemble. Simply "glue, smooth and finish" to get the most beautiful flying scale model you have ever seen.

Go to your model shop now !

SWIFT—Length 24 in.; Weight 4½ oz. Span 20 in. For Jetmaster motor with Augmenter Tube. Price: **Kit, Augmenter Tube and motor clip—only 21/- inc. P.T.**

HUNTER—Length 25 in.; Span 20 in.; Weight 4 oz. For Jetmaster motor with Augmenter Tube. Price: **Kit, Augmenter Tube and motor clip—only 21/-, inc. P.T.**



SKYRAY—Length 12 in.; Span 9¼ in.; Weight 1¼ oz. For Jetex 50B with Augmenter Tube. Price: **Kit, Augmenter Tube and motor clip, 10/6, inc. P.T.**

SKYROCKET—Length 11¾ in.; Span 7½ in.; Weight 1¼ oz. Power Unit—see SKYRAY. Price: **Kit, Augmenter Tube and motor clip, 10/6, inc. P.T.**

SUPER SABRE.—Length 10 in.; Span 7¼ in.; Weight 1¾ oz. For Jetex 50B or Atom 35 motors, each with Augmenter Tube. Price: **Kit, Augmenter Tube and motor clip, 10/6, inc. P.T.**

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Tailored Kits

POWER UNITS

Seven motors with thrust range: ¼ oz. to 6 oz.

JETMASTER
For large scale models with long tail pipes. Outfit—**28/-**. Motor only, **20/7**. Carton of 10 fuel charges **2/11½**, inc. P.T.

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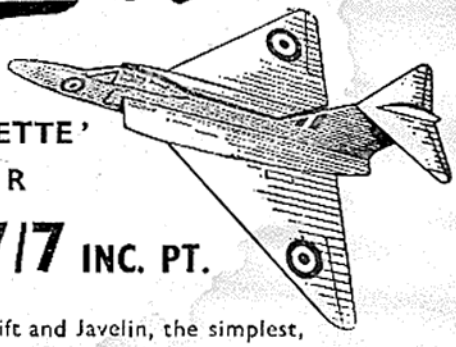

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FOR ONLY 7/7 INC. PT.

Save with "Silhouettes," Swift and Javelin, the simplest, the zippiest "Knockabout" models you can fly. Either of these super simple "Tailored" models can now be yours—with motor, wick and all accessories included—for only **7/7** inc. P.T.

WILMOT MANSOUR & CO., LTD.

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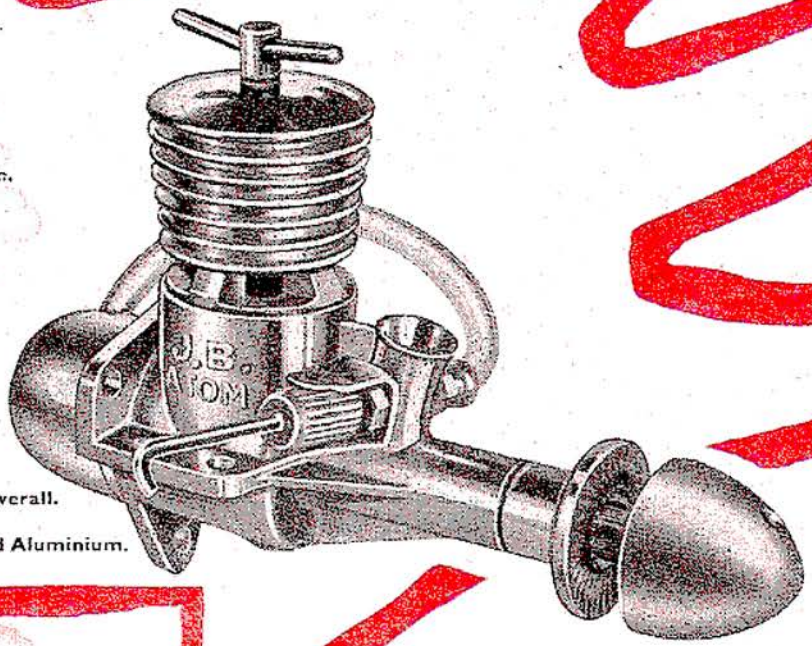
THE "ATOM" IN HAND

The J.B. 1.5cc. MODEL DIESEL ENGINE

THE ENGINE THAT DISPELS ALL DOUBT THAT THE BRITISH CAN MORE THAN HOLD THEIR OWN AGAINST ALL COMERS

* FUEL CONTROL OFFSET FOR KNUCKLE SAFETY
* DESIGNED BY THE MOST EXPERIENCED DESIGNER OF THEM ALL—CHARLIE GRAY (See M.A. April '55)
* COMPLETELY READY FOR INSTALLATION
* BEAM AND RADIAL MOUNTING
* EASY STARTING



Specification:

Stroke: 0.400 in.

Bore: 0.539 in.

R.P.M.: 14,000.

B.H.P.: 0.18.

Weight: 2¾ oz.

Height: 2 in.

Length: 4 in.

Width: 1¾ in. overall.

Finish: Polished Aluminium.

Price 50/-
P.T. 8/-
Very attractive box and presentation

USE **J.B.** ATOMIC FUEL WITH YOUR ATOM ENGINE

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OCTOBER 1955 No. 172 VOL. 14

Contents

Cover Story

The range of types produced by Miles Aircraft Ltd. has included a number of attractive designs, not the least of which is the "Gemini." From a model point of view it incorporates features which undoubtedly make it an interesting proposition, either to the experienced C/L enthusiast or to the newcomer to C/L scale models. In addition, it provides plenty of scope for colourful finishes, there having been some 140 "Geminis" built. Our cover picture of the model's full size counterpart was taken by Charles E. Brown, who was also responsible for last month's striking photo.

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

Published on the 20th of each month prior to the date of issue by PERCIVAL MARSHALL & CO. LTD., 19-20 NOEL ST., LONDON, W.1.
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Letters TO THE EDITOR

Reply to Seaham

DEAR SIR,—The letter "The Frozen North" in the August issue of MODEL AIRCRAFT is without doubt self-condemnatory and displays gross ignorance of the facts and conditions.

The Northern Area, of which this club is a member, are co-organisers of the Northern Gala—their own Nationals. Is not the Seaham Club aware of this? Are they not also aware that they, and all northern area clubs, are always represented in Council by their area delegates, who exceed the number of officers by at least two to one?

The statement that the annual general meetings are always held in London is totally wrong. A recent meeting was held in Birmingham and this year's meeting will be held out of London.

We can only conclude from the general contents of the Seaham Club's letter that they do not take advantage of the democratic system of control in the Society by participating in the local area organisation, whereby they would be fully acquainted with the activities of the area committee, to which they belong.

Yours faithfully,
Hon. General Secretary, S.M.A.E. D. A. GORDON.

Information Wanted

DEAR SIR,—May I appeal to readers of MODEL AIRCRAFT through your columns for information concerning the history of No. 234 Squadron.

The records that the squadron possesses are very meagre and I am trying to contact past members, particularly ones from the last war, who can let me have information or photographs.

Anyone who can furnish details of squadron markings or aircraft numbers, or any other information of interest should write to the Officer Commanding, No. 234 (F) Squadron, Royal Air Force, 2nd T.A.F., B.A.O.R. 1.

Yours faithfully,
No. 234 Sqn., B.A.O.R. 1. R. A. BROWN, Flight Lieutenant.

Paul Mantz Collection

DEAR SIR,—Modellers who, having read the recent article on the Paul Mantz Collection, are thinking of reproducing the Spad S.XIII C-1, may be interested in a few additional points. Eddie Rickenbacker's actual machine

(*Continued on page 412*)

F.A.I. CONFERENCE REPORT

TO many readers the F.A.I. seems an extremely remote organisation and thus the illustration below is of particular interest as it shows the recent meeting of the International Model Aeroplane Committee (C.I.A.M.) at the F.A.I. conference. A. F. Houlberg, S.M.A.E. chairman, C.I.A.M. president, was addressing the meeting when the S.M.A.E. vice-chairman, R. F. L. Gosling, took the photograph.

Points of interest from Robert Gosling's report of the meeting are given below, but possibly the most important point is that there will be no changes in the Sporting Code before 1957 and that countries suggesting rule changes should apply them provisionally for a year or so to evaluate their worth before submitting them.

It was agreed that a single C/L wire may be used for speed flying, provided that it is twice the sectional area of one of the wires used in the equivalent two-wire control. Mathematicians forward please, to work out the theoretical line drag of the alternative systems to see if there is any gain.

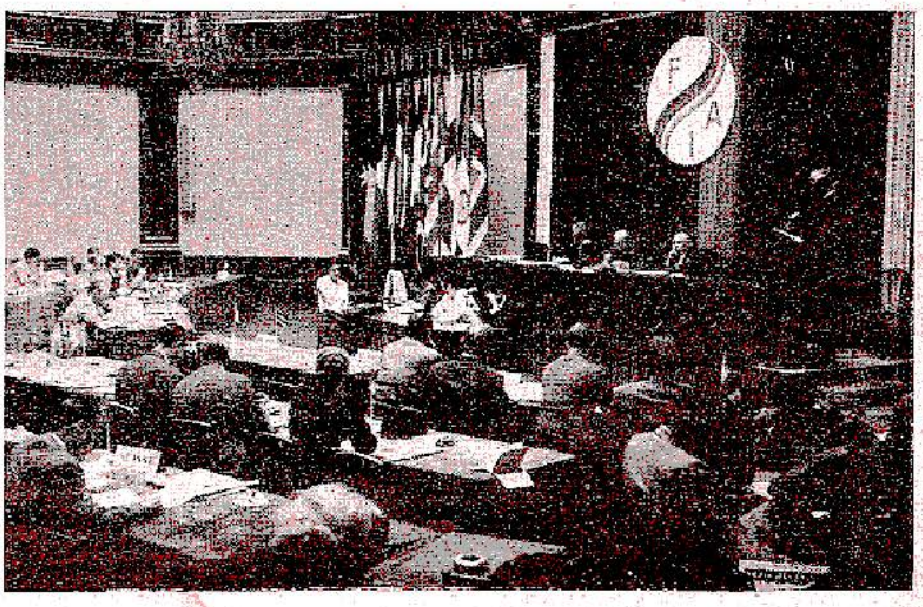
The S.M.A.E. proposal to abolish the R.O.G. ruling caused some discussion but was eventually defeated by 7 votes to 5 with 3 abstentions. The other British proposal to reduce the number of flights in World Championship meetings from five to three received no support.

For F.A.I. certificates, it was agreed to reduce the motor run to 15 sec. and towline length to 50 metres. It was generally considered that the A/1 glider class was not suitable for international competition.

A Danish proposal that a maximum 2.5 c.c. engine capacity should be applied to all types of international power flying was carried, and consequently the C/L speed championships in future will be run with engines of this capacity.

As the new F.A.I. team race line length has met with approval where it has been tried, it was decided that it would be a retrogade step to shorten it, particularly in view of the increase in speeds. A further alteration to the rules is to divide the circle into eight segments. Lots are drawn for starting positions in four consecutive segments, and when refuelling, the model must be moved to the nearest rearward segment to the landing point, unless that is engaged, when the next segment is used.

The latter rules will be tried out at the Brussels meeting and if satisfactory may be adopted at the next F.A.I. meeting in December.



Gently with the Bentley

WHEN are modellers going to learn *to fly their models away from* parked cars? It is of no use blaming the motorists. We have seen it happen time and time again; whenever a vehicle appears on the airfield, it is henceforth made the centre point of activities and models are despatched right and left. Sooner or later someone prangs the car and, although this may be highly diverting for onlookers and the more witless clubites, who can gaze open mouthed at the dents so produced, it does little to help the hobby in general. The idea that "claiming on the 'S.M.A.Y.'" solves everything is pretty clueless too.

RANDOM COMMENT

After a total of approximately fifteen hours' running time, the reed-valve, on one of the Elfin BR.1.49's used in the recent M.A. test report, has fractured. Since this represents about nine million complete cycles, we are not grumbling. The rest of the engine shows no sign of deterioration whatsoever.

* * *

Worth investigation by the organisers of national events are the very excellent score cards used by the R.A.F. Model Aircraft Association. Each card, printed on both sides, measures 8 in. × 6 in. and contains columns for all events.

* * *

Congratulations to Roy Wesson, assistant editor, on his marriage to Margaret Wells. Roy returns from holiday in time to help with the November M.A.

World Champs.

RESULTS OF THE INTERNATIONAL MEETING HELD AT WIESBADEN, GERMANY

Wakefield

Wakefield Cup. G. Sämann, Germany.
F.M.A. Team Trophy— Sweden.

1. G. Sämann	... ...	Germany	5 x 3:00 +	5:15
2. A. Hakansson	...	Sweden	,, +	4:49
3. V. Scardicchio	...	Italy	,, +	4:46
4. J. Altmann	... ...	Germany	,, +	4:44
5. E. Fresl	... ...	Yugoslavia	,, +	4:30

G.B. 11th, F. Holland, 14:40. 15th, H. O'Donnell, 14:36. 29th, J. O'Donnell, 13:54. 37th, P. Read, 13:20.

Power

F.N.A.F.O.M. Cup. M. Gaster. Great Britain.
Fanjo Klutz Team Trophy— Great Britain.

1. M. Gaster	... ...	Great Britain ...	5 x 3:00 +	*
2. F. Stajcer	... ...	Argentine	,, +	*
3. B. Jones	... ...	Canada	,, +	*
4. V. Hajek	... ...	Czechoslovakia ...	14:46	
4. L. Mangino	... ...	Mexico	14:46	

G.B. 6th, P. Buskell, 14:31. 16th, J. Parrott, 13:05. 34th, A. Mussell, 11:36.
* Fly-off times not available at time of going to press.

A/2

Swedish Cup. R. Lindner, Germany.
F.M.A. Team Trophy— Italy.

1. R. Lindner	... ...	Germany	14:46
2. R. Gilroy	... ...	Great Britain ...	14:40
3. R. Hagel	... ...	Sweden	14:37
4. E. Giusti	... ...	Italy	14:36
5. J. Esvelt	... ...	Holland	14:00

G.B. 19th, J. O'Donnell, 12:30. 59th, D. Yeabsley, 9:14. 62nd, G. Lefever, 9:06.

Seamew film

SHORT Bros. & Harland Ltd. have produced a "short." No pun really, as recently we attended a preview of "The Seamew," a film depicting the design, development, and production of this aircraft, which we featured in the August issue of MODEL AIRCRAFT. As it will eventually be issued for general release, enthusiasts and the public together will have the opportunity of seeing—in a necessarily abbreviated form—how an aeroplane is transformed from a design on paper to the completed machine.

The film opens with scenes of the lough right on the doorstep, as it were, of the company's factories at Belfast. The camera then moves to inside the factories to show how the *Seamew* is built up, the various stages being shown in brief sequences right through to the flight testing of a completed aircraft.

The pilot demonstrates the *Seamew's* agility in a brief flying show, which forms a fitting conclusion to a film of this type.

OBITUARY

WITH deep regret we heard recently of the death of Mrs. Rippon, wife of C. A. Rippon or—as he is better known to modellers everywhere—"Rip."

Mrs. Rippon was a staunch supporter of the aeromodelling movement for 30 years and was very largely responsible for the smooth running of the most successful of the pre-war meetings, the Northern Heights Gala Day at Fairey's Aerodrome at West Drayton.

We feel that all our readers who knew Mrs. Rippon will join us in offering "Rip" our most sincere condolences.

Modelling in Burma

ALTHOUGH aeromodelling in Burma is still in its infancy, there is no lack of enthusiasm or even building skill, as was evidenced when we received a batch of photographs recently from two of the five clubs now active in Rangoon. Up to the present, the lack of a modellers' organisation (such as our S.M.A.E.) has retarded the hobby's development somewhat, but in the meantime the Burma Air Force gives its fullest co-operation in an effort to infuse a wider interest in model aircraft and aviation. The Air Force gives its help in a practical way by arranging lectures, film shows, exhibitions, and visits to aerodromes, and even distributes free kits, engines, and accessories (imported from the U.K.) to the clubs.

The Rangoon University Aeromodellers' Club is a "going concern" and has as its president one of Burma's most experienced modellers, 29-year-old Sai Mya Tha, who is a graduate of the University and has been a model aircraft enthusiast for 15 years.

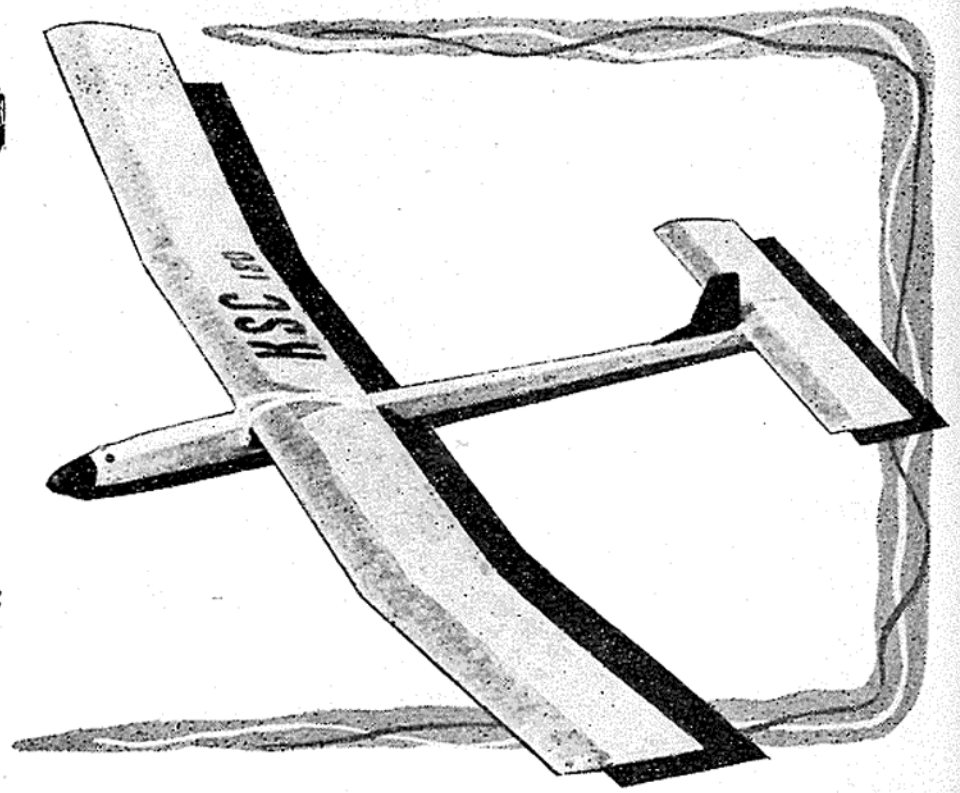
The Burma Aero-Modellers' Club has the laudable motto of "Build 'em—Fly 'em—Keep 'em Flying" and with such a basic approach they can hardly help being successful.

At present the club holds a "field day" once a month, when members meet to fly their models (all built from kits) and exchange ideas, and as soon as more experience is evident, they intend to hold a contest rally.

With such widespread interest, in the not-too-distant future perhaps we can expect—and certainly will welcome—Burma's participation in international events.

Though hardly the ideal outfit for chasing fly-away models, B.A.M.C. member Mg. Kyaw Zaw certainly presents a colourful picture as he launches his Ercoupe scale model.

Oberon



by J. van Hattum

AN ATTRACTIVE GLIDER DESIGN THAT IS SIMPLE IN CONSTRUCTION YET GIVES A GOOD PERFORMANCE IN OPEN CONTESTS

THIS design may be considered as a development of the author's 1949 product *Satyr* which proved a very useful intermediary contest model until the present day.

With a span of 60 in. and a minimum all-up weight of just over 11 oz., *Oberon* is a useful stepping stone from the light and small beginner's model to the more ambitious Nordic. Experienced modellers will have little difficulty in scaling up the design to A/2 specification, in which case I would suggest changing the constant chord outer wing panels to a 2/3 taper ratio. For the same area this would increase the span by 6 in. with a tip chord of, say, 4 in.

The present design aimed at simplicity of construction, attractive lines, good aerodynamic form and easy trimming characteristics, yet none of these points were to be stressed at the expense of the others.

Building is quite simple, provided one really takes the trouble to study the instructions before starting on the job.

Fuselage

Start by tracing the plan view of the fuselage on medium sheet balsa. If the length of the sheet is insufficient, join on an extra section at the tail as shown. Mark the centre line and location of the formers and cut to shape with a slight overlap which is trimmed off later. Mark out and cut the sides and formers. Mount the formers, then the sides and cement on the top covering sheet. If you want to use an automatic rudder, select any of the proven systems, but do not forget to cut holes for the operating thread and to have it inside the fuselage before it is closed.

Wing Tailplane

This is a straightforward job and the construction follows standard principles. See that all joints are well cemented. Take good care to ensure that dihedral is symmetrical and that the wing is not warped after covering and doping.

The rudder is built integral with the fuselage and must be carefully aligned or it will cause a turn on the glide. The tailplane is very similar to the wing in construction and will present no difficulties. Here, again, one should guard against warps which must be corrected before flying, either by an extra coat of dope or by holding the tailplane in a jet of steam, twisting it in the other direction until it is flat and true. The D/T arrangement is simple and of standard type, and it should be used on every flight.

Finishing

The fuselage can be strengthened and improved in appearance if it is covered with lightweight tissue and given a couple of coats of clear dope. Coloured dope can be used sparingly in order to make the appearance more attractive.

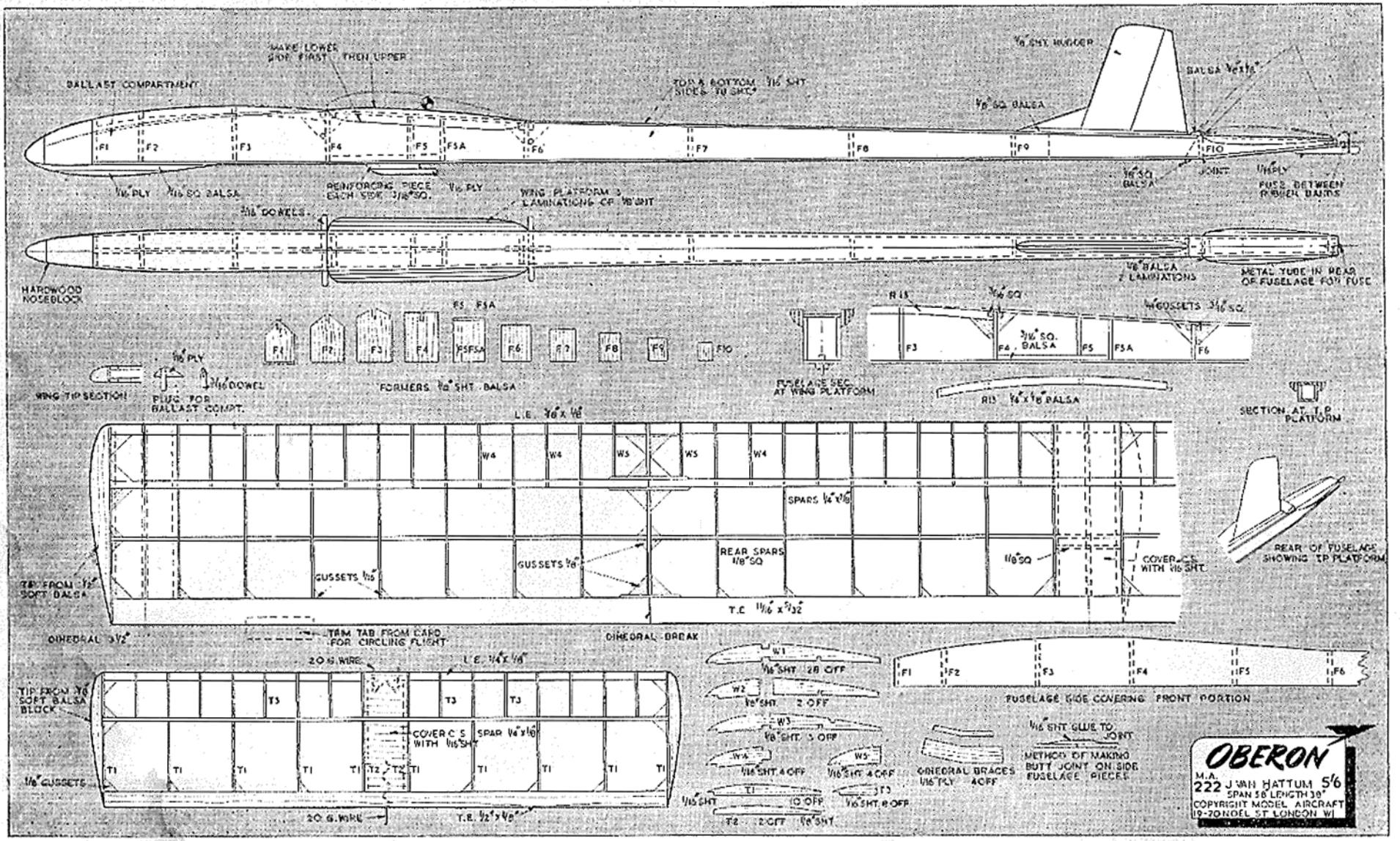
The model should possess the angles of incidence as given on the plan and the centre of gravity should lie about 3 in. behind the leading edge. Make sure that there are no warps and that all the major components are true and sit squarely on the fuselage. Rubber bands should be taut but still allow for movement on impact.

Trimming and Flying

It is worth while taking the trouble to work to a definite programme, as the best trim is then obtained quite easily and in a short time.

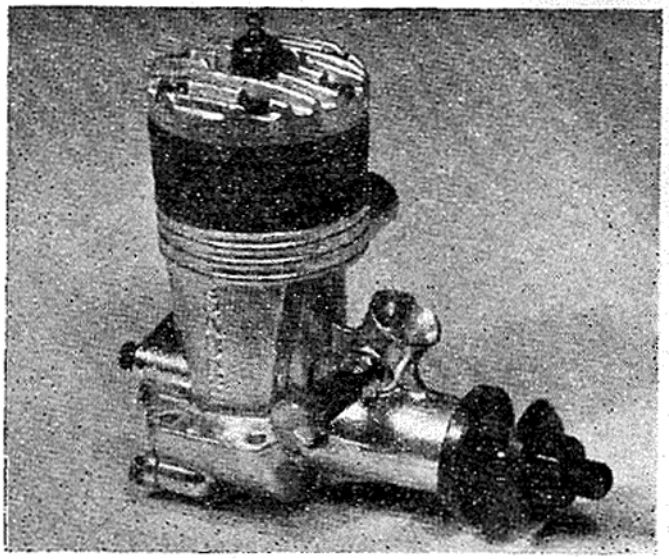
The model should first be hand launched and all apparent faults rectified before it is towed up on the line. Only a towline launch will show up the real defects. Any tendency to turn can be temporarily cured by cementing small tabs on a wing-tip; the tab should be small and removed after the warp has been taken out.

To get the best longitudinal stability, watch for undulations when the model stalls; good stability is present when, after an intentional stall—slight pull on the towline just before release—it returns to a flat glide after two or three switchbacks. It should never keep on stalling. Best performance is obtained with a model trimmed very close to the stall with the c.g. as far back as possible and the difference between the rigging angles of wing and tailplane as small as still allows for sufficient stability. When the model is properly trimmed, a stall—caused by a gust—will soon be damped out.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20 NOEL STREET, LONDON, W.1, 5s. 6d., POST FREE

Engine Tests



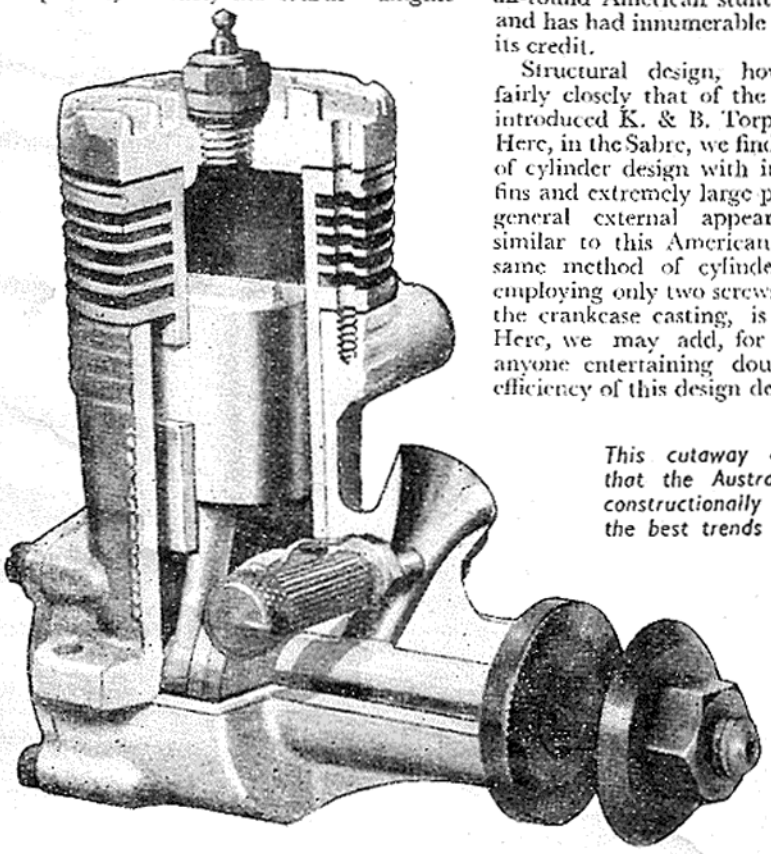
No. 78. The Sabre 35

THE Sabre 35 engine, which is built by Gordon Burford and Company of Grange, South Australia, may justly claim to be the best engine of its type produced in the British Empire. Admittedly, the 0.35 cu. in. class glowplug engine has no equivalent among domestic productions, but even if it had, we feel that the Sabre would still rank among the leaders. Gordon Burford has been producing engines for many years, first under the name of "Gee-Bee" and later as the "Sabre" series and he is undoubtedly the No. 1 manufacturer in the British Commonwealth, outside the United Kingdom. The present report is, in fact, the fourth "Engine Test" article to deal with a Sabre engine.

The Sabre 35 is a glowplug engine designed primarily for stunt and combat work and, as its name suggests, is of 0.35 cu. in. capacity. In all these respects it is essentially "American" in conception. This is carried a stage further in the design and construction of the unit which is in accordance with established and well-proven U.S. practice.

Thus, we find that the engine has a bore and stroke of 0.800 in. by 0.700 in., precisely the same measurements as those of the American Fox 35, an engine which, for a number of years has enjoyed the distinction of being the best all-round American stunt model engine and has had innumerable contest wins to its credit.

Structural design, however, follows fairly closely that of the more recently introduced K. & B. Torpedo 35 model. Here, in the Sabre, we find the same type of cylinder design with integral cooling fins and extremely large ports, while the general external appearance is very similar to this American engine. The same method of cylinder attachment, employing only two screws threaded into the crankcase casting, is also featured. Here, we may add, for the benefit of anyone entertaining doubts about the efficiency of this design detail, that there is little risk of distortion and leakage for three reasons.



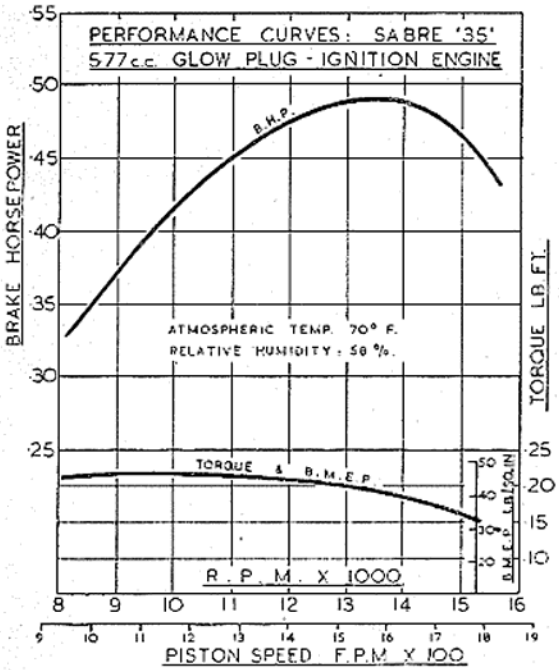
This cutaway drawing shows that the Australian Sabre 35 constructionally closely follows the best trends in U.S. design.

Firstly, the bottom flange of the cylinder, which is a full $\frac{1}{16}$ in. thick, is also stiffened by a thickening of the cylinder wall between this and the first cooling fin. Secondly, the lower section of the cylinder is closely fitted in the upper portion of the crankcase and the two flange faces are accurately aligned. Thirdly, the two screws pass through from the cylinder head, which is an extremely rigid alloy casting, attached with four screws to the cylinder, and an evenly distributed pressure is thus transmitted down the cylinder walls to the flange faces, provided the two screws are tightened equally.

Some concern may be felt in regard to the considerable loads imposed upon these two screws, in resisting combustion chamber pressures, and to this we can only reply that the method has proved adequate, in this respect, in at least two other engines of similar design and performance and that the risk of thread damage has been reduced, in the Sabre, by making the screws enter the casting to a depth of nearly $\frac{5}{16}$ in.

Structurally, the Sabre 35 embodies two features which should not go unmentioned. Firstly, all the production engines have a large main bearing clearance, which is quite intentionally made so, in accordance with test findings by the maker, and purchasers should not, therefore, suppose that this is a "fault." Secondly, the cylinders, unlike some other engines of similar type, are hardened, ground and lapped for increased bore life—an important consideration in parts of Australia and other places where dusty conditions predominate.

The Sabre 35 is of pleasing appearance and the diecastings, which are of high silicon content aluminium alloy, are exceedingly cleanly produced. They are set off by smoothly machined steel cylinder fins which are blued against corrosion.



Specification

Type: Single cylinder, air-cooled, two-stroke cycle, glowplug ignition. Shaft type rotary valve induction. No sub-piston supplementary air induction. Lapped piston with straight baffle. Cross-scavenged two-port cylinder.

Swept Volume: 5.767 c.c. (0.3519 cu. in.).

Bore: 0.800 in. Stroke: 0.700 in.

Stroke/Bore Ratio: 0.875 : 1.

Compression Ratio: Not disclosed.

Weight: 7.4 oz.

General Structural Data

Crankcase diecast in 12 per cent. silicon aluminium alloy with integral main bearing housing and carburettor intake. Extra strong beam mounting lugs. Detachable rear crankcase cover of silicon aluminium alloy, secured with four screws. Crankshaft of 3 per cent. nickel steel, hardened and tempered and blued against corrosion and running in steel bushing. Hardened, ground and lapped cylinder with integral cooling fins. Mechanite piston with solid gudgeon pin. Diecast 12 per cent. silicon aluminium alloy finned cylinder head attached with six screws, two passing through cylinder fins to secure assembly to crankcase. Impregnated asbestos cylinder-to-head and cylinder-to-crankcase gaskets. Steel propeller drive plate keyed on to flat on crankshaft, with heavy steel washer and nut, all blued. Brass spraybar type needle-valve with ratchet.

Test Engine Data

Running time prior to test: 2 hours.

Fuels used: (a) Running in: 70 per cent. power blending methanol, 30 per cent. castor oil B.P. (b) Dynamometer test: 55 per cent. blending methanol, 20 per cent. nitro-methane, 25 per cent. castor oil B.P.

Ignition equipment used: Maker's long-reach glowplug. 1.7 volts to start.

Performance

The Sabre 35 is not at all fussy and starts very easily. For an initial start from cold, we primed fairly generously through the exhaust after choking to draw the fuel up to the jet. When hot, the engine will restart, irrespective of prop size, after a single choked flick, on the running setting. Initial running-in was carried out with the engine "four-stroking," i.e. running on a rich needle setting at reduced r.p.m. Due to the large main bearing clearance, the benefits of running in are mainly confined to the piston and cylinder surfaces. Indications were that an unduly lengthy running-in period was not necessary.

The recommended fuel blend given in the maker's leaflet is a plain two-part mixture of methanol and castor oil and the engine behaves very well on this economical fuel. However, in order to give a fairer basis for comparison with American engines of a similar type (which are invariably rated for performance on the nitroparaffin content racing fuels readily available in the U.S.A.), a 20 per cent. nitromethane content fuel was used for our dynamometer test.

Under these conditions, a maximum torque of 0.22 lb./ft. was recorded at a little over 9,000 r.p.m., equivalent to a b.m.e.p. of approximately 47 lb./sq. in. Torque declines steadily above 10,000 r.p.m. and results in the maximum output being realised at between 13,000 and 14,000 r.p.m., the actual peak appearing at about 13,700 r.p.m. where the output registered was 0.49 b.h.p.

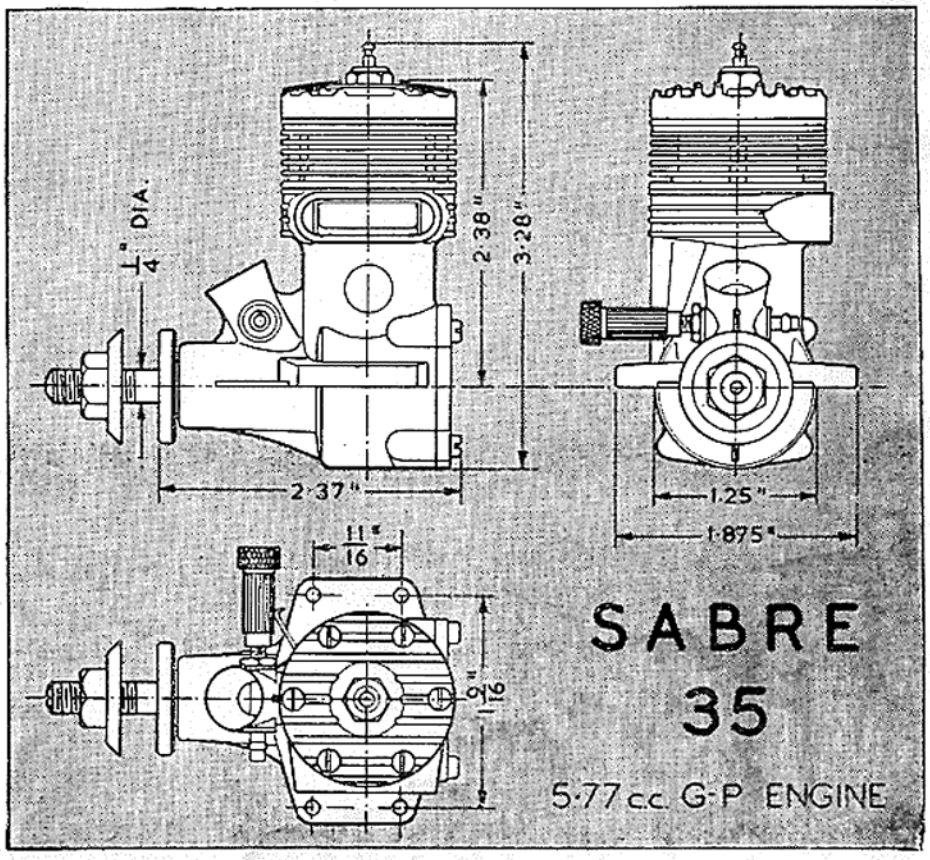
This, of course, is a very useful performance and, while no greater than one might reasonably expect of a modern 0.35, from which an output of around ½ h.p. is usual, is particularly noteworthy on the basis of power/weight ratio, as the Sabre exceeds 1 b.h.p./lb.

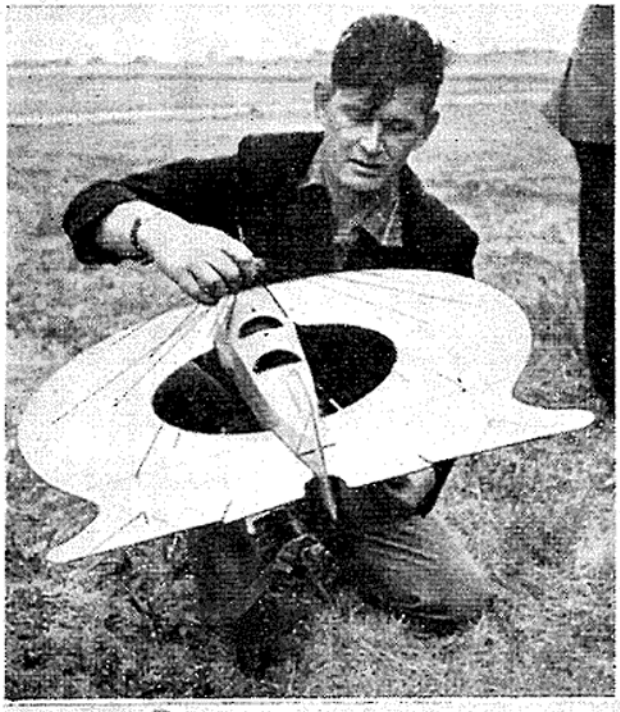
Two minor faults came to light during our tests. The first concerned the glowplug supplied. Half-way through the tests it was found that the coils of the filament had become displaced and bunched together within the filament cavity, presumably due to softening of the filament wire. This may, perhaps, be attributed to the somewhat more severe operating conditons of our bench tests and may not occur under actual flight conditions.

The second bother concerned the steel drive plate. This is keyed to the shaft by means of a flat on the latter and, should the engine backfire (a contingency which cannot, of course, be completely guarded against), the drive plate hole becomes enlarged, so that a backlash will develop. Fortunately, the shaft is hard enough to resist damage, so that the only component likely to require replacement is the drive plate itself.

Power/weight ratio (as tested): 1.06 b.h.p./lb.

Specific output (as tested): 85 b.h.p./litre.





ROYAL AIR FORCE MODEL AIRCRAFT ASSOCIATION

CHAMPIONSHIPS

Strong winds marred the Royal Air Force Championships Meeting held at R.A.F. Station, Horsham St. Faith on August 6th and 7th.

Noteworthy was the fact that two of the models which performed very well in the extremely gusty conditions were Sgt. McHard's *Super Swede* and Chief Technician Edwards' annular wing model (see photos on this page). Both of these were more stable in flight than the majority of the machines of orthodox design.

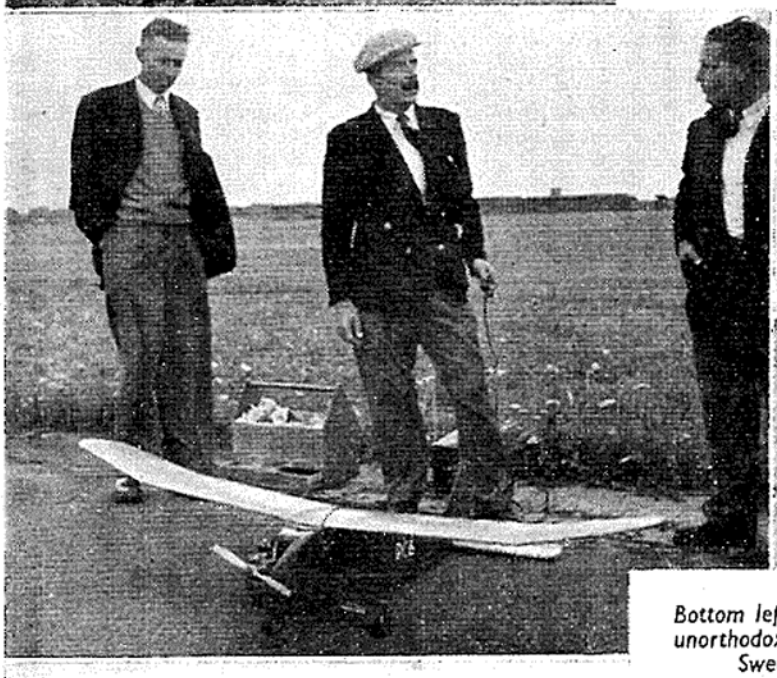
The *Victor Ludorum* was Cpl. Rimmer (R.A.F. Valley) and the placings in the Command Championship were as follows:—(1) Fighter 161 pts., (2) Technical Training 106, (3) Flying Training 98, (4) Coastal 85, (5) Bomber 65, (6) Transport 59, (7) Maintenance 33, (8) Home 20, (9) 90 Group 17.

The C.-in-C. Fighter Command, Air Marshal Sir Dermot Boyle (president of the R.A.F.M.A.A.) was present at the meeting and the prizes were presented by Lady Boyle.

Left: An interesting scale model of the Lee-Richards annular by C/T Edwards. It flew well and was built from information obtained from the Science Museum.

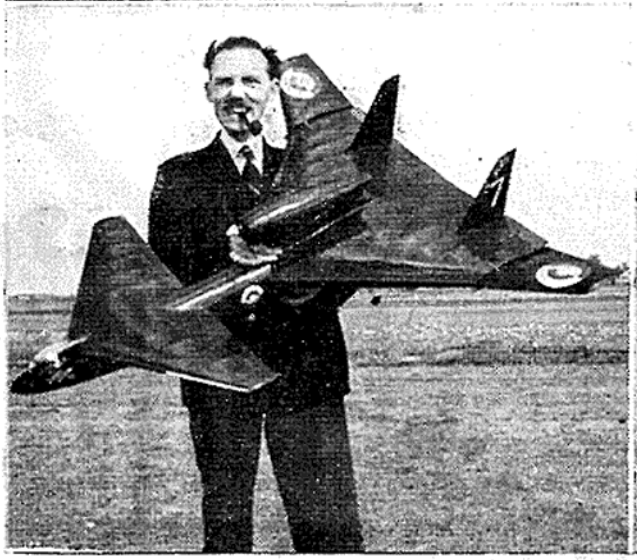
Left below: F/Lt. Cable (behind his model) flew in the R/C event.

Right below: A fully detailed Republic "Seabee" was flown by F/O Norman in the flying scale class.



Bottom left: Sgt. McHard won the unorthodox event with his "Super Swede" canard delta.

Below: Scale "Seagull" (M.A. plan 83) built by J/T Percival.



Civil Markings

PART ONE

by P. M. H. LEWIS

COLOURING and detail finish are of great importance to the scale modeller, enabling him to reproduce correctly in miniature the original aircraft for both flying or exhibition. Presented in this first article is a wide selection of aircraft bearing British registration letters and of which models are likely to be made.

Many of the aircraft are already popular with modellers because of their interesting history, but a number of types from the past will be noted which may well be revived as practical flying models. In some cases, the aircraft may have been observed in colours differing from those given. Alterations are often made when re-doping at overhauls and with changes in ownership.

The registrations of the earlier British types mentioned were normally carried above the upper and below the lower wing surfaces and on each side of the fuselage. A post-war practice on some types, notably Miles and Auster, is that of using smaller lettering on the wings than hitherto, and painting them on the starboard upper and port lower panels. Reference to all available photographs is to be recommended for location and detail of markings. The aircraft are listed in alphabetical order of makers' names, and the overall colour is stated first.

The *Aeronca* 100, rarely modelled, has interesting possibilities and G-AEWV, all silver with black registration, is an example flown in the U.K. The first British aircraft in production with a retractable undercarriage was the Airspeed *Courier*, one of which was G-ACLS, all silver with red markings and black cowling. The post-war Auster J/1 *Autocrat* is popular, G-AGTY all cream/green being typical. The Auster B4 *Ambulance/Freighter* G-AMKL was grey/red. One or two Avro 4M *Avians*, contemporaries of the D.H. *Moth*, are still flying, the silver and black G-ABEE being one of them. The *Commodore* G-ACNT came in similar colouring from the same company. One of the two remaining Avro *Club Cadets* is G-ACHP in silver/red.

British Aircraft Co. produced the German *Klemm Eagle* G-ACZT and *Swallow* 2 G-AFCL, the former with blue fuselage and rudder and silver wings and tailplane, the latter, silver with black trim. Several of the ultra-light B.A.C. *Drones* were built; G-ADSB with a fearsome dragon effect painted on the fuselage and G-AEKV in a quieter silver/black.

An American type, the Cessna C-34 *Airmaster* is a first-class design for flying-scale, and an imported example was the pale green G-AEAI, trimmed in a darker shade of the same colour. Turning to single-seat

The "Rapides" illustrated on this page are just two of the many still in service. Our heading shows "Lord Shaftesbury" in the colours of B.E.A., whose chief photographer took this fine air-to-air shot. Below is a "Rapide" of Derby Aviation finished in an attractive light blue with dark blue trim.

"Autocrat" G-AHAP, in light blue with dark blue trim, about to touch down at Elstree Aerodrome.

racing types, we meet the neat little *Chilton* DW-1a G-AFSV in black/white. G-AKFD, silver with blue trim, is the tricycle-undercarriage Chrislea CH3 *Ace*.

Interest in the autogyro revives occasionally, and the Cierva C19 G-ACFI, silver/black, and C30 G-ACWH, blue/silver, would make unusual models. The few surviving Comper *Swifts* remain popular, Tony Cole's G-ABUS *Black Magic*, being all black with white trim. A red fuselage with silver wings and tail distinguish G-AMJP, the ultra-light Dart *Kitten* 3.

First of the large De Havilland family in this survey, and successful in both full-size and flying-scale, are the two Canadian designs, the D.H.C.2 *Beaver* 1 and the D.H.C.1 *Chipmunk*, G-ALOW, silver with maroon trim and G-AKDN, silver and green, respectively. CF-FHF, a Canadian-registered *Beaver*, is also silver overall but with red trim. Few will dispute the fact that the D.H.88 *Comet*, designed for the 1934 England-Australia air race, was one of the best looking of all aircraft. Scott and Black won the contest in G-ACSS *Grosvenor House*, in red with white trim and a black 34 race number.

An unusual little biplane of the 1930's was the D.H. 83 *Fox Moth*, and G-ACFC in the silver with blue trim of Olley Air Services Ltd., London, was stationed at Shoreham for joy-riding. The earlier D.H.60 *Gipsy Moth* is represented by a pair of famous examples: Miss Amy Johnson's *Jason* G-AAAH, green fuselage, silver wings and tail, black registration on wings with black G on rudder; and Miss Jean Batten's silver/black G-AARB. The D.H.87B *Hornet Moth* came into use as a later biplane, the silver/black G-ADUR being owned by the London Aero Club Ltd. Should the D.H.85 *Leopard Moth* be chosen, G-ACHC may be finished in silver/black, while the cream/black D.H.94 *Moth Minor* G-AFRY makes up well.

A refreshing newcomer, and the third D.H.C. design, the *Otter* G-ANCM flew from Hatfield as a demonstrator. J. A. Mollison's Atlantic-crossing D.H.80A *Puss Moth* G-ABXY, was silver/black and named "The Heart's Content," another being that of G. Head, G-ABGS, red fuselage, rest silver, and Shoreham-based pre-war.

In the 1930's, Brooklands School of Flying operated D.H.82A *Tiger Moth* G-AESD with red fuselage, remainder silver. Two "one-off" racers were the D.H. *TK2* and *TK4*, respectively G-ADNO "18," all black, white trim, and G-AETK, red/white. The Desoutter 2 high-wing monoplane G-AAPZ, in silver/black, was a contemporary of the *Puss Moth*.

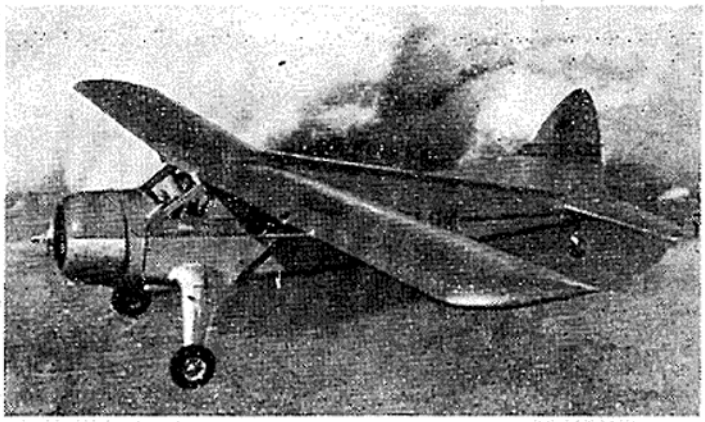
An out-of-the-ordinary model would be the silver E.O.N. *Olympia* sailplane, which carried G-ALNF in black on the fuselage. Another American design, the Ercoupé, flew here in small numbers and the silver/black G-AKFC was one of those imported. The Canadian Fairchild *Husky* has good proportions for flying-scale and the silver with black trim CF-BQC could be used, while the original Foster Wikner *Wicko* was the red and white G-AENU of 1936. At about the same time, the all silver/black G.A. *Cygnet* G-AFVR appeared. Gloster's now own G-AMRK, the sole *Gladiator* flying, also finished in silver and black.

The pre-war Hafner Gyroplane is another autogiro and appeared as G-ADMV in white with red outline registration. The Hawker collection of their own aircraft still flying includes the silver/black *Cygnet* G-EBMB, *Hart* 2 G-ABMR, *Hurricane* 2C G-AMAU "The Last of the Many," and *Tomtit* G-AFTA, the last three finished in royal blue overall with gold trim. One of the few high-wing aircraft with a retractable undercarriage, the prototype Heston *Phoenix* G-ADAD had eau-de-nil fuselage and tail unit with silver wings. One of the Czech-designed and British-built Hillson E114 *Pragas* was registered G-AEUT, coloured silver/black.

A natural flying-scale design is suggested by the Austrian-designed and British-owned, all-silver Hirtenberg HS9A G-AGAK, another old-timer being the only British-registered Lockheed *Vega* G-ABGK "Puck," all white, black trim, and flown by Woods and Bennett as No. 36 in the MacRobertson Race. Two Luton aircraft designs are the pusher *Buzzard* and the *Minor*, the former G-AJYX in green with silver control surfaces, and the latter G-AFIR with red fuselage and silver wings and tail.

(To be concluded next month)

The well-known Comper "Swift" G-ABUS, with the cowling badge shown in the illustration on the left.



Left: At least four civil operators are now using D.H. "Otters." Right: The well-known demonstration "Beaver," G-ALOW.

Left: This colourful "Leopard Moth" carried the registration G-ACKL. Right: An unusual "Gipsy Moth" bearing a Brazilian registration.

Left: D.H. "Hornet Moth" G-ADLY. Right: Jim Mollison's famous "Puss Moth" G-ABXY finished in silver and black and named "The Heart's Content."

Left: This "Piper Cub" is silver with blue trim. Right: "Chipmunk" G-AKDN, whose colour scheme is described in the text.

OVER THE COUNTER

Branded Keilkraft sheet and strip is now being distributed throughout this country and abroad, marking a return by E. Keil and Company to the "sheet and strip" market, as opposed to kit production. E. Keil and Company were pioneer balsa cutters for the trade in this country, starting back in the early 1930s.

* * *

Baby C/L "trainer" and sports flier for the Frog "50" has just been put on the market by International Model Aircraft. Known as the "Tyro," the kit features printed, pre-cut balsa parts, plastic wheels, etc., and formed wire components. Span is 17 in.

* * *

Merger of K. & B. and Allyn Sales, of the United States, now shows a total of fourteen different engines available, including twin-cylinder in-line and single-cylinder outboard unit.

* * *

Berkeley Models (U.S.A.) have recently shown a keen interest in glass plastic construction and now market this material for amateur constructors, glass cloth and resin and hardener being sold separately. Price of the cloth is approximately 9s. per square yard to American modellers. We understand that future Berkeley kits may incorporate glass-plastic components as an alternative to conventional plastics.

* * *

Elmic's new Limitank solves a major problem for F/F modellers in providing a constant, but adjustable, volume of fuel supply for timing the motor run with a built-in "header" tank to give additional fuel for starting. Operation is very simple and, of course, there is no need for a separate timer or cut-out device.

Two new kits added to the range produced by Contest Kits are a 24-in. span semi-scale cabin glider, featuring sheet balsa fuselage sides (pre-cut) and a 13½-in. span Jetex "50" (or Atom "35") duration design. Unusual feature of this latter model is the arrangement of the Jetex unit ahead of the wing and the tip-dihedralled tailplane used with an underslung fin.

* * *

Class B team racer which placed second in the Nationals event is scheduled as a new Mercury kit model to appear this autumn. The kit model will differ in small details from the contest *Thunderbird*, which was powered by a hotted-up McCoy "29."

* * *

Latest additions to the Frog Junior scale model series are the Beechcraft Bonanza, B.A. Swallow and Bellanca Airmaster. These attractive little models should be in the shops by now.

Some modifications introduced in the Frog "Pioneer" (all-metal) kit are: the hole in the cowling made slightly larger for more clearance for the propeller shaft, slightly larger screws used to hold the cowling in place, and the inclusion of a generous supply of spare clips.

* * *

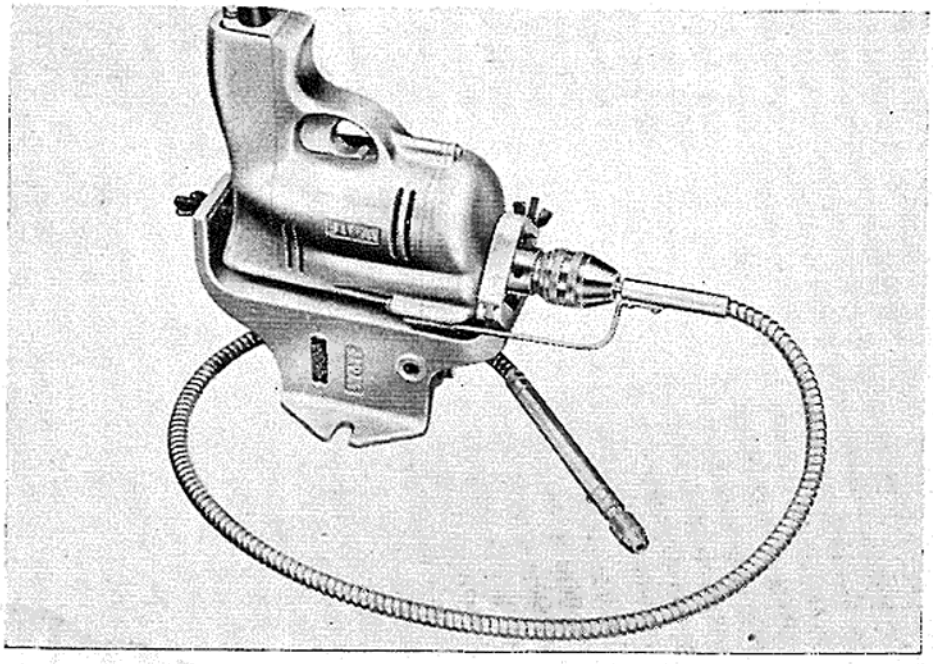
Woodside Models are marketing rod-type Alcomax permanent magnets suitable for "vane" steering gear employed for holding a true course on slope-soaring gliders. The length of these magnets is 3 in., dia. $\frac{5}{16}$ in. and weight exactly 1 oz. Price is 2s. 11d. each.

* * *

Cellon dopes, widely used in the full-size aircraft industry, are available in a range of 18 colours for the modeller. Besides a full range of glossy dopes in the more usual colours — some in two shades — there are a few unusual ones as well, such as pink and imperial brown. Three matt camouflage colours cater for the scale modeller.

* * *

Greater scope is afforded the Wolf Cub electric drill by the addition of the new flexible shaft set (shown below) to the already wide range of accessories. The chuck takes a variety of heads suitable for many intricate tasks such as grinding, drilling, engraving, met with by the modeller working with a wide range of materials, such as wood, plastic, or plaster. A suspension bracket is also supplied as an accessory to provide unrestricted movement of the shaft.



OVER THE COUNTER KIT REVIEW

The KEILKRAFT JUNIOR 60

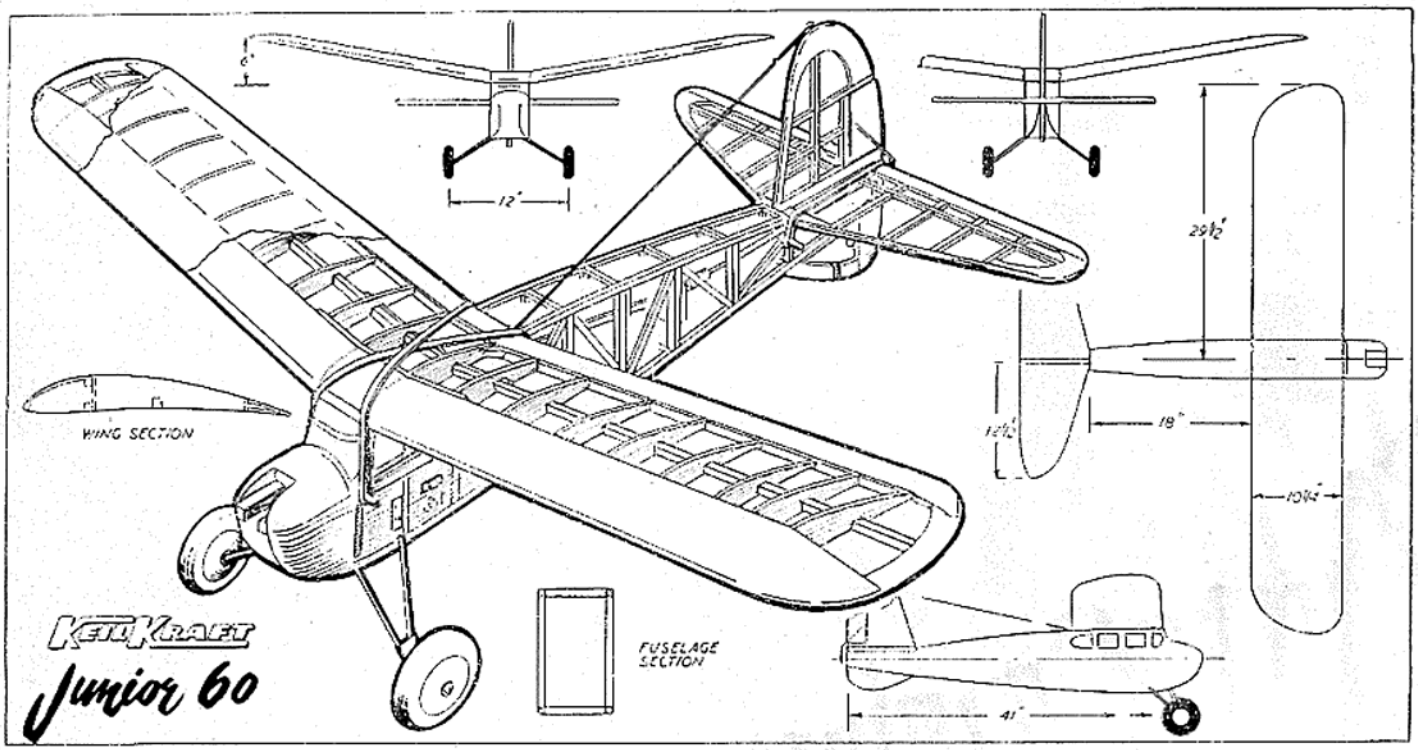
The *Junior* "60" is a time-honoured sports design which was adopted in the early days of R/C flying as a standard machine, appearing in a variety of forms, such as extended wings for greater area, ply-sheeted fuselage back to the rear of the cabin position, and sometimes overloaded up to 6 or 7 lb. flying weight. Whatever the modifications adopted, these models flew, and flew well, but the original layout would still more than hold its own with any for R/C work.

Right up to the present time, in fact, most people experienced in radio flying would be the first to recommend the *Junior* "60" to anyone starting this branch of the hobby. The size was right, the design was right, and its payload capacity well within any standards of workmanship, plus as much radio gear as could be accommodated within the fuselage. Above all else it was a really stable aeroplane which, on being left alone, would quickly sort itself out from any trouble which it had got into through mal-operation of the control button. And all through, remember, this kit model was produced as a sports type F/F design.

Now the *Junior* "60" has reappeared, somewhat modified in detail design, and expressly intended for R/C work. The fuselage is rather more capacious, especially in the cabin area, whilst complete details are given for the installation of the radio gear, batteries, etc., together with a pivoted rudder and the necessary intermediate linkage. The kit itself is most attractive, with "integral" strip lengths die-cut, clearly printed sheet, etc. The structural design is quite orthodox and the kit itself straightforward in contents. All the ply parts are ready cut to shape (including that especially tricky job of making dihedral braces without "notching" vital bends), the set of finished wing ribs are more accurate than the majority of amateur builders could produce, whilst the balsa quality is uniformly excellent, although tending a little to the soft side. Four giant tubes of cement and four tubes of tissue paste are also included, as well as shaped blocks for the cowling, wire, dowel and really tough (beech) motor bearer stock. We know from experience that the structure is more than rugged enough for R/C work, and also that it is quite straightforward for building. Not even a beginner should get into any real trouble with assembly.

Design-wise, the *Junior* "60" is an orthodox cabin layout with a low wing height, generous dihedral coupled with relatively large fin area, and a certain amount of sub-fin area which could be expected to improve stability in turns. Both the tailplane and fin are flat plate sections. Were we asked to recommend R/C design features most likely to be foolproof, our experience in this field would say wing height above thrust line fairly small, flat plate tail and fin sections, generous wing dihedral to make fin area non-critical and balancing with c.g. well forward. Just the layout, in fact, that the *Junior* "60" employs. The only design feature we would criticise is the undercarriage position. The track is rather too wide and the wheels too far forward for good straight take-offs on roughish ground, but such a layout does give better "ground" stability on landing. You cannot have it both ways and since a model always has to land, but can be hand-launched, this is quite a logical solution for a kit designed for general consumption.

Modification of the undercarriage could, in any case, upset the balance of the finished model. The nose is extremely short for an R/C design and so it is rather important to keep the tail end light and the nose end relatively heavy to balance on the wing front spar.



Book Department

Reviews of current aviation literature

The Soaring Pilot. *By Ann & Lorne Welch and F. G. Irving.* John Murray. Price 15s.

There are few sports today that have retained their independence against the encroachment by commercial interests and yet still enable participation by the ordinary person of moderate means. The art of gliding is one of the few, and an art it is, as anyone who reads this book will readily appreciate.

The co-authors, well known in the gliding world, have attempted to explain the modern glider and the technique of using it. That they have succeeded is evident; the style is straightforward and easily understood by anyone with an intelligent interest in matters aeronautical.

Chapters range from glider design to navigation and parachutes, from instruments to championship flying, and all are sub-headed for easy reference. The fact that it is excellent for this purpose in no way detracts from its readability.

That full-size gliding is akin to its modelling counterpart was brought home to us when reading the chapter "Thermal Soaring," and the A2 contest types could well pick up a few tips (as well as a few thermals next year) by reading this and the other 13 chapters!

For its interest alone, we would have no hesitation in recommending "The Soaring Pilot," and if you then aspired to loftier heights rather than remain an earthbound flier, we'd be with you all the way!

Britannia "Presso" Book. *By Wallis Rigby.* Brockhampton Press Ltd. Price 5s.

With the *Britannia* constantly in the news, it is appropriate that the latest "press-out" book designed by Wallis Rigby should feature this turboprop airliner.

Designed to a scale of .13 in. to the foot, the pre-coloured parts, when joined together by means of tabs, make up into an attractive replica. When the model is completed and the press-out pages finally removed, there remain eight large pages of text and drawings on the *Britannia*, which no doubt will be read by junior and dad with equal interest.

Cheshire V.C. *By Russell Braddon.* Evans Bros. Ltd. Price 12s. 6d.

Although the biography of one man, "Cheshire V.C.," nevertheless deals with three personalities—Leonard Cheshire the undergraduate; Group Captain Leonard Cheshire, V.C., D.S.O. and three bars, D.F.C.; and Cheshire the man of peace, a man who has dedicated his life to helping others less fortunate than himself, even though at this moment he is in a sanatorium suffering from tuberculosis.

Russell Braddon has drawn a fine picture of all three, and skilfully knitted them together to present the story of quite one of the most remarkable men of our time.

Cheshire's school days must have followed a pattern similar to that of many young men who were later to become embroiled in a war, although to Cheshire, as he says himself, it gave him "a motive for life and an authority to live under. I was glad to get into it."

His R.A.F. career is traced with commendable clarity, including all the anecdotes, exciting moments—and frightening ones too—we would expect of the man who, in his V.C. citation, had said of him: "He has a reputation second to none in Bomber Command." Here is the story of a man who detested heights yet became leader of the immortal 617 Squadron; a man who perfected a marking technique that at the time had no parallel in the world. The story is all here.

The end of his service career really came not when he was "demobbed," but when he was sitting in a Superfortress flying at 39,000 ft. over Japan after seeing the results of an atomic bomb dropped on Nagasaki. As Russell Braddon says: "If Hiroshima and Nagasaki were our civilisation's supreme moment of history,

they were equally, to Leonard Cheshire V.C., his personal moment of destiny."

As is well known, Cheshire has since devoted his time and energies to helping others, and has, too, a deep interest in religion. All this in spite of a complaint that largely confines him to a bed in a sanatorium.

This is no conventional biography; it is an unusual story of an unusual man, and one which provides an example of greatness it would be difficult to match.

British Civil Aviation. *By D. G. T. Harvey.* Adlard Coles Ltd. Price 15s.

This book is an attempt to fill a long standing need in current aviation literature, and, while it is not absolutely comprehensive, it is fairly representative.

Its scope extends beyond the usual formulae of photograph, description, and silhouette, the subjects being divided into six sections. Section I deals with current aircraft, and, in addition to numerous excellent photographs, it contains payload details, operating costs, and sectional views of seating arrangements of the more important types, together with the descriptive notes. Each aircraft is also illustrated by a three view line drawing on a tone background, and here the overall high quality of the book is marred by inconsistency. While some of the drawings are of a reasonable standard, others, unfortunately, have been poorly drawn—that of the Proctor V especially.

The section "Future Developments" describes and illustrates

(*Continued on page 412*)

HELICOPTERS and AUTOGIROS

PART TWO AND CONCLUSION

by R. H. Warring

Even full size helicopters have their difficulties. High temperatures in August caused B.E.A.'s S-55's to lose power and the aircraft were temporarily grounded. B.E.A. photo.

THREE alternative forms of power unit are available for the model helicopter or autogiro—rubber, Jetex and diesel (or glow motor), and all have their respective limitations. Rubber power is attractive on account of its simplicity and cheapness, but about the only way to achieve good durations is to adopt the "stick" model layout, which is far removed from full size helicopter design practice, both in function and appearance.

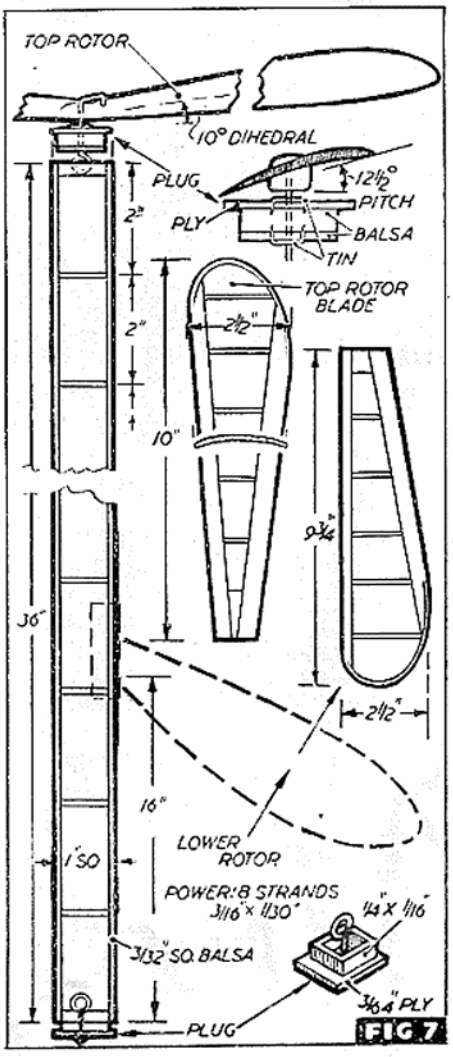
Design is typified by the current British record holder (Fig. 7), which is still essentially similar in form to the layout used by Penaud some 70 years ago. Stability is often critical (these models are particularly prone to turn over and dive-in under power) and no attempt is normally made to get the blades to autorotate at the end of the power run. Thus the model simply falls to the ground when the rubber turns have run out but, being light, seldom damages itself. Weight is a critical factor, for these designs operate in the inefficient trim of direct lift.

A rubber powered helicopter of the type that holds the British record for this class.

Duration possibilities with rubber-driven semi-scale layouts are strictly limited. In fact, at the present state of development, it is something of an achievement to get flights of the order of 20 sec. with such types, due principally to the limited amount of rubber which can be accommodated. The length of motor possible with contra-rotating rotor systems is extremely small, without offending against semi-scale appearance, and single rotor layouts with "belt" driven tail rotors may look attractive enough, but are generally even more limited in performance (Fig. 8). Semi-scale rubber-powered helicopter layouts have been described in previous issues and so will not be elaborated upon here.

This leaves Jetex power and the small internal combustion engine, the former again limited in the possible "power on" duration. Both types have now reached quite a reasonable state of development around two distinct types of rotor layout. The flapping rotor is used almost always with Jetex power, whilst pivoted rotor blades on rigid mounts are the general rule for reaction-powered systems with diesel or glow, although flapping rotors have been successfully used. The former is essentially of British origin, the man responsible for perfecting a simple flapping hinge system being Borham. In America, glow and diesel-powered helicopters follow mainly the rotor systems developed by Clough.

The requirements of a helicopter rotor are different from those of the pure autogiro or autorotating rotor



previously described. A rotor which will autorotate is an essential requirement for a smooth power-off descent. Such a rotor with a small negative pitch angle will, however, generate insufficient lift for ascent when driven. Hence the helicopter rotor requires positive pitch when driven in order to develop maximum lift with the means to change automatically to a small negative pitch angle when the applied power is cut off, so that the rotor will continue to rotate successfully.

With a fixed positive pitch rotor in vertical ascent and descent, provided it was disengaged and free to rotate on its own, it would slow down and stop after the applied power was removed and then start to rotate or windmill in the reverse direction.

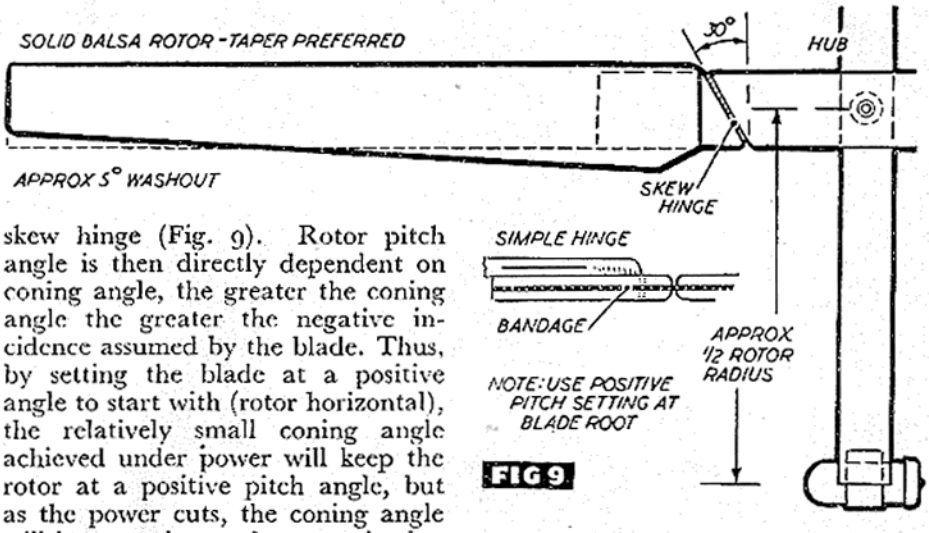


FIG 9

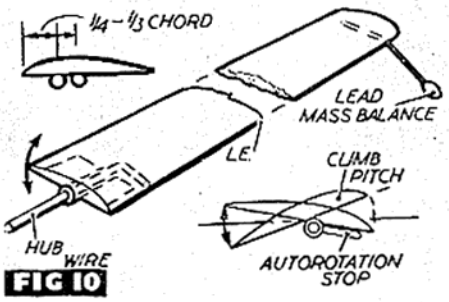


FIG 10

A three-bladed flapping-rotor type of helicopter designed by A. Hodgson. Plans of this model, M.A. 112, are available from the M.A. plans service.

In the meantime the model will have tumbled all over the sky. With an automatic change-over system, the rotor continues to rotate in the same direction all the time, changing from being power driven to autorotation smoothly and readily.

With a flapping rotor, this pitch change can be achieved by using a skew hinge (Fig. 9). Rotor pitch angle is then directly dependent on coning angle, the greater the coning angle the greater the negative incidence assumed by the blade. Thus, by setting the blade at a positive angle to start with (rotor horizontal), the relatively small coning angle achieved under power will keep the rotor at a positive pitch angle, but as the power cuts, the coning angle will increase due to the rotor slowing down, so that it finally assumes the correct negative angle for continued autorotation. It will also be appreciated that a skew hinge of this type will also produce a cyclic pitch change with translational velocity, the advancing blade losing lift both by its greater coning angle and the reduced pitch angle which follows.

A skew angle of about 30 deg. is generally satisfactory for a Jetex powered system and this angle is not particularly critical. For Jetex, the most successful flapping rotor schemes have all been two-blade designs, with power applied on a separate cross beam mounted at right angles to the main rotors (Fig. 9). Jetex units mounted on the rotor blade tips have consistently failed to produce a stable system and direct coupling of the crankcase of the engine to the rotor hub has yielded equally unpromising results with two-blade rotors. However, three-blade rotors crankcase mounted give the necessary stability.

A typical Clough-type pivoted blade is shown in Fig. 10. The theory is that both cyclic pitch and autorotative pitch trim can be obtained equally well by pivoting, rather than articulating, the blade on a skew hinge—the reacting forces involved being purely aerodynamic. Pivoted at about one quarter to one third chord, however, a leading mass balance attached to the tip of the rotor is necessary to obtain automatic cycling pitch and ensure autorotative descent, this serving both to balance the forces and increase the inertia of the system about the pivot axis. A forward rotating stop is necessary to limit the negative pitch which the blade can assume for autorotation, but no positive pitch stop appears

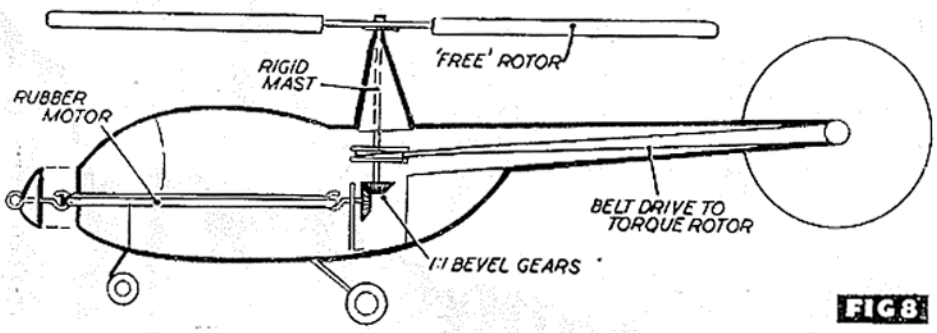


FIG 8

necessary, although this is frequently employed. In such cases, this may be fixed as high as 35 deg. pitch angle, although such a high angle would not normally be assumed under power.

Such a rotor system appears to work quite well, but since the motor also drives a standard propeller, the useful proportioning of power is on the low side. As a result, it is generally necessary to use four-bladed rotors to achieve the required amount of lift. In some cases all four blades are pivoted in the same manner; in others only one pair of rotor blades are pivoted, the other pair being of the fixed pitch type set with a small positive angle for "power on" conditions. This, in effect, combines an unstable rotor pair with a stable pair, the former being the main lift producers and the latter mainly employed as stabilisers, although also contributing their proportion of useful lift. Both types fly, and fly quite well, on properly balanced designs, although the fully pivoted system appears the better, provided all four blades operate with identical effect.

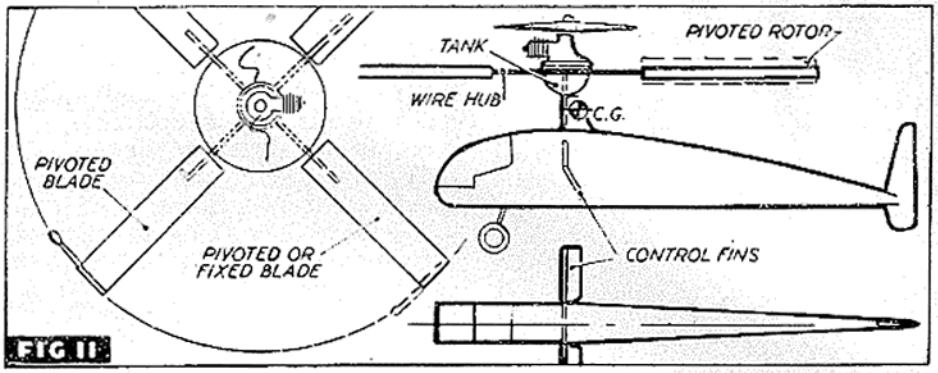


FIG 11

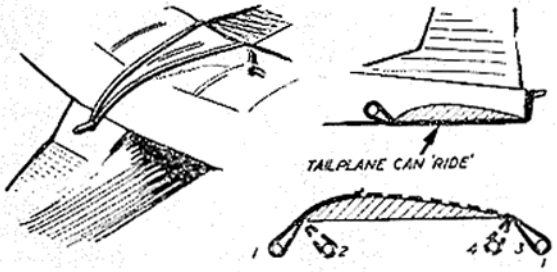
A semi-scale type fuselage is readily suspended below the rotor system, the only force transmitted to it, apart from rotor downdraught, being bearing friction. Thus, there is little tendency for the fuselage to rotate with a good, free bearing, and even this small reaction force can be damped out by the downdraught acting on fin surfaces in line with the rotor axis.

This downdraught can also be used to increase the efficiency of the rotor system by promoting forward flight—using outrigged fins swept back at some small or moderate angle (Fig. 12). A noticeable improvement in rate of climb is produced with forward flight, although excessive speed may, in gusty weather in particular, load the rotor beyond the limits of the automatic cycling pitch arrangement, so that a roll develops. This may be continued as a form of "Dutch roll" or even cause the model to flip over onto its back and come in upside down.

Centre of gravity position, incidentally, does not appear to be all that

DESIGN TIPS No. 9

Avoid these



Poor location of wing- and tail-fastening bands can cause a lot of trouble. Badly positioned, they may allow the surface they are holding down to shift forwards or backwards; or require excessive band tension to prevent the wing or tailplane from rocking.

A single front dowel for wing fixing on a cabin-type slab-sided fuselage is poor. The wing is very prone to slide forwards unless positively locked in place. Also, unless the dowel is located well below the wing leading edge, very strong bands and high band tension are needed to hold the wing down securely. A transverse dowel through the fuselage and well below the leading edge is much safer, even if it does not look so neat.

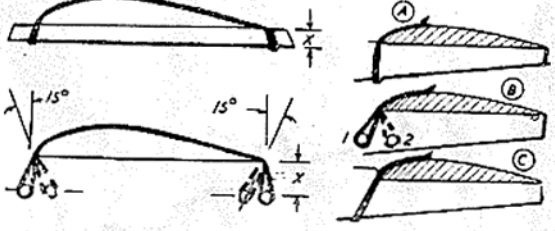
Tail fastening bands which pull forwards or backwards can be just as bad. In the top sketch, the tail will tend to ride forwards, possibly even under motor vibration, and change the trim of the model. Splaying bands out, e.g. 1 to 3, is using the rubber tension inefficiently, so that more tension is needed for safety, and consequently more strain on the structure 2 to 4 is better. Avoid combinations like 1 to 4 or 2 to 3, as these are asking for trouble, unless the tailplane is positively keyed in position.

Desirable design features are summarised in the bottom sketches. The greater you can make the distance "X," the less the band strength needed to hold the wing down securely. Avoid carrying wing-retaining bands right round the bottom of the fuselage, however, as this exerts unnecessary crushing strength on the longerons.

Locate wing dowels either directly below the leading and trailing edge positions, or inclined inwards slightly (but never more than 15 deg.). Inclined rubbers tend to give a firmer seating, but the wing is more prone to be displaced one way or the other if knocked. Some form of keying for positive location should always be included with wings strapped in place with bands.

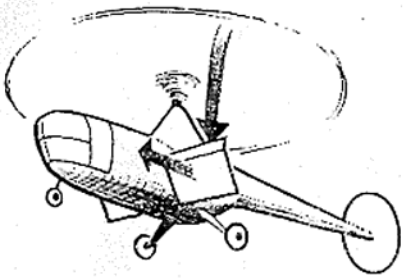
To utilise the tailplane hold-down band for tipping (dethermaliser) action when the trailing edge of the tail is released, the band should angle forwards. Action will be sluggish with the band in position A, and perhaps not pull the tail up to the full angle of tip required; splay forwards as in B-1, but only as far as necessary to produce the required action *positively*. Position B-2 will make matters worse. The leading edge of the tailplane should have some proper support, both to locate the tail on the fuselage and provide a pivot line for the tail to tip about. A tailplane set in a "step" in the fuselage longerons is best of all from the point of view of simple dethermaliser action—C.

Try these



critical. On most layouts of this type the c.g. is located just aft of the rotor axis, the vertical position also being quite high, since the majority of the weight is concentrated in the engine.

Fuel feed to the engine presents no special flight difficulties if the tank is incorporated with the hub and rotates freely with it, one of the main points being to design a tank which will not allow fuel to be thrown out under centrifugal action when the system is spinning. A hemispherical shape appears best, sealed except for a small vent hole near the top centre. A single hole can be used for the fuel line, which is removed for filling purposes. The main source of trouble with regard to consistent engine operation appears to be vibration due to unbalanced rotors, and this point should receive careful attention.

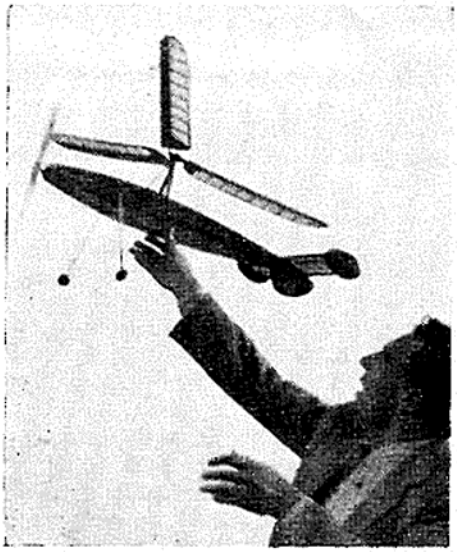


ROTOR DOWNWASH GIVES FORWARD THRUST

FIG. 12

The idea of applying power to a rotor by mounting it to the crankcase of an engine, using a normal propeller and letting the propeller rotate one way and the engine the other, may appear rather crude but is certainly the most satisfactory "engine" application which has yet been evolved for small models. The type is most interesting to fly and will climb to tremendous heights—for as long as there is fuel in the tank, in fact. But they are still apt to behave in an unpredictable manner at times, so there is still considerable work to be done in improving automatic stability.

For general overall stability—and in particular in gusty conditions—the Jetex-powered helicopter with flapping rotors is considerably ahead, but it cannot compare with the flight durations that can be achieved with diesel or glow-powered designs in proper trim.



An experimental rubber powered autogiro launched by C. W. Carson. Model flew well in calm weather.

RAPID SCALE CONVERSION

THIS is a method of making rapid conversions of any full scale dimension—especially designed for those people to whom fractional scale measures are something of a mystery. Even the most accurate of scales cannot, in any case, give the same accuracy of conversion.

The method is very simple—all the hard work is already done in the table. The full size dimension must be expressed fully in *feet* and decimal fractions of a foot, when the scale dimension, to any required scale, is found by dividing by the following :—

For 1/12th scale, just read full scale dimension in *feet* as scale *inches*.
For 1/24th scale, divide by 2.
For 1/36th scale, divide by 3.
For 1/48th scale, divide by 4.
For 1/60th scale, divide by 5.
For 1/72nd scale, divide by 6.
For 1/108th scale, divide by 9.
For 1/144th scale, divide by 12.
For *any* scale, 1/X, divide by X/12.

The table is used to transform inch and inch fractions into decimal fractions of a foot, after which simple division gives the approporiate scale dimensions *in inches*.

Example : To convert 45 ft. $9\frac{11}{16}$ in. into corresponding 1/48th scale dimension. From the table, 45 ft. $9\frac{11}{16}$ in. equals 45.8 ft. The scale divisor is 4, hence scale dimension is

$$\frac{45.8}{4} = 11.45 \text{ inches.}$$

INCHES	0	1	2	3	4	5	6	7	8	9	10	11
DECIMAL EQUIVALENT	—	·08	·17	·25	·33	·42	·50	·58	·67	·75	·83	·92
FRACTIONS OF AN INCH 1/16	·01	·09	·17	·26	·34	·42	·51	·59	·67	·76	·84	·92
1/8	·01	·09	·18	·26	·34	·43	·51	·59	·68	·76	·84	·93
3/16	·02	·10	·18	·27	·35	·43	·52	·60	·68	·77	·85	·93
1/4	·02	·10	·19	·27	·35	·44	·52	·60	·69	·77	·85	·94
5/16	·03	·11	·19	·28	·36	·44	·53	·61	·69	·78	·86	·94
3/8	·03	·12	·20	·28	·37	·45	·53	·62	·70	·78	·87	·95
7/16	·04	·12	·20	·29	·37	·45	·54	·62	·70	·79	·87	·95
1/2	·04	·13	·21	·29	·38	·46	·54	·63	·71	·79	·88	·96
9/16	·05	·13	·21	·30	·38	·46	·55	·63	·71	·80	·88	·96
5/8	·05	·14	·22	·30	·39	·47	·55	·64	·72	·80	·89	·97
11/16	·06	·14	·22	·31	·39	·47	·56	·64	·72	·81	·89	·97
3/4	·06	·15	·23	·31	·40	·48	·56	·65	·73	·81	·90	·98
13/16	·07	·15	·23	·32	·40	·48	·57	·65	·73	·82	·90	·98
7/8	·07	·16	·24	·32	·41	·49	·57	·66	·74	·82	·91	·99
15/16	·08	·16	·25	·33	·41	·50	·58	·66	·75	·83	·91	·99

Topical Twists

Decentralised

Down South, where the pitiful remnants of the once proud and mighty London clubs make their last gallant stand on the broken sandhills of Chobham Common, the desperate gloom of the flying field situation is relieved only by the heartening prospect of the annual pilgrimage to Cambridge. There is among these dispossessed survivors an almost touching pathos in their eager anticipation of the feel of soft, green grass beneath their calloused feet; grass over which they can light-heartedly skip without fear that the model they chase will turn out to be a circling vulture.

But already inhuman forces are at work; aimed at depriving them of this last frail link with civilised model flying. The movement for the de-Nationalisation of Cambridge is fast gaining ground in the North. Seaham, Cheadle, and the other clubs which gave such magnificent support to last year's Northern Gala, are agitating for a larger share of the S.M.A.E. prize booty. The Nationals must go North—even if there isn't an airfield to fly on.

Of course, the idea of holding a major event without an airfield is not so senseless as it might seem. Airfields have a nasty habit of concealing themselves in virtually unexplored stretches of countryside, are always at least 20 miles from the nearest station, and, as an added safeguard against the intrusion of modellers, are never indicated on maps. This means that the only people who visit rallies are the car-borne and motor cycling varieties; types who are more interested in the " hunt-the-airfield " chase than in model flying. And the few model fliers who do reach the aerodrome spend more time outside it than in it. This is ensured by the organisers who, looking forward to a quiet day in the sun, regard the model fliers as a downright pest, and find the most effective means of disposing of them is to locate the take off areas at the downwind end of the airfield, within favourable distance of some inpehetrable wood.

This suggests that any F/F event could be more efficiently handled from a suburban hockey pitch, where everything would be nicely compact, with plenty of roads to facilitate retrieving. After all, if you did lose your way you could always ask a policeman, which is more than you can do (or dare do) in the middle of a cornfield.

Much the same applies to radio events, which are mainly F/F. Since a radio model either lands near the transmitter, prangs the crowd or flies away, a football field would provide a much cosier setting than an airfield. And the enclosed space would add zest to the sport as the spectator would not have the same freedom of evasive action. Team racing could be held in a school playground, to which it is eminently suited, and Combat fought out on the rectory lawn.

With all events thus held in the heart of a big city, the airfield problem would be effectively bypassed. But there is only one snag—to find a big city where model flying is not yet banned from all its open spaces.

Space Suit

Adding to the list of colourful club names comes the newly formed Spetchley Sky Blazers. The title, we understand, does not refer, as you might suppose, to a club uniform of light blue sports jacket, but modestly hints at the club's pyrotechnic achievements in the lower atmosphere.

Now, while we do not imagine that this comic strip title will blaze its way past the S.M.A.E. censorship on frivolous titles, even on the sports jacket pretext, there might be some hope for any enterprising club adopting the ambiguous name of " Flying Satellites." Apart from the nice topical flavour it should have a flattering appeal to the central body.

10 c.c. and All That

Adding zest to the dreary recitation of birth, marriages and small town gossip, one club is diverting local newspaper readership with the enthralling saga of its glorious history. The idea recommends itself to other publicity-conscious clubs; and so, by way of guidance, we present a gripping instalment from the archives of the Little Prangley Club.

Last week you read of the grand pioneering spirit of N. Bloggs and A. Flopp in introducing the model flying machine to Little Prangley, and how they escaped the wrath of the villagers by seeking sanctuary in the local Kite Club. Now read on . . .

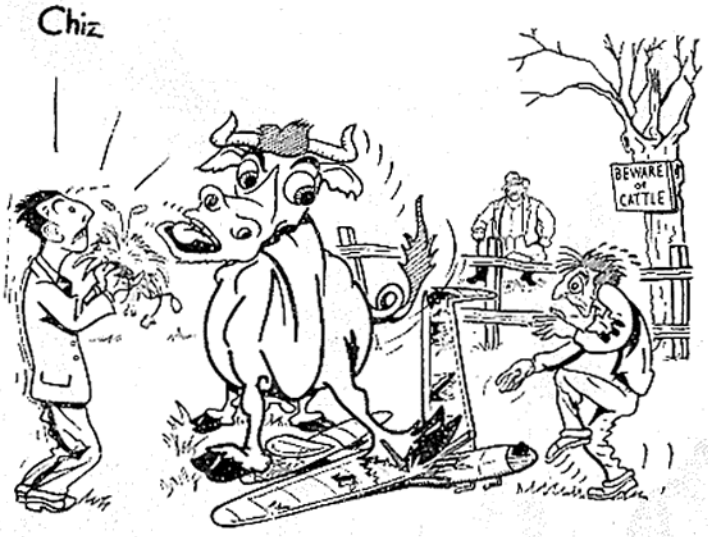
When it became known to the Kite Club members that the Stringfellow monoplane, which our two heroes intended to fly on the village green, was, in fact, one of the new fangled string-less box kites, there was a storm of protest, mainly from the realist element, who indignantly complained that, apart from being misled about the string, the thing didn't even look like a box kite.

Frustrated by the fixed principles of the Kite Club, they were encouraged by the more tolerant attitude of the villagers, who downed pitchforks to enjoy the enviable status of having two village idiots, to form their own club—the Little Prangley & District M.F.C.

The club expanded rapidly, and was at the height of its fame when it was dramatically confronted by its first major crisis. Forty members attended an emergency meeting at the newly-built clubhouse, to discuss a bombshell proposal from Messsrs. N. Bloggs and A. Flopp, which was in effect a demand that the club should acquire the use of a flying ground. After long and careful deliberation, during which it was revealed that the committee of 38 did not include these two honourable gentlemen, the proposal was rejected by 38 votes to 2.

Undismayed, our two heroes then proceeded to form a new club known as the Dampshire Nomads. The club, which achieved considerable success, had no clubroom or committee and only two members. However, a drive was made to recruit new members, and came the momentous occasion when President N. Bloggs proudly announced that the club had no less than 50 members. This figure was immediately disputed by Secretary A. Flopp, who contended that, as the 48 junior members were all six months in arrears with their subsciptions, a truer assessment of the membership figure would be the overall total of 2: President N. Bloggs and Secretary A. Flopp.

Next week you will read how our two heroes effected a reconciliation with the old Prangley Club, and how the present club, The Little Prangley and Dampshire Nomads M.F.C., became established.



We learn from a club report of a junior building a successful model, following suggestions made by the seniors.

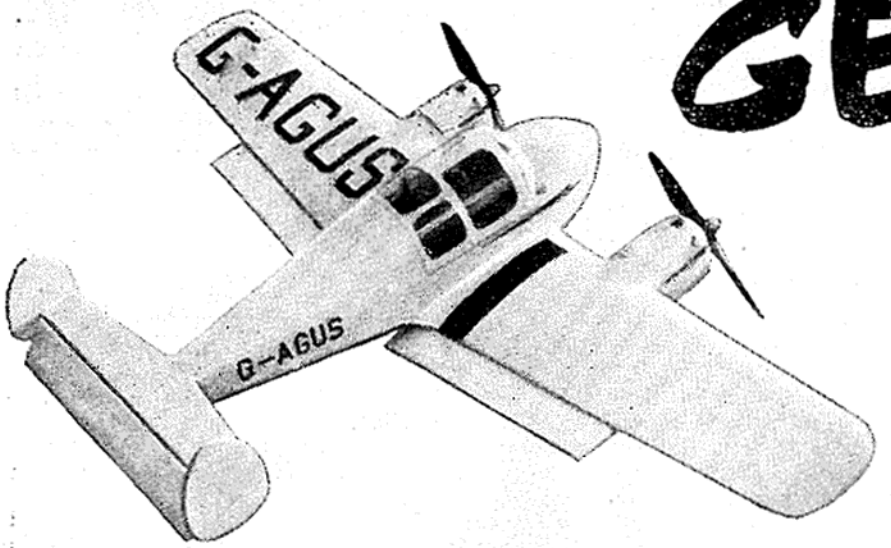
He can only be congratulated on his strength of mind in ignoring them.

Pylonius

GEMINI

A heavenly twin control-line model powered by two 1·5 c.c. engines

By F. Buckland



ANXIOUS to try a twin, I looked through my magazines until I found a drawing of the *Gemini*. Here was what I wanted; small and trim looking, sturdy fixed undercarriage, ample wing area—the ideal twin for small engines. The model, when built, fulfilled all my expectations, being snappy enough for the expert yet easily handled by the younger modeller.

Fuselage

Cut out all formers; mount A, B, C & D on ⅜ in. crutch pieces, fix hardwood bellcrank support and add side sheets; allow to set, then cement in remaining formers. Make tailplane using sandwich method, fixing tape hinges and 20 S.W.G. wire connector between laminations. Cut slot in elevator and cement in 1/16 in. ply horn. Sand to aerofoil shape. Cut tailplane seating from ⅛ in. sheet and fit between formers F and G. Install controls and cement tailplane in position, check for free movement. Cover decking and fuselage bottom from D rearwards with 3/32 in. sheet and install tail-wheel; add tail block and elevator fairing. Make dihedral keeper and engine support from ⅛ in. ply and cement securely against former B.

Do not add fins or cabin frames yet.

Wings

Build over plan in the usual way, using hard balsa for spars and trailing edge. While wing is drying, cut out engine nacelle formers and bearers, and bend undercarriage legs from 12 S.W.G. wire. Remove wing from plan and sand smooth. Shape trailing edge except for the end which fits into slot in side sheeting on fuselage. Offer wing to fuselage, cement rear spar to face of former C, and carefully fitting ply dihedral keeper in rib slots, cement firmly to main spar. Place assembly on flat surface and check for accurate dihedral; allow to set hard before proceeding.

Engine Installation

Fit bearers and rear nacelle former which is cemented to face of rear spar. Bolt undercarriage in position using tin can straps and 8 B.A. bolts. Add firewall and install tank, using scrap balsa to keep tank in position.

If you are doubtful of your ability to start two inverted engines, use small stunt tanks instead of the team race type. The *model* can then be inverted for starting and quickly righted when the engines are running. Stunt tanks can, of course, be inverted without fuel running out.

Make air outlet chute from 1/16 in. sheet. Cover bottom of fuselage between wings with 3/32 in. balsa. Cover wing from the root rib to rib 4 with 1/16 in. sheet on top and bottom surfaces. Nacelles can now be planked in with 3/32 in. balsa. Add tail blocks and sand smooth. Fit engines and nose blocks. Make a thin card template for cowling then mark out this shape on thin aluminium; there are no double curves so this is a very simple job. Incidentally, some Oxo containers as supplied to grocers are ideal, being just about the right gauge. Glue a strip of ply to outer bearer and using small wood screws secure cowling to this after well fuel-proofing engine compartment and air outlet.

Finishing

Fit 1/16 in. ply cabin frames and wrap over thin celluloid canopy. Windscreen is not difficult to make. Fashion a wood mould, heat celluloid or acetate sheet in front of electric fire until soft, then quickly pull over mould. Gloves are useful here. You may have to make two or three windscreens before you are satisfied, but it is well worth the effort. A dummy pilot (bareheaded) can be mounted on the bellcrank support if desired. It does look well in the air.

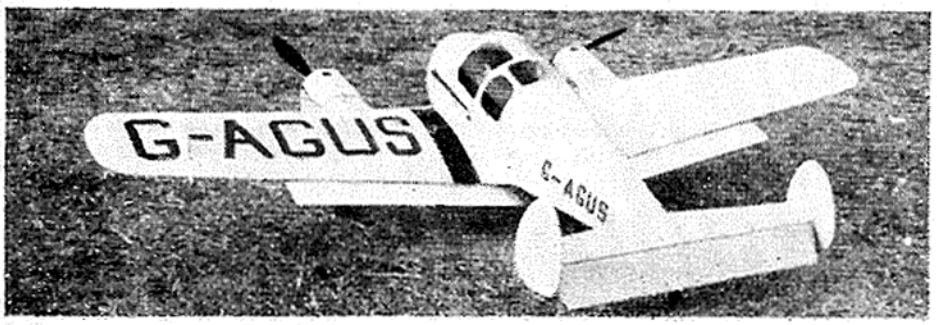
Cement fins securely in place. Shape nose block and spot cement in position; check that model balances where shown; if too far back add a little lead in nose block, then cement securely to former A.

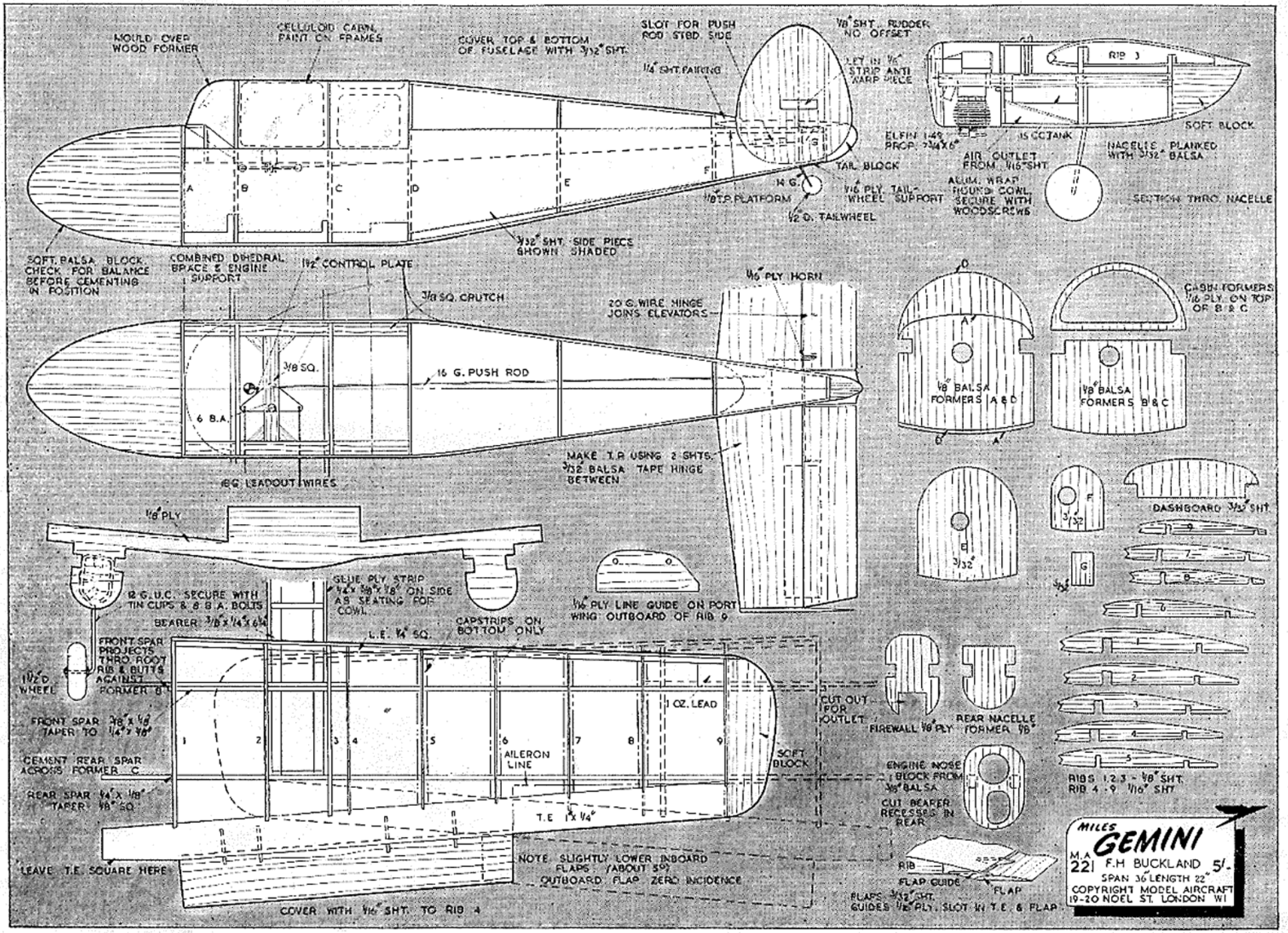
Finish model in your favourite way, but don't spare the elbow grease or sand-paper. The original model was in Milesian colours of cream with red letters and flashes, and was G-AGUS, the *Gemini* prototype with fixed undercarriage.

Flying

Choose a calm day for testing. Use 50 ft. stranded lines. Model will fly on either engine quite well, so don't be afraid to start inboard one first if you find it easier.

If you have never flown a twin before, you have a new thrill coming when the *Gemini* takes the air.





FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1, 5s. POST FREE

The Model Engineer 1955 EXHIBITION

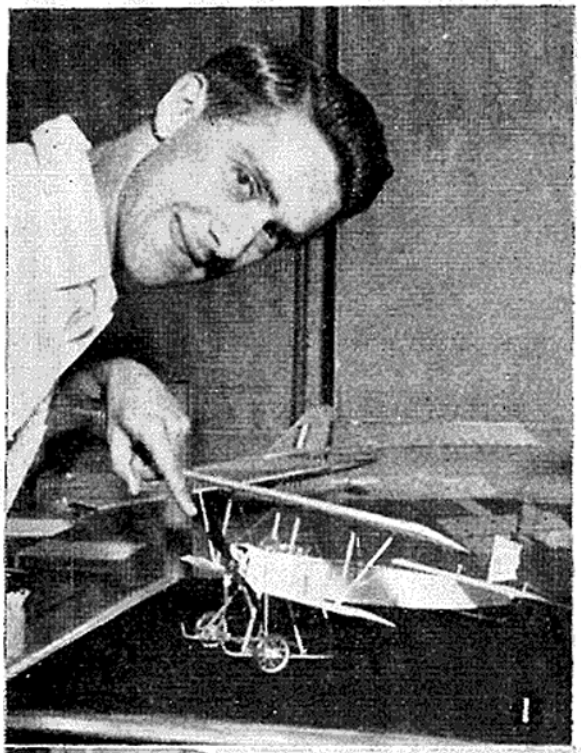
SCALE models undoubtedly have the advantage of eye appeal over the more sober type of contest model, at least to the layman, and thus it is fitting that for the last few years there have been a preponderence of scale models in the aircraft section. The impression given to the general public has been of a good and interesting show of aircraft models, a fact of some importance to the movement.

This year was no exception; there were plenty of good scale models and a marked increase in the total number of non-flying exhibits.

On the whole the standard of the aircraft models was high and certainly maintained, if not exceeded, that of previous years.

It may be remembered that an "old timer" (a Bleriot XI) won the Championship Cup last year. Again this year it was an "old time" model that carried off the top honours. R. M. Thorogood won a silver medal, the Championship Cup, and the Bristol Cup with his 1/24 scale Bristol 1911 racer—his first-ever attempt at a scale model!

Another silver medal winner was Dr. F. J. Morley with an impressive collection of 16 1/72 scale models of all vintages. Raymond Axford, too, won a silver medal for his C/L scale model of an FW 190A3, which was highly detailed.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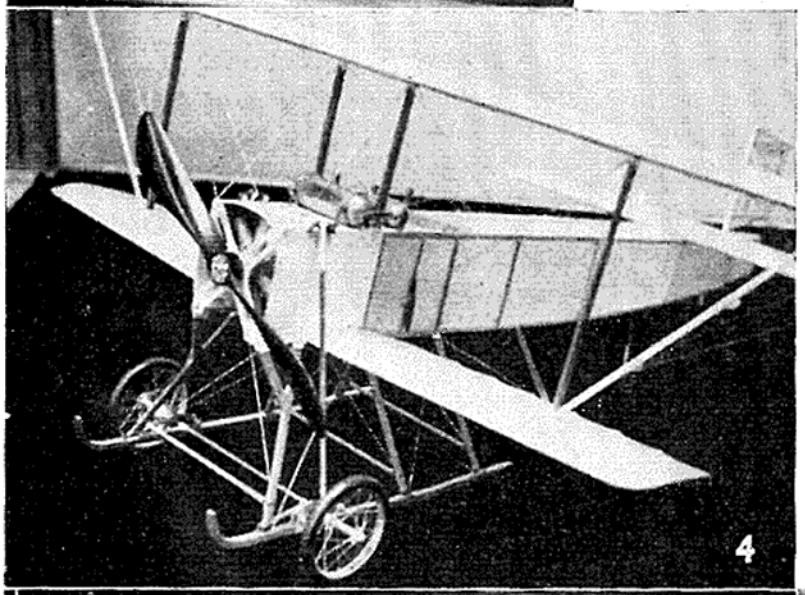
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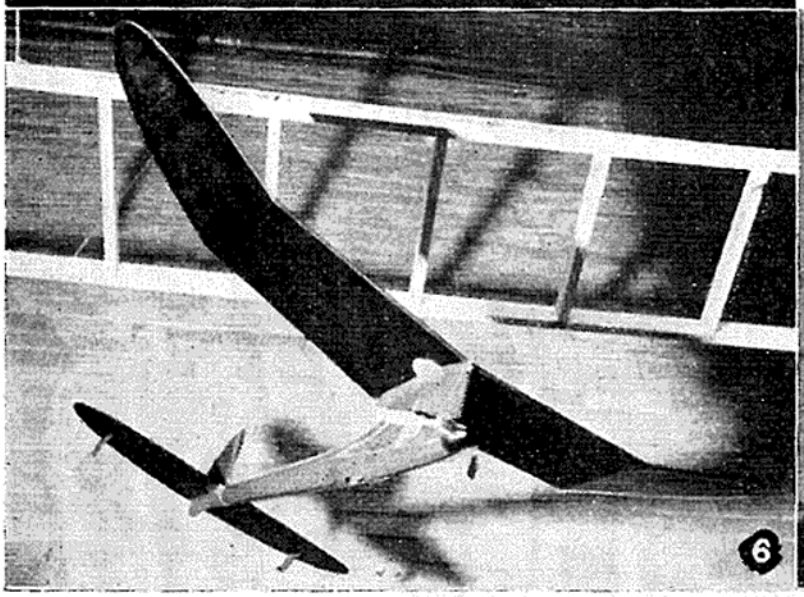
1. *Robert Thorogood with his Bristol 1911 racer which was awarded the Championship Cup in the aircraft section.*
2. *Raymond Axford's C/L FW 190, powered by a Nordic 10 c.c. motor, a silver medal winner.*
3. *Maj. S. Taylor and his son Dick had a busy time answering queries at the S.M.A.E. stand.*
4. *A close-up of the beautifully detailed Bristol 1911 racer, which also won the Bristol Cup.*
5. *A bronze medal was awarded Keith Jacobs for this 66 in. span B.G. 44 sailplane.*
6. *John Saunders' entry, a power duration model of American design, won him a bronze medal.*
7. *A general view of the aircraft section, which attracted a constant stream of visitors.*
8. *The "Mew Gull" won the King's Cup Air Race. while its model counterpart won a bronze medal.*
9. *A fine Vickers "Vildebeest" IV entered by Cpl. R. Winters, who was awarded a bronze medal.*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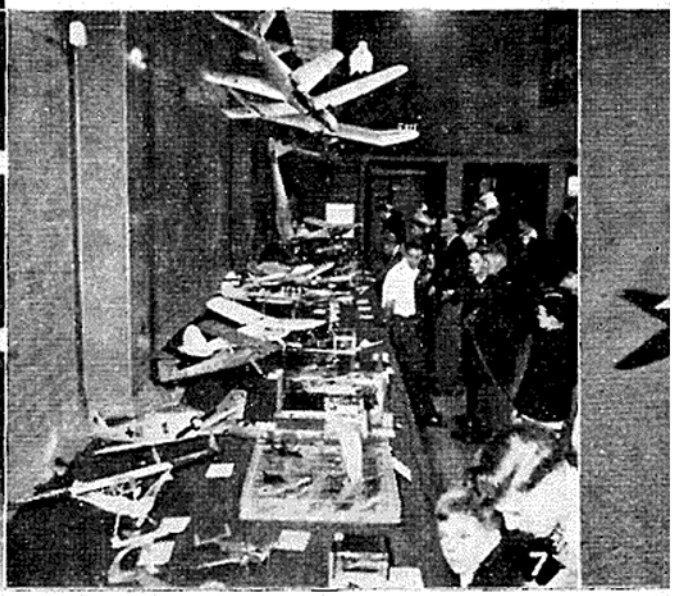
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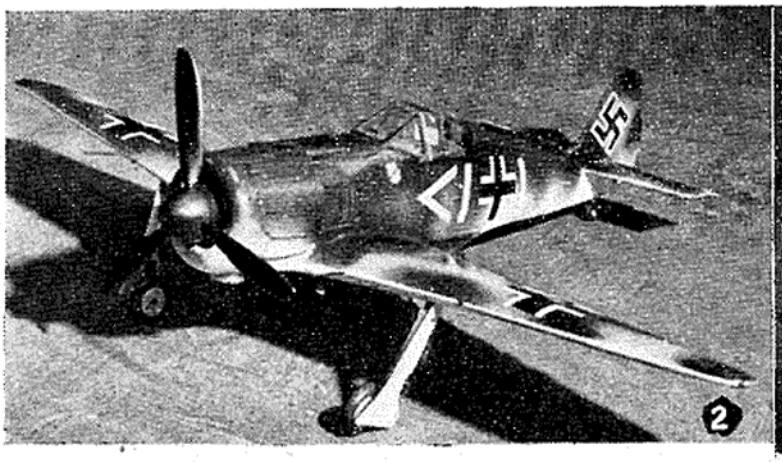


COMPETITION RESULTS

CHAMPIONSHIP CUP
R. M. Thorogood (Bristol 1911 racer)

"MODEL AIRCRAFT" PRIZE
(For models built from "M.A." plans)
W. R. Stobart (H.M. 300)

BRISTOL CUP
R. M. Thorogood (Bristol 1911 racer)

CLUB TEAM TROPHY
Northampton Model Aero Club

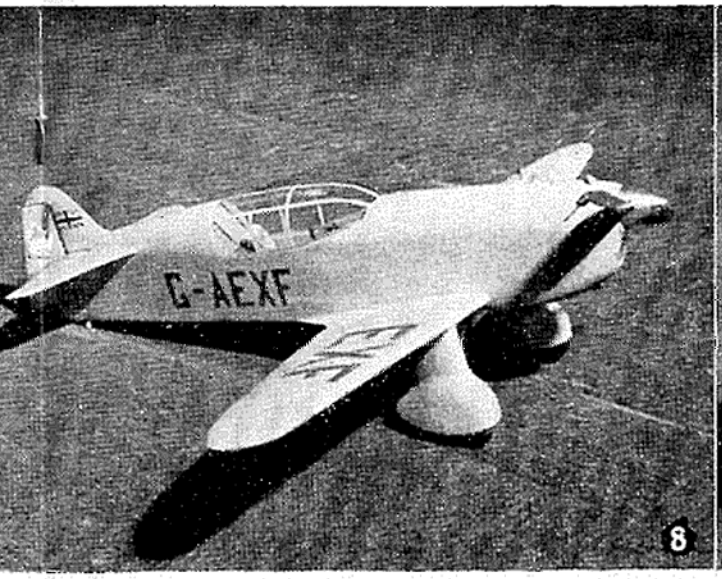
FREE-FLIGHT POWER-DRIVEN AIRCRAFT
Bronze Medal ... ... J. P. Saunders (Power duration model)

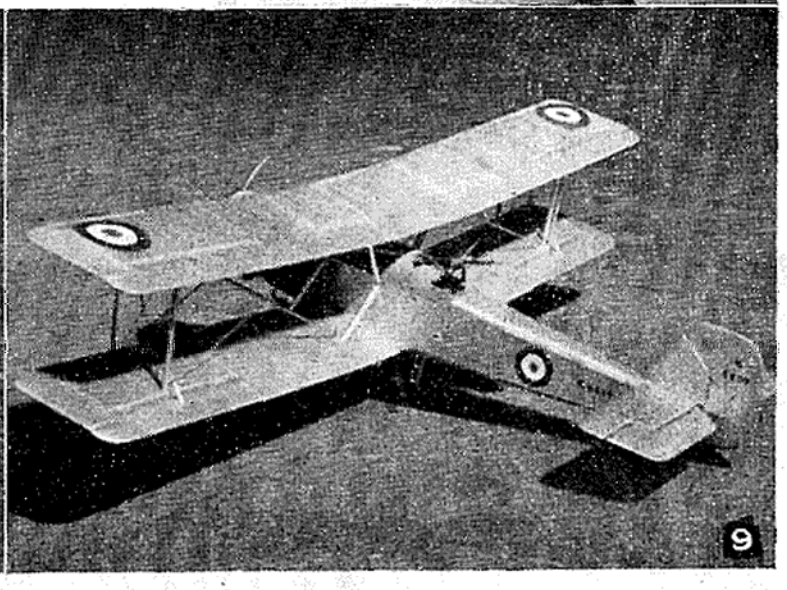
CONTROL-LINE AIRCRAFT
Bronze Medal ... ... D. H. Jones (Percival *Mew Gull*)

SAILPLANES
Bronze Medal ... ... K. L. Jacobs (B.G. 44)

NON-FLYING AIRCRAFT
Silver Medal ... ... Dr. F. J. Morley (16 1/72 scale models)
Silver Medal ... ... R. M. Thorogood (Bristol)

SCALE FREE-FLIGHT OR CONTROL-LINE AIRCRAFT
Silver Medal ... ... R. Axford (Focke Wulf)
Bronze Medal ... ... Cpl. R. Winters (Vickers Vildebeest)





Aviation NEWSPAGE

by J. W. R. Taylor

The supersonic "Sea Dart" now refitted with single ski.

Aircraft with speed ranges between **MACH 10** and **MACH 20,** approximately 7,000 to 14,000 m.p.h. will be built in the next 20 years, according to Larry Bell, head of Bell Aircraft Corp. They will operate at heights up to 50 miles, and will make it possible to travel to any place on earth in one or two hours. Bell, whose company built the X-1, first aircraft through the "sound barrier," said that aviation is now faced with the thermal barrier. "And, when that is licked, there probably will be a couple more to contend with, perhaps the radiation barrier and maybe even the time barrier."

* * *

INCREASED ROTOR DIAMETER of 36 ft. (from 32 ft. 10 in.) on the French SO.1221 *Djinn* light two-seat helicopter has put its payload up by 132-154 lb. without lowering performance.

* * *

INBOARD AILERONS, which can be drooped together to lessen the angle of attack during take-off and approach, distinguish the prototype Folland *Gnat* from its low-powered counterpart, the *Midge*. Other changes include bigger air intakes for its Bristol Orpheus turbojet; shorter, but increased diameter tailpipe; bulged fairings round the tailplane roots; larger windows behind the cockpit hood; repositioning of the pitot head under the starboard wing and introduction of new lightweight undercarriage wheels. No armament is yet fitted.

* * *

OTHER LIGHTWEIGHT FIGHTERS in the news are the French Breguet Br.1001 *Taon* and Dassault *Mystère XXVI* and the Italian Fiat G-91, which were designed to meet the NATO specification for a light tactical fighter. Three prototypes of each have been ordered and the United States will contribute around $7½ million to their cost under the Mutual Weapons Development Programme. All are fairly conventional swept-wing single-seaters, powered by an Orpheus, and development of this British engine is also being backed with M.W.D.P. funds. An additional 27 Fiat G-91s are being built for tactical trials under the direction of SHAPE.

* * *

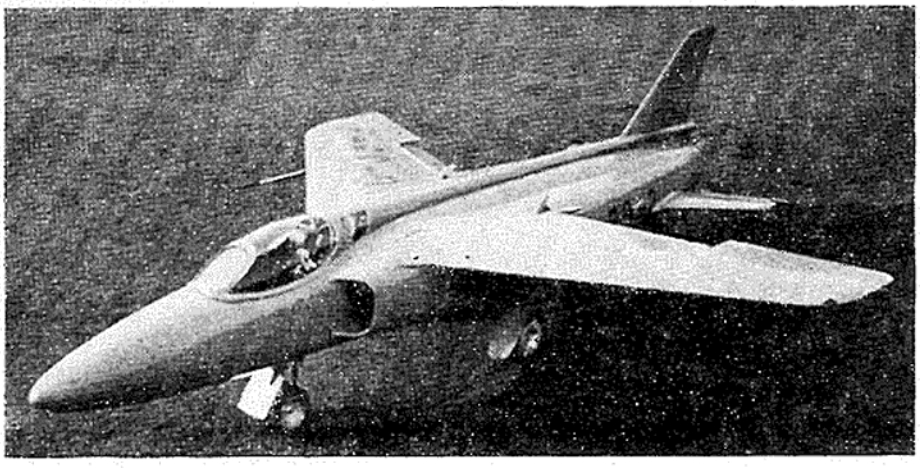
SERVICING EQUIPMENT for Convair's XFY-1 vertical take-off fighter includes finely crushed walnut shells, which are run through its turbines occasionally to clean out carbon and dirt. Same system has been used on the company's R3Y *Tradewind* flying boat and *Sea Dart* hydro-ski fighter.

* * *

TALKING OF SEA DARTS, one of the prototypes has been refitted with a single ski as part of the Convair-Navy hydrodynamic research programme, and has been tested successfully for several months. In other respects it is similar to twin-ski XF2Y-1's, powered by two Westinghouse J46 turbojets and capable of supersonic speed in a shallow dive.

* * *

NEW FACTS on the Boeing B-52 *Stratofortress* reveal that it is the first military aircraft to have a cross-wind



Note the inboard ailerons, new undercarriage wheels, and other detail changes that distinguish the "Gnat" from the "Midge."

Odd "Super Connie" here sports B.O.A.C. colours and still carries its U.S. registration number, N6503C.

undercarriage as standard equipment. When the wind is blowing across a runway, its four pairs of main wheels can be preset before take-off or landing, so that they run straight down the concrete while the nose of the 156-ton bomber points into wind. Result is improved lift and less drag for take-off, and reduced risk of ground-loop and drift during landing.

Now fully-operational, B-52s are complete with two large underwing fuel tanks outboard of their podded J57 turbojets, a two-gun tail turret with oversize radar tracking scanner and gunner's position, and a socket to receive flying boom type flight refuelling, which gives them virtually unlimited range.

* * *

FIRST SUPERSONIC ATOM-BOMBER is the new F-100C long-range version of the North American *Super Sabre*, which has entered service with the 322nd Group of the U.S.A.F.'s 450th Fighter Day Wing at Foster Air Force Base, Texas.

Apart from two fuel tanks and four bombs slung under its wings in the picture below, it looks little different from the F-100A, holder of the World Speed Record. But more than 287,000 engineering man-hours went into its development, to introduce flight refuelling equipment, weapon and tank carriers, and new electronic gear to ensure pin-point bomb-drops.

Retaining the four 20 mm. M-39 cannon of the F-100A, the new *Super Sabre* can be used as a pure interceptor, long-range bomber escort fighter, or as a fighter-bomber able to fly supersonic for as long as its fuel lasts with a full load of H.E. or tactical A-bombs. Its span of 38 ft. and length of 47 ft. are slightly greater than original dimensions of the F-100 series, and it has a 10,000 lb. thrust Pratt and Whitney J57 turbojet with afterburner.

* * *

VISCOUNT-MAJOR is the name by which B.E.A. will distinguish its "stretched" *Viscount* 802s. The Corporation has ordered 22, with an option on 10 more.

* * *

RARE SIGHT is this Model L.1049B *Super Constellation* in B.O.A.C. insignia. Still carrying its U.S. registration (N6503C), it is one of two Seaboard and Western Airlines aircraft hired by the Corporation to assist with the flood of tourist traffic between New York and Bermuda. Built as freighters, these 1049B's have only half the normal number of cabin windows; but are comfortably furnished with 86 armchair-type seats and full galley and toilet facilities. Flown by Seaboard crews, with B.O.A.C. cabin staff, they have slashed flight time on the 772-mile route to 2 hr. 40 min.

* * *

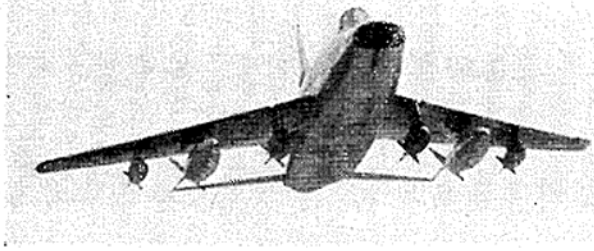
ANOTHER RARE BIRD, this time in U.S. Army colours, is the YL-26 *Aero Commander*, three of which were bought for service trials. More than 150 similar *Aero Commander* 520 civilian light transports were produced by the Aero Design and Engineering Corp. of Bethany, Oklahoma, mainly as 6-7 seat executive transports. Powered by two 260 h.p. Lycoming GO-435-C2B engines, they have a top speed of 211 m.p.h. and a cruising range of 1,150 miles at 197 m.p.h. Wing span is 44 ft. 7 in., length 34 ft. 4½ in. and loaded weight

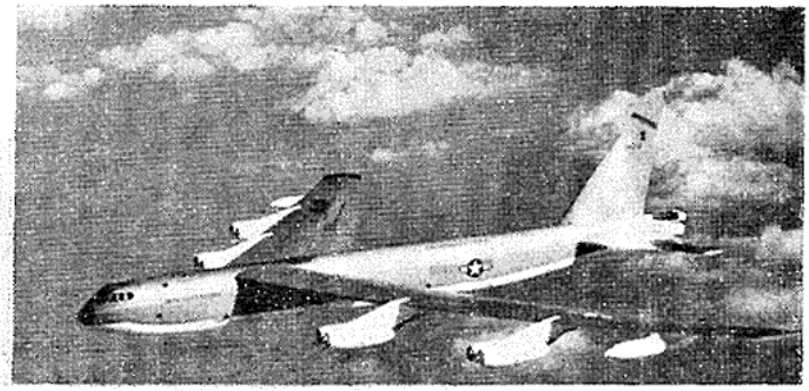
5,500 lb. Latest production version is the *Aero Commander* 560 with 270 h.p. Lycomings, swept tail surfaces and 6,000 lb. AUW.

* * *

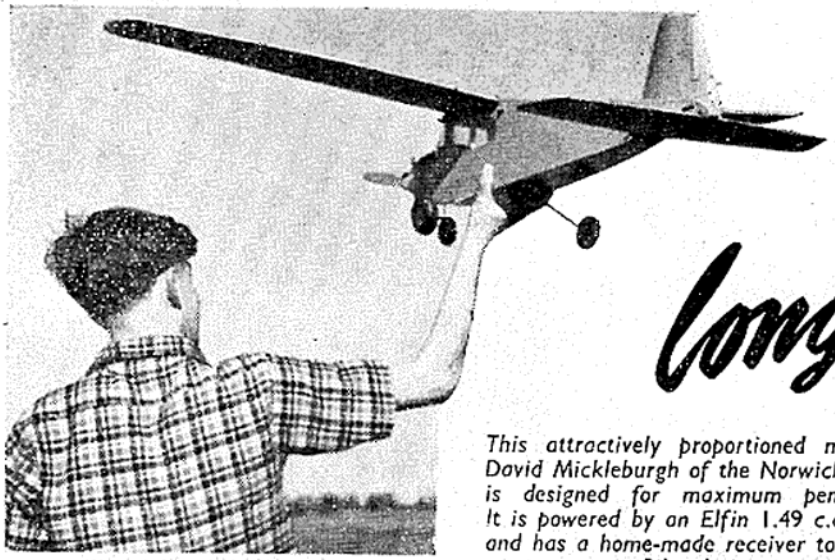
THREE H.D.35 PROTOTYPES, developed from the ultra-high aspect ratio Hurel Dubois H.D.32 transport, have been ordered by the French Navy for evaluation as maritime reconnaissance and anti-submarine aircraft. A large production order is expected to follow and the nationalised Sud-Est company is preparing to tool up for this.

Left: The long range F-100C, which is supersonic despite the "extras." Right: The B-52 "Stratofortress" has an unrefuelled range of around 6,000 miles, and its eight Pratt and Witney J57 engines are reputed to give it a top speed of over 650 m.p.h.





Thoughts on long-range R/C



This attractively proportioned model by David Mickleburgh of the Norwich M.A.C. is designed for maximum penetration. It is powered by an Elfin 1.49 c.c. engine and has a home-made receiver to a Geoff Pike design.

THERE are two types of record which impress themselves on the minds of the public: speed and distance. Two hundred miles an hour on water, four hundred on land, seven hundred in the air; all make the headlines and become a topic of conversation on the 8.30 to the office in the morning. In this rapidly shrinking world, distance achievements are a little less impressive, but anyone who remembers the London-to-Capetown flights of the nineteen-thirties will recall the excitement these caused. Pure endurance work on closed circuits, on the other hand, has never attracted quite the same attention; days aloft in a light aircraft is apt to be looked upon as something akin to pole-squatting and few people are aware of the still unbeaten pre-war world record achieved by a Citroen car which circled Montlhery track continuously for *four months* at nearly 60 m.p.h. covering 300,000 kilometres.

The same, perhaps, goes for model aircraft records. The idea of a C/L model travelling at 150 m.p.h. is still rather exciting. Mere duration records, on the other hand, no longer claim the attention of the experts, who recognise that outdoor F/F records (as distinct from consistently high contest performance, of course) are too much dependent on the vagaries of weather conditions to accurately reflect the capabilities of designer and constructor.

Duration records have, however, lately gained attention from R/C enthusiasts who (since directional control will allow a suitable model to be kept in sight irrespective of drift) can, quite rightly, find some satisfaction in keeping a model airborne for long periods.

At the moment, the power R/C model record stands at approximately three hours. Such a figure is within the capabilities of a conventional R/C model, given a reasonable battery weight and an economical engine.

ACCENT ON POWER
by
P. G. F. CHINN

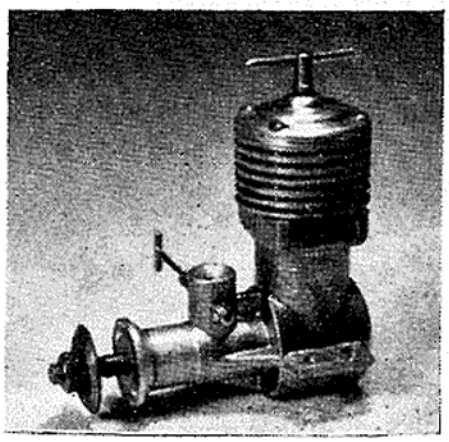
Much beyond this point, however, the model requirements become progressively more specialised and equipment more complicated. Model design will call for "PAA-Load" and "Clipper-Cargo" techniques, for the model will become, eventually, purely and simply, a weight lifter.

The alternative approach is the "distance" or long-range model. So far, we have seen only one notable flight of this type: the Redlich-Allen cross-Channel flight. As far as publicity value is concerned, this was, undoubtedly, the "plum." However, there are plenty of other point-to-point flights worth attempting which would not necessarily involve the expense and complication of the Channel flight. Alternatively, one may aim simply at covering the greatest possible distance in a straight line for the purpose of establishing a national or international record.

The main obstacles to be dealt with in the distance attempts concern the method of control and means of following the model. It would seem that an escorting vehicle, carrying the transmitter, is the only method likely to receive any sort of support at present. Few amateur model builders are likely to be in the fortunate position of having access to a light aircraft for escort duty, while the only other means of directing control of the model, i.e., stationing a number of transmitters along the route and handing over control from one to the other, seems hardly practicable over any appreciable distance. Even with crystal-controlled transmitters of the maximum permitted power, a strict compass course and routing in the direction of the prevailing wind, it would seem unwise to space the control points at intervals of more than, say, 1½ miles, a somewhat expensive method except over distances of the most modest dimensions.

In a recent letter, Frank Bethwaite, the present holder of both glider and power R/C duration records, remarked that the problems of model design and radio equipment reliability are negligible compared with the practical difficulties surrounding duration record attempts. It is obvious that cross-country distance flights will be considerably more difficult in this respect.

Let us consider, for a moment, one or two of the problems involved.



The new Italian Barbini B.38 2.5 c.c. diesel. It will be described in our next issue.

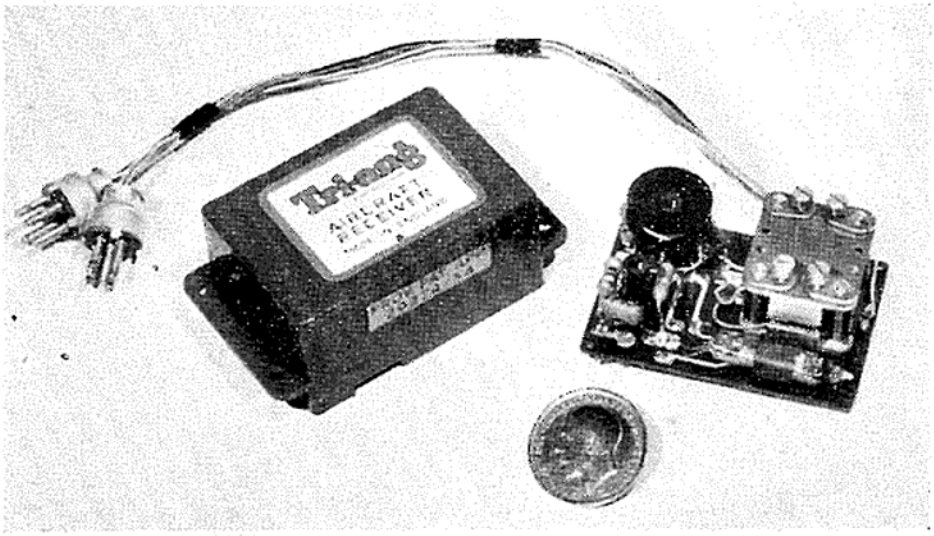
Frank Bethwaite remarks that his present world records "do not approach worthwhile figures. . . ." Presumably, he has in mind a dawn-to-dusk flight as a potential target. Obviously, while model design problems have not been acute in the case of records established to date, it will be a very different story when one attempts to design a model capable of flying for, say, twelve hours.

Most of the duration records to date have been set up with small, economical diesels. Geoff. Pike used an Amco 0.87 c.c., Hilton O'Heffernan and Bethwaite have used Mills 1.3's. Unless we go to the other end of the scale and use a 10 c.c. spark-ignition petrol engine, a Mills 1.3 is, perhaps, the best possible choice at the present time. It requires to be operated on a carefully chosen prop which will load it for a speed not faster than 6,000/7,000 r.p.m., at which speed it will give about the best balance between economy and power developed. The main problem then becomes one of loading up the model with as much fuel as it is possible for it to carry without failing to r.o.g. The lighter the airframe and the rest of the equipment, of course, the more fuel it will be possible to lift.

Undoubtedly, a lot can be done on the structural and aerodynamics side to provide an airframe capable of lifting several times its own weight. In the U.S.A., a Cargo-Clipper class model, using only a ½-A class (0.8 c.c.) engine, has lifted more than 40 oz.—the bare airframe weight probably being not more than one-seventh of this figure. Incidentally it should not be assumed from this that the larger capacity Mills 1.3, in a duration model, would lift a proportionately larger load: it must be remembered that the ½-A engine will be operating at, or near, a speed where its maximum power is available, as this is required only for a short time and consumption is immaterial. However, the moral of the airframe weight is clear. The model designed expressly for capturing a world R/C duration record may not be a particularly serviceable one; in fact, the builder may well be advised to regard it as expendable and to be used for record attempts only.

One advantage that the contender for the R/C duration record possesses over the cargo-clipper builder is that, while both models may have to take off at high wing-loadings, the R/C model, provided it is successful, will land at a greatly reduced wing-loading, due to fuel consumed, whereas the cargo model will land at the same weight as it took off and is thus more prone to damage.

Since the R/C duration model is continually getting lighter as it remains airborne, a serious bother will begin to make itself felt due to increased climb. If we imagine a model getting off at a wing-loading of 16 oz./sq. ft. and then, after some hours, this figure is reduced to 10 oz./sq. ft., it will be readily appreciated how embarrassing this can be. There appears to be four ways of dealing with this problem; the simple spiral dive, elevator control, engine control, or weight redistribution.



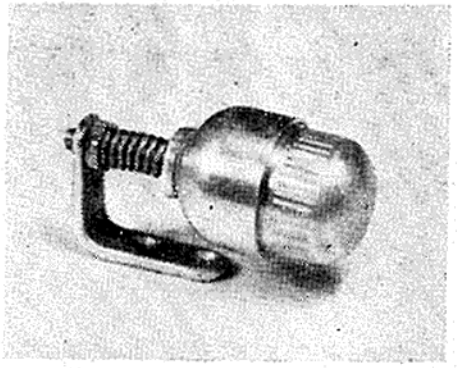
With the lid off is shown the new Tri-ang radio-control receiver. A relay of outstanding design is incorporated in this receiver.

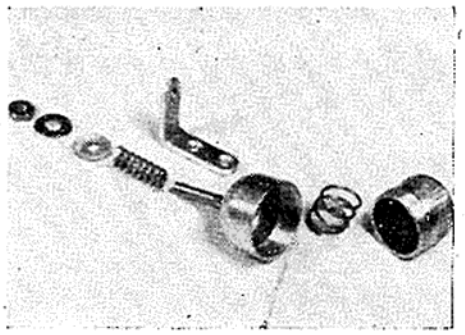
The spiral dive, obtained simply by holding on rudder, of course, may appear to be an obvious solution. Two things are against it. We are endeavouring to lift a certain weight and to keep it airborne as long as possible. The initial part of our flight, especially the take-off, is likely to be critical in this respect and we want all the power we can get. It therefore seems wasteful to deliberately dissipate the power of the engine during the later stages. Secondly, if a diesel is being used, there is a distinct danger, when running on the fairly large prop required, of overruning the compression adjustment during the spiral dive and stopping the engine.

Elevator control will require the addition of an extra channel in the receiving equipment. It should preferably be a simple trim tab—not a self-neutralising elevator, so that an occasional touch on the third control will retrim the model for level flight. The model will, of course, gradually speed up, which may be helpful for increased penetration under windy conditions. Alternatively, at the expense of some extra complication, it may be possible to couple in a throttle control which would decrease engine speed slightly with each successive retrimming movement. Such an arrangement would be preferable to having engine control only. The subject of engine speed control is too wide to be adequately dealt with here, but it is obvious that, of the various methods of engine speed control available, it is advisable to choose one which does not waste fuel unduly.

Lastly, we can utilise weight redistribution as a means of re-trimming the model as the fuel is used up. The principle is simple. We merely instal the fuel tank with its c.g. slightly behind the c.g. of the entire model (with tank). As the fuel is then used up, the c.g. will gradually move forward and prevent the model from climbing excessively. The best location can be determined by preliminary limited duration test flights using a full, and then almost empty, tank, before fixing its position finally.

Many of the lessons learned and experience gained from R/C duration flying may be applied to good effect in long-range flying, but, as records progress, it is certain that the two types of model will grow more and more dissimilar. A cross country flight of, say, 20 miles, may take no more than an hour and it would certainly seem somewhat premature





These two photographs show the New Zealand made Velo-jet 50 unit. The case halves screw together and a safety valve is incorporated in the mounting spindle assembly.

at this stage to start thinking in terms of long-distance flights occupying several hours. Obviously, the most important consideration with a distance model will be to obtain the most positive system of control—preferably proportional—which will enable it to be flown straight and at a constant altitude with a minimum of trouble.

First requirements, we would suggest, are a stable model with no tendency to yaw, an elevator trim tab by which small corrections to longitudinal trim can be made in flight, and a reasonably fast flying speed. A car or motorcycle escort will, of course, be required, and the obvious first step is to try a few dummy runs across an airfield, followed by some short preliminary runs along a suitable stretch of deserted open road. Incidentally, no R/C distance flight should be undertaken without first notifying the appropriate authority (as required under the terms of the transmitter's licence) including the police, if roads are to be used, of the proposed attempt.

To simplify control, and avoid any risk of losing sight of the model, it will obviously be desirable to choose open country and roads free from trees which may obscure vision. Also a route that is as straight as possible and parallel to the prevailing wind will be advisable. Such may not be easy to find, and if, and when, records begin to reach dimensions of any note, we may well find that it will be in the wide open spaces of the American and Australian (not to mention Asian) continents that these are achieved.

In Australia, where one or two speedboat-escorted overwater flights have already been made, one noted modeller has hopes of completing a 40-mile cross-country flight shortly. Making flights over suitable stretches of open road is envisaged there and it is considered possible to complete 100 miles, in the future, in this way, without too much trouble. Obviously, this calls for an open road such as we have never seen in Britain. Straight roads do exist in Australia, however: we once heard of an XK. 120 being driven over the 670 miles from Darwin to Tennants Creek at

Tail Units for Built-up Scale Models

by P. G. Cooksley

IT is commonly known that builtup models in the larger scales suffer from frail tail units due to the thin structure necessary; the method described here obviates the difficulty.

The surfaces are outlined on mm. ply, complete with the movable portion, which is then cut off along the hinge line. The ribs and spars are marked off on both sides of the wood.

A sheet of wood or plastic is then selected equal in thickness to that of the required surface, minus 1 mm. Strips are cut of the required thickness to represent the ribs, etc.

The movable portion next has a piece 1 mm. wide trimmed off its hinge line, and along this edge, above and below, is cemented a length of the strip with a 1 mm. overhang, so that a channel results.

After drying, small pieces about 3/64 in. wide are filed out on the hinge points. Similar pieces, but without overhang, are fastened to the fixed portion, as the ribs and spars are represented similarly. Having set, the members are filed and sanded to the correct section.

A length of 20 S.W.G. brass wire is cut and fastened in the channel, and over this, moving in the 3/64 in. slots, are placed small U-shaped metal pieces with their extremities cut into points. These can then be driven into the rear edge of the fixed portion, so that a hinged surface results.

Should control horns be necessary, these are cut from fine gauge sheet and fastened in a slot before the fixing of the wire. To accommodate them they may require a small notch cut in the angle.

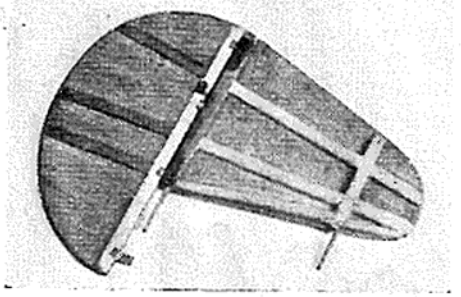
The unit having been fitted with lugs to engage holes in the rear fuselage for fixing, it is now ready for covering, which is carried out in the usual manner, and doped.

The result is a tail unit which is not only unusually robust, will not warp during shrinkage of the covering, and is indistinguishable from the conventional type, but also can reproduce even the most difficult shapes in about a third of the usual time.

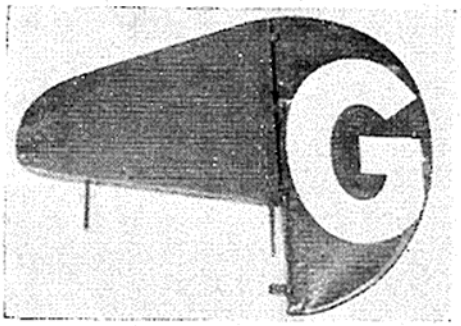
Should a clear doped machine of the early type be contemplated, it is a simple matter to cut out the areas between the structural members with a fret-saw to produce the correct "transparent" effect.

This method has been tried out by the author and is incorporated in his latest model.

The uncovered rudder.



The finished rudder.



an average of 92 m.p.h. (the police were so outraged that they clapped the driver in the local gaol for the night), which seems to suggest that Australia may be the future location for all cross-country R/C distance records.

In Brief . . .

An entirely new Aerotrol R/C receiver and transmitter will shortly be marketed in the United States. Quite different from the original Aero-Spark Aerotrol and its present successor, the D-E Super-Aerotrol, the new receiver is of the modulated type, using three hard valves. It is regarded as being the most stable circuit yet put on the market. Maker Joe Dale tells us that the prototype was put in a boat a year ago, was tuned on installation and has not required an adjustment since.

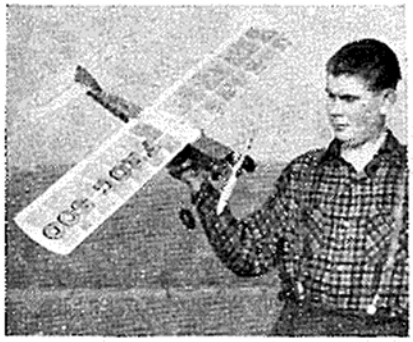
We have just received one of the new 2.5 c.c. Allyn Twins from America—the first, we believe, to reach this country, although others, no doubt, will be here by the time these words appear in print. Production of the engine has been somewhat delayed since the original target (May) for their production. The engine will be fully described next month. Meanwhile, to satisfy curiosity: the engine uses coupled crankdiscs driving an extension shaft (*à la* Taplin) but has a rotary valve incorporated. It weighs less than 3 oz. and looks no bigger than a pair of Allbon Darts put together.

Several variations on the Jetex motor, using I.C.I.-Jetex fuel, have lately appeared in the southern hemisphere—notably from New Zealand and Japan. A similar unit has also appeared in the U.S.A. One of the New Zealand-made units recently reached us. Something of its general design and construction can be gathered from the accompanying two photographs. Instead of using a spring clip, per Jetex, to keep the end cap in place, the case is made in two halves and screwed together. Avoidance of damage through a blocked jet is then provided for by a safety-valve hole in the front end of the case, which is covered by a suitable washer, retained in position by a compression spring on the mounting spindle. The Velo-Jet, as it is called, is made by the Betta Model Aeroplane Supply Co. of New Plymouth, N.Z. Also available for use with this motor is the " Flite Extenda Barrel," which is a longer motor barrel enabling two fuel charges to be accommodated.

MA Model Quiz

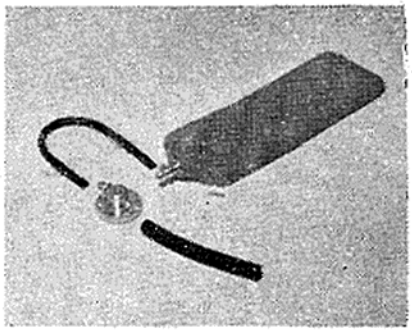
Test your knowledge of model aircraft matters with this interesting quiz. Score 10 points for each complete answer. A total of 50-60 is fair; 60-70 is good; 70-80, very good; over 80, excellent.

Answers are on page 418.



1. The original of this model won the Gold Stunt Trophy at the British Nationals at York in 1949.
(a) Who designed and flew it ?
(b) What was the engine used ?
(5 points each question)

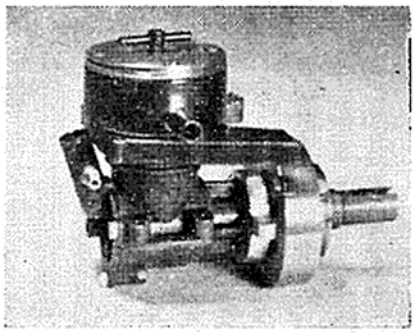
2. Wakefield Special.
(a) Who flew a Wakefield winner called *Clodhopper* ?
(b) Name the countries which have won the Wakefield once.
(5 points each question)



3. What is this ?

4. Two of the undermentioned aerofoil sections are streamlined sections and two are undercambered sections. Can you group them ?
R.A.F. 30, R.A.F. 31, R.A.F. 32, R.A.F. 34.
(2½ points for each correct answer)

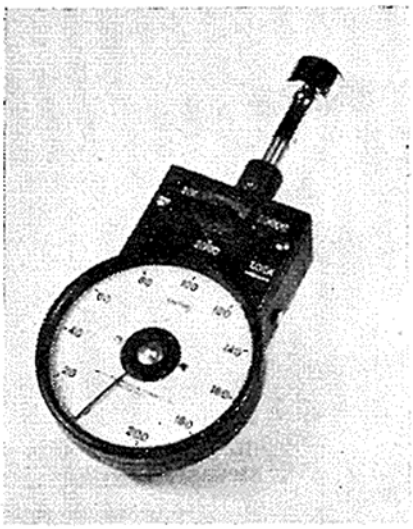
5. This is a marine conversion of a famous model aircraft engine.
(a) What is the name of the engine ?
(b) Who designed it ?
(5 points each question)



6. What do the following radio-control model designs have in common ?
(a) *Rudderbug* ; (b) *Guff* ; (c) *Wag*.

7. There are three well-known rubber model builders in this photograph. Can you name them ?
(5 points for two names, 10 points for all three)

8. Rearrange in order of weight, beginning with the lightest, the following woods.
(a) Birch; (b) Balsa; (c) Bass; (d) Box.
(2½ points each correct answer)

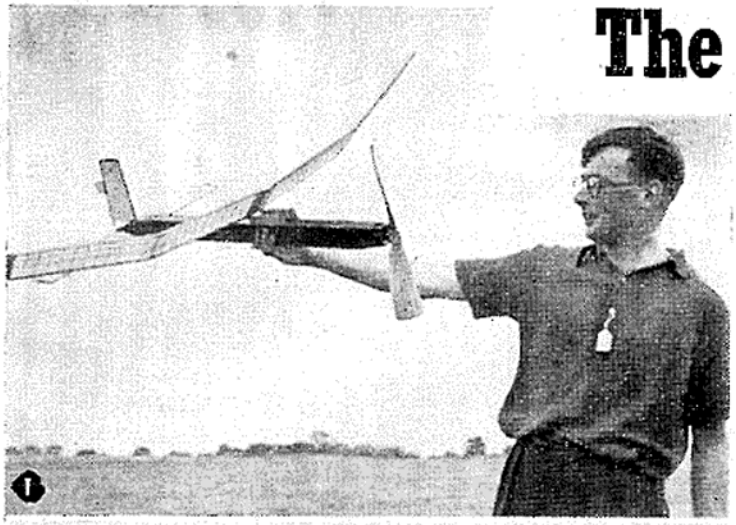


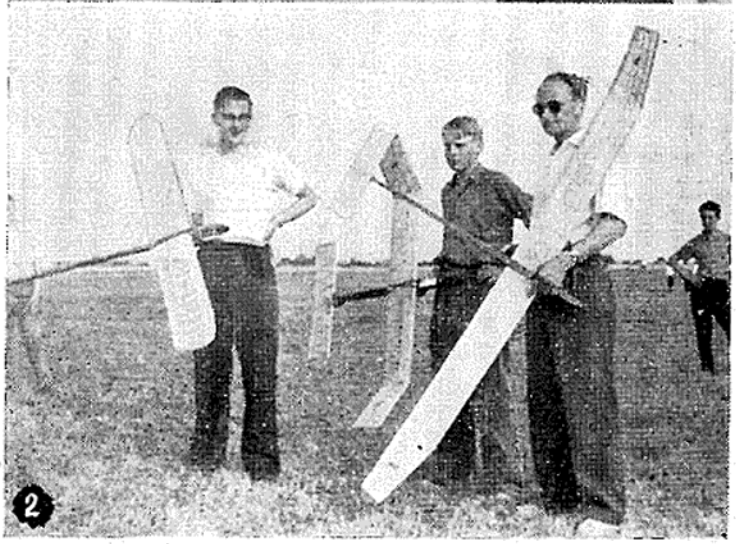
9. This instrument is a:
(a) (i) Revolution Counter; (ii) Tachometer; (iii) Spring balance; (iv) Torque indicator.
It operates:
(b) (i) Electrically; (ii) Mechanically; (iii) Magnetically; (iv) By spring tension.
(5 points each question)

10. Who designed the following famous models ?
(a) *Super Buccaneer* ; (b) *Slicker* ; (c) *Toothpick* ; (d) *Speedwagon*.
(2½ points each correct answer)

The NORTHERN GALA and I.R.C.M.S. meeting

Held at Croft Airport Nr. Darlington





THE weather in the North this year has been exceptional, and modellers attending the Northern Gala could not have picked better conditions than those prevailing. Although at first it was overcast, it was very warm, and, with only the slightest breeze, at times the air seemed a little dull and heavy, but by lunch time thermals were strong and plentiful and it seemed that even a well trimmed brick would record a maximum.

The F/F lads tucked themselves away in a quiet corner and with the help of the contest controllers seemed to run the contests on a nice help-one-another basis. The standard of flying was extremely high, but the one or two people who thought the day might turn to rain, and hence flew off their three flights early in the day, suffered by not being a little more patient. Some idea of the conditions prevailing in the late afternoon are indicated by the winners' times: the first three in the C.M.A. glider event all recorded triple maxes and in the fly-off B. Harvis (Prestwick) made a flight of 11.19 to place first, second was J. Simcock (Northwick Park) with 10.26, and A. Farrer (Pontefract) had to be content with third place. Times in the power event were even higher: again all the first three put up maximum times, and G. Upson (Northwick Park) scored 13.26 in the fly-off to run out first, V. Jays (C.M.) put up a

1. *The winner of the Flight Cup for rubber powered models, J. K. Cartwright of Hull, displays his model.*
2. *The three finalists in the C.M.A. Cup event for gliders before the fly-off. Comp. winner was J. Harvis of Prestwick (right).*
3. *In the act of releasing R. Firth's glider is C. Clay (York). The flight was not as good as the launch.*
4. *Dozy-do and swing around. A close-up of the finalists in the F.A.I. international class team race.*
5. *Brian Faulkner of Cheadle, who seems to make a habit of winning PAA-Load events, collects a cup and table lighter from Councillor J. Neasham, J.P., at the prize-giving.*

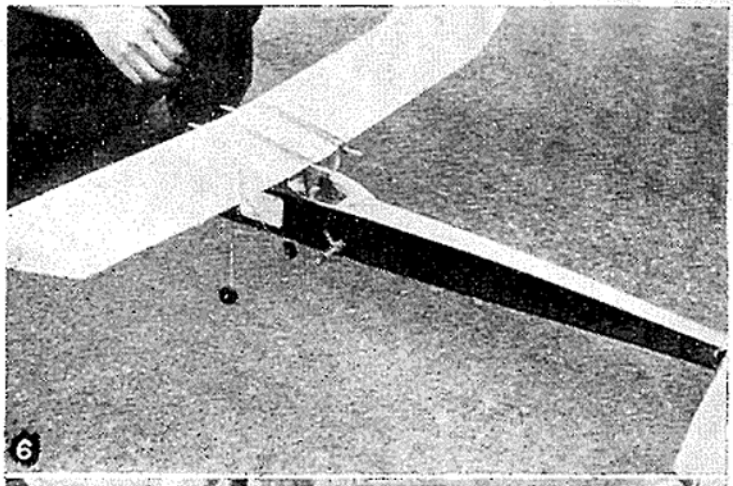
6.52 to be second. Third man, W. Archer of Cheadle was very unlucky, losing his model on his third maximum flight.

PAA-Load times were not, of course, so high, since these small motors had a lot to do, but here again the standard of flying was excellent, and B. Faulkner of Cheadle put up a good performance to finish first from R. Firth (York) and D. Morgan (Wigan). Winner's time was 3.49.

The team races ran as all team races do—with lots of noise, a few arguments and the inevitable wait for the competitors to get themselves ready. Foresters made no mistake in the F.A.I. final, and in the Class B event, West Essex found all three finalists.

At the conclusion of the meeting prizes were presented by Councillor John Neasham, J.P., to whom the N.E. area owe a great deal of thanks for help in placing the drome at their disposal. Nor must be forgotten the vast amount of work put in by the N.E. area Organising Committee, and in particular the Darlington club, whose efforts made this second Northern Gala a very happy and successful meeting.

During the S.M.A.E. events, the I.R.C.M.S. were running an International R/C contest. There were, unfortunately, no foreign entries, but the ten English performers put up a very good show, much to the delight of the very large crowd watching. Single and multi-channel jobs seemed to be in equal proportions, and all performed quite steadily and generally in answer to the man at the switch.



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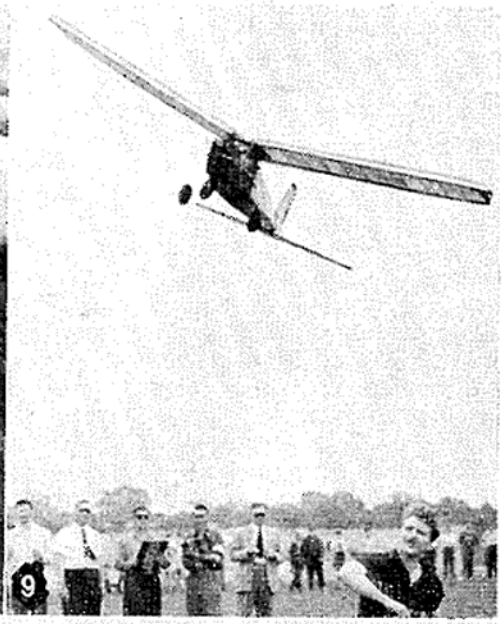
7

6. *Neat lay-out characterised B. Faulkner's "Golden Fleece," the PAA-Load winner.*
7. *Ron Firth of York, second prize winner in the PAA-Load contest makes a clean launch.*
8. *I.R.C.M.S. contest winner O. E. Hemsley with his 4 reed, Forster 29 powered model.*
9. *A fine action shot taken as the "Rudderbug," entered by D. Wainwright of Brighouse, takes the air.*
10. *W. Airey of Kendall entered his seven year old "Rudderbug," which flew well.*
11. *Roger Clark launches Breeze's model which finished on top of the hangar.*

8



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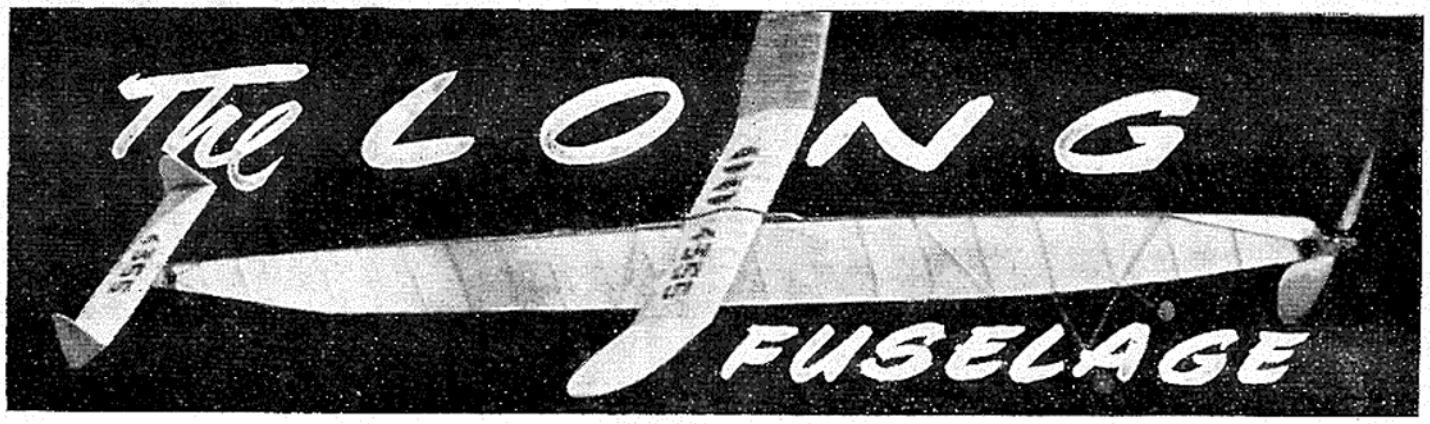
11

The LONG FUSELAGE



The 80 in. fuselage Wakefield above was made overnight by the Belgium team as a joke answer to the long fuselage U.S. models when they first appeared at the 1951 Wakefield contest.

THE ultra-long fuselage model first came into prominence with the astounding Wakefield performances put up by these American designs in 1951-52, and by Ossi Czepa's winning A2 model of 1951. Actually the first experience British modellers had with this type of layout was at the 1950 F.N.A. Cup contest at Paris where a number of the Italian team models featured ultra-long fuselages with return gears, giving a total motor length of something like 8 or 9 ft. They were singularly unsuccessful and, in fact, those that got airborne at all persistently failed to reach any respectable height and their flight times were poor.

The long fuselage Wakefield of the American school was undoubtedly evolved independently, with the man responsible, Henry ("Hank") Cole. His original design, O-so-long, was completely unorthodox in conception and, unlike so many unorthodox models, highly successful from the start. After winning the 1951 nationals rubber event, it so impressed leading Wakefield modellers in the Californian area that many were tempted to adopt a similar layout and "long" models were one of the outstanding features of interest at both the 1951 and 1952 Wakefield contests in Finland and Sweden, respectively. After that they appeared to have had their day, although their influence remains even with the present restricted rubber rules. Similarly with the glider design of Czepa. The layout was copied, but has never come to the fore since its initial success.

The long fuselage models—Wakefields in particular—were too good to dismiss as merely lucky models. Yet it is fairly true to say that of the hundreds of modellers throughout the world who tried the layout, none approached the performance achieved by the leading American fliers using similar designs. Of the many copies of Cole's and Bilgri's "long" designs, we do not know of one which came up to even moderate performance standards.

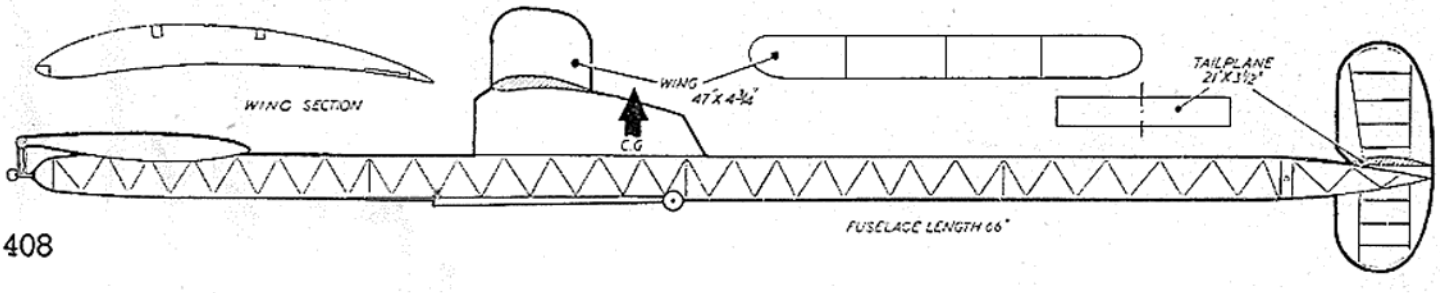
The main trouble is that almost invariably these copies were hopelessly overweight. The extra length fuselage imposed a weight penalty and to carry 5 to 5½ oz. of rubber which was necessary to compare with the performance of the best of the orthodox return-gear designs, very little was left for the structure to produce a total weight of 9 to 9¼ oz. This is about the maximum an old-rule Wakefield could carry without showing signs of losing out both on height reached under power and glide. It meant building the 5 ft. fuselage down to about 1¼ to 1½ oz., ¾ oz. wings and propeller assembly under 1 oz. It could be done (and was done by the Americans) and only under such conditions could the layout show its true potentialities.

Contrary to popular belief, these models were not unduly fragile, nor were they fair weather machines, even with the 24-in. dia. propellers they used. It is pretty fair to say, however, that they gave of their best in dead calm, no thermal conditions when, right on trim, they definitely had the edge on any other type of Wakefield.

Hank Cole's original design was not produced "just to be different." He went into the matter of design layout very carefully on the basis of still air performance—no doubt influenced by the conditions under which the 1950 Wakefield was flown in Finland—and came to the rather surprising conclusion that the long fuselage layout utilising maximum tailplane lift should have about 15 per cent. better still air performance than a conventional layout, and about 5 per cent. better than a canard layout, which would still show a "paper" improvement over the accepted arrangement.

Other principles incorporated in the design were (although the theories involved may not be universally acceptable) that the high pylon and sub-rudder improved spiral stability; and also by moving the centre of gravity right aft, the beneficial pylon effect was greatly increased. As the lower sketch shows, the c.g. position worked out nearly half a chord length *behind* the wing trailing edge.

With such a marked rearward c.g. position, quite obviously a strong tail lift is required to trim. However, since the moment arm also is long, a conventional tailplane area



can still be employed. Another advantage of the long moment arm is that the downwash effect of the wing is reduced so that reversal of tailplane action is less likely than with a more closely coupled design with a small longitudinal dihedral angle. Poor stall recovery did, however, remain a feature of these designs. A stall initiated by a sudden gust might put the model into a dive from which it showed little signs of pulling out during a 100-ft. descent or more. Few followers of the design trend, in fact, used quite such an extreme aft c.g. position, although it still remained behind the trailing edge. Those who "played safe" and moved it farther forward virtually destroyed the potential advantages of such a design layout.

Czepa's A2 winner followed similar ideas, but this time aimed almost entirely at transferring as much area as possible from the tail to the wing, where it could be used more effectively as "lifting" area. He combined this with cutting down the "parasitic" or purely drag-producing components of the model to the barest minimum. Extending the very thin fuselage well forwards as well in order to use a minimum ballast weight, this was a vulnerable layout and again essentially a calm weather model.

Now both types of model appear to be part of model aircraft history, although there was far less reason for abandoning the long A2 layout than its Wakefield counterpart. An essential feature of the latter was a higher power/weight ratio, no longer possible under the new rules. The permitted length of rubber would only stretch about half the length of the fuselage, made up into an adequate cross section.

Ossi Czepa, 1951 World Glider Championship winner. He originated the long fuselage glider trend.

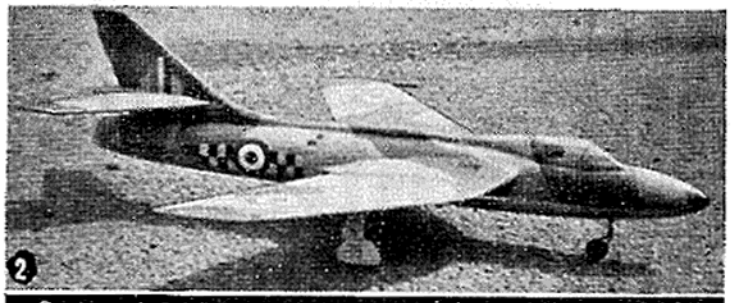
Modellers who dismissed the "long" jobs as freaks unworthy of consideration showed a lack of appreciation in the lessons of aerodynamics they imparted. Almost from their conception, in the right hands, they produced something sensational in the way of performance. Whilst more conservative designers may have refused to admit any superiority, certainly the average length of current Wakefield fuselages thereafter increased by several inches. Long moment arm A2 designs are also more numerous than they were and the "long" power duration model can also perform with the best, although the stretching here has never quite reached the same limits. Yet if Cole's original theory holds good, there may be more in this than appears at first sight.

Potentially, in fact, the "stretched" fuselage appears to be good aerodynamic practice on almost any duration layout, especially where the aim is maximum still air performance. In gusty conditions the short moment arm design should show markedly better recovery from upsets, particularly if rigged with a fairly forward centre of gravity position. But with powered models, in particular, "stretching" can only be used to full advantage with a certain amount of pylon height for the wing, the longer the moment arm the higher the pylon, as a generalisation. One of the main problems with a really long job is then getting it down safely on the dethermaliser. A pop-up tail simply puts the model into a series of loops instead of a normal super-stalled descent, whilst a parachute of adequate size to a satisfactory rate of descent brings that vulnerable nose of the fuselage into contact with the ground at an angle of about 45 deg. Perhaps Roy Yeabsley had the best idea. On a very long A2 design he used a small parachute triggered by a normal fuse. If the model was in lift and still flying after, say, another 2 min., a second fuse burnt down to pop up the tail and bring the job down with the risk of breaking the fuselage, rather than lose it completely. And even that system had a major snag. We remember holding for one launch and finding it impossible to reach down to the tail end of the fuselage to light the fuses!

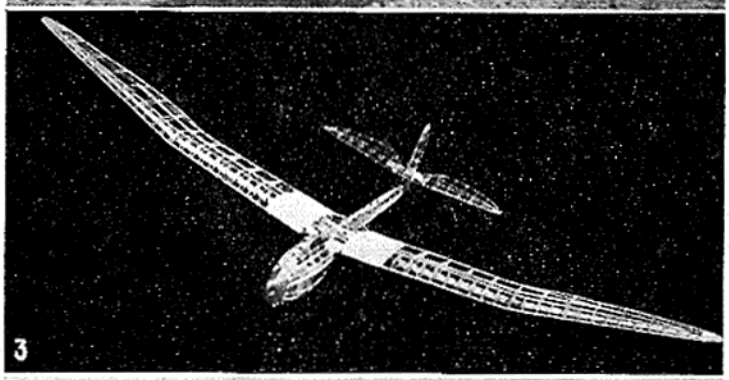
Joe Foster, once an exponent of the long fuselage, at the 1951 Wakefield.

PHOTONEWS

ALTHOUGH it does not come from the Himalayas and as far as we can see is not associated with an abominable snowman, the model in our first picture is named *Yehti.* But this is not its only name—in fact it seems to suffer from a multiplicity of names. It is basically a powered glider design (power in this case is the E.D. Baby) and was originally an American design called the Whirlwind. Renamed the *Yehti,* the model, which was built by J. R. Warren and is pictured held by his wife Iris, has the nickname of the " dog's hind leg," bestowed by the fellow members of the Enfield club. The latter name arises from the polyhedral gull wing. J.R. assures us that in spite of the heavy load of names the model carries, it flies well, and is fitted with a parachute D.T.

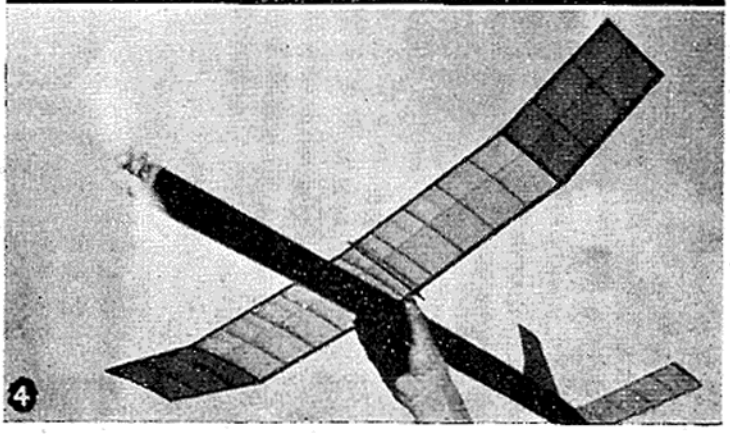


Lone wolf aeromodeller in the Stoke-on-Trent area is Roland Buxton, builder of the Jetex Hunter in photo **No. 2.** Finished in No. 43 Squadron colours, the model has been fitted with knock-off wings and weighs 6 oz.—1 oz. lighter than its weight when it was silver. Roland intends to install a Jeted Scorpion to give greater thrust, which should considerably enliven his *Hunter's* performance.



A typical example of German modelling during the war is the sailplane in photo **No. 3.** This model is constructed in ply and hardwood. W. Kroger, designer of the *Nervensage,* published in our January issue, sent in the picture.

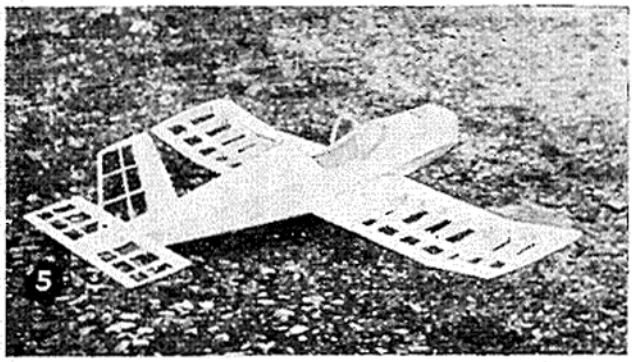
The 36-in. span model in photo **No. 4** was constructed by P. J. Lambert of Kentish Town, London. The model has a 16-in. dia. propeller and the wing section is N.A.C.A. 6509. Still-air performance is 2-2½ min. which P. J. Lambert hopes to boost by using a larger dia. prop.



The 1/10th scale model Fletcher FD. 25 *Defender* light ground attack aircraft in photo **No. 5,** has taken J. Andrews of Oldham 18 months to build! Perhaps we should go on to explain that most of the work has been done in quarter-hour sessions at lunch-time in the Avro design office where J. Andrews works. The wing span is 36 in. and power will be provided by a Frog 50.

Phil Smith's popular 48-in. *Syskooter* design was chosen as a first radio-controlled model attempt by Charlie Moody of Bacton, Norfolk (photo **No. 6**). An E.D. Bee engine is used for power. Charlie also built the receiver which is to a published design by F. C. Judd. The two wing-panels are sensibly painted in light and dark colours to aid visibility " coming and going."

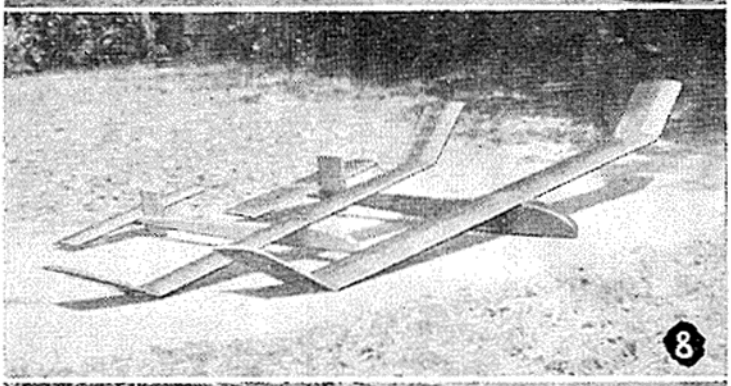
An E.D. Bee supplies the power for the Vultee *Vigilant* in photo **No. 7.** This model was built from M.A. plan No. 136 by C. Chaplin of Cheam, Surrey.

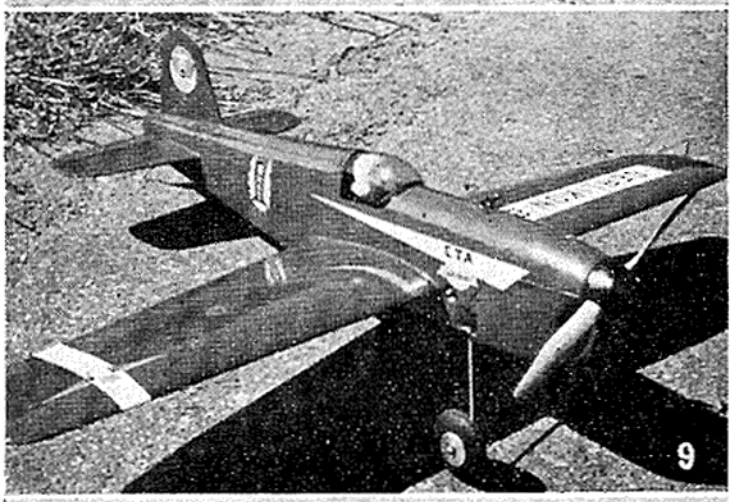


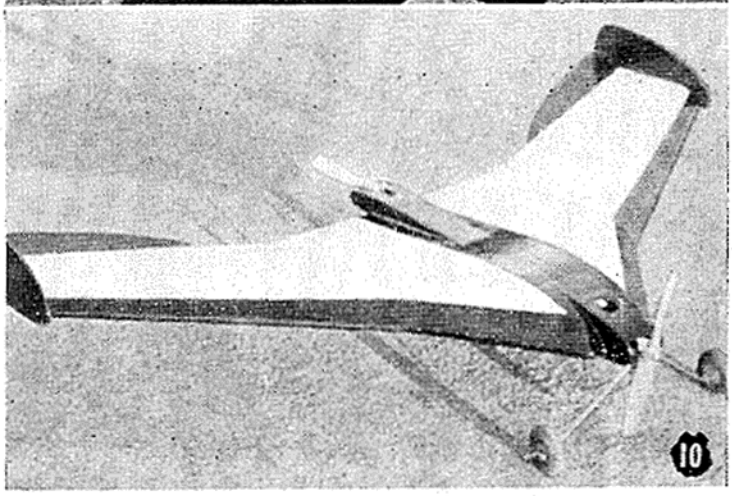
The two towline gliders featured in photo **No. 8** were built by Gary Lucier of Canada. The smaller model on the left was built to American limited rules and placed first in the senior limited glider event at the 1954 American nationals and gained a Canadian national record in the same event. The larger glider is built to Nordic sepcifications and placed second in the 1953 American nationals and gained the Canadian national record for this event at the same meeting. Both models feature N.A.C.A. 4612 aerofoils and 25 per cent. stab. areas with 8 per cent. Clark Y aerofoils. The wing spans are 55 in. and 72 in. respectively. Fuse actuated tip-up tail dethermalisers are fitted to both craft.

Junior Technician Higgins of R.A.F. Kinloss (when at home a member of the Cheltenham M.A.C.) built and photographed the class "B" team racer *Gerlikon* 2 in photo **No. 9.** Power comes from a standard Eta 29 and the model is finished in red with white trimmings. Its performance first time out was 33 laps at 90 on 56 ft. lines, using a home brewed un-nitrated fuel. The prop is an 8 × 8.

A later twin engine version of the Mk. 4 *Ionosphere*, M.A. plan No. 157, is the Mk. 16 in photo **No. 10**, designed and built by O. F. W. Fisher of R.A.F. Yatesbury. The Mk. 16 model is driven by two ball-bearing Elfin 1.49's and will fly very satisfactorily no matter which engine cuts out first. The free flight flying wing is very lightly loaded in spite of nylon covering and relatively heavy engines. The machine is very popular in the Station club and so far two have been built to O.F.W.'s plans, and a further three are under construction. The design is quite versatile and a choice of engine can be used with equal reliability.







Letters

Continued from page 377

differed from the replica in having rather larger stars on the wheels with sharper points, while in the centre, a large red disc appeared—in fact, the inter-war American star. The inner wheel discs were clear doped.

In addition, the u/c legs of the genuine article bore red, white and blue stripes, the red at the top, running at right angles to the leg edge. These bands were about 2 in. wide.

I am a little puzzled by the cockades on the Collection's Spad. From the photographs these appear to be either British or, more likely, French, since the white ring is between the two darker colours.

Actually, United States Air Service machines at this period (Rickenbacker's Unit included), carried white as the centre spot, with the outer ring red.

Yours faithfully,
PETER G. COOKSLEY.

Wallington, Surrey.

The following two letters were selected—as they were of general interest—from those received by Eric Fearnley after publication of his "Flying Scale Topics" series in recent issues of M.A.

DEAR SIR,—Your "scale" articles in MODEL AIRCRAFT were very interesting. The only criticism I would make would be on your remarks about competition models and bods, as this produced a certain amount of heat, locally! However, I was pleased to see that your final letter on the subject indicated your tolerance in the matter.

The local club do only F/F, with the accent on A2s. There are only about three keen power comp. types—the others do sports jobs with an odd scale model here and there.

There are one or two points which occur to me arising out of the articles which require clarifying.

If you have a light model in "windy trim" with a powerful engine and plenty of down thrust, what happens when the engine cuts? Surely with the high flying speed, and nothing to hold the nose down after the motor stops, the model is going to whistle up into a terrific stall? With minimum longitudinal dihedral this stall may not be too bad, but the model must still stall and the recovery is going to be uncomfortably long, especially with a scale tail.

To build a light model with a complex fuselage section like, say, a *Spitfire* means recourse to a stringered structure, which is not so good. It's not so good from strength, appearance, anti-puncture and handling points of view, as compared with sheet monocoque.

If a low inertia stringered structure is used this is O.K. on short nosed prototypes, but if the nose is long, a tail weight is required to compensate the engine weight and most of the low inertia effect is lost.

A *Spitfire* would be in this category, and I am considering a $\frac{1}{16}$th sheet planked job with most of the bulkheads removed after building.

Yours faithfully,
Liverpool. NORMAN D. PEACOCK.

DEAR SIR,—I have just sent for the plans of the *Motor Tutor* from May MODEL AIRCRAFT. This is to be my first attempt at R/C. I read with interest your article in June MODEL AIRCRAFT where you say a friend was shocked at rudder control, which from what I can read appears to be the done thing!

I have flown the *Tutor* as a glider and am an instructor on tandem *Tutors*, having had some 200 hours flying on this type. I thought it might interest you to know that the pupil is instructed to make a turn in this way: "Apply bank in the direction in which you wish to turn with just sufficient rudder to prevent skid or slip." If a pupil shows a tendency to misuse rudder, and cannot be corrected, he is told to fly with his feet off the rudder pedals and use stick only, as a better turn can be made without rudder than can be made using rudder improperly.

In explaining the primary and further effect of the controls the pupil is told: "Put the stick to the left and the left wing goes down" (Primary effect), the further effect being that the nose turns towards the lower wing so showing that a turn can be made without using rudder. Now the rudder: "Apply full left rudder (wings level), the nose turns to the left and the aircraft skids to the right," no actual turn being made. If due to air conditions a wing drops, the aircraft will turn towards the lower wing. So it must stand to reason that to make a turn, lift must be increased on one wing and drag on the other.

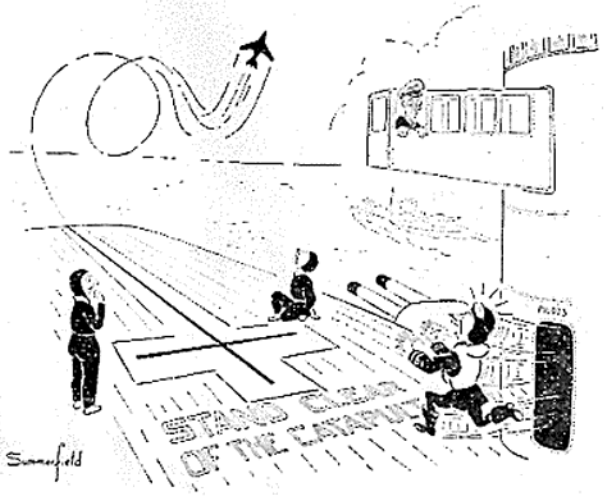
In making an intentional spin you would pull the stick back until it stalled, waggle the stick as hard as you like when it is stalled, and the ailerons have no effect. Push on the rudder pedal once and the A/C will immediately spin!

If you have any further information on aileron control or could suggest a simple way to operate them by R/C, I should be very pleased to know. One thing is sure, by hook or by crook—no rudder control for me!

Yours faithfully,
HUGH MCNEILL.

Grangemouth, Stirlingshire.

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



"I had a feeling we'd forgotten something!"

Book Department

Continued from page 390

the various projects now being undertaken by British manufacturers, and gives some idea of the form the three V-bombers—*Vulcan*, *Valiant* and *Victor*—will take in civilian guise.

Helicopters and flying boats are also dealt with, and the final sections list in considerable detail the more important operating companies, together with notes on entry into the Airways Corporations, conditions of employment, salaries, etc.

Although well produced on art paper, "British Civil Aviation" seems rather highly priced at 15s., but its value lies not so much in its number of pages (168), but in its contents, which provide a very useful collection of facts and figures, all in one pocket-style volume.

MODEL AERODYNAMICS No. 10

Motion about the rolling axis is called a roll—a familiar enough manoeuvre, but one which is generally restricted on model aircraft. Rotation about the yawing axis produces a yaw or a crabwise attitude relative to the true flight path. Rotation about the pitching axis is easiest to understand, producing a stall one way and a dive the other—Fig. 1. Initial balance determines that there is no diving or stalling tendency with the model and the " built-in " stability—usually afforded by a tailplane—damps out any subsequent pitching motion induced by gusts, etc.

Recovery from a disturbance about the rolling axis is somewhat different, however. If a roll is started, one wing drops, and normally having the effect of making the model skid or sideslip in the direction of the lower wing. As a result there is now a diagonal airflow over the model—Fig. 2. With the centre of side area normally behind the centre of gravity this will have the effect of making the model turn as well in the direction of the lowered wing. Some strong action is therefore needed to provide correction, this normally being given by a generous wing dihedral.

The appearance of a flat wing and a dihedralled wing, as offered to the airflow in a sideslip, is sketched in Fig. 3. It will be seen that the dihedralled wing offers considerable " flat " area to the relative wind just where it is wanted—on the inside wing. The more the dihedral the better in this respect, although if too large, the recovery force will be so powerful that the wing will be rolled back past its normal position and sideslip the other way, to recover again, and so on. It is a characteristic of a wing with too much dihedral that it will make a model roll from side to side in flight, called " Dutch rolling," although the flight path is otherwise normal. Equally so, it is a characteristic of a model with insufficient dihedral on the wings that it will be prone to sideslip and lose a lot of height in turns.

For F/F models, a minimum of 5 deg. dihedral is recommended, and this only for high-wing sports-type models or radio control designs—where a certain amount of automatic stability is sacrificed in the first place to maintain a " scale " appearance, and in the second case to make the model more manoeuvrable. For duration type models, a minimum of 10 deg. is recommended, with 12½ deg. more usual with straight dihedral and appreciably greater angles used on tip panels.

Dihedral reduces the projected or effective lifting area of the wing —Fig. 4—but this loss is never serious unless the dihedral is very much exaggerated. It is always better to err on the side of too much, rather than too little dihedral. As far as weathercock and spiral stability area are concerned, the " fin " effect of the dihedral is balanced out by the fixed fin on the model and the larger the dihedral the less critical this " balance " becomes. With dihedrals approaching the minimum of 5 deg. it can be quite tricky to arrive at an " optimum size " fin.

Straight dihedral is adequate for rubber models and gliders. Polyhedral or tip dihedral—Fig. 5—provides a more powerful righting moment (with a larger tip rise normal practice) and is used on most high powered designs. It will be obvious, too, that the higher the wing the greater the righting effect in a sideslip, and so the less the dihedral required. Tip rise per inch of semi-span for various dihedral angles is given in the table—e.g. multiply the semi-span (inches) by the required tip rise figure to find the actual tip rise, in inches.

Area *above* the centre of the model will also help recovery from a sideslip, such as a dorsal fin or normal high fin—Fig. 6. But many designs incorporate a ventral fin (or its equivalent) and underfins are quite common. Such models will not so readily recover from a sideslip, for low fins will be fighting the dihedral effect. But models, when properly trimmed, often fly at a fixed, if small, angle of yaw tending to skid *outwards* on turns, when underfins may give a stabilising effect.

There is no cut and dried answer to this for much depends on how the model is trimmed and the type of disturbances it meets in flight. As a generalisation, however, models with underfin area are more likely to get into trouble than those with more orthodox layout which rely on dihedral and a balanced top fin area.

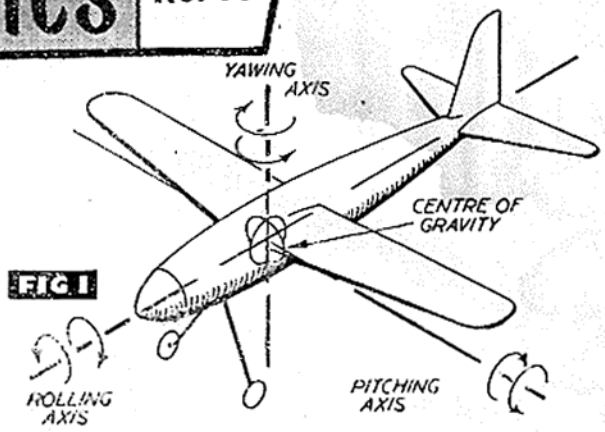


FIG 1

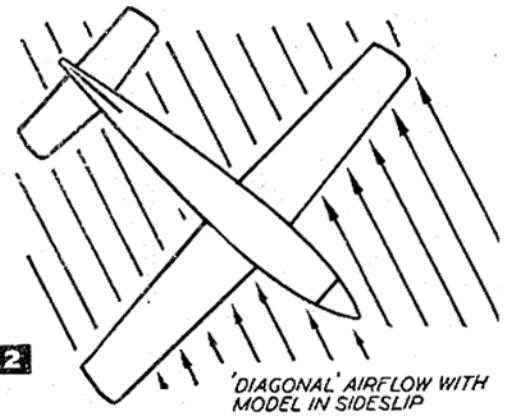


FIG 2

FIG 3

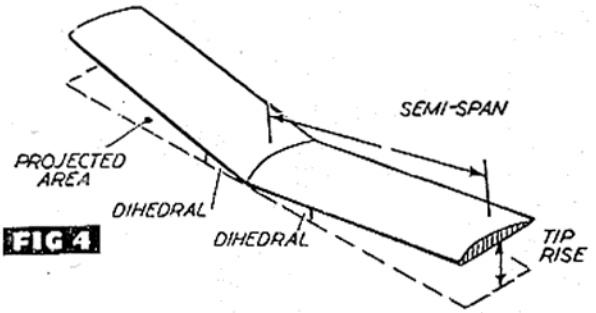


FIG 4

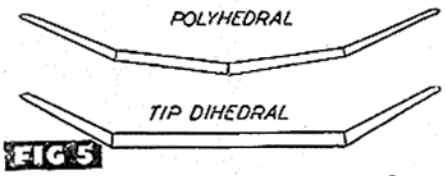


FIG 5

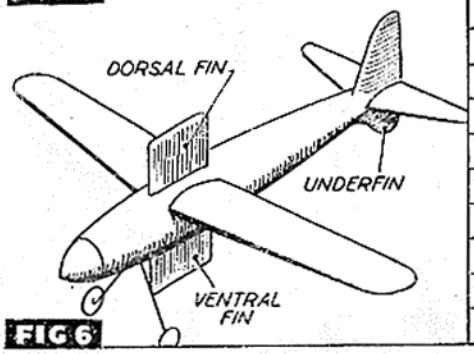


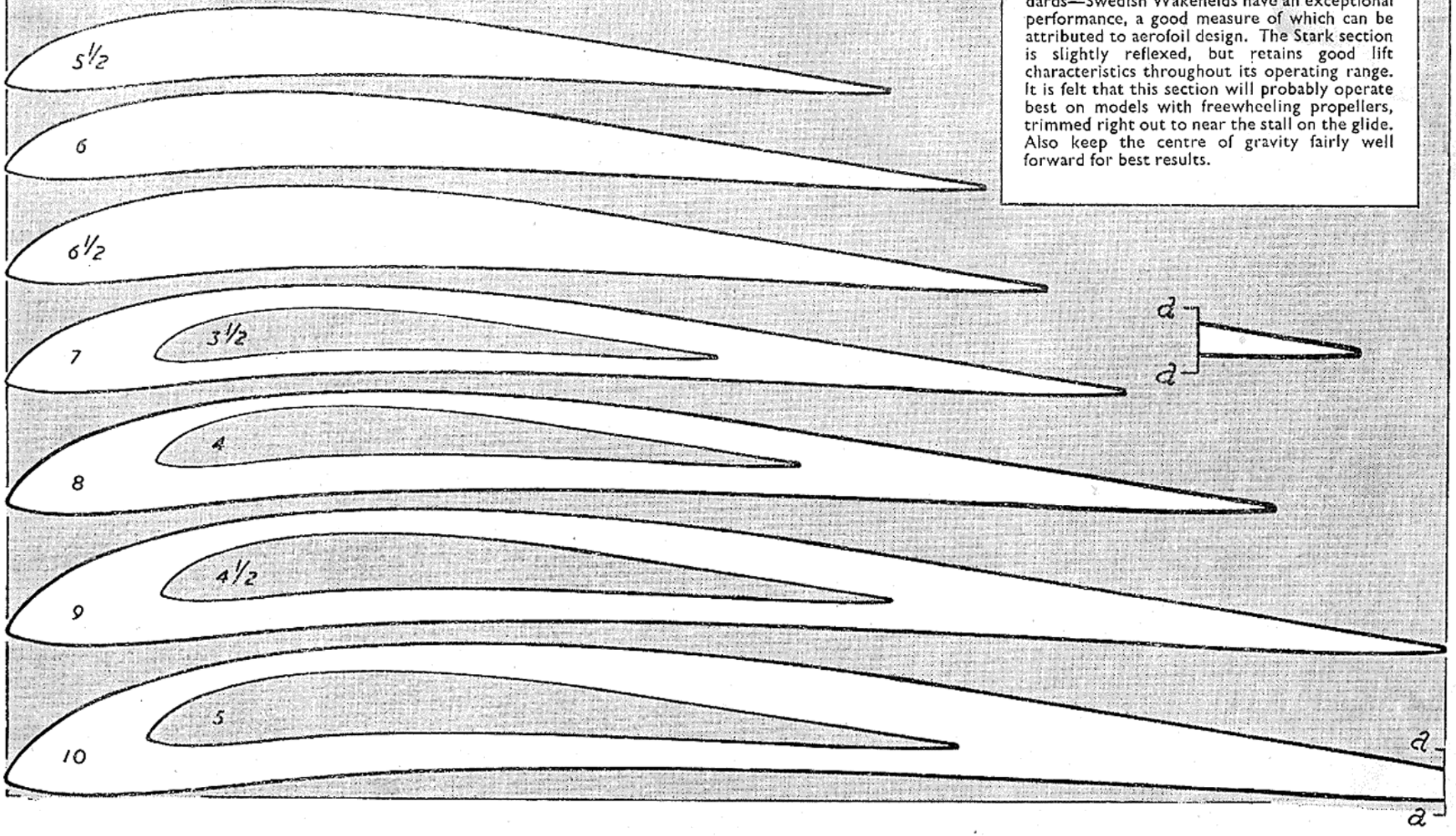
FIG 6

DIHEDR'L DEG.	TIP RISE
5	·087"
6	·105"
7	·122"
8	·140"
9	·156"
10	·174"
12½	·216"
15	·260"
17½	·300"
20	·342"
25	·423"
30	·5"

STATION	0	25	5	10	20	30	40	50	60	70	80	90	100
UPPER	0	3·1	4·8	6·9	8·6	8·9	8·4	7·5	6·3	4·9	3·3	1·7	·2
LOWER	0	-·5	-·5	-·3	+·6	1·1	1·3	1·2	1·0	·6	·2	-·1	-·2

STARK

This is the aerofoil used by the Swedish Wakefield expert, Sune Stark, on his 1951 World Championship model. Plain, straightforward designs—old-fashioned by many standards—Swedish Wakefields have an exceptional performance, a good measure of which can be attributed to aerofoil design. The Stark section is slightly reflexed, but retains good lift characteristics throughout its operating range. It is felt that this section will probably operate best on models with freewheeling propellers, trimmed right out to near the stall on the glide. Also keep the centre of gravity fairly well forward for best results.



Club News

AND NEWS FROM THE S.M.A.E.

WEST SCOTTISH AREA

The last month has proved quiet in the area, with the Northern Gala as the only major meeting. A strong contingent travelled down from Scotland to this contest and had a fair measure of success. B. Harris bringing back first glider and J. Findlayson third rubber. After this taste of Sassenach blood, the boys are waiting with drawn claymores for the P.A.A. Festival in September.

Our eliminator on August 14th, to select our Scottish team for the U.K. Challenge match, was blessed with fliable weather.

Our team comprised: Glider: R. Sleight (Prestwick); B. Harris (Prestwick); W. Shanks (Lanark); W. Inglis (Lanark).

Rubber: N. Cliff (Prestwick); U. Wannop (Edinburgh); J. Findlayson (Glasgow S.A.); D. Addison (Dunfermline).

Power: R. Parsons (Prestwick); R. Taylor (Lanark); G. Blair (Edinburgh); J. Muir (Prestwick).

This team shows the present Scottish trend towards two or three very strong Scottish clubs, with Prestwick still ruling the roost, but Lanark now challenging their position.

CHESTER M.F.C.

We held our annual open contest for rubber-powered models recently, at Sealand Aerodrome.

Under ideal weather conditions, H. F. Wilde was first to fly and had to watch his model disappear from sight, at an altitude of well over 1,000 ft., knowing that recovery was well nigh impossible.

Master J. Moulton gave a good performance in his first entry in a Chester M.F.C. competition, and Charles R. Filtness scored a max., only to lose his machine in a field of growing oats, just off the aerodrome. (The position has been noted and the farmer notified !)

Two lady members, Mrs. C. R. Filtness and Mrs. K. A. Modern put up a good show. Mrs. Filtness won the Parbo cup and C. R. Filtness and H. F. Wilde tied for second place. The Junior Cup was won by Master Moulton.

A crowd of well over 21,000 people were present at the famous Chester Autumn Sports which are held annually on the Roodeye—the land which belongs to the citizens of the city !

Considerable interest was shown by spectators in the various model aircraft contests (C/L) which the Chester club organised. Clubs from as far afield as Nottingham, Birmingham and West Essex competed and there were about 70 entries in all.

NORWICH M.A.C.

The most important event during the past month has been Cpl. Pete Godfrey's record R.A.F.M.A.A. Class II speed flight of 111.9 m.p.h., which was timed at the R.A.F. championships. The model he used was an Eta 29 powered team racer of his own design.

The monthly cup was again won by a junior, Trevor Carter, whose *Riptabits* C/L stunter won the award and 5s.

The world record duration attempt has been put back a few weeks as the model broke its back in one of its numerous trial runs.

SOUTHPORT MODEL AND ENGINEERING CLUB

The annual exhibition takes place in the Congregational Chapel Street, hall, from September 24th to October 1st, inclusive, excluding Sunday 25th.

As a club, we are multilateral in character, substantially supporting a general type exhibition: R/C in both ships and aircraft has also well established itself in Southport.

We welcome all to come and view, but those who would care to bring or send exhibits are asked to contact: D. Sephton, Exhibition Manager, 6, St. Annes Road, Southport, or the Secretary, at 30, Kensington Road, Southport.

The customary insurance coverage is offered for models whilst in our care and we assure readers that the judges invited will be independent of our club.

Perhaps readers—would-be exhibitors—would give us the opportunity of seeing the modelling standards from other parts of the country. However, we have quite high standards here and have drawn up 26 classes, with appropriate cups and shields this year—have we been busy !

There are no entry fees, but we are usually pushed for space, by previous years' reports !

SOUTH BRISTOL M.A.C.

A display at Kingswood attracted a large crowd. K. Jones' *Wyvern* was the only model pranged—much to the sorrow of the spectators !

The occasion was enlivened by some hot stunting by B. Hopkins, who was, unfortunately, unable to fly his jet stunter, *Aero-jet*, due to lack of take-off facilities. A hand-launch was attempted, but was not a success !

Terry Smith finishes his National Service in October, and we hope that his return will help to encourage more interest in competition work.

HAYES M.A.C.

The club passes into the semi-final of the L.D.I.C.C.C., having beaten Northern Heights M.F.C. by 4 : 04. Mainly responsible for our victory were our two rubber men—P. Hedgman, who clocked two maximums and 2 : 13, with a 300 sq. in. lightweight, and J. Wassell, with one maximum in a total of 8 : 16. The final score was Northern Heights 26 : 54, Hayes 30 : 58.

J. Baguley recently went trimming with his brand new 1.5 F.A.I. power model, and came back without it, after a D.T. failure. Other members keep their models long enough to trim them right out ! However, J. Marshall's tailless rubber model is giving consistent high times, and showing up many orthodox models. Mr. Woolls beware ! !

Models under construction at the moment, in the club, include a 300 sq. in. lightweight, a Wakefield, a *Y-Bar*, and a 6-ft. tailless glider.

While our membership is small, enthusiasm is high, and we welcome any keen fliers in the Uxbridge, Hayes, and Southall area. Club meetings still take place every Wednesday evening in Cranford Park.

ENFIELD AND DISTRICT M.A.C.

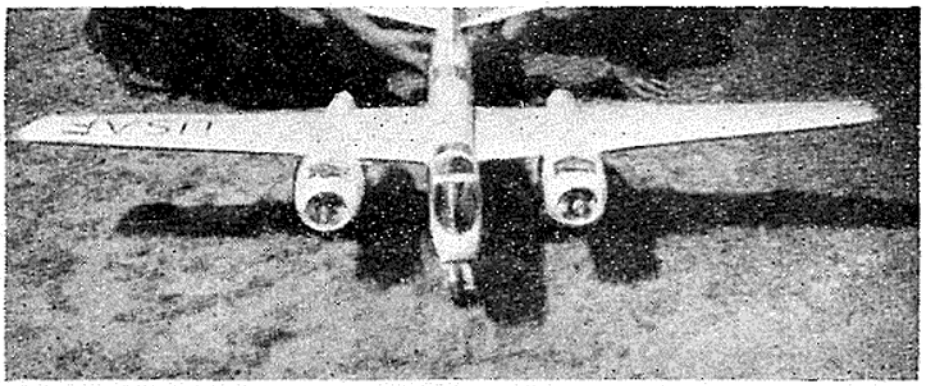
Once again the Enfield C/L Rally was held n almost perfect weather. The entries were very well up on the average for an event of this type, and everyone spoken to since thoroughly enjoyed the rally. This was no doubt greatly contributed to by the excellent organisation, which went without a hitch, and to the help of the Northern Heights members with the lap counting. Judging from our own feelings and the remarks heard afterwards, we think we can honestly say that other organisers will find it hard to beat the standard set up for field organisation.

The rally provided many surprises, not least being that there were 20 per cent. more entries in the speed than in class "B" T.R. ! Further speed surprise was the dead tie between J. Hall (Chingford) with his "19" model, and R. Edmonds (High Wycombe) with the 2.5 c.c. model which he took to Paris recently. Both achieved exactly 95.65 0/0 of the handicap; Edmonds flight was very good, and his speed for 168.225 k.p.h., (105.1 m.p.h.) is being claimed as a new British record on the long lines. Strange coincidence was that both winning motors "went home" in the process.

The combat was very well supported, and after a long series of heats and semi-finals, three competitors were left to fight out one of the best finals we can remember. Eventually, M. Smith (High Wycombe) emerged as the winner by only one point from C. Taylor (West Essex), with "Stoo" Steward (West Essex) a long way behind, 3rd. due to spending some time on the ground.

The team racing provided some more surprises, the very large "A" entry, and the rather low "B" entry, also that the fast model in class "A" was 3½ m.p.h. faster than the winning class "B" model ! After starting very slowly the class "A" speeds gradually increased during the afternoon until the finals were the fastest on record. The winner, G. Yeldham (Belfairs) taking only 8 : 15 (72.8 m.p.h.). Conversely the "B" was one of the slowest, the winner, Denyer (Sidcup) making 9 : 59, a speed of only 60.1 m.p.h. What happened to the fast models we don't know, but only one turned up, and that didn't complete its heat.

Lastly, we would make these observations as a result of the rally. That scoring combat on the number of cuts, instead of streamer cut off, is much fairer, that interest certainly is growing



Scale models are beginning to become popular with the members of the Brisbane Model Aeronaughts Association, Australia. The club president, Dick Rendle, started the ball rolling with a twin "500" powered scale Douglas "Invader" (pictured above). Unfortunately this fine model had a sad ending when the inside engine cut during flight.

again in speed, and that other organisers might consider including a handicap event, as it was quite unexpectedly well supported. Also, that it is time some modellers made themselves familiar with the team racing rules, as, although the flying was good, no less than 30 per cent. of the entries had to be modified in some way to make them comply with the rules. This in spite of the fact that we were permitting a margin outside the rules before doing anything about it. Most of the "offences" were exposed cylinder heads, flaunting the semi-scale rule.

Results

Class "A" T.R.
1. G. Yeldham, Belfairs, 8 : 15.0, 72.8 m.p.h.
2. — Pegler, High Wycombe, 8 : 36.6, 67.9 m.p.h.
3. R. Edmonds, High Wycombe, 9 : 25.5, 63.6 m.p.h.
4. —

Class "B" T.R.
1. P. Denyer, Sidcup, 9 : 59.0, 60.1 m.p.h.
2. M. Templeman, Sidcup, 11 : 1.5, 54.5 m.p.h.
3. S. Moxham, I.C.A. Tigers, 11 : 37.5, 51.6 m.p.h.
4. —

Combat
1. M. Smith, High Wycombe, 6 points.
2. C. Taylor, West Essex, 5 points.
3. L. Steward, West Essex, —6 points.

Handicap Speed
1. J. Hall, Chingford, "19" model, 114.8 m.p.h. 95.65 per cent.
2. R. Edmonds, High Wycombe, 2.5. c.c. model, 105.15 m.p.h. 95.65 per cent.
3. R. Gibbs, East London, 2.5 c.c. model, 99.6 m.p.h. 90.60 per cent.
4. R. Studer, Northern Heights, 5 c.c. model, 117.8 m.p.h. 87.40 per cent.

CHEADLE AND DISTRICT M.A.S.

At our home pitch at Woodford, the Cheadle members had a unique opportunity of losing their models. Those models which survived the morning shower bath were hurled skyward in an attempt to register a score, but the usual Woodford hoodoo was still on. The only place went to Andy Anderton who traded his *Olympus* and *Marathon* in for a toast rack; the models are still downwind. This is the third time Andy has placed, but not won rubber, presumably the hoodoo does not affect him since his "district" is the Isle of Man.

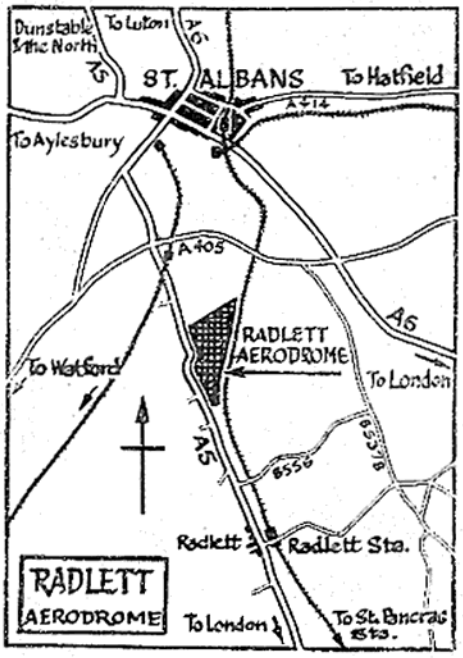
Clwydd presented a rather more impressive picture, although unfortunately the wind was wrong, and the comp developed into a glorified chuck glider event. Dick White first found a riser, then lost an A/2 and finally collected first place. In R/C, Walt Nield ran home a sharp win over the other entrant, who pranged.

We made a mass migration to Darlington, where the lack of wind had a rather disturbing influence on the boys, three of whom didn't bother to fly. Technical interest centred on Fred Passe's 38 in. span Oliver Cub model—no, he didn't trim it but it was exciting while it lasted! Then he scored 2 maxes with his old faithful.

Bill Archer ran up three maxes, and is still looking for his Torp 0.19 Zeke. Third place went to Bill.

PAA-Load paid off to B. T. Faulkner, who flew his *Golden Fleece* into first place again, the old E.D. Bee still chugs over after many years service. Incidentally, rumour has it that this chappie is currently looking at a Fearaley scale plan with interest. Ian Harrison has forsaken F/F for the C/L section. Those who went to Chester only wore out their engines.

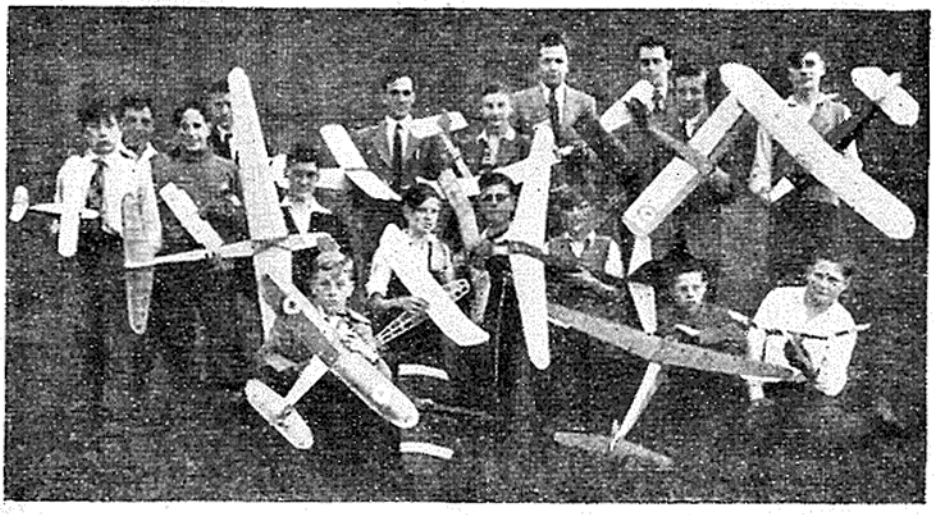
Sunday morning flying meetings are held at the club field in Councillor Lane, and new members are invited to come along and join the club.



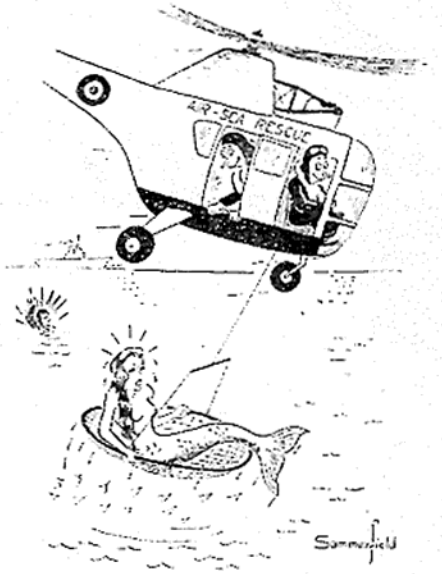
ALL BRITAIN RALLY

The rally this year promises to be the biggest ever with 25 different contest categories—something for everyone from the spectator to the ardent contest enthusiast. Prizes numbering over 100 are to be won, in addition to trophies and diplomas. Admission is by programme, price 1s., and there will be plenty of parking space in a central position, although a small charge will be made.

The stage is set, so come along, all you modellers.



The first exhibition to be held by the new Sandiacre and District Model Aircraft Club, was held recently at the garden party at St. Giles' Rectory. The photograph above shows some of the 30 members with their models.



S. MIDLAND AREA RALLY

In delightful weather, on the first class aerodrome at Cranfield, the South Midland Area clubs—Bletchley, Henley, High Wycombe, Letchworth, Luton and West Herts—acted as hosts at one of the best area meetings to be held in recent years. The absence of the general public and the resulting concentration of modellers contributed to making a most enjoyable day's flying for the 280 competitors who attended.

A new approach was tried with combat. Competitors were allowed as many entries as they liked at sixpence a time and this had the effect of keeping the circle going well, and although there was some criticism of the marking system the fun was in the main fast and furious.

The club of the day was Coventry, and member A. Barr by winning the glider event achieved a unique double—he won it last year.

Results

T/R "A," (1) Thompson, Foresters, 9.45; (2) Howard, Foresters. T/R "B," (1) K. Marsh, W. Essex, 9.45; (2) Walker, Enfield. Combat, (1) Grimmett, W. Brom; (2) Ulyatt, Foresters. Chuck Glider, (1) R. Monks, Birmingham, 2.12; (2) J. Barker, Surbiton, 2.02. Rubber, (1) H. W. Revell, Northants, 12.00; (2) A. E. Jones, Birmingham, 11.26. Power, (1) J. Bickerstaffe, Rugby, 11.11; (2) B. Mack, C.M., 11.10. Glider, (1) A. Barr, Coventry, 12.00; (2) R. Adamson, Derby, 10.18. R/C, (1) E. Ardron, Ely, 111 pts.; (2) H. Boys, Northants, 57 pts.

S.M.A.E. Aeromodeller National R/C contest, (1) O. E. Hemsley, B. Park, 265 pts.; (2) A. McDonald, W. Essex, 212 pts.

CARDIFF M.A.C.

The club has at last obtained a flying ground which possesses good tarmac for the T.R. types. The flying ground is the ex-Cardiff airport at Pengam. A.M. 25 powered Mercury *Macs* circulate there every Sunday.

R/C has perked up with five C/L types taking it up. The first one to get results (?) used a boat.

BRADFORD & LEEDS M.A.C.

The club's annual "free-for-all" slope-soaring contest, held at Baildon, attracted 12 entries ranging from A/2s to a *Contender*. C. P. Miller, the owner, lost it on his last flight for 2 : 43 o.o.s. (not bad for a power model used as an H.L. glider!) aggregating 4 : 11 to place 3rd. Joe Oxley, winner for the past two years, this time came in second, with 4 : 36, to Frank McNulty's top score of 5 : 15—achieved by means of a dihedralled "floating" tailplane which automatically kept the model into wind. Ingenious, simple and very effective!

On the same day open glider and rubber comps. were staged. Top man in glider was K. Pickles with 5 : 45. H. Tubbs placed first in rubber with 9 : 50. Only 6 sec. behind was Ken Rutter; his model—lost on its last flight—came in through the front door of a local resident, who kindly informed the owner!

The incredible weather at the Northern Gala—

when you really could lie down and wait for your model coming back into your hand—did not favour our members (we're too used to flying in gales) but B. Eggleston only lost a triple max. in power through D/T'ing early on his first flight, finishing with 11 : 40; A. Collinson and Stan Eckersley were close behind with 11 : 19 and 11 : 07 respectively. In rubber, our best effort was C. P. Miller's 8 : 41; in glider, Keith Pickles shone again with 7 : 17.

HYDE M.A.C.

Recently, on the kind of day of which modellers dream—warm, sunny and a gentle breeze—we held our rally. Unfortunately the support was poor; in fact we thought of cancelling the meeting. However, those modellers who did attend had a good time on the large field in the perfect weather.

The results were:—

Power		
T. M. Unsworth	Stockton	8 : 23
B. Picken.	Wigan	3 : 33
Rubber		
W. Nelson	Sheffield	9 : 18
A. Naylor	Sheffield	7 : 4
Glider		
K. M. Webster	Pontefract	10 : 28
W. B. Remington	L'bro. Col.	9 : 48
Radio Control		
W. Airey	Kendal	575 pts.
G. W. Parkinson	Kendal	570 pts.
Team Race "A"		
J. Thompson	Foresters	
J. Howard	Foresters	
Team Race "B"		
J. S. Jackson	Foresters	
T. Rowley	Heath	

Rally Champion: D. Morgan, Wigan.

NORTH KENT NOMADS M.C.

We are in a position which is very gratifying as membership has now reached 57, including honorary members, two being abroad—Jack Upton in New Zealand and Bill Henderson in Canada. Jack has been successful in gaining a position in the N.Z. Wakefield team.

Successes so far, are Daphne Knight winning the Ladies' Cup, H. J. Knight, top London area man in the Western Cup and a member of the Wakefield team, and C. F. Dance, who placed second in the Taplin Trophy.

Ray Parker managed two maximum flights with his Wakefield at the Northern Heights Gala, but was not in the fly-off as the machine was lost in the "forest."

The All Kent Rally was not very well supported probably due to the high wind prevailing.

The Wilkens Wakefield Shield was won by Latter of the Men of Kent, the Parker power trophy by Bishop of Blackheath, and the Rotarian glider cup by Blount of Croydon.

For a change weather was ideal for the Dance R/C Trophy. The event was open to members only and there were six entries. We wonder if there is another club in the country who could produce this number of R/C men, and make two flights each without a crash! E. F. H. Cosh judged the contest and, as the results show, it was a very close thing.

B. G. Taylor of Gravesend was the winner with 165 points, C. F. Dance second with 160 points, and J. Ashcombe third with 158 points.

Mrs. Cosh presented the trophy to the winner and a good time was had by all including the spectators.

HENLEY M.C.

Some of the worst flying weather ever encountered prevented high times in the Keil and Frog Junior events, although all fliers managed three flights.

In the power trials, Dave Painter missed a place in the team by a mere 24 sec.—despite the model using 25 deg. of down thrust! Critics, please note.

A similar model by Jim Waldron won the Hamley trophy, with Painter second; the same pair nearly scored a one-two in the Thurston cup at the nationals, Painter winning it, with Waldron third.

Wakefield interest is kept alive by Roy Cooke and Patrick Larcey; Cooke was out of luck at the trials. Both are using single-blade folders, but Larcey is dabbling with featherers. Junior Larcey was also the only club member to do well in the A/2 trials, his well-worn *Seraph* placing 7th.

Of technical interest is the preponderance of forward keels and fins on glider and power models, Painter using a dural sheet one on his new A/2, while the club power design uses no pylon, having a keel on the underside of the nose instead.

CROYDON & DISTRICT M.A.C.

Edwin Bennett went to the Northern Gala alone, the rest of us thinking that if Cambridge is too far from the North so is Croydon too far from Croft for one day only. He hadn't got his

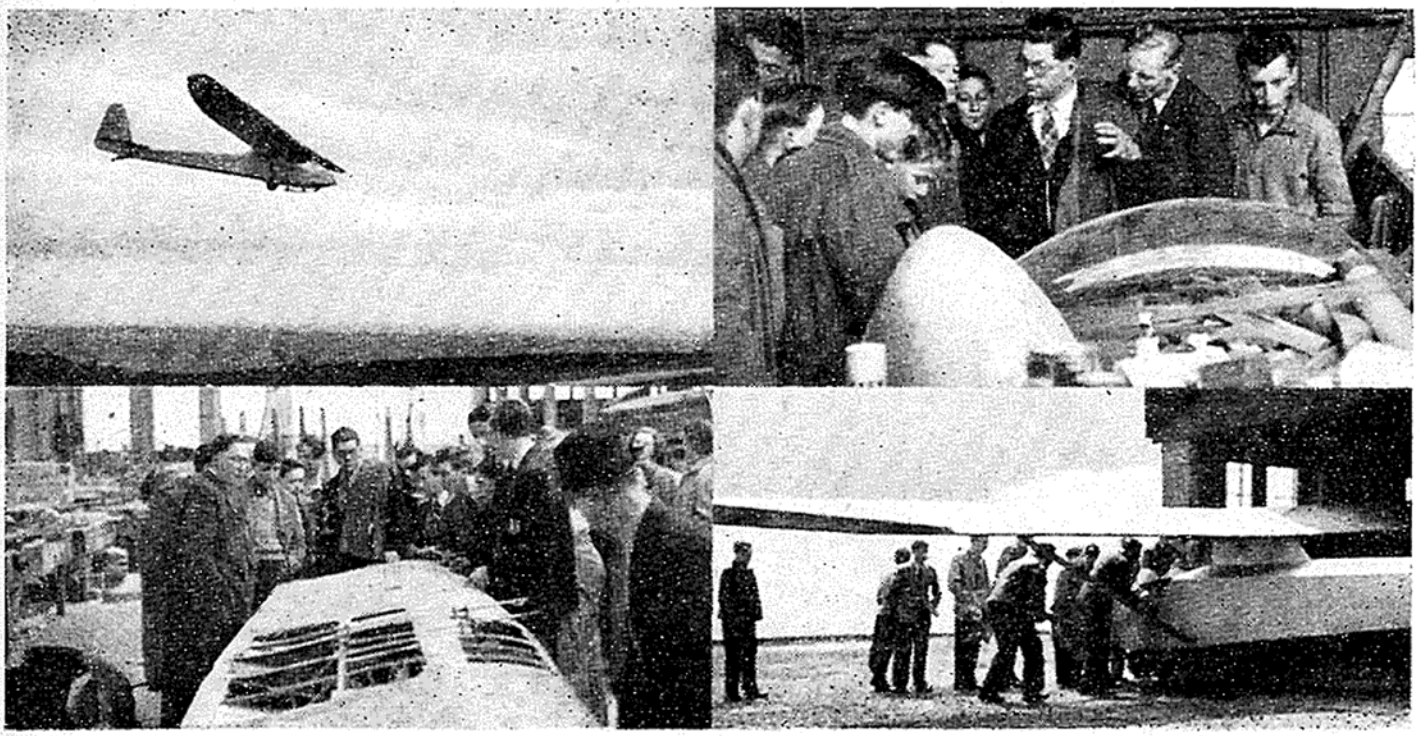
NORTH LINCS CLUB OUTING

The North Lincs Model Aircraft Society, well known for its different way of doing things, had a very successful day's outing at the Slingsby sailplane factory at Kirby Moorside, followed by a visit to the Yorkshire gliding club soaring site at Sutton Bank. For once the weather man was cheated in that the rain in the morning came down while we were safely in the factory, and the wind, which was strong in the afternoon, was just right for the full size gliders: one of the few aero club outings which it is possible to enjoy in bad weather. Many models taken stayed in the bus, as club members were far too busy seeing the expert craftsmanship that goes into a Kirby sailplane, the general construction of which is so like a well-made model—the flawless "bubble" canopies made on the job, and the latest fibre glass mouldings for high performance sailplanes.

After lunch, at the Sutton Bank slopes, we were surprised to find that even training gliders with comparatively high drag and lower performance constant chord wings, such as the Kirby Cadet, were able to stay up in the "scoop" of the hillside just about as long as they wished; and club secretary, Ted Scoles, later got the thrill of his life when the two seater T2 he was in did a loop! The instructor demonstrated four consecutive loops with scarcely any loss of height in the same aircraft, which, he says, just will not stall. This is known affectionately as the Barge.

Higher performance Kirby Tutors and Kites also showed their paces, average flights being about ten or twenty minutes, which seemed like as many hours to club members waiting their turn to fly.

Top left: Ted Scoles comes in to land after his loop in the Kirby T2 trainer. Top right: Club Chairman Ted Cartwright asks questions about the production of fibre glass mouldings and bubble canopies. Bottom left: Members examine damaged wing in for repairs. Bottom right: Club members assist in taking out the T2 trainer.



new 300 rubber job ironed out and he "kippered" his old geared model: a gentleman from Whitfield who was holding it at the time regrets this, we hear.

Our club Nordic event at Epsom was well attended and the motor and motor-cycle show rivalled Pride and Clarke's on a Saturday afternoon. Some also brought models. John Blount had an early lead but when he fluffed his last flight there was a scramble to fly. Dick Standing edged him out and John Palmer's protege, Miss Margaret Revelle, flew a pretty model to third place. Jack North has his first new Nordic in five years but it obviously needs a season or two to mature yet.

There are also other new models around. Norman Marcus appears occasionally with a vicious new version and Ed. Bennett has a gas job which looks like bits of everyone else's, but flies as if they were the right bits.

Social news: Pete Cameron married Doreen and got a telegram of congratulations from Crowdon and Riskit.

The recently held Croydon gala was held in variable weather—drizzle at first then fine and sunny with light winds. The results were :—

Rubber		
C. West	Godalming	12 : 00
B. Rowe	St. Albans	11 : 20
P. Crossley	Blackheath	10 : 42
Glider		
Miss M. Pepper	Southampton	8 : 17
G. Leech	Northwick Park	8 : 07
G. Hancock	Surbiton	7 : 39
Power		
D. Posner	West Middx.	11 : 00
M. Gaster	C.M.	10 : 37
G. Barker	Surbiton	10 : 29
Slope Soaring		
R. Boxall	Brighton	2 : 29
B. Hutton	Northwick Park	1 : 56
Chuck Glider		
A. Brooks	Grange	1 : 22
Gala Champion		
H. Welbourne	Hayes	21 : 41

CAMBRIDGE M.A.C.

We now have the use of Oakington Airfield, seven miles from the city, when the club's regular flying ground at Waterbeach is not available.

This latest Air Ministry O.K. gives Cambridge modellers the choice of three ideal flying grounds, as local Stourbridge Common has been in use—with city council permission—for a number of years.

Veteran radio flier Paul Firman had an amazing stroke of luck recently. Flying from Waterbeach, the radio in his E.D. 2.46 powered model broke down. With a half-full tank, off went the model on a tour of the Cambs. countryside.

In his office next day a friend told Paul that the model had landed on the roof of his house, in a village seven miles away from Waterbeach. Paul collected his belongings and found his plane virtually undamaged.

Now he is ensuring that he gets no more radio failures—just in case his friend's obliging roof top does not happen to be around.

FORESTERS (Nottingham) M.F.C.

The Foresters had their first experience of F.A.I. class team-racing at Croft, where J. Howard's *Finger-Print* won, taking 5:20 for 10 kms. at a timed air-speed of 90 m.p.h. J. Thompson's *Blue-Print* was 2nd, only 3 laps behind. Both machines were Oliver powered (of course).

At Chester the following day, the order was Thompson, Howard, Geeson, in an all-Foresters class A final. In combat, M. Ulyatt reached the semi-finals.

Recently the forces had to be split, one car-load travelling to Hemswell for the East Midland Area Rally, duly winning combat and placing 1st and 2nd in class A in 4:15 and 4:22 respectively. Another car-load went across the Pennines to the Hyde Rally, also placing 1st and 2nd in class A (with F.A.I. machines) and 1st in class B.

NEW CLUB

SANDIACRE AND DISTRICT M.A.C.

This club was officially formed a short while ago by D. Massingham, chairman, 7, Ilkeston Road, Sandiacre, Notts. Meetings are held on Wednesday evenings at the Church Hall and flying takes place on Sunday at 2 o'clock on Stoney Clouds. New members are welcome.

MODEL AIRCRAFT

CONTEST CALENDAR

Sept. 25th **All Brit. Rally.** Radlett, Herts.

Oct. 2nd Area.
***MODEL ENGINEER CUP.** Team Glider.
GUTTERIDGE TROPHY. 1st 1956 Wakefield Elim.

,, 2nd **6th Criterium d'Europe.** C/L speed 2.5 c.c. & supporting events, Brussels.

,, 16th **AREA K.M.A.A. CUP.** 1st 1956 Glider Elim.
HALFAX TROPHY. 1st 1956 Power Elim.

,, 16th **Int. C/L Speed.** Aerobatic & Team Racing. Monaco.

*Plugge Cup Event.

S.M.A.E. CONTESTS IN CAPITALS

QUIZ ANSWERS

1. (a) Brian Hewitt, (b) Yulon 30. 2. (a) Jim Cahill (1938), (b) France and Australia. 3. The Jim Walker Pressure Tank and Fuel Regulator. 4. R.A.F. 30 and R.A.F. 34 (streamlined), R.A.F. 31 and R.A.F. 32 (undercambered). 5. (a) Amco B.B.3.5, (b) Ted Martin. 6. All three were designed by Dr. Walter A. Good. 7. Warring and Copland (winding) and Frank Holland (extreme right). 8. (a) Balsa, (b) Bass, (c) Birch, (d) Box. 9. (a) (ii) Tachometer, (b) (iii) Magnetically. 10. (a) Bill Effinger, (b) Bill Dean, (c) Oskar Czepa, (d) Harold deBolt.

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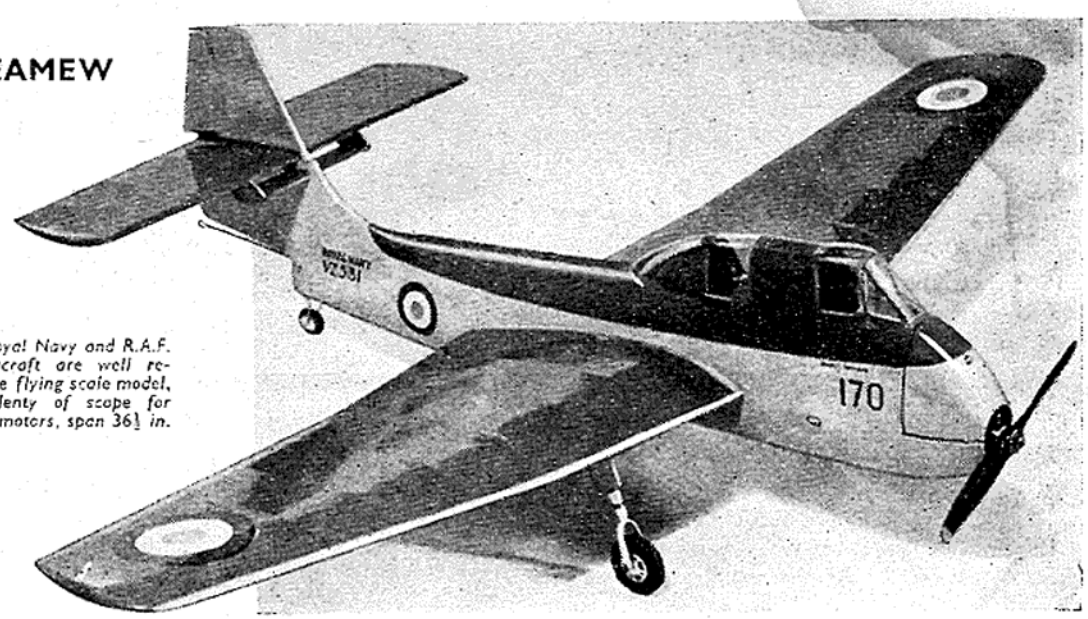

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MA 125 Auster, *by H. G. Moore* 3s. 6d.
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An unusual power model for 1.5 c.c. engines based on contemporary designs. Span 48 in

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MA 177 Dartex, *by K. Brown* 3s. 3d.
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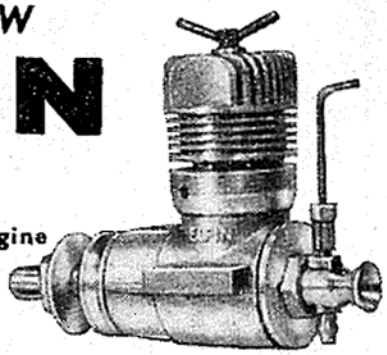

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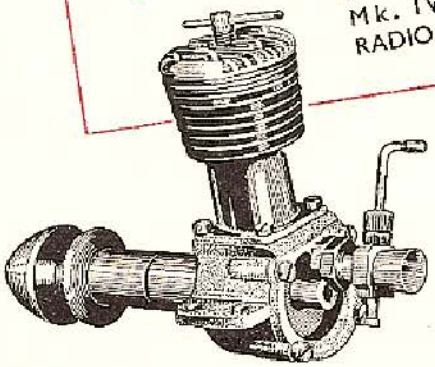
Held in Paris Sunday June 19th 1955

WON by **G. Honnest-Redlich** using a "Wavemaster" Boat, powered by an **E.D. 3.46 c.c.**

"HUNTER" WATERCOOLED **ENGINE**

and controlled with E.D. Mk. IV MINIATURE RADIO CONTROL UNIT



POOLE RADIO CONTROLLED BOATS REGATTA

June 25-26 1955

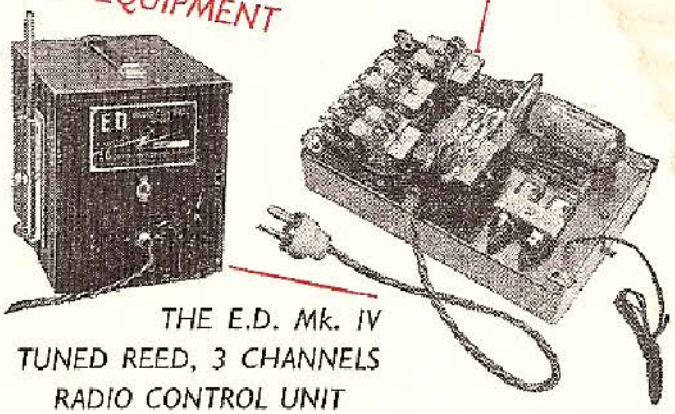
Two-lap Race for Radio Controlled Power Boats — **W. Warne** **1st**

"Bravery" Challenge Cup for Radio Controlled Yachts (Handicap). — **Lt.-Col. C. E. Bowden** **1st**

"Freeman" Challenge Cup. Steering Competition for Power Boats. — **W. Warne** **1st**

"Taplin" Challenge Cup. For Radio Controlled Yachts. — **George Honnest-Redlich** **1st**

● *ALL COMPETITORS USED E.D. TUNED REED MULTIPLE CHANNEL RADIO EQUIPMENT*



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TUNED REED, 3 CHANNELS
RADIO CONTROL UNIT

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Order from your model shop.

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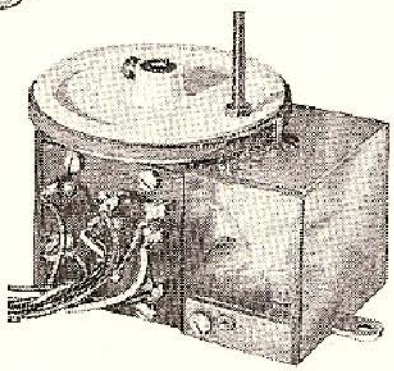

Specially designed to operate with a multi channel type receiver.

Driven by a 4½ volt micro-electric motor and is self centring under power.

Drive to the operating wheel is by friction direct from the motor spindle.

Activating Pin has a throw of approx. 30° either side of neutral position and can be used for either or both elevator or rudder control.

Supplied fully wired up and the wiring chart (colour coded) makes it simple to install.

Weight, 4½ oz. Price £3 11s. 3d. inc. Purchase Tax.

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DEVELOPMENT ENGINEERS

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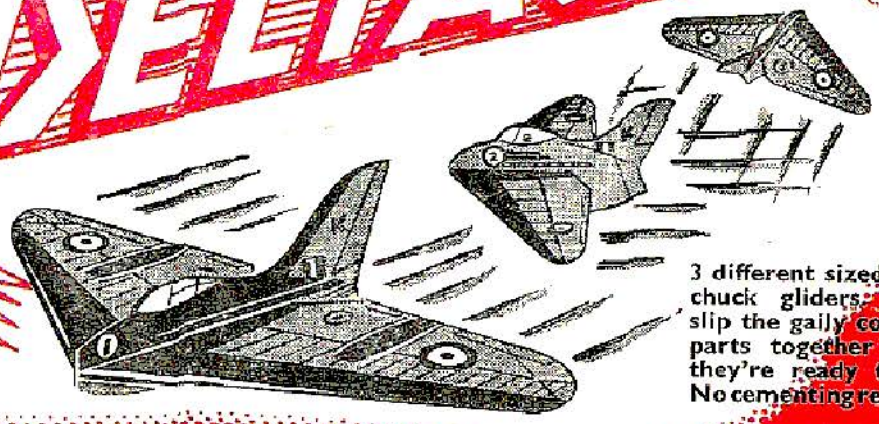

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1/16" x 3/16"	...	1½d.	1/8" x 1/2"	...	3d.
1/16" x 1/4"	...	1½d.	3/16" square	...	2d.
1/16" x 3/8"	...	2d.	3/16" x 1/4"	...	2½d.
1/16" x 1/2"	...	2½d.	3/16" x 3/8"	...	2½d.
3/32" square	...	1d.	3/16" x 1/2"	...	3d.
3/32" x 1/8"	...	1½d.	1/4" square	...	2½d.
3/32" x 3/16"	...	1½d.	1/4" x 3/8"	...	3d.
3/32" x 1/4"	...	2d.	1/4" x 1/2"	...	3½d.
3/32" x 3/8"	...	2d.	3/8" square	...	4d.
3/32" x 1/2"	...	2½d.	3/8" x 1/2"	...	5d.
1/8" square	...	1½d.	1/2" square	...	6d.
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1/8" "	... 8d.	1/-	1/4
3/16" "	... 9d.	1/1½	1/6
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SHAPED TRAILING EDGE (36" lengths)

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1/8" x 1/2"	...	4½d.	1/4" x 3/4"	...	7½d.
3/16" x 1/2"	...	5d.	1/4" x 1"	...	9d.

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3/8" x 3/8"	...	7½d			

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