MODEL AIRCRAFT

Christmas Number

Christmas stories — puzzles — full-size plans — plus all the regular features

1'6

DECEMBER 1955

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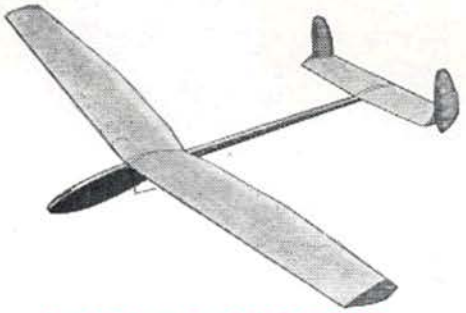

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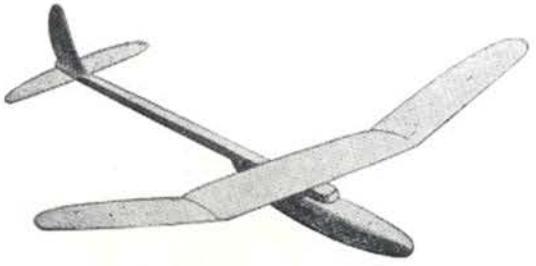

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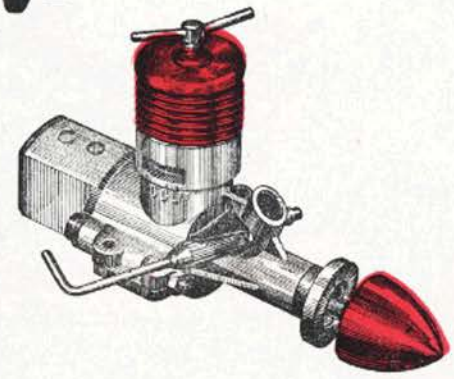

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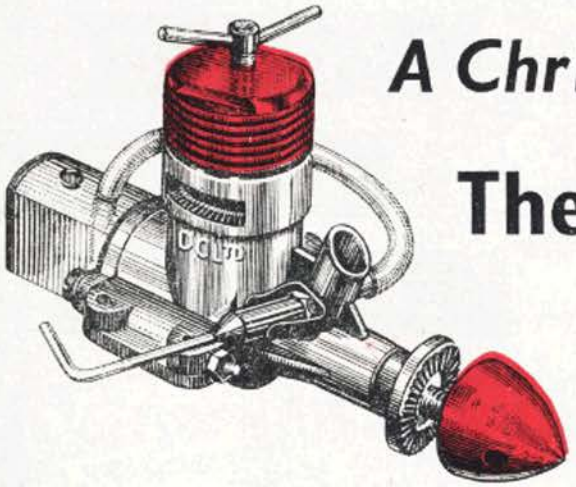

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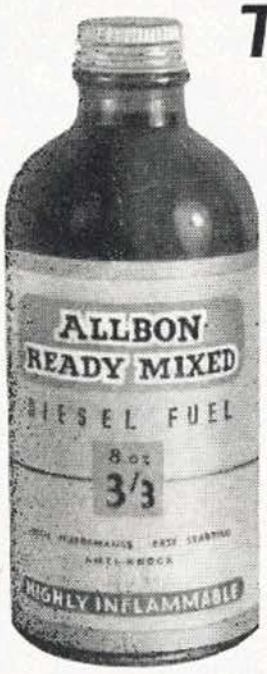

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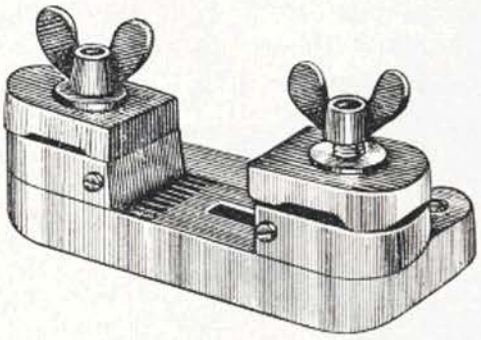

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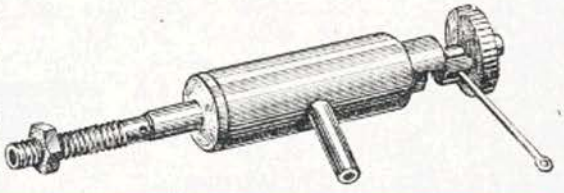

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Now redesigned and specially adapted for radio control, the Junior 60 is the easiest to build large power model on the market. It takes off and lands just like a full size plane, and has very steady flying characteristics. Although the winner of many important R/C contests, it is also the ideal free flight model. **54/-**

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SPECIFICATION
Span 64½ in. Length 39 in. Total Area 515 sq. in. Weight 14½ oz. **22/-**

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DECEMBER 1955 No. 174 VOL. 14

Contents

Cover Story

Our readers, we feel sure, are connoiseurs of fine lines—epitomised on our cover by Miss Jill Eccles and the Folland "Gnat." Seventeen year old Jill, daughter of American modeller Bill Eccles, holds pop's favourite model, which he says "flies real well."

The "Gnat" is undoubtedly Mr. W. E. W. Petter's favourite model, after all, he designed it. Here it is piloted by Sqd. Ldr. E. A. Tennant, D.F.C., who put on such a spectacular show at Farnborough with this beautiful little aircraft. Power comes from a 4,000 lb. thrust Bristol Orpheus, giving it a high sub-sonic speed.

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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Letters TO THE EDITOR

A Bouquet

DEAR SIR,—May I offer a word of appreciation to your contributor, Mr. P. L. Gray, on his article and drawing of the Pfalz Dr. Ia in September MODEL AIRCRAFT?

How refreshing to encounter articles on these older, rarer types, which are in danger of being relegated into the forgotten past. One realises the amount of painstaking research that must go into even a short article on these types, which must necessarily stand or fall on the accuracy of the "gen."

Perhaps it may be possible for you to publish more of this class of article, including particularly the rarer "one off" types.

Such types as the Pfalz D.13, Junkers C.L.1, Albatross D.10 etc., on the German side. Perhaps it is asking too much of even your contributors to supply details of the Austin Triplane, and the even less known Nieuport Triplane.

Anyway, my respects to MODEL AIRCRAFT for once more showing itself "out of the rut."

Yours faithfully,

Walsall. C. W. HARRIS.

Radio Resume

DEAR SIR,—Mr. Hugh McNeill asks for information on aileron control for a R/C model aeroplane, and as I have built and flown models sometimes with ailerons and sometimes with rudder, perhaps my experience can help him.

My first R/C model was a Fairey Junior, true to scale except for increased dihedral and perhaps wing incidence. Control was with scale size Freise type ailerons differentially operated giving 20 deg. upward, and 15 deg. downward deflection.

Ailerons were used mainly to get the same degree of control with or without engine, not with the idea that ailerons would give better turns. The increase in dihedral and incidence was for the purpose of stability. Turning on the ailerons was excellent in all respects. The escapement used was rather small, being built into the wing centre section, and after a short time began to give trouble.

A rudder controlled model was then built to investigate the trouble, the escapement being very accessible. The difficulties continued, and no satisfactory flights were made until a magnetic

(*Continued on page* 477)

PURCHASE TAX INCREASE

THAT the recent announcement by the Chancellor of the Exchequer in his Autumn Budget of an increase in purchase tax will affect the model aircraft industry is certain, but the increase, which is from 25 to 30 per cent., is comparatively small and amounts to an extra threepence on a five shilling kit. Unfortunately, it has been imposed at a time when manufacturers, faced with ever increasing costs of production, are trying hard to keep the retail prices of their products as low as is reasonably possible. It would also seem to have diminished the possibility of a relaxation of purchase tax on kits, etc., in the foreseeable future—a matter to which the Federation of Model Aeronautical Manufacturers and Wholesalers have given constant consideration since the original imposition of purchase tax in 1949.

A leading kit manufacturer with whom we discussed the matter expressed the view that the present upward trend in the sales of kits, engines and accessories would not be affected by the 5 per cent. tax increase, and in this matter we share his optimism.

Israeli Nationals

THIS year's Israeli Nationals, held at an airfield ten miles outside Tel-Aviv, were preceded by a series of lectures, culminating in a visit to Lydda Airport and an aircraft overhaul base.

Contests were run to F.A.I. rules, and it was a big disappointment to the organisers to find that the total entry figure of just over 100 was well below that of last year.

All the usual events were held, but it was the control line speed that provided the biggest surprise of the four-day meeting. This branch of the hobby has, according to our correspondent, been sadly neglected by Israeli modellers, with relatively poor standards achieved when compared with other countries. The national record stood at 105 km./h. until Ch. Zackland, at this meeting, raised it to 124 km./h. with his ordinary speed model powered by a K. & B. Torpedo 0.29. Two other models, in fact, topped the 100 km./h. mark.

Nothing else eventful was to happen, and the meeting ended with the prize-giving ceremony attended by the Director of Civil Aviation.

PAA-Load Jet Competitions

THE purchase of 45 jet airliners by Pan American Airways will reverberate throughout the model world if the present plans of the company reach fruition! They now envision a PAA-Load Jet Event to complement the usual PAA-Load contest, and ask modellers in this country "how best to adapt jet power to PAA-Load in the most acceptable and successful manner to appeal to most modellers. . . ."

However, there are a few basic "musts" for the proposed type of model and these are as follows:—

1. Carry a payload of at least one dummy pilot—shape, size and weight as yet undetermined.
2. Fly through the air under its own power.
3. Be powered by propellerless "engine(s)" in simulation of full scale jet-turbine type.
4. Have an enclosed payload compartment with "visibility" for the dummy pilot—similar to the past requirements of "PAA-Load" models in this regard.

Readers of M.A. with their own ideas on the subject should write to this office and clearly mark their envelopes PAA Jet Event; we will then forward them on to the P.A.A. headquarters in New York.

MAKING MERRY

FRIENDS, acquaintances, and rivals in the model aircraft trade all met in the Horse Shoe Hotel on October 14th for the first dinner and dance of the Federation

After an excellent dinner and the Loyal Toast, Mr. E. F. H. Cosh, chairman of the Federation, introduced Mr. A. F. Houlberg to the guests. In a short speech, Mr. Houlberg mentioned the iniquities of purchase tax, and felt that it was a rather short-sighted policy when the aeromodelling movement could do much to promote air-mindedness among the youth of this country, to the advantage of Britain's aircraft industry. In closing, he extended cordial greetings from the S.M.A.E. to the Federation. Mr. E. H. Keil, president, ably replied on the Federation's behalf.

Dancing followed for the remainder of the evening, enlivened by a brisk cabaret act and the ebullient personality of Henry J. Nicholls, who acted as M.C. It was Henry's genius, we suspect, that was responsible for Mr. E. Keil's prize in the first spot waltz—a box of Keilkraft propellers!

Festivities ended at midnight, and the ninety members of the trade and their guests all had such an excellent evening that the dinner is almost certain to become an annual event.

Some of the members of the Federation of Model Aeronauticol Manufacturers and Wholesalers and their guests at the Federation's first dinner and dance. See "Making Merry."

S.M.A.E. Dinner . . .

THE Christmas spirit will receive a preparatory warming up on December 10th—the date fixed for the annual dinner and prize-giving of the S.M.A.E. Venue is again the Horse Shoe Hotel, Tottenham Court Road, London, W.1, and early application for tickets is advised. To whet the appetite (literally) the festivities will start at 6 p.m. with dinner at 6.30 p.m.

Tickets, price 25s. each, may be obtained from the Hon. Gen. Secretary, S.M.A.E. Ltd., Londonderry House, 19, Park Lane, London, W.1. Winners of 1955 National Contests, who should attend for their prizes, may obtain their tickets for 12s. 6d.

. . . and A.G.M.

ON Sunday, December 11th, at 10.30, the day following the dinner and prize-giving, the Society hold their annual general meeting at the Horse Shoe Hotel.

This is the most important meeting of the year and, of course, the one which any member can attend. In the past there have been complaints that when the meeting was held in London few members from the provinces were able to attend, but it was explained at the recent council meeting when the venue for this year was decided, that no area had accepted the invitation to suggest an alternative venue. The reason for arranging for the a.g.m. to follow the dinner is to enable the members who attend the dinner and stay the night in London to attend the a.g.m. on the following day.

NEW SPEED RULE

AN S.M.A.E. ruling that was recently introduced requires that a speed model which has broken a record be impounded immediately after the flight by the timekeepers, and be subsequently submitted by the organisers of the meeting to the S.M.A.E. Technical Secretary for examination.

Planes for Publicity

AIRLINE companies have for long appreciated the publicity value of model aircraft, and their increasing use by the aircraft industry was emphasised at the S.B.A.C. show at Farnborough. In the exhibitors' marquee there was hardly a stand without its collection of model aircraft, representing a company's current types or future productions.

Model construction varies according to the need. An airliner featuring alternative seating arrangements will usually have a model counterpart of the semi-transparent type, so that the various cabin interiors can be examined. Any special flying qualities may also be emphasised by a model. A case in point is the Prestwick *Twin Pioneer*, noted for its extremely short take-off and landing runs—achieved by a system of slots and flaps. These were clearly shown on a model replica at the company's stand during Farnborough week.

Also at the S.B.A.C. show, Short Bros. exhibited models of their *Seamew* in the national markings of the N.A.T.O. air forces, no doubt with an eye on sales to the respective countries.

More recently we learn that after a *Britannia* had flown Canadian Pacific Airlines' polar route from Amsterdam to Vancouver, Bristol's presented the airline's president with a model *Britannia* finished in his company's colours. A few weeks later he signed on the dotted line for three *Britannias*. Obviously Bristol's are one company who will appreciate the value of models in their future sales campaigns!

A Christmas Caper

by L. Ranson

I MIGHT agree with all those cosy Christmas sentiments about peace and goodwill and all that if it weren't for a chronic seasonal blight, known throughout the modelling hells of East London as Froggy Manners. Every year at the crack of bon-bon time this boisterous character comes barging in on the Yuletide scene with the sort of dim-witted scheme, which only a born idiot would listen to. Why he should single me out for persecution I don't know—probably I'm a sympathetic type.

So, there I was, snoozily digesting the turkey and pud, and dreaming of a quiet spot of radio flying on the morrow, when I was woken by the most unearthly din. Something like Stephenson's Rocket ploughing its way through a tin can factory. The old ticker sank faster than a brick in a downdraught. There was only one thing that could make a noise like that this side of the earth's crust, and that was the Froggy flivver. Quick as a flash I made a grab for a bunch of grapes and the thermometer and made a dive for the bedroom, but before I could reach the door I caught a glimpse of the Froggy phyzog leering at me through the window.

"Watcher, me old cock," he hailed, as I opened the door, "Long time no R/C, eh?"

"Hullo, Frog," I replied in lukewarm fashion, "You're looking a bit on the rakish side. Been slimming?"

"Don't talk wet. Reason the old torso's under the weather is all this radio revelling. Hectic, you know."

"Given up F/F?"

"You bet. Don't think I'm mug enough to go running meself to a shadow at that game, do you?"

I thought it was about time I knew the worst. "What's new, Froggy?"

"What's new? The boy says," chuckled Froggy knowingly, "Out there, that's what's new." He pointed in the direction of his ancient chariot.

"You don't mean that thing?" I gasped, "As Queen Victoria said when she first saw it, 'I am not amused'."

"Comedian, hey," countered Froggy, "Cut the cackle and cast a peeper at that gorgeous hunk of model in the back seat."

"Well, bring her in and introduce me," came my enthusiastic retort. Perhaps old Froggy wasn't such a blight after all.

"What you gabbling about?" said the Frog, looking at me queer-like, "I'm talking about my new radio job. What a record breaker! Have those little old Russkis begging for mercy."

This had me suspicious right away. "What's the catch, Froggy?"

"No catch at all, pal. Just that I betted old 'Polly' Perkins that my new job had the edge on that battered bit of uncontrolled balsa of yours."

Of all the nerve. You could have knocked me down with a two bladed featherer. A Froggy model would draw sighs of sympathy from onlookers even when it made a perfect landing. I reached for the nearest flower pot.

"Take it easy, chum," said Froggy, drawing away, "No harm meant. But with all this guff going on about long distance radio flying, I thought you and me might have a duffy on those lines. A bit of a race to Southend."

I sat down, feeling suddenly weak. "A race to Southend?"

"Yep," continued Froggy, coming in for the kill, "Old Polly 'll fix you up with the car, and act as co-pilot, and here's the scheme."

Whereupon he drew a grimy map out of his pocket and stubbed it with a grimier finger. "Here's the finishing post. Nice little field just off the main road."

"Any bull?"

"No. Just speak to the farmer nicely."

Boxing Day morning the neighbourhood awoke to the shattering roar of "Polly" Perkins' sports special charging up the road. The only reason I could see for calling it a sports car was that you needed to be an athlete to push it. As it shuddered to a halt by the door, the character called "Polly" jumped out. It wasn't that he was energetic, but it appeared to be the only means of exit.

"Just jettison the junk in the back seat," quoth he, breezily, "Hey! careful with the door, old bean. Expensive stuff, cellotape."

Progress to the airfield was by way of a series of violent leaps from bump to bump, which kept the model on the back seat in a semi-airborne state. If I'd had any breath left when we arrived I'd have breathed a sigh of relief.

Froggy was already on the scene, going through the tic-tac routine with some distant character.

"Something wrong?" I asked, more in hope than expectation.

"Nothing much," he replied airily, "Escapement's a bit on the stiff side. Must be the weather. Have it right in a jiff."

Chronologists, engaged in scientific research into the exact time lag of a jiff, might be interested to learn that before this time factor had elapsed we had managed to cram in lunch, plus a few warming up circuits round the airfield—Bannister style.

Eventually, when we were collapsed in a state of advanced refrigeration, the Froggy loud hailer beat upon our frozen eardrums.

"Well, what are we waiting for? Father Christmas?"

"Our first impulse was to send Froggy the same way as his last model—the pieces of which were widely scattered over the airfield. Anyway, we restrained our enthusiasm, and together managed to get his model—and his car—away to a perfect handlaunch.

After all the dust had settled, we

". . . I caught a glimpse of the Froggy phyzog leering at me . . ."

followed the same procedure and made off in hot pursuit. Exactly what manoeuvres the model executed during our leapfrog chase across the airfield I would be the last to know. A series of short stiff uppercuts from the sharp edge of a bleep box was all I remembered.

I awoke just in time to prevent the model from doing a spot of conker collecting, and soon we were happily chugging towards the coast, with the model doing a vulture act overhead.

About half way, I eased a crick or two out of my neck, which might have felt worse had I not spent a wasted youth in the front seats of the ninepennies. Then Polly turned to me and remarked, by way of a lengthy discourse of the relative merits of his junk heap special over that of Froggy's, that it was rather odd that we hadn't passed that gentleman's entourage.

Further speculation was rudely interrupted by a sort of strangled noise from inside the bonnet, and the game little sportster stuttered to a stop. Polly, veteran of a thousand breakdowns, joyfully reached for his outsize in toolkits.

"Carb," he said tersely, "Won't take a tick."

If those chronologists have sorted out Froggy's jiff, they might turn their attention to tne problem of Polly's tick. It might be possible to measure it in light years or galactic time, but at least it outdistanced the largest tankful of fuel.

"All set for the take off," Polly called out, emerging from inside the bonnet. "Told you it wouldn't take a tick." He fastened down the bonnet with a professional looking granny knot, and then gaped blankly in my direction. "I say, where's the jolly old kite?"

"In the jolly old dickey," I replied sourly. "Too much tick—too little juice."

"Sorry, old thing," he said miserably, moustaches adroop. "Suppose we'd better flap along to the rendezvous."

We proceeded on our doleful way, consoling ourselves with the prospect of Froggy having been overtaken by a worse fate. We would have probably passed the field had it not been for the jubilant figure of Froggy waving us to a standstill.

Inside the field, he poked a bedraggled looking model under my protesting nose. "What price the Froggy technique, now?" he crowed.

"Why all the tears and broken undercart?" I asked suspiciously.

"Pranged a hedge as it came in," came the Froggy rejoinder, "Got a trifle short of fuel, you know. Talk about luck. There I was, just half a mile off."

"Hey, mister," interrupted a youthful voice from behind the gate. Froggy looked round, startled.

"Hey, mister," came the youthful voice again, its diminutive owner now hoving into view, "I found your wheel."

Froggy, a little white, but still game, said boldly, "Thanks, kid. Must have found it behind that hedge," he continued turning to me, studiously ignoring the youth, who now dismounted from his bicycle.

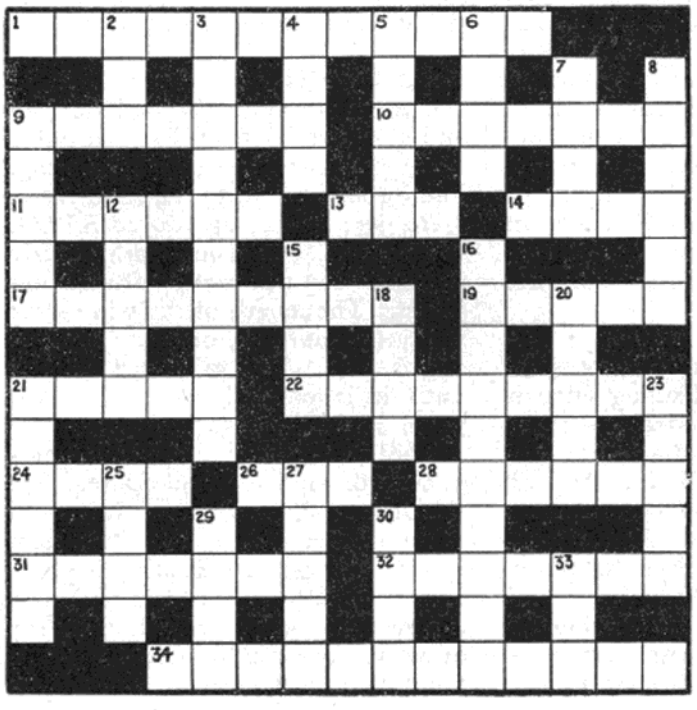
"Sorry I tore your tissue getting it down from that tree, though," persisted the youth, "Forgot I put the wheel in my pocket."

While I gave the youth the third degree on the exact location of the said tree, the inquisition was suddenly drowned by the tin can symphony of the Froggy flivver belting through the gate.

I haven't seen the menace since, but I'm preparing a special reception for him next Christmas.

CHRISTMAS CROSSWORD

Here is an answer to start the ball rolling—21 across, JODLE. We noticed, too late for alteration, that it was wrongly spelt, but our ill-fortune will give you a flying start. JODEL is the correct spelling.



ACROSS

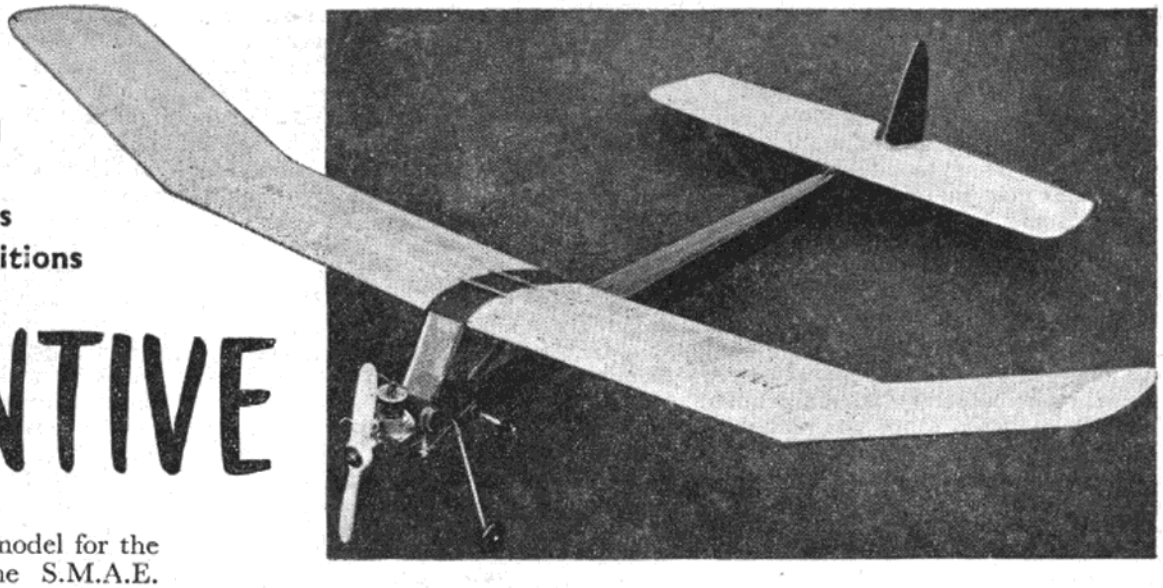
1. This M.A. plan should score a bull with most modellers (12).
9. Windy American engine (7).
10. Popular power plants (7).
11. Degree and Highlander combine for luck (6).
13. Batteries and tanks can be (3).
14. Tick-over to start a New York airport (4).
17. Messy toil ensures a smooth-running engine (3, 6).
19. Act it for silent understanding (5).
21. Phonetically a Swiss pastime but in fact a French Bebe (6).
22. When you make one, inform the S.M.A.E. (3, 6).
24. Short for a long Whitsun meeting (4).
26. The type of jet for a flight to Mars (3).
28. Could be a plan (6).
31. See 29 down.
32. A bandit from Bristol (7).
34. You may miss this dish in the morning if you're selected to represent us on the Continent (4, 3, 5).

DOWN

2. Section of T/R circle (3).
3. They're reputed to be worth modelling (10).
4. Weak point for Achilles (4).
5. This should reign on the flying field (5).
6. The snow lay thus according to the carol (4).
7. There may be one in your engine and your radio receiver (4).
8. Model appearance depends on this ratio (6).
9. Cut in relief upon a shell often used as an adornment (5).
12. This type of model is not always this (5).
15. Knock senseless with a C/L manoeuvre before tea (4).
16. High engine power, correctly applied, will give your model this (5, 5).
18. Dunmow's the town that loses its colour and is cut-up about it (4).
20. Could describe a finish (5).
21. No scope for model flying in this dense vegetation (6).
23. Dared to fear (5).
25. Hardly a suitable modelling material (4).
27. She was a Fair child (5).
29 and 31 across—Your model's performance largely depends on it (4, 7).
30. Some councils have put it on model flying (1, 3).
33. The Air Officer Commanding gets his initial recognition (3).

Ronald Firth describes his 1 c.c. PAA-Load model which has taken several places in national competitions

INCENTIVE



AFTER designing a model for the Elfin 1.49 to the S.M.A.E. PAA-Load specification for models up to 1.5 c.c. power, the contest at the All Britain Rally for 1 c.c. PAA-Load models spurred me to design a further model for an Allbon Spitfire. The excellent radial mount available for this engine was utilised, thus saving the weight of engine bearers.

Fuselage

Formers F1 to F12 are cut out and the 1 mm. ply formers F3 and F4 well cemented to their 3/32 in. sheet balsa counterparts. Cut the two fuselage sides from $\frac{1}{16}$ in. sheet and cement in place formers F3, F4 and F5. When dry join at the tail and add formers F6 to F12. Cut the two root ribs from hard $\frac{1}{16}$ in. sheet making sure that the $\frac{3}{16}$ in. dia. holes for the wing dowels are in identical positions in each rib. This is important as the wing incidences depend upon it. Cement each root rib to formers F3, F4 and F5. When dry cement in the 2 in. long wing dowels. Cement F2 in place. Make up the undercarriage box from $\frac{1}{16}$ in. ply and after cutting slots in the fuselage side cement firmly in place. Cut the hole in the port side of the fuselage for the Elmic diesel timer and reinforce the starboard side with 1 mm. ply to which the timer is bolted.

Cut a piece $\frac{3}{16}$ in. square $1\frac{1}{2}$ in. long and cement across fuselage at the position shown. Make former F4a from a piece of 1 mm. ply and bind 20 S.W.G. wire to it as shown and then cement firmly to former F4 after cutting slots in the fuselage sides. Cover fuselage top and bottom with $\frac{1}{16}$ in. sheet. Add the two $\frac{1}{8}$ in. $\times$ $\frac{3}{8}$ in. pieces behind the dummy position, the two $\frac{1}{4}$ in. $\times$ $\frac{1}{8}$ in. dummy braces, and also the two pieces of $\frac{1}{8}$ in. square which form the cabin front. Add the $\frac{1}{8}$ in. sheet fin (the anti-warp piece is important) and hinge the rudder with aluminium strip. The tailplane support is then made up and inset into the fuselage top as shown. The cabin roof is covered with 1/32 in. sheet. Make a hatch below the dummy position and hinge with bandage.

Drill former F1 to take the three 8 B.A. bolts. Screw the bolts in place and solder wire between to lock them. Glue former F1 in place with Durofix and for additional strength cement bandage over the former and on to each fuselage side.

Sand the fuselage frame and cover using lightweight Modelspan doped on. Fuel proof overall. Add the celluloid windows, the celluloid extending over the root ribs; this strengthens the centre section considerably. Add the D/T band wire fixing and tailskid below fin. Form the U/C legs from 16 S.W.G. wire. Fit the 4 oz. dummy in the fuselage. A pin can be used to keep the dummy door closed when the dummy is in position. Make up the fuel tank from celluloid and cement on the fuselage side. Fix the Keilkraft or Mercury fuel cut-off valve in the position shown and connect to the Elmic Timer with 20 S.W.G. wire.

Wings

The trailing edge is 1 in. $\times$ $\frac{1}{4}$ in. T.E. stock and the leading edge is from $\frac{3}{8}$ in. $\times$ $\frac{1}{4}$ in. sanded to section.

Pin T.E. to plan and also the L.E. which is blocked up $\frac{1}{16}$ in. Add all ribs except W4, and cement mainspar in place. When dry remove from board and cement subspar in place. Divide wing at rib W4 position and fit a dihedral brace. Add wing tip sheet and $\frac{1}{8}$ in. sheet gussets as shown. Add $\frac{1}{8}$ in. $\times$ $\frac{1}{4}$ in. top spar to ribs W1 and the two ribs W2. Fill in between ribs W2 with $\frac{1}{8}$ in. sheet below mainspar. Add the $\frac{1}{8}$ in. $\times$ $\frac{1}{2}$ in. piece between ribs W2 and the two pieces of 1 mm. ply $\frac{3}{8}$ in. square drilled centrally. When dry, insert the 18 S.W.G. wire attachment pieces and fix permanently by a right angle bend at front. Bind the wing band hooks to the spars as shown and cement well. Add the two $\frac{1}{8}$ in. square pieces between the $\frac{1}{8}$ in. $\times$ $\frac{1}{2}$ in. piece and the subspar. Face the root rib with 1 mm. ply.

Tailplane

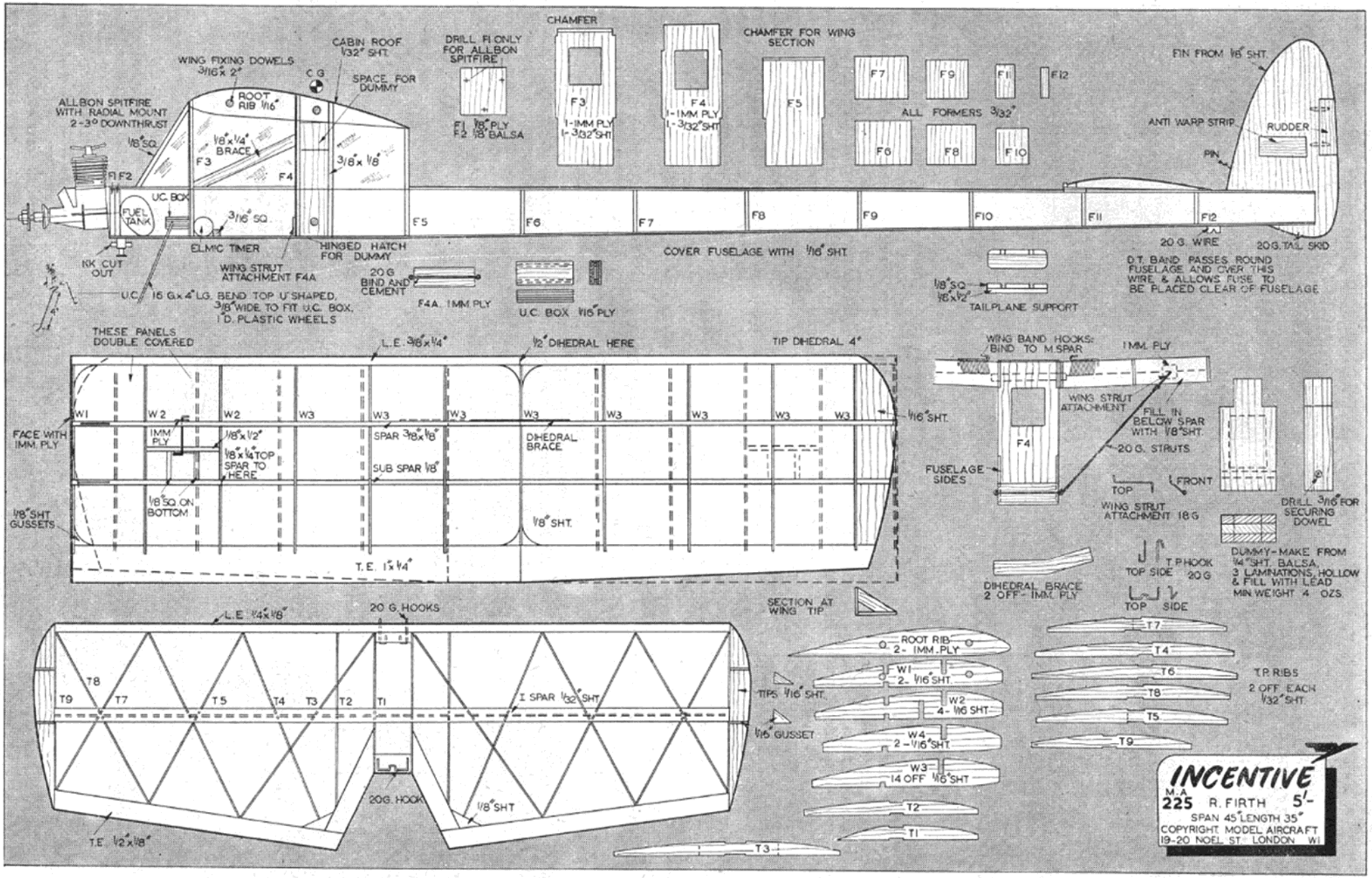
Pin the L.E., the bottom of the I section spar and the T.E. to the plan. Cement ribs in place except T3, T5 and T7 which are divided at the dotted lines and trimmed to fit. The web pieces of the I spar should have vertical grain. Strengthen tips with the $\frac{1}{16}$ in. sheet gussets.

Final Details

Cover with lightweight Modelspan and give two coats of dope. Double cover first two panels of each wing. Fuel-proof the wing undersurfaces.

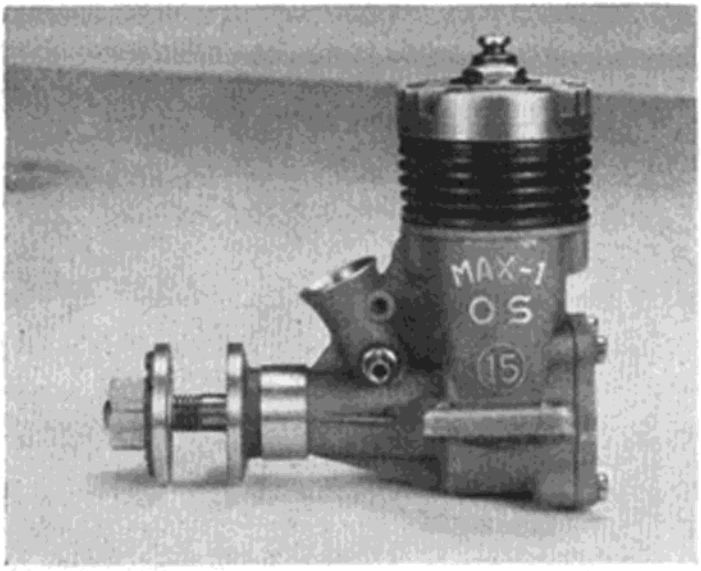
Rigging: Make up two 20 S.W.G. wing struts, which are permanently fastened to the wing attachment pieces. The length of the wing strut is adjusted until the dihedral angle at W4 is $\frac{1}{2}$ in. The tailplane is tilted until it is parallel to the inboard panel of the starboard wing.

The engine should have 2 deg.-3 deg. downthrust and 3 deg. left sidethrust when a 7 $\times$ 4 in. pitch Stant propeller is used. The starboard wing panel (inboard) is given 1 deg. "wash in" at W4. Centre of gravity is the centre line of the dummy. The flight pattern is right-hand climb and glide.



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. 0d., POST FREE

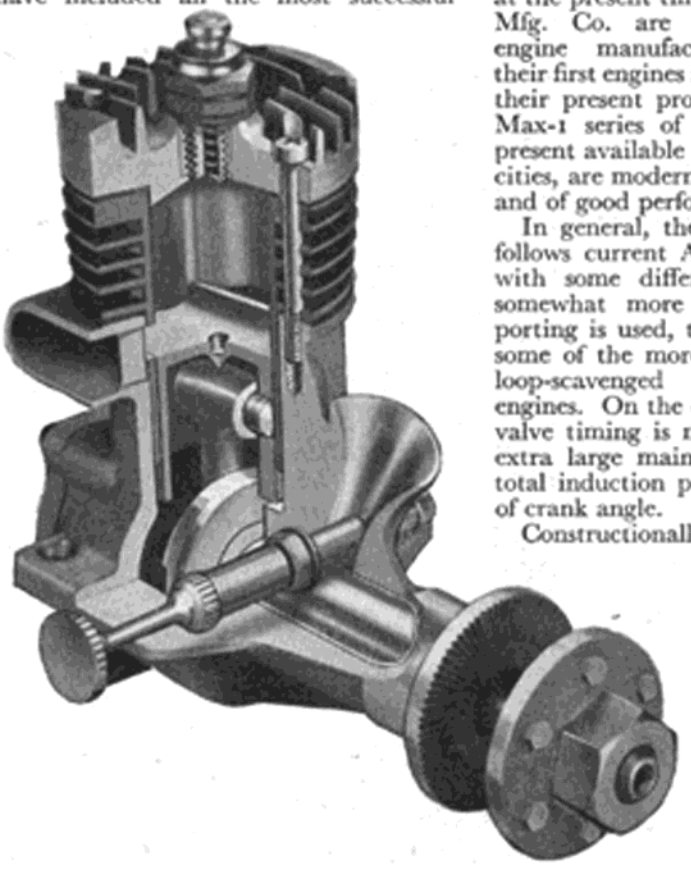
M.A. Engine Tests



No. 80. The Japanese O.S. Max-I

WITH the recent F.A.I. decision to adopt the 2.5 c.c. class engine as the official International class for *all* models (i.e. not merely F/F power-duration as previously), there is bound to be a further increase in the attention being paid to this already popular sized engine. We may expect to see renewed efforts by manufacturers to further improve performance, and competition-minded modellers in all countries will doubtless be eager to learn of the latest 2.5 engines from abroad and to be informed of their capabilities.

During the past two or three years, that is, during the time that the 2.5 c.c. class has become widely adopted internationally, the "M.A." Engine Tests have included all the most successful 2.5 c.c. units, both British and foreign and it will be our policy to continue to give emphasis to the International class in future tests.



In the past we have dealt with 2.5 c.c. engines from Great Britain, Italy, the U.S.A., Holland, Norway, Australia and Germany. This month, for the first time, we are dealing with a Japanese International class engine. This is the new O.S. Max-1 0.15 glowplug unit, built by the Ogawa Model Mfg. Co. Ltd., of Osaka, and which is now being exported to the U.S.A. and other countries and may, therefore, be seen in future international competitions.

The Max-1 0.15 is the best 2.5 c.c. engine being manufactured in Japan at the present time. The Ogawa Model Mfg. Co. are old-established model engine manufacturers, having built their first engines nearly 20 years ago and their present products, particulary the Max-1 series of engines which are at present available in three different capacities, are modern designs, soundly made and of good performance.

In general, the design of the Max-1 follows current American practice, but with some differences. For instance, somewhat more conservative cylinder porting is used, than is to be found on some of the more extreme examples of loop-scavenged high-speed glowplug engines. On the other hand, the rotary-valve timing is more generous and the extra large main bearing port gives a total induction period of over 200 deg. of crank angle.

Constructionally, the engine is pleasing, with excellent diecastings, matt finished and with polished edges. The integral cylinder fins are blued in order to provide a certain amount of protection against rusting. The beautifully diecast cylinder head is retained by six Phillips head screws, two of which pass through into the crankcase castings to secure the entire cylinder assembly.

As on most Japanese glowplug engines, a cast-in threaded bronze bush is used for the glowplug hole. Also bronze bushed is the connecting rod big-end (an unusual feature on a relatively small engine) and the crankshaft main bearing. Incidentally, all bushings on Japanese engines appear to be of a rather yellow bronze and, presumably, the alloy used is of a lower copper content than the normal bearing bronzes employed in British, American and most other engines.

As delivered, the Max-1 is equipped with a 5.5 mm. choke tube and this was retained during our tests. With the choke tube removed, the venturi diameter is increased to 6.5 mm. which, provided that the cylinder porting proves adequate, may be expected to extend the top end performance of the engine.

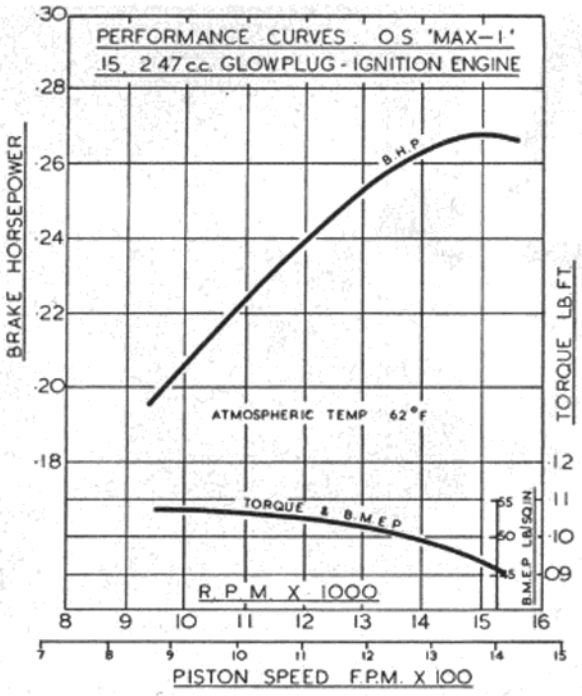
Despite its solid appearance, the Max-1 0.15 is of notably moderate weight and this helps to give it one of the best power-to-weight ratios yet realised on the 2.5 c.c. class.

Specification

Type: Single-cylinder, air-cooled, loop-scavenged two-stroke cycle, glow-plug-ignition. Shaft type rotary valve induction. No supplementary air induction. Lapped piston with baffle.
Swept Volume: 2.47 c.c. (0.151 cu. in.)
Bore: 15 mm. Stroke: 14 mm.
Stroke/Bore Ratio: 0.933 : 1.
Weight: 3.5 oz.

General Structural Data

Diecast aluminium alloy crankcase and main bearing housing with integral carburettor intake and mounting lugs. Diecast rear cover secured with four Phillips head machine screws. Counter-balanced alloy steel crankshaft with rectangular induction port and running in bronze main bearing. Fully machined steel cylinder with integral cooling fins blued against corrosion. Lightweight lapped piston. Forged connecting rod,



with bronze big end bearing. Brass end-pads on gudgeon pin. Diecast aluminium alloy cylinder head contoured to suit piston deflector and with central plug location. Aluminium alloy prop driver keyed to flat on shaft. Brass spraybar type needle-valve assembly. Provision made for installation of second needle-valve for two-speed operation. Beam type mounting lugs.

Test Engine Data

Running time prior to test: 1½ hours.

Fuel used: 50 per cent. Blending Methanol, 25 per cent. B.D.H. Nitromethane, 25 per cent. Duckham's Racing Castor-Oil.

Ignition equipment used: O.K. long-reach glowplug. 1.6 volts used to start.

Performance

The Max-1 is a pleasant engine to handle. It starts well, using the standard glowplug engine procedure of an exhaust prime when starting from cold and a choked preliminary flick when re-starting hot. It is not fussy about the sort of fuel it consumes and will run on economical methanol/castor mixes as well as on the more potent nitro-paraffin-doped blends.

The best performances are obtained at r.p.m. well into the 'teens and there is little point in loading the engine for anything less than a five figure speed. However, the Max-1 is relatively flexible and delivers useful torque figures at the more moderate revolutions as well as running quite evenly when four-stroking at reduced speed on a rich mixture. Thus, the provision for an extra needle-valve, suggesting R/C use for this normally high-speed engine, is by no means incongruous and the unit should prove quite tractable in its two-speed version.

The maximum torque delivered was very good, being the equivalent of a b.m.e.p. of 53 lb./sq. in. at 10,000 r.p.m., which is above average for the glowplug engine of under 0.2 cu. in. capacity. The torque curve declines steadily as r.p.m. are increased, but b.m.e.p. does not drop below 50 lb./sq. in. until 14,000 r.p.m. are approached, so that the peak output is realised in the region of 15,000 r.p.m. Actual maximum b.h.p. obtained on test was slightly under 0.27 which, of course, is very good.

One feature we would like to see changed (not only on this engine but on others using similar methods) is the manner in which the alloy prop driver is hinged to a flat on the crankshaft. Invariably, in time, the hole in the driver becomes enlarged and gives rise to backlash. A preferred system is the use of mating tapers. There is, however, very little else about the Max-1 0.15 with which one can find legitimate cause for complaint.

Power/weight ratio (as tested): 1.23 b.h.p./lb.

Specific output (as tested): 108 b.h.p./litre.

The M.A. Engine Test next month will be the new

FROG 249 B.B.

Engine Materials—5

Drop Forging. Commonly employed in the production of connecting-rods. Forging, in general, consists of shaping metal by hammer blows while the material has been softened by heating. In drop forging, dies are used to produce accurate dimensioning and repetition.

Duralumin. Of the vast number of aluminium alloys available, those of the Duralumin type are commonly used for machining such parts as carburettor intakes, drive collets and cylinder barrels. Duralumin type alloys contain small percentages of copper, magnesium and manganese which impart considerable strength and hardness to the base aluminium content which, with normal impurities, (chiefly iron and silicon) comprises about 95 per cent. of the total.

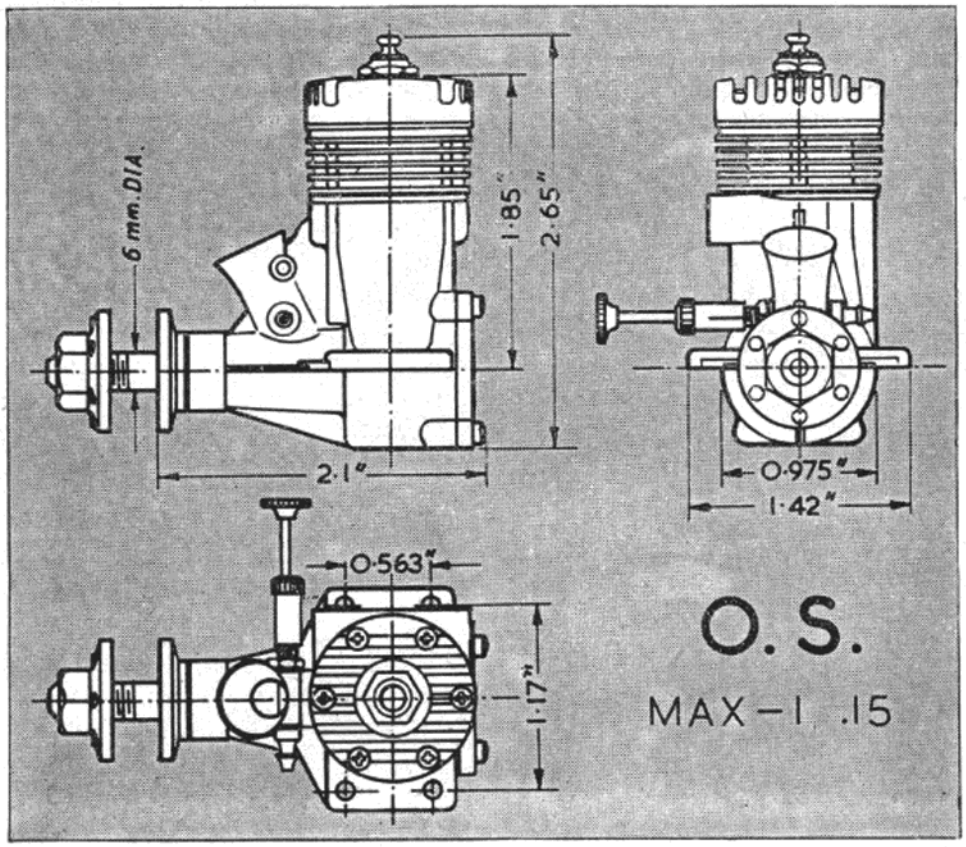
Elektron. A magnesium base alloy in which aluminium, manganese and zinc are present and which is extremely light in weight, being only about two-thirds the specific gravity of aluminium. These magnesium alloys are sometimes used for crankcase diecastings, such as in the Mills engines.

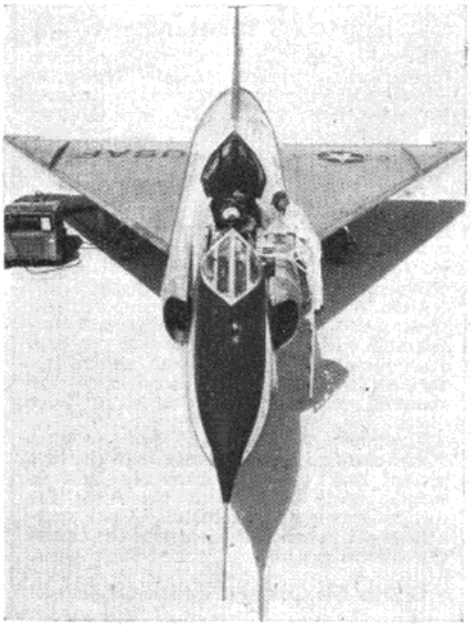
Gravity Die Casting. See Die Casting.

Gunmetal. Sometimes used as a bearing alloy, this is a bronze containing 88 per cent. copper, 10 per cent. tin and 2 per cent. zinc.

Heat Treatment. The processes of heating and cooling applied to metals to effect modification of certain conditions or characteristics. The various processes of annealing and hardening come under this heading, also the relieving or balancing of internal stresses in components (due to manufacturing processes, causing, for example, unequal cooling) to avoid localised weaknesses.

Hiduminium (R.R.) Alloys. Hiduminium is the proprietary name under which a group of special high strength aluminium alloys are known. Widely used in full scale aircraft construction, they are also to be found in some makes of British model engines for such components as connecting-rod forgings (R.R.56) and crankcase and cylinder head castings (R.R.50 and R.R.53).

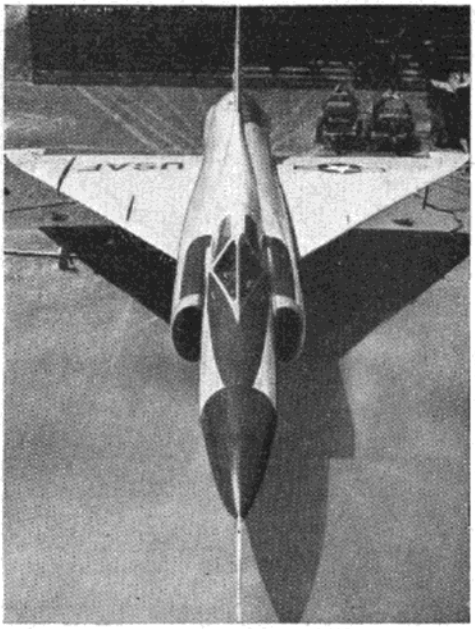




AREA RULE ... AND MODELS

by R. H. Warring

Supersonic research may solve low-speed design problems



Our two heading pictures show well the "before and after" of area rule as applied to the Convair XF-102. Note the "coke bottle" fuselage shape of the F-102A in the picture above.

A RECENTLY released N.A.C.A. Research Memorandum provides an insight into the reason for the development of "waisted" fuselage shapes on a number of recent American supersonic aircraft, with possible parallel applications to model design.

This new "area" rule, as it is called, is amazingly simple. If we take an ideal fuselage shape for minimum drag in the trans-sonic region it will be of circular section somewhat similar in appearance to Fig. 1. When a wing is added, total drag is fuselage drag plus wing drag plus interference drag. The latter, it has been found, can be out of all proportion to the values of the other two drag components and may well become the major factor as Mach 1 is approached. Thus a conventional aeroplane with a well shaped fuselage, and a very thin swept wing, may still refuse to go supersonic on the level because of the excessive drag rise in the trans-sonic region due primarily to "interference" drag producing a strong shock wave *behind* the wing.

Detailed investigation of this problem led to the very simple hypothesis, later confirmed by numerous practical tests in high speed wind tunnels, that the effect of adding a low drag wing to a low drag fuselage is to produce the equivalent, as far as drag is concerned, of a body with a swollen region corresponding to the wing position, the increase in area in this region being equal to the *cross sectional area* of the wing. Obviously the trans-sonic drag of such a shape will be high.

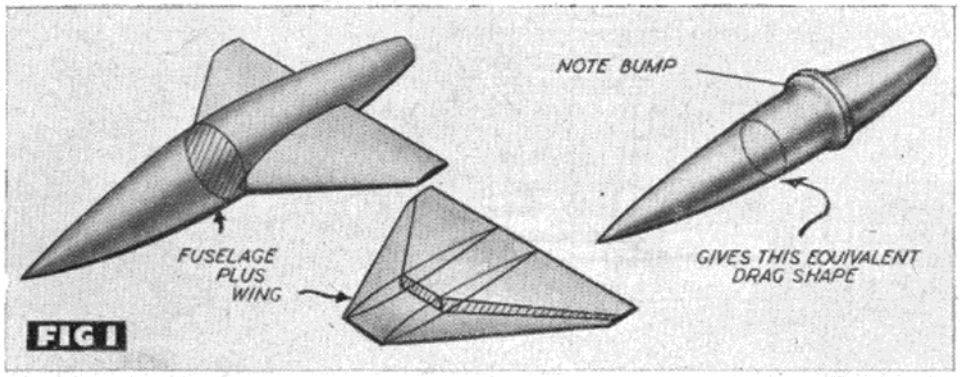


FIG 1

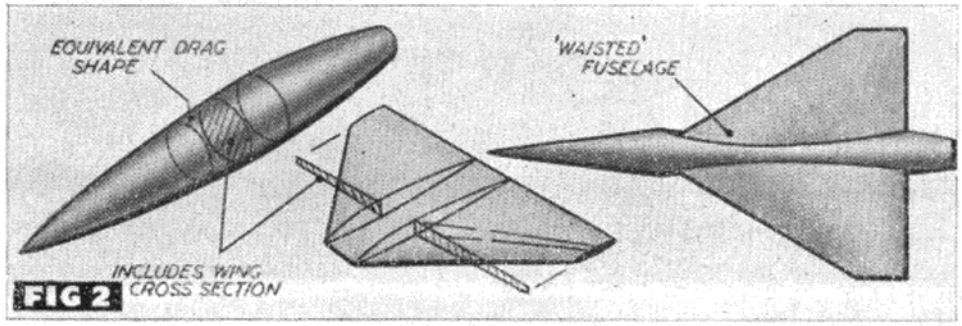


FIG 2

For optimum drag performance, therefore, design on the area rule basis starts with the ideal fuselage shape, *deducts* the wing cross sectional area from the portion affected, and ends up with a "waisted" fuselage, as in Fig. 2, the *whole aircraft* retaining the ideal drag form of the original streamlined body.

The waisted fuselage shape is apparent on a number of recent American military aircraft. In the case of the Convair XF-102 design, this was built originally with a "normal" fuselage shape, very thin delta wing and afterburner for maximum thrust. It remained subsonic on the level at maximum thrust, but when later considerably modified by "waisting" to conform to the area rule, proved itself readily capable of supersonic speeds on the level *without* the use of the afterburner.

Now trans-sonic speeds and design characteristics may seem far remote from the model sphere, which they are to a large extent. In some ways, however, the problems connected with the two are similar. In the trans-sonic range the problem is mainly concerned with the formation and disposition of shock waves causing, to put it very crudely and not strictly accurately, an early breakaway of the airstream. Shapes to which the airflow clings at lower speeds become inefficient at higher speeds because of

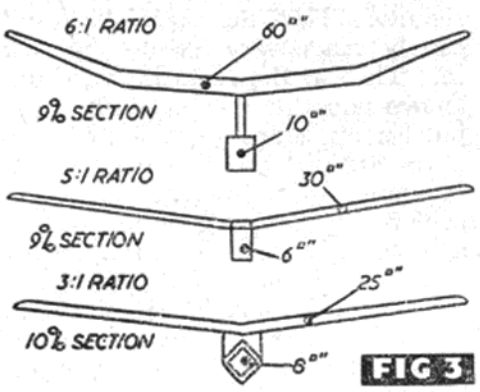


FIG 3

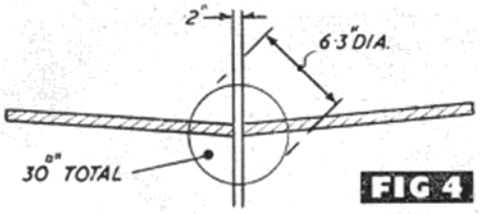


FIG 4

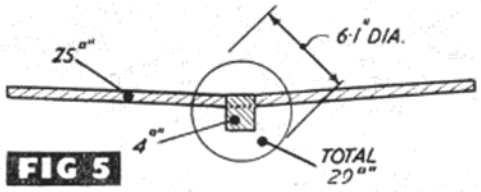


FIG 5

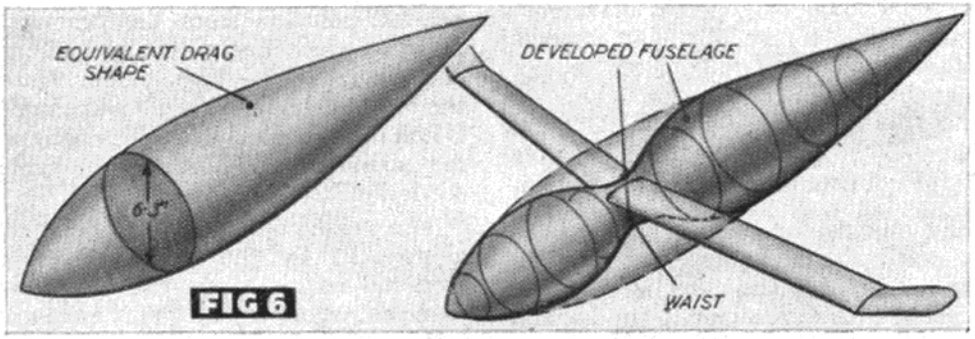


FIG 6

this breakdown of the flow.

The parallel with model design is that here again we are operating in a region of " critical " airflow, where the airstream is all too ready to break away from wings and fuselages, causing early stalling and low lift and high drag values. Other borrowed features from high speed design, such as pointed leading edge and laminar flow aerofoils, have produced claims for greatly enhanced performance at model speeds. In contrast, turbulators achieve an airflow controlling effect in a different way. But on evidence it could not be claimed that any one of these " trick " methods have indisputably produced definite performance increases.

Yet, to take the case of turbulators, these definitely *do* have some effect. If a model is flown with and without turbulators on the wing, without altering the trim, the turbulated wing will have a centre of pressure which is farther aft, making it necessary to trim out the model for a comparable performance. This would appear to indicate that the separation point has been moved farther aft along the wing. Yet nobody who has used turbulators for any period on a model would be prepared to state *and prove* that the overall performance was all that much better than with an unturbulated wing.

Perhaps, then, we are back to a parallel of the trans-sonic " area " rule. Such improvements as we may produce in aerodynamic design refinements to individual components are masked, on the working model, by the high interference drag resulting from combining all these components in a working layout. It became an accepted fact towards the end of Wakefield development under the old (unrestricted rubber) rules that any gain in performance due to aerodynamic refinement could be neglected, compared with the increase in performance which could be gained by increasing the rubber/airframe weight ratio. Throughout the development of all types of high-performance F/F models, in fact, the subject of outline form appeared to become less and less significant as the standard of performance increased; and structure design became more important than aerodynamic design.

Although at this stage this is pure conjecture, *if* interference drag is a completely major part of total drag in model performance, then an application of the full size area rule to model design might produce quite startling results. If it was effective in reducing interference drag to a purely nominal level, then other aerodynamic refinements would begin to show up more clearly and we might, by adopting suitable new shapes, go on to produce a model which is comparable in efficiency with a full size aeroplane. When one realises that the lift/drag ratio of some full size sailplanes is of the order of 30 : 1 whilst it is a very good model indeed which approaches 10 : 1, then the possible effect on flight times is obvious.

Strictly speaking, the area rule, as explained, applies to the aircraft flying at an attitude of zero lift. It can equally well be applied to any flight attitude, although not necessarily in the same simple form. This we can ignore in the interests of getting an approximate solution without having to resort to tedious mathematical calculations. In any case the only true answer will be to try it and see—but we need a little further thought first to see exactly what it is we have to try.

The first most striking fact is that the cross sectional area of model wings is very high, in proportion to the normal fuselage cross section. Typical figures for three representative high-performance F/F models are summarised in Fig. 3. Wing cross sectional area, in all cases, exceeds

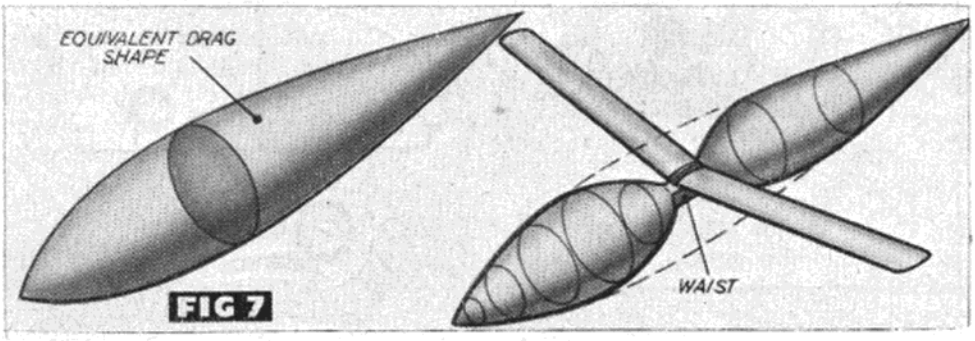


FIG 7

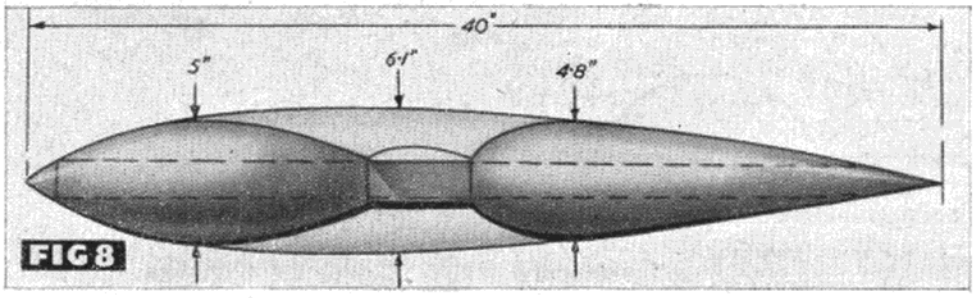


FIG 8

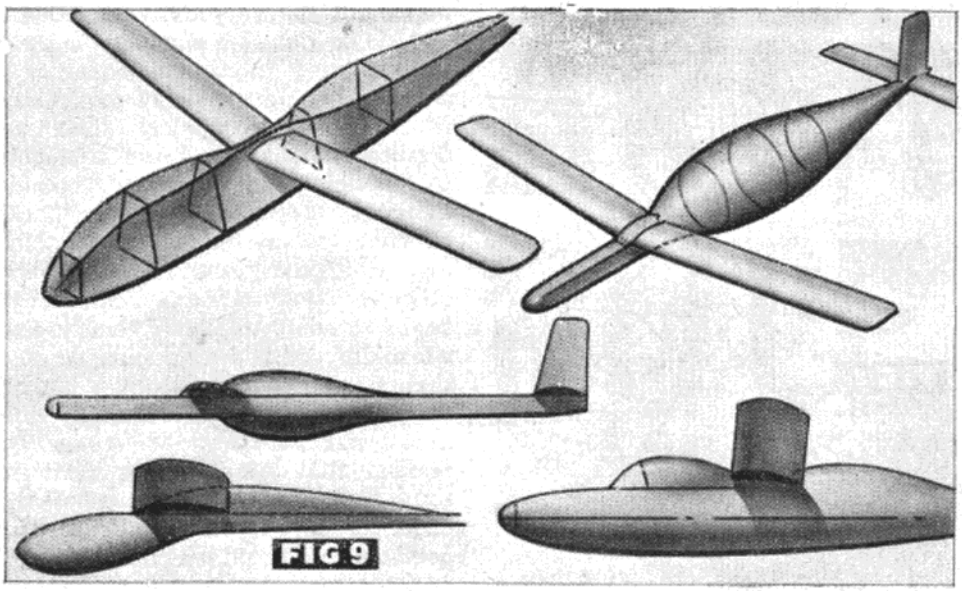


FIG 9

fuselage cross section—in the ratio of 3 : 1 for Wakefields, 5 : 1 for A-2 gliders and 6 : 1 for power duration. It is probably only coincidental, but the Wakefield model, even allowing for the disparity in size, tends to be the most efficient type of the three whilst power model glide performance is not, in *non-lifting* air, anything like as good as it *appears* to be, timed as duration from a given height.

Quite obviously, within the small area fuselages common on present day models, we cannot hope for an overall shape conforming to the area rule. On the other hand, if we design a fuselage shape to produce an " area rule " model we shall end up with a fuselage cross section out of all proportion to the rest of the model —at least as far as logic and our present idea of good shapes are concerned. But it is instructive to calculate a couple of quick examples.

Take the A-2 design first, where there are no practical requirements on fuselage cross section other than rigidity. Thus the actual " waist " can be made very narrow—say 0.2 in. This, at the moment, is of unknown depth (height)—Fig. 4—but has appended 30 sq. in. of wing cross sectional area. If we want a minimum drag fuselage section to conform to the area rule this will be a circle embracing 30 sq. in. plus 0.2 times the diameter of the circle, i.e. the actual fuselage cross section at the waist. Take the mathematics as read. The answer is a circle of just over 6.3 in. diameter—a not impossible solution from the practical point of view, but a strange-looking A-2, nevertheless—Figs. 5 & 6. Here the original body, before " waisting," is laid out as a good streamlined shape for a maximum diameter of cross section of 6.3 in.

The case of the Wakefield is aggravated by the minimum cross sectional requirements to accommodate the rubber motor. This means a minimum basic fuselage shape of not less than 2 in. square, for safety. To this must be added 25 sq. in. of wing cross sectional area, so that the total " circle " area required is 29 sq. in.—i.e. a diameter of about 6.1 in. This produces the insect-like shape of Fig. 7.

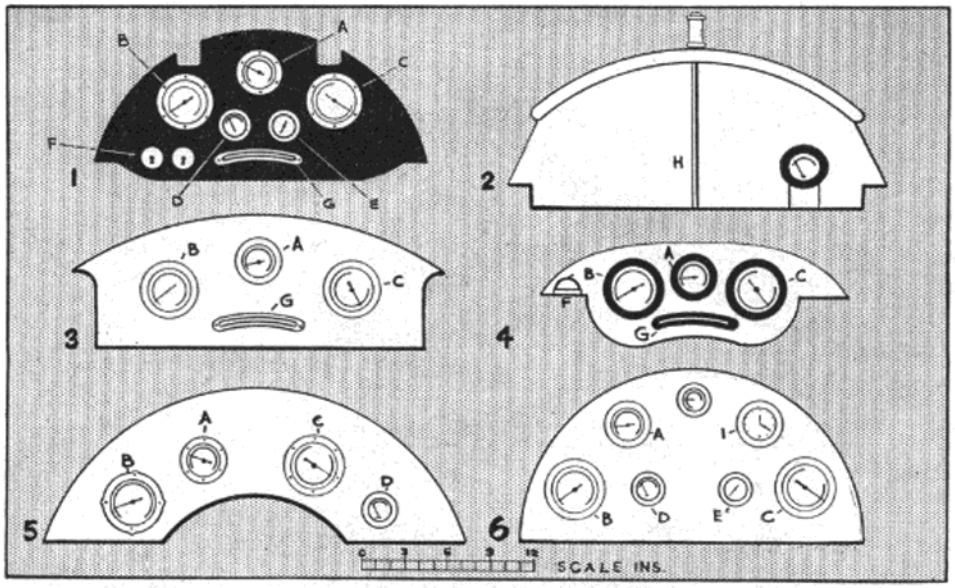
It should be noted that in neither of these cases is the full calculated

DASHBOARDS OF VETERAN AIRCRAFT

by P. G. Cooksley

OLD timers, although a favourite subject for all classes of models, too often feature only a barren hole for the cockpit.

This is probably due to lack of information, so presented here are six of the more popular types.



A. Altimeter.
B. Rev. counter.
C. Air speed indicator.
D. Oil pressure gauge.
E. Oil temperature gauge.
F. Ignition switch.
G. Turn & bank indicator.
H. Tube to oil pulsator.
I. Clock.

No. 1 the Sopwith F1 *Camel* is alone in being black. The rims, about ½ in. broad, were of tinned brass, which resulted in a dull grey shade. The dial faces are white.

No. 2 is the Gorden Bennett Cup, Bleriot XXVII, the board, in common with all those following, was natural varnished wood, the white faced dial being black rimmed. The oil gauge was simply a glass tube with metal caps.

No. 3, the Fokker *Dr* 1 triplane was also natural wood, but with brass dial rims.

No. 4 represents the Sopwith *Pup*; the majority of these were similar to the above, but, probably at a later date, that of the specimen in the Shuttleworth Collection from which this was copied, has been silvered, and the rims picked out in black.

The rims of Nos. 5 (the Avro 504 *K*) and 6 (the *B.E. 2A*) were dull brass. In these examples, the ignition switches, where shown, were of the old-fashioned domestic type, brass with china backs.

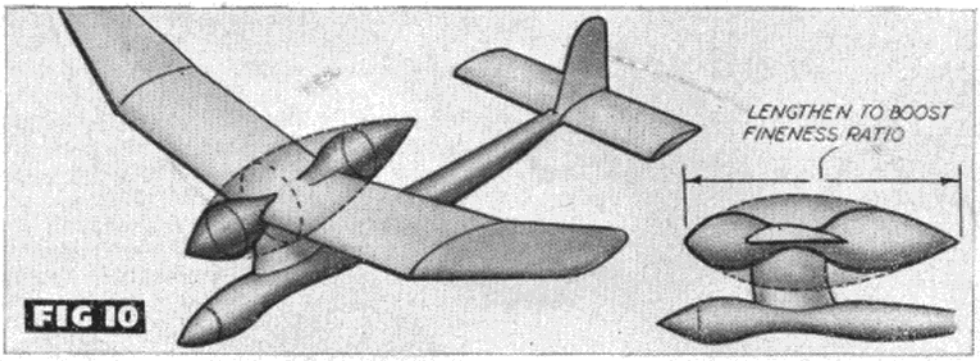


FIG 10

diameter necessarily incorporated in the " waisted " fuselage at any point. This diameter corresponds to the " equivalent streamlined body " section at the wing (aerodynamic chord) position, and the actual maximum diameter of the final fuselage may be appreciably less—Fig. 8. Further it should be remembered that if the " equivalent " fuselage shape *is* truly representative of the total parasitic drag, then even quite large streamlined sections have amazingly low actual drag values. A nicely streamlined body 30 in. long and 6 in. in maximum diameter, for example, has only the same drag as a penny normal to the airstream.

Also there is no reason why the actual figures used in these provisional calculations should not be modified (e.g. by thinning the wing), or the ultimate shape evolved around other than a purely circular section. However, since we are seeking aerodynamic refinement, it would be better to stick to well steamlined sections as far as possible.

Again, too, it is only a guess that the whole of the wing cross sectional area need be incorporated in the equivalent streamlined shape. If the rule is going to work we should probably get noticeable results, at least, by using, say, one half of the wing cross sectional area as a basis for calculation. Certainly this would not give us anything like such bulbous shapes or such extremely " waisted " fuselages. The practical disadvantages of an extreme waist are enormous since this automatically implies a weak point in the structure due to the change in stress distribution. Some random ideas of possible fuselage shapes are sketched in Fig. 9.

It will be noticed that the pylon model has been left out entirely. This particular configuration just does not lend itself to the conception of an equivalent overall low-drag streamlined body since it is, as it were, out on its own. The nearest one can approach to the idea is to treat the wing as a separate entity and " waist " the fuselage to account for the pylon cross section. This, within the area rule, should give a minimum drag fuselage-pylon combination. The wing is then " streamlined " separately by transforming it into a second " equivalent shape " and then translating this in terms of a nacelle mounted in front of the wing and " waisting "—or literally " wasting " away—into the wing proper—Fig. 10. In practice the cross sectional area required to even approximate to the rule would appear to be prohibitive.

On the other layouts, ideally the wing should sprout from the geometric centre of the " waist," so that asymmetric " waisting " would appear in order for high wing or low wing layouts. Also to do the job properly the same treatment should be afforded at the tail end to " include " tailplane and fin cross sections so that the final model—to take the Wakefield as rather the more amenable to treatment—would appear as in Fig. 11. Unorthodox as it may appear, this is quite a practical layout. But the idea behind it at present still remains a theory. If nothing else, the subject is a good discussion point and if we can introduce something new into design—and not just something different for the sake of being different—then it is to be welcomed.

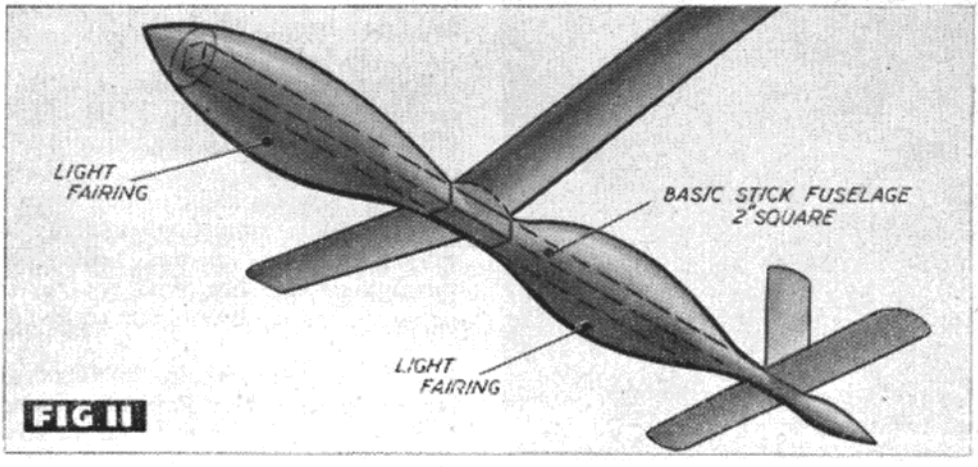
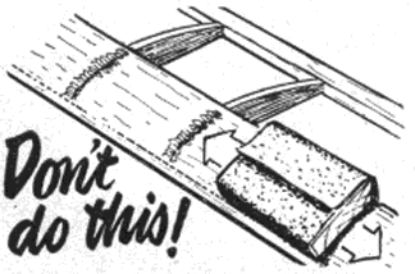


FIG 11

DESIGN TIPS No. 10

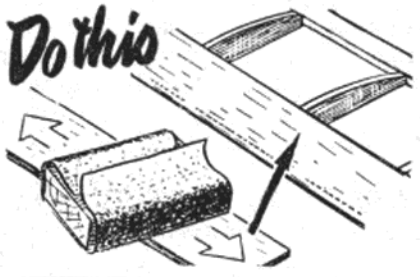


Don't fall into the old trap of trying to smooth sheet covering *after* you have cemented it in place. That's a sure way of asking for trouble. You are bound to reduce the thickness of the sheet most at points where it is supported by rigid framework underneath. And by the time you have worked the unsupported springy areas smooth you will probably have gone right through the sheet at these other points.

The secret is—sandpaper the sheet covering smooth *before* you attach it. In this way, too, you can work the sheet down to the required weight and thickness, knowing that you will not have to touch it afterwards.

Never try to cover with too thin a sheet. Anything less than 1/32 in. is useless on any size of model, and even 1/32 in. sheet is only suitable for wing sheeting up to Wakefield size models. Thicker sheet need not be heavier, if you choose a really light grade. Also select sheet stock which will bend readily—not the brittle kind.

Finally, on a large wing, check that the weight of any sheeting used is the same for each wing half. The same rule, of course, should also apply to wing spars.



Aviation NEWSPAGE

by J. W. R. Taylor

In the recent exercise "Beware," Gloster "Javelins" operated for the first time. Note the new pointed radome nose.

AREA RULE has helped to solve the problems of the single-seat *F-102A* all-weather interceptor, which originally showed an unfortunate reluctance to hit Mach 1. First adopted for Grumman's *Tiger* naval fighter, the Area Rule has given both aircraft a wasp waist, which reduces very greatly the sharp drag rise that occurs at transonic speeds and gives an increase of up to 25 per cent. in speed.

Big advantage of the Area Rule, which was worked out by Richard T. Whitcomb of the U.S. National Advisory Committee for Aeronautics, is that it can be built into an aircraft from the earliest design stages. Drag rise is primarily a result of the combined cross-sectional area distributions of the fuselage and wing. So, by pinching in the fuselage around the wing roots, the total cross-sectional area of the fuselage and wing can be kept the same as for a perfectly streamlined fuselage minus wing.

* * *

DELTA DEFICIENCIES seem to have sorted themselves out, because both the Gloster *Javelin F.A.W. Mk.* 1 and the U.S.A.F.'s Convair F-102A are beginning to enter service. Two *Javelins* were operated experimentally from R.A.F. Coltishall during Exercise "Beware" in September-October, with considerable success. For the first time, high-flying raiders, including *Canberras*, were intercepted and theoretically pranged while they were still 100 miles away from our coastline. One crew—Wing-Cdr. E. D. Crew and Sqn. Ldr. J. Walton—claimed at least 10 kills during the 10-day exercise.

* * *

THREE LARGE PRODUCTION CONTRACTS for the Convair *F-102A* include orders for a two-seat operational trainer version designated *TF-102A*, the prototype of which began flight tests at Edwards AFB in the Mojave Desert in late October.

Main external change is the wider nose section to accommodate side-by-side seats for instructor and pupil, each of whom has a separate basic instrument panel. The widening has also entailed redesign of the air intakes for the afterburning Pratt and Whitney J57.

Intended mainly "to familiarise trained jet pilots with the *F-102A's* performance as an integrated weapon," the *TF-102A* could double if needed as a fully-equipped single or two-seat supersonic tactical interceptor.

* * *

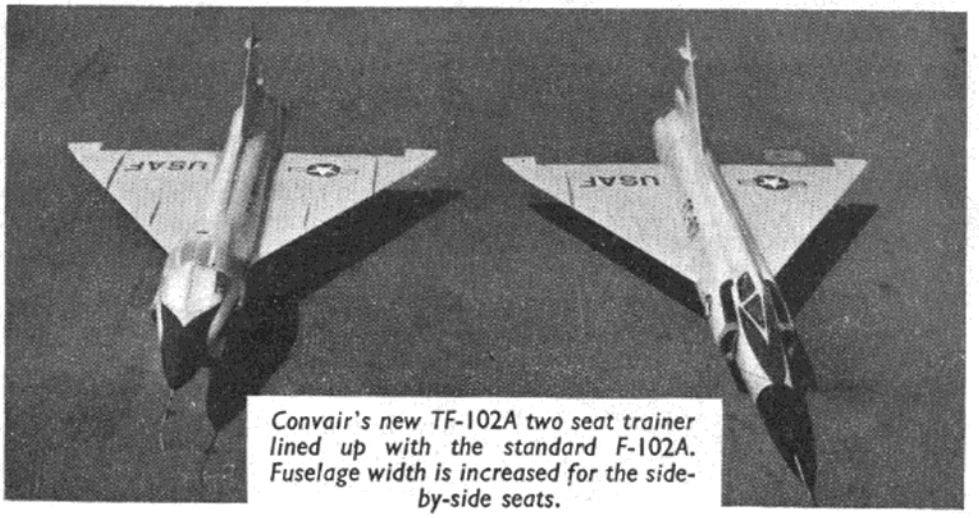
WHEELSKIPLANE sounds like a Russian flying saucer, but is actually the name under which D.H. Canada are marketing the *Beaver* with combined wheel and ski undercarriage. Designed to fit around the normal wheels, the skis are raised a few inches above the ground for take-off from hard surfaces. For take-off or landing on snow, the skis can be lowered hydraulically in a few seconds on the ground or in flight. Just the job for bush flying in Canada's frozen north.

* * *

Experiments in the use of closed-circuit **TELEVISION FOR AIR-CREW BRIEFING** are being made on H.M.S. *Ark Royal*. A single briefing crew could broadcast from a central studio simultaneously to the three briefing rooms dispersed throughout the ship, with no fear of being picked up by outside receivers.

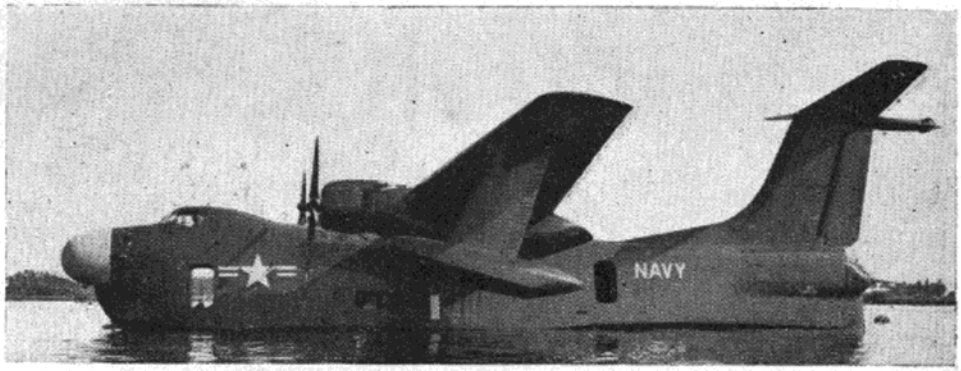
* * *

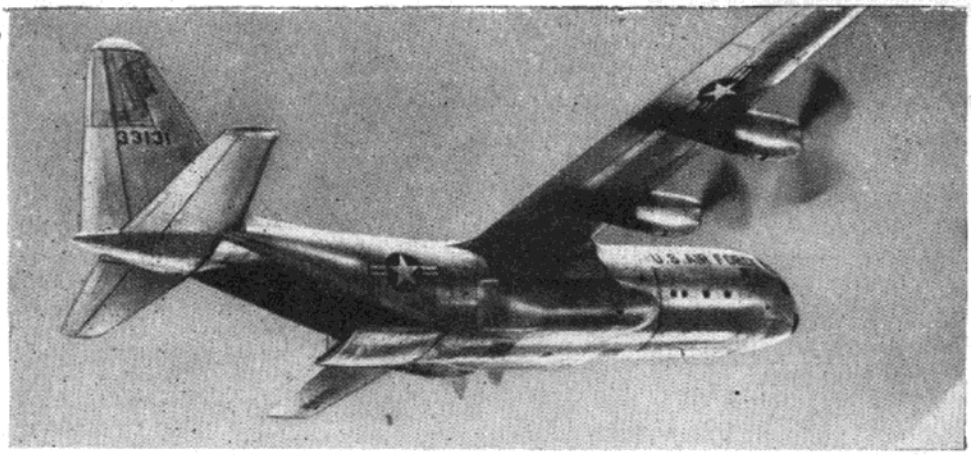
Visitors to the Stockport, Cheshire factory of the The Fairey Aviation Company saw recently the nearly-complete wing and tail unit of the



Convair's new TF-102A two seat trainer lined up with the standard F-102A. Fuselage width is increased for the side-by-side seats.

Right: Exclusive photograph of U.S. Navy Martin P5M-2 "Marlin" flying boat, which carries the largest tactical radar scanner of any warplane. Latest "mod." seems to be an odd item of operational equipment at the tip of the fairing, behind the T-mounted dihedral tailplane. Below: Lockheed C-130 "Hercules" displays its doorstep over which heavy equipment can be tipped for parachuting to ground forces. Lockheeds recently received from the U.S.A.F. a repeat order for C-130's worth over $100,000,000.





prototype **ROTODYNE HELICOPTER.** If the fuselage, being made in Fairey's southern factory at Hayes, Middlesex, is equally advanced, there is little doubt that this 44-passenger convertiplane will start ground tests on schedule in mid-1956.

* * *

ONE WEEK'S ORDERS received by Lockheed recenty totalled nearly £100,000,000. They included a fourth U.S.A.F. contract for the C-130 Hercules turboprop transport, and commercial orders for 10 *Super Constellations* and 40 *Electras* for Eastern Airlines, 10 *Super Constellation* 1049H freighters for the Flying Tiger Line and three more *Super Constellation* 1049G airliners for Air-India.

* * *

Known inevitably as the **DOUBLE SCOTCH,** the Scottish Aviation *Twin Pioneer* is the best argument so far against helicopters. Developed from the earlier *Pioneer*, it features the same multiplicity of flaps and slots and was designed originally for operation in the Scottish Highlands and islands.

Specification was for an aeroplane with exceptionally short landing and take-off runs, a 3,000 lb. payload and range of up to 500 miles. The prototype flew on June 28th this year and had logged 50 hours' flying up to early October, including impressive displays at Farnborough.

Powered by two 550 h.p. Alvis Leonides radials, the *Twin Pioneer* will unstick from grass in 100 yards with 16 passengers and fuel for 500 miles. A great saver of bawbees, it offers a direct operating cost of just over 1½d. per passenger-mile (or under 2½d. including U.K. petrol tax) and a speed range of 48-180 m.p.h. Wing span is 76 ft. 6 in. and a.u.w. 13,500 lb.

* * *

GERMANY'S AIRCRAFT INDUSTRY will probably be combined into two zonal groups, rather like the French nationalised companies. Present indications are that the northern group will include Focke-Wulf, Hamburger Flugzeugbau (Blohm and Voss), Henschel, Finanz und Verwaltungesellschaft Weser and the works of Prof. Blume at Duisburg. The southern group will consist of Dornier at Friedrichshafen, Heinkel and Messerschmitt.

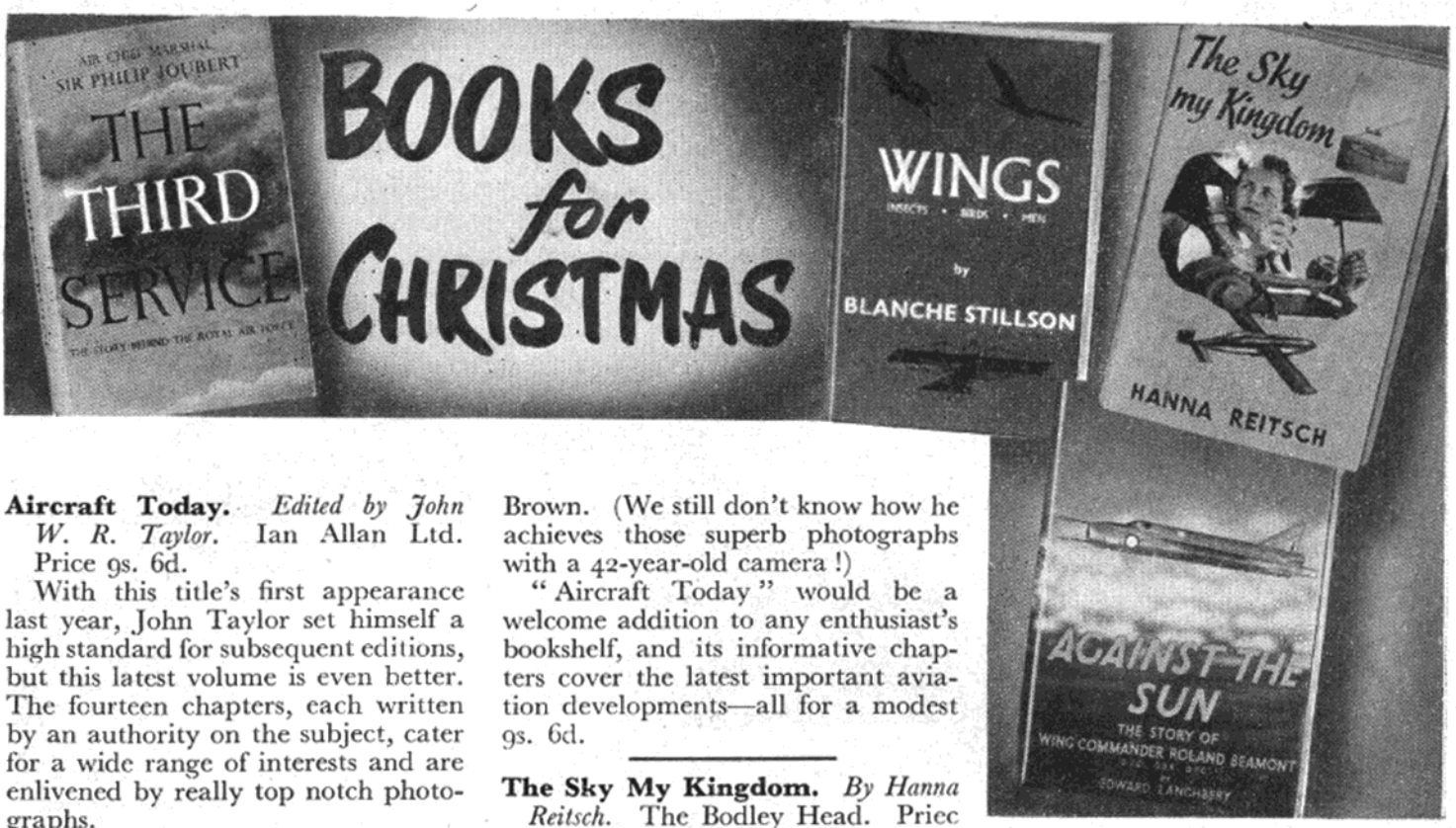
First German-built aeroplanes to fly are the Blume 501 and 502 lightplanes, of which the latter is a four-seater with a 150 h.p. Lycoming engine and cruising speed of 140 m.p.h. But both Dornier and Messerschmitt have been active in Spain. The Hispano Ha.200 turbojet trainer is a Messerschmitt design, and the C.A.S.A.-built Dornier Do.27 high-wing A.O.P. and liaison aircraft is already slated for production in Germany next year.

* * *

NEWS FROM SUD-OUEST is that they will begin deliveries of *Vautour* bombers to the French Air Force in the spring of 1957. Delivery of the first all-weather fighter and ground attack versions should start some months earlier. Production machines will have SNECMA Atar turbojets.

S.O. claim that their *Trident II* is the fastest combat plane in Western Europe. During its fifth flight, it exceeded Mach 1 in a shallow dive on the power of its wingtip jets alone. Its rockets have now been fitted and it should prove even faster than the *Trident I*, which has exceeded Mach 1 by several hundred m.p.h. both in level flight and in a climb.

New aircraft with the "old" look is the Scottish Aviation "Twin Pioneer" developed from the earlier single engined "Pioneer."



Aircraft Today. *Edited by John W. R. Taylor.* Ian Allan Ltd. Price 9s. 6d.

With this title's first appearance last year, John Taylor set himself a high standard for subsequent editions, but this latest volume is even better. The fourteen chapters, each written by an authority on the subject, cater for a wide range of interests and are enlivened by really top notch photographs.

Of especial interest to modellers will be R.A.F. Squadron Insignia by J. D. R. Rawlings, which incorporates a comprehensive chart of current squadron markings.

A factual chapter on Russian Aircraft by "Chronicler" is enhanced by the inimitable drawings of Wren, who presents the major types from a humorous aspect, at the same time punching home their salient recognition features.

We cannot mention all the many interesting chapters, but we were particularly impressed with the editor's balanced "Review of World Aviation," absorbed by Harold Penrose's "Adventures of Test Flying," and amazed by the technique and equipment used by that doyen of aircraft photographers, Charles E. Brown. (We still don't know how he achieves those superb photographs with a 42-year-old camera!)

"Aircraft Today" would be a welcome addition to any enthusiast's bookshelf, and its informative chapters cover the latest important aviation developments—all for a modest 9s. 6d.

The Sky My Kingdom. *By Hanna Reitsch.* The Bodley Head. Price 12s. 6d.

In its formative years, aviation was regarded as being essentially a man's sport and occupation, and consequently the few women who encroached on this masculine preserve were not accepted gladly. Hanna Reitsch, in this autobiography, tells of her own struggles to overcome this prejudice and in doing so presents an illuminating picture of the German aviation scene both in peace and war.

After her many successes flying gliders during the nineteen-thirties, Hanna Reitsch became a test pilot in World War II. Remember German aircraft being fitted with a leading edge "fence" to cut balloon cables? Hanna Reitsch was responsible for most of the development flying on that project. Especially interesting are her first hand experiences of flying the Messerschmitt Me163 and the piloted experimental versions of the V.1. Notable, too, is her eye witness account of Hitler's last days in his bunker.

Altogether this is an unusual book by an unusual woman, whose love for flying she vividly communicates to the reader.

Against The Sun—The Story of Wing Commander Roland Beamont, D.S.O., O.B.E., D.F.C. *By Edward Lanchberry.* Cassell & Co. Ltd. Price 16s.

The name Roland Beamont is synonymously linked with the development of the *Canberra*, and rightly so, for he it was who contributed so much to the initial success of Britain's first jet bomber.

But until the publication of this biography, very little was generally known about the Beamont of "pre-Canberra" years.

In "Against the Sun" Edward Lanchberry has presented us with an eminently readable story of a man completely dedicated to flying since he took his first flip in an *Avro* 504 at the age of six. As can well be imagined, a career that takes in the era of flying from the *Avro* 504 to the *P.*1 is not lacking in interest, be it fighting in the Battle of Britain, test flying with *Hawkers*, or dealing

(*Continued on next page*)

"Anyone here know the F.A.I. T/R specification?"

Letters

Continued from page 461

actuator was installed, and this started my "Rudder Waggler" proportional control. An improved actuator then gave about the same turn with or without engine, and this rudder control seemed as good as the earlier aileron.

A later model was not satisfactory so the problem was investigated. It was found that the satisfactory model, when rudder was applied, seemed to bank first and then turn. The later model was made quite satisfactory by altering the rudder position, and has done most of my flying for the past five years.

Another model was fitted with aileron and rudder controls, and each tried in turn. There was no appreciable difference in control between the two. Of course, an escapement-operated rudder would give more turn with engine than without, whereas ailerons would give about the same.

My flying wing has aileron control, there being no fin or rudder, and for simplicity only "up" is used to give a downward moment and extra drag; this is very effective. Alec Wilson's flying wing had rudder control, and this was not as good, but was probably due to the rudder position.

I believe that given more dihedral the *Motor Tutor* would turn just as well on rudder as on aileron, and rudder control is very much easier to make and install.

If Mr. McNeill cares to write to me, c/o MODEL AIRCRAFT, I will help him in any way I can.

Yours faithfully,

Rugby. HOWARD BOYS.

Experiment in Colour

DEAR SIR,—In the Cover Story of your July issue you said that "jet aircraft lack an indefinable 'something' possessed by aircraft of the pre-jet era."

Modern aircraft look sleek and silvery and fairly sparkle, whereas wartime aircraft had a strange dingy, utility look about them.

I found this 'something' was connected with the aircraft's camouflage, so I painted a small Hawker *Hunter* with W.W.II camouflage and markings, and *voila* it had lost its sparkle and gained something of that strange quality. That experiment convinced me that this 'something' is connected with colour.

Yours faithfully,

Dumfries. ADAM D. REAY.

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 wonder what he wants for Christmas?"

BOOKS (continued)

with the V.1s, and the author has captured well the atmosphere of wartime operational flying.

The accounts of Beamont's test flying are full of interesting detail. It fell to his lot to put the *Typhoon*, which had many teething troubles, into a 500 m.p.h. dive to see if the tail would break off! In fact, it was largely due to Beamont's faith in the "Tiffy" that it entered squadron service at all.

At the end of 1944, after his personal success against the V.1s, Beamont was finally shot down when flying *Tempests* with the 2nd Tactical Air Force. He made a successful crash landing and was picked up while trying to make his way to the British lines.

After repatriation he returned to make test flying his career. That he has succeeded in this also is well known by his brilliant demonstrations at post-war S.B.A.C. shows. But his story is not yet complete—the *P.*1 is now the object of his attentions and no doubt others will follow, and perhaps his later experiences will provide an equally entertaining story.

The Third Service. *By Air Chief Marshal Sir Philip Joubert.* Thames & Hudson. Price 21s.

This book has already put the proverbial cat among the pigeons by reason of the author's outspokenness. Air Chief Marshal Sir Philip Joubert de la Ferté is well qualified to write the story of the Royal Air Force from its formation in 1918. His service career has spanned its whole history and consequently he has an insight into the ceaseless clash of opinions and policies of the statesmen and officers who worked behind the scenes.

He has many an anecdote to tell of the early days, but he does not spare his criticism where he feels it is justified. Consequently the book has a pace which is much more refreshing than a mere account of the surface history of the R.A.F.

Obviously the Air Marshal is a man with a mission. He sees the future of the R.A.F. beset with the perils of an inter-services "carve-up" and warns of the risks that are involved by allowing jealousies to obscure sound judgment.

Wings—Insects, Birds, Men. *By Blanche Stillson.* Victor Gollancz. Price 16s

Winged flight, be it by insects, birds, or men, usually receives "matter-of-fact" acceptance. But in this unique book Blanche Stillson has correlated the three aspects of flight to reveal a fascinating record of progress from its inception more than 225,000,000 years ago.

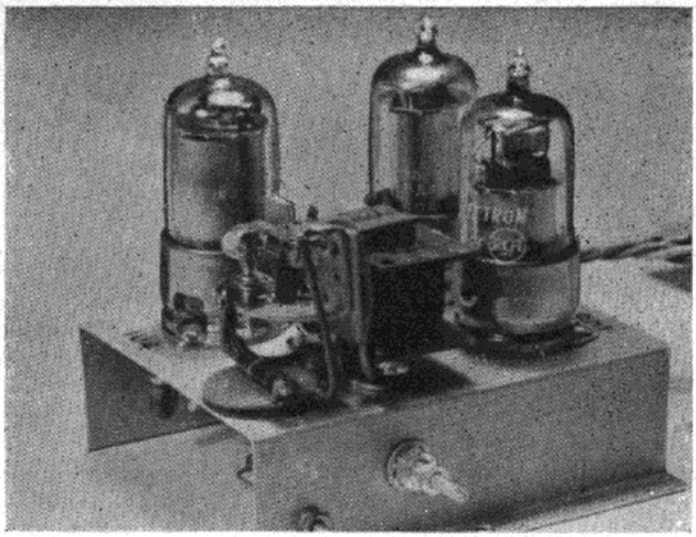
One cannot fail to marvel at Nature's ingenuity in enabling the various forms of insect and bird life to fly, and it is easily understandable how man, in his premature ventures, attempted to emulate creatures that accomplished flight so effortlessly.

The three sections are written in a style that makes absorbing reading by avoiding the burden and obscurities of technicalities, but without detracting from an authoritative study on the history of flight.

* * *

Minikscale Ltd., makers of Avian solid model kits, have recently published a 'solids handbook' combining a catalogue and instruction manual. It forms a useful guide to solid modelling and contains many hints and diagrams, together with details and photographs of the full sized aircraft in the Avian range. Price is 2s.

New arrivals from the U.S.A.



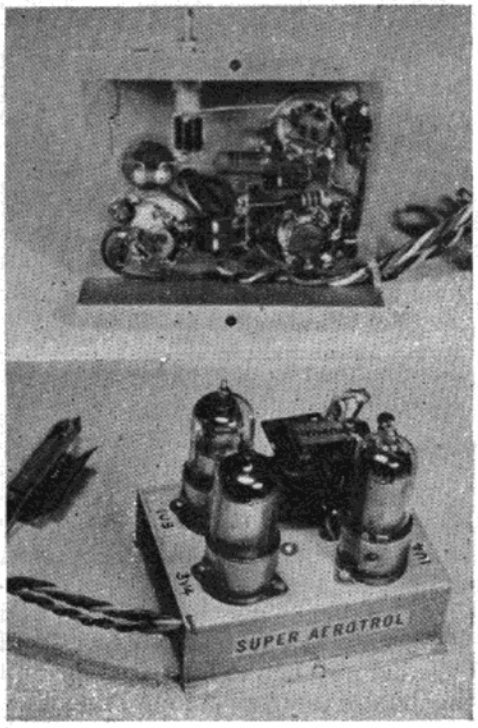
The relay side of the new "Tone-Aerotrol" radio receiver discussed in this article.

PREFERENCE for one type of R/C gear or another is undoubtedly influenced a good deal by personal experience. No matter what the advertisements say, or how good a piece of equipment may be theoretically, it is, after all, the performance and reliability under actual operating conditions which count.

In our own experience, the worst thing that the newcomer to R/C can do, when choosing a set, is to take too much notice of (*a*) publicity, (*b*) highly technical arguments put forward in favour of one particular type of circuit or circuits, and (*c*) competition successes.

The radio contest winner who is an expert on radio can recognise the shortcomings of his equipment and act accordingly. He can also check or even rebuild it to ensure that it is put together properly and unlikely to let him down at a crucial moment.

The same type of equipment in the hands of the newcomer may prove very disappointing. A receiver circuit, for example, may be theoretically sound and the designer may submerge us in a sea of high-sounding technical jargon as to the reason why it is better than anyone else's. Yet it may have certain idiosyncrasies which, simple enough for our expert to cope with, are quite beyond the understanding of the modelling type. Worse, the supposedly sound design may never have a chance to prove itself because of shoddy workmanship and inadequate standards of inspection at the factory.



The new "Tone-Aerotrol" receiver. The 3-valve circuit employs 3V4, 1U5 and 1U4 valves and a new 5,000-ohm Kurman relay with screw mounted contacts. The receiver is 3¼ in. x 3⅛ in. x 3 in. high and weighs 4¼ oz.

ACCENT ON POWER
by
P. G. F. CHINN

This latter possibility is made a hundred times more important if the firm concerned show little interest in the customer after his purchase—an attitude that is certainly by no means rare. We have had some enlightening letters, from time to time, from disillusioned purchasers of highly publicised equipment. One thing seems evident: purchase price has no bearing on the standards of reliability or service that can be expected.

We have to confess that, during the past six years, we have experienced (and we have also been witness to) many changes of heart in regard to what can be considered as the "best" commercial R/C equipment currently available. Some sets which, on initial acquaintance, may impress one quite favourably have failed to live up to one's hopes beyond prototype tests. On the other hand, one or two types which started shakily have subsequently proved tolerably reliable. So far as British equipment is concerned, it would certainly appear to be unwise to be committed to the opinion that such-and-such a make is the best, or the worst, as it is necessary to constantly revise such opinions, with continuing development.

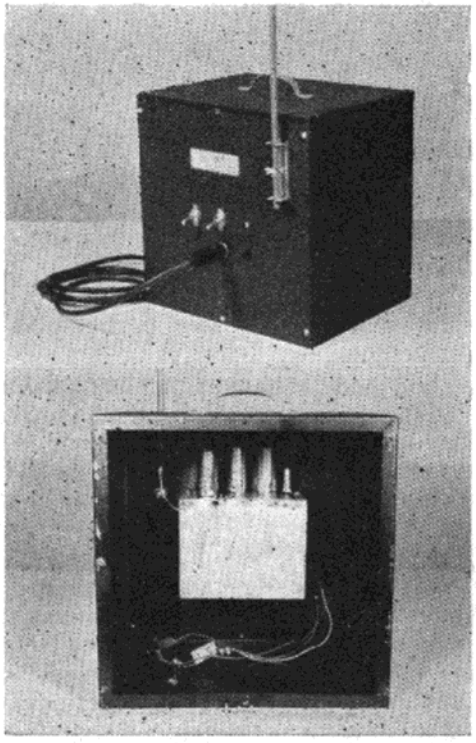
We do not wish it to be assumed from the foregoing that our following remarks concerning the new "Tone-Aerotrol" are therefore automatically an endorsement of this equipment. The above paragraphs will, perhaps, help to explain any favourable personal impressions of the Aerotrol, but we would hasten to add that in any case, our knowledge of Aerotrol sets is confined to five years' use of four different examples, obtained, at intervals, from the U.S.A. and subsequently used by a friend in various types of models.

The first outfit was one of the earlier 52-54 m/c sets comprising transmitter (with separate batteries and half-wave aerial), receiver and escapement, in kit form, which the writer built up and which, in view of this fact, he was subsequently somewhat surprised to find actually worked. The second set was one of the first 27 m/c outfits and the third was a production set of the eventual Super-Aerotrol design, as introduced on the adoption of the U.S. Federal Communications Commission free band, in which a new crystal controlled hand-held self-contained transmitter with ⅛-wave whip aerial was employed and the receiver became tunable by means of a dust iron cored tuning coil.

Each of these sets was, of course, of the single valve type, all the receivers using the thyratron gas filled valve circuit pioneered by E. J. Lorenz in the original Aerospark-Aerotrol design. Each of them, in our experience, was superior to any other soft-valve set produced. In the two factory assembled units, wiring was neat and every joint was a perfect example of soldering art. Lastly, the performance of the receiver was in no small way due to the excellence of the Kurman relay employed.

Now, D-E Model Products of New York, who have been responsible for the development and manufacture of the Aerotrol for the past half-dozen years, have introduced an entirely new transmitter and receiver. We obtained one of these outfits in August of this year and deliveries are expected to be well under way by the time these words appear. The new Tone-Aerotrol utilises a three-valve transmitter and three-valve receiver and is entirely different from the earlier models.

The main disadvantages with the single soft valve circuit is, of course, the valve itself which has only a short useful life, is expensive and, to a more or less degree, depending on the circuit design, requires frequent retuning of the receiver as the characteristics of the valve change with use. With some circuits in common use three or four years ago, these changes took place so rapidly that the receiver would go out of tune within 15 or 20 min., which meant, of course, that unless a recheck was made before every flight, there was a distinct danger of loss of control during flight. In our experience, the Super-Aerotrol, particularly when fitted with the RK.61 valve, could be relied upon to remain in tune for a several times greater period than most other soft valve receivers, but, just as most other manufacturers now appear to have abandoned the soft-valve type circuit, so, it appears, the makers of the Aerotrol have decided that a set which requires negligible attention is the principal ingredient for the future popularity of R/C.



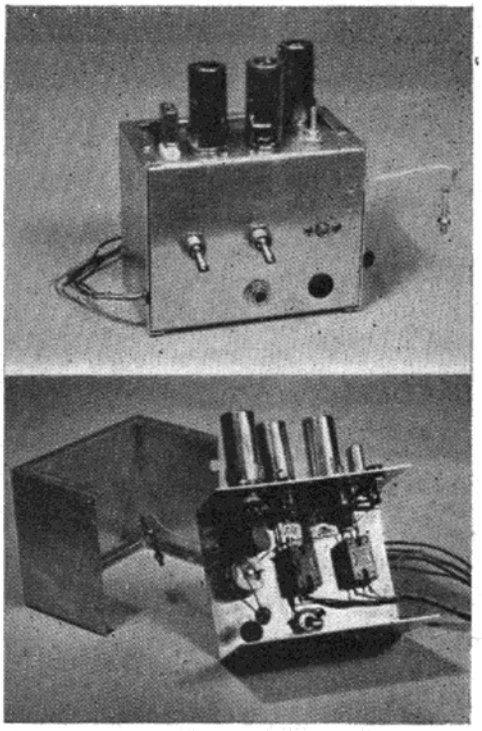
The "Tone-Aerotrol" modulated transmitter. Transmitter chassis and batteries are housed in a black crackle-finish steel case 10 in. x 10 in. x 8 in. The two switches are the on/off switch and a high-power/low-power switch for increasing range.

The new equipment is bigger, heavier and more expensive, but long-life miniature valves are used and adjustments are reduced to one simple control on both transmitter and receiver which, once tuned, should require no further attention for an indefinite period.

The Tone-Aerotrol is of the modulated carrier wave type as its name suggests. It was designed by the noted American R/C pioneer, Dr. Walter A. Good, and it had three seasons' thorough testing before being put into production by Joe Dale of D-E Model Products. The claim for this equipment is that it is as easy to operate as an ordinary broadcast receiver. People have said this about other sets, of course—without much foundation. On the other hand, the designers of the Tone-Aerotrol do seem to have taken a step in the right direction.

The transmitter is crystal controlled and cannot, therefore, wander off frequency. Adjustment for "aerial current" is provided by means of a small lamp. One simply tunes for maximum brightness. Similarly, the receiver has one adjustment only, which is sensitive but quite positive.

Using 45 volts on the receiver, current change is from 3 milliamps to zero. Using 60 volts, the change is from just under 5 milliamps to zero. Unlike some earlier modulated sets, response is instantaneous: one can send rapid signals and there is a satisfying click-click from the excellent Kurman 5,000-ohm relay just as quickly as it is physically possible to move the keying button. The new Kurman relay, incidentally, is now equipped with screw adjustment contacts.



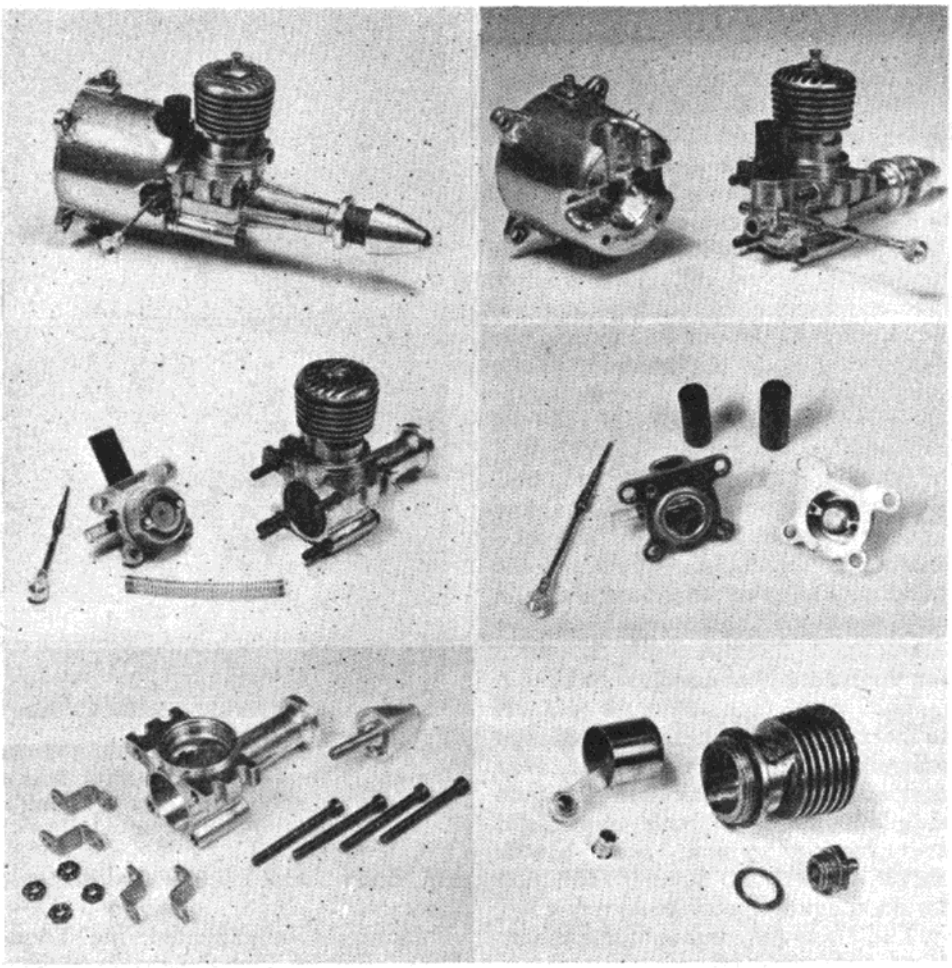
The "Tone-Aerotrol" transmitter chassis. The crystal can be seen mounted beside the three valves. Two 3V4 and one 3A5 valves are employed.

As might be expected, the Tone-Aerotrol is somewhat more expensive to purchase than the single valve Aerotrol, although, having regard to the obviously much greater time and materials cost of the new model, the retail price of $79.90 (£28 10s. 9d.) for transmitter and receiver is reasonable by comparison with the Super-Aerotrol price of a little under £18. All R/C equipment is, of course, somewhat more expensive in America than elsewhere and these prices are by no means high in the U.S.A.

The O. & R. "Midjet" Reed-valve Engine

First announced in the American model press some months ago, the Ohlsson & Rice "Midjet 0.049" engine has been eagerly awaited by model engine enthusiasts. One or two quite glowing reports of the engine reached us from the U.S.A. before we managed to get one of these engines from New York, and the most intriguing bit of information of all was the statement that the horse-power output claimed for it by the makers was no less than 0.117 b.h.p.

Now, for a 0.049 cu. in. engine to develop 0.117 b.h.p., the specific output would need to reach 144 b.h.p./litre. Up to the present time, such values have been realised only by highly developed racing engines—



The new O. & R. Midjet .049 engine of .81 c.c. has several unusual features. Shown, centre left, is the reed-valve induction unit detached from the engine, also the fuel tube, wire-wound to prevent kinking. Centre right, the induction unit separated, showing also the rubber choke inserts. Bottom left, the robust crankcase with accessories for separate radial mounting. Bottom right, the fixed head cylinder, ultra-short glowplug and piston assembly with separate big-end bush. Bore and stroke are .413 in. by .370 in. and the engine weighs approximately 2.1 oz., or 1½ oz. without fuel tank.

mostly in the 5-10 c.c. class. Indeed, as the "M.A." Engine Test reports have proved (and, in fact, as can be verified by simple prop./r.p.m. tests against power-absorption curves), the small glowplug engine is, by comparison with its larger brother, or by small diesel standards, relatively "inefficient" and, in the 0.049 class, seldom exceeds half the output figure claimed for the Midjet.

It was, therefore, with rather more than usual interest, that we put the Midjet through its paces. We are almost sorry to say that, while undoubtedly good, the Midjet is *not* phenomenal after all and, based on the performance of our one example, it appears to be no more than the equal of the Cox 0.049. In our case, it was actually inferior to the latter engine. However, let us begin at the beginning.

The Midjet is the first new O. & R. engine for some years and, in most respects, shows marked departures from usual O. & R. practice. One thing remains, however, and that is the non-detachable cylinder-head. In the larger O. & R. units, spot welding was widely employed. In the Midjet the head is turned integrally with the cylinder and no welding is used anywhere in the construction of the engine. All previous O. & R. engines have been either of the straightforward three-port two-stroke cycle type or have had shaft type rotary valves. The Midjet, on the other hand, has an adaption of the reed-valve system, in this case called a feather valve. The engine uses two exhaust ports and two transfer grooves to produce a reverse-flow scavenged cylinder. This is in accordance with the current trend away from full circumferential ports in small engines and can be seen in other half-A units including the new clappper-valve McCoy 0.049 and the recent Super-Tigre G.28 and G.29, as well as the Cox 0.049. However, due to the unique shape of the Midjet's exhaust ports, both the exhaust and the transfer ports are of larger area than in any of these other engines.

Due to the relatively thin, steel cylinder head, a special ultra-short reach O. & R. glowplug, known as the type KS-5, is used. The actual filament cavity is only about 2 mm. deep, compared with 4 mm. for a standard short-reach K.L.G., but it has about 25 per cent. greater bore. Slightly better scavenging of burnt gases from the cavity should result.

The engine is assembled around a very strong pressure die-cast crankcase which includes the main bearing. The one-piece steel cylinder is screwed into this with a soft plastic sealing gasket—quite probably of "Silastic" or similar material—under the cylinder flange. Incidentally, the cylinder is machine finished *inside* and out—possible because the non-detachable cylinder head discourages the usual internal honing operation. The nitralloy steel crankshaft is of a counterbalanced pattern and is relieved in the centre to provide two short journals fore and aft. While, with this arrangement, it is considered possible, in addition to reducing drag, to provide for closer fitting shaft bearings, the Midjet, in fact, appears to have a quite loosely fitted shaft and there was a visible crankcase compression loss through the front of the bearing housing on our test engine.

An unusual piston and conrod assembly is employed featuring a fabricated steel rod and a fully-floating bronze big-end bushing. The little end bearing is confined entirely within the piston but takes the form of a modification of the normal gudgeon pin type rather than a ball-and-socket joint.

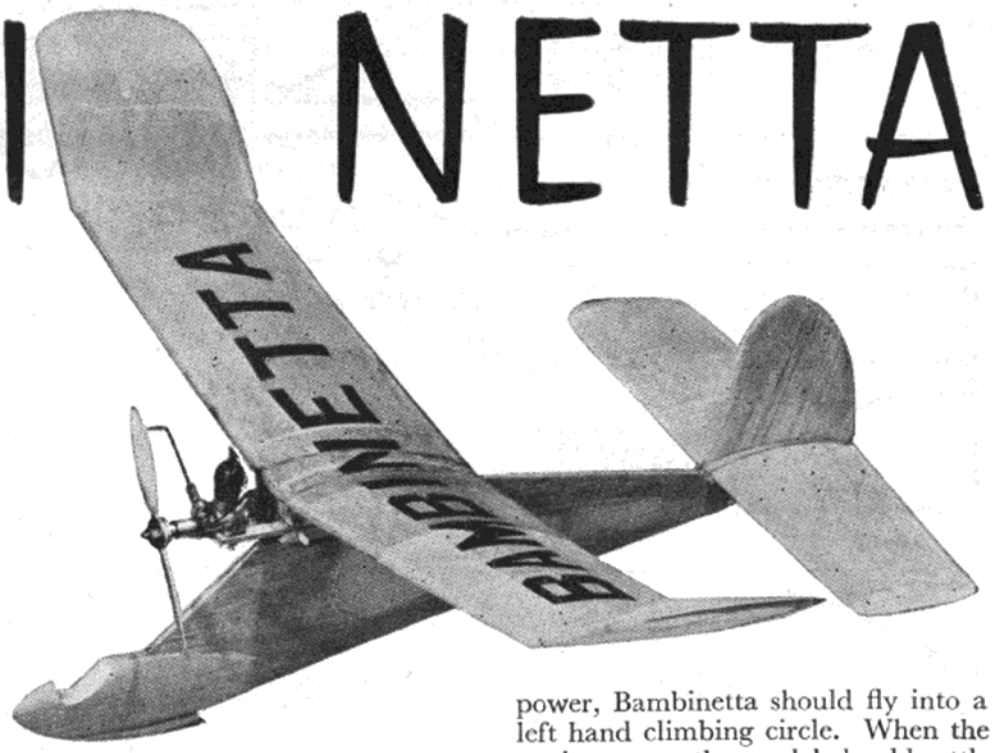
The most interesting feature of the engine is the reed-valve which, on the production model, is somewhat different from the "four-port" valve originally advertised. A general idea of the layout will be gained from reference to the accompanying photographs. Two die-castings are used, mounting the carburettor assembly and reed-valve assembly respectively and, flanged together, these form the engine backplate. The carburettor intake is vertical and opens smoothly into a large diameter chamber just below the spraybar. Synthetic rubber choke tubes of two different bores are provided, for moderate or high-speed operation. The gases are then led into the reed-valve housing,

(*Continued on page* 485)

BAMBINETTA

FULL-SIZE PLANS OF A DIMINUTIVE FREE-FLIGHT JOB FOR THE BAMBI DIESEL

by Ray Malmström



WHEN I lovingly caressed my Bambi diesel for the first time I knew I had to wrap something very special around this minute bundle of power. At the risk of having my head referred to as being rather larger than normal size (!) I think Bambinetta is that "something." An all up weight of less than 2 oz. ensures that your Bambi won't have to tear its heart out hauling Bambinetta aloft, and there is no fear of bending that precious metal prop. on landing.

The fuselage is from medium hard $\frac{1}{8}$ sheet thinned to 3/32 at the rear. Cover the cut-out portion with lightweight Modelspan. Cement in position the $\frac{1}{8}$ ply engine mount supports, and the rear wing mount Add the pod sides, made from $\frac{1}{8}$ sheet, and round off all edges with fine sand-paper. Complete by adding wing pegs, and give two coats of clear dope after water-stretching the tissue. Fuel-proof the engine mount.

The wings need little explanation. Check for correct polyhedral angles and do be sure your wings are free from warps. Water-stretch and give one coat of clear dope. Fuelproof the three centre panels.

Add the tailplane mount to rear of fuselage. The fin is cut from sheet; note the small trim tab. Tailplane is perfectly conventional, and of simple construction. Give fin and tailplane one coat of thin, clear dope.

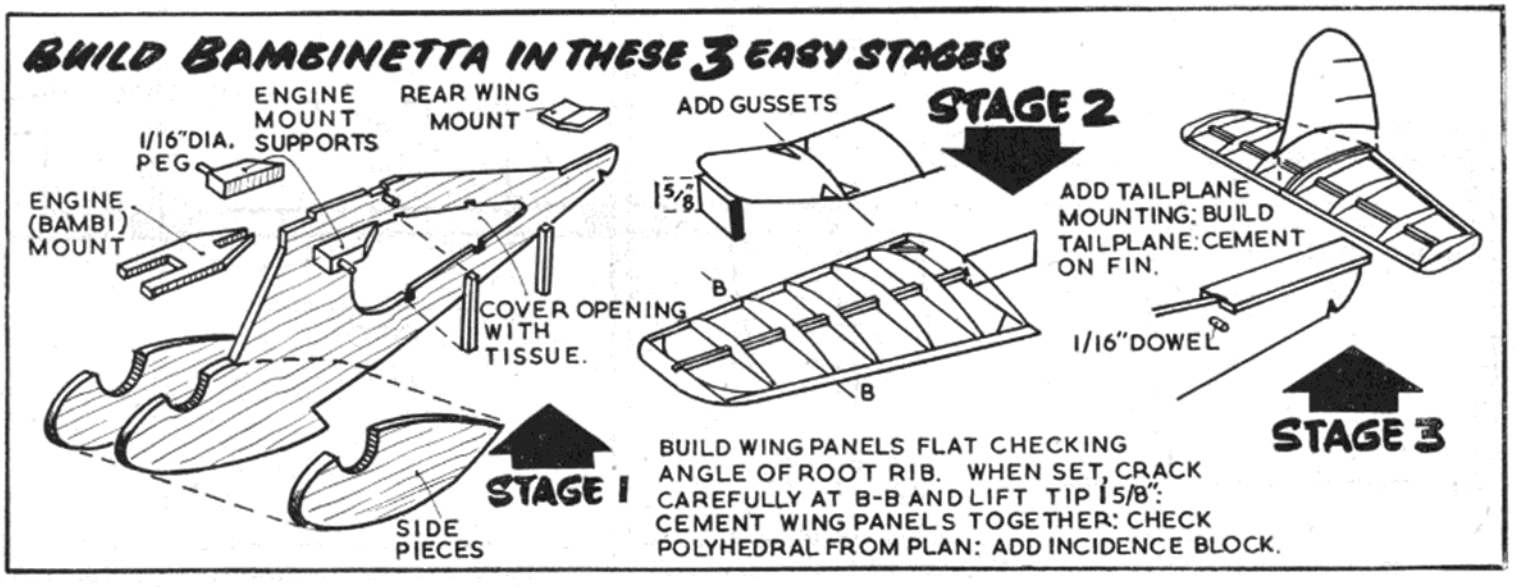
Flying

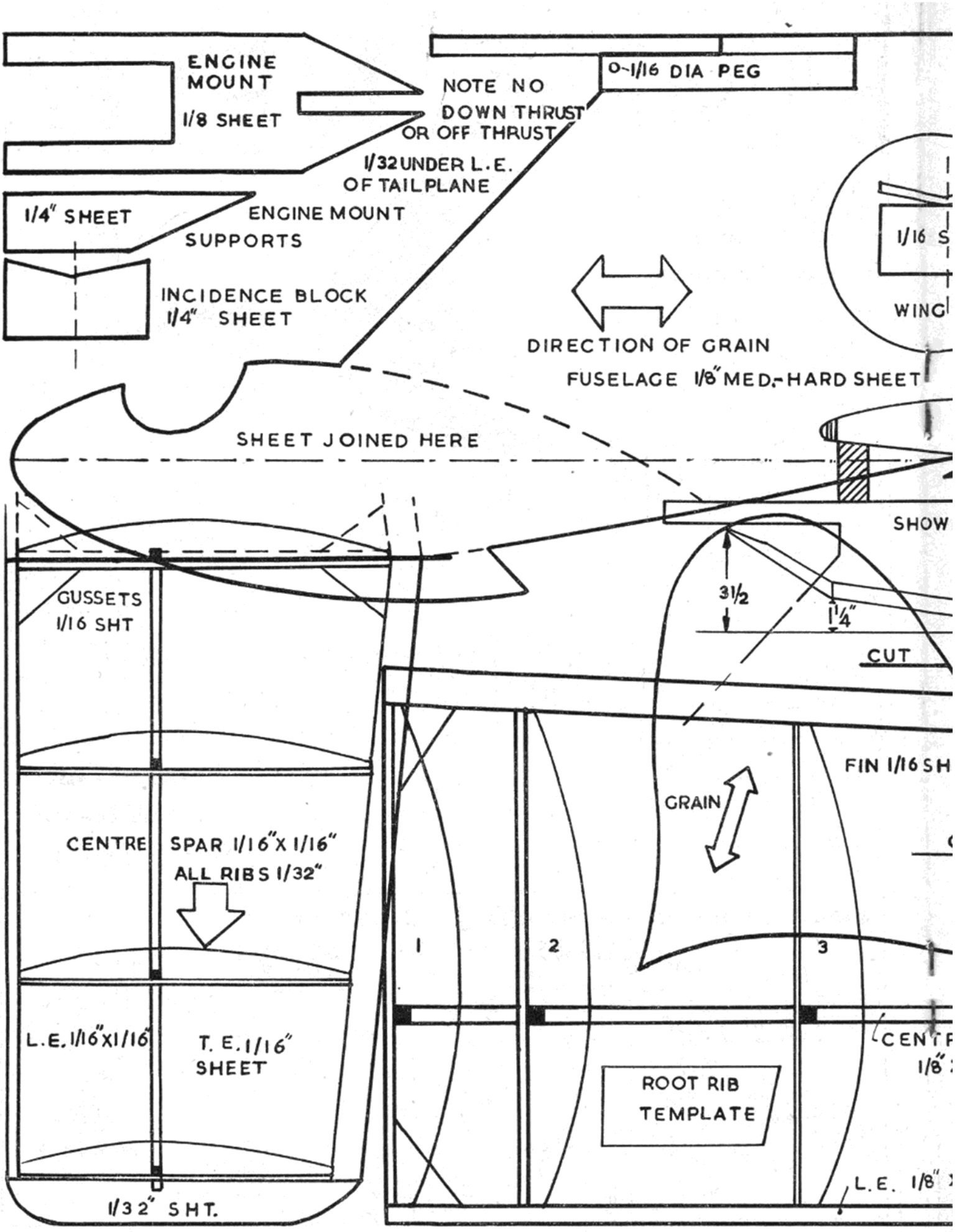
Make sure your balance is correct (see plan); original balanced without any weight adjustment, and has $\frac{1}{8}$ packing under leading edge of tailplane. Test glide over long grass. Obtain a reasonably flat glide, without any suspicion of a stall, or turn to the right. Then with your Bambi giving less than full revs, try your first power-on flight. A gentle climbing turn to the left should result. Avoid a sharp left turn by slightly offsetting the fin. Do make all adjustments gradually. On full power, Bambinetta should fly into a left hand climbing circle. When the engine stops, the model should settle into a flat glide with a wide left-hand circuit. Avoid any tendency to turn to the right, which on this type of model can be very dangerous.

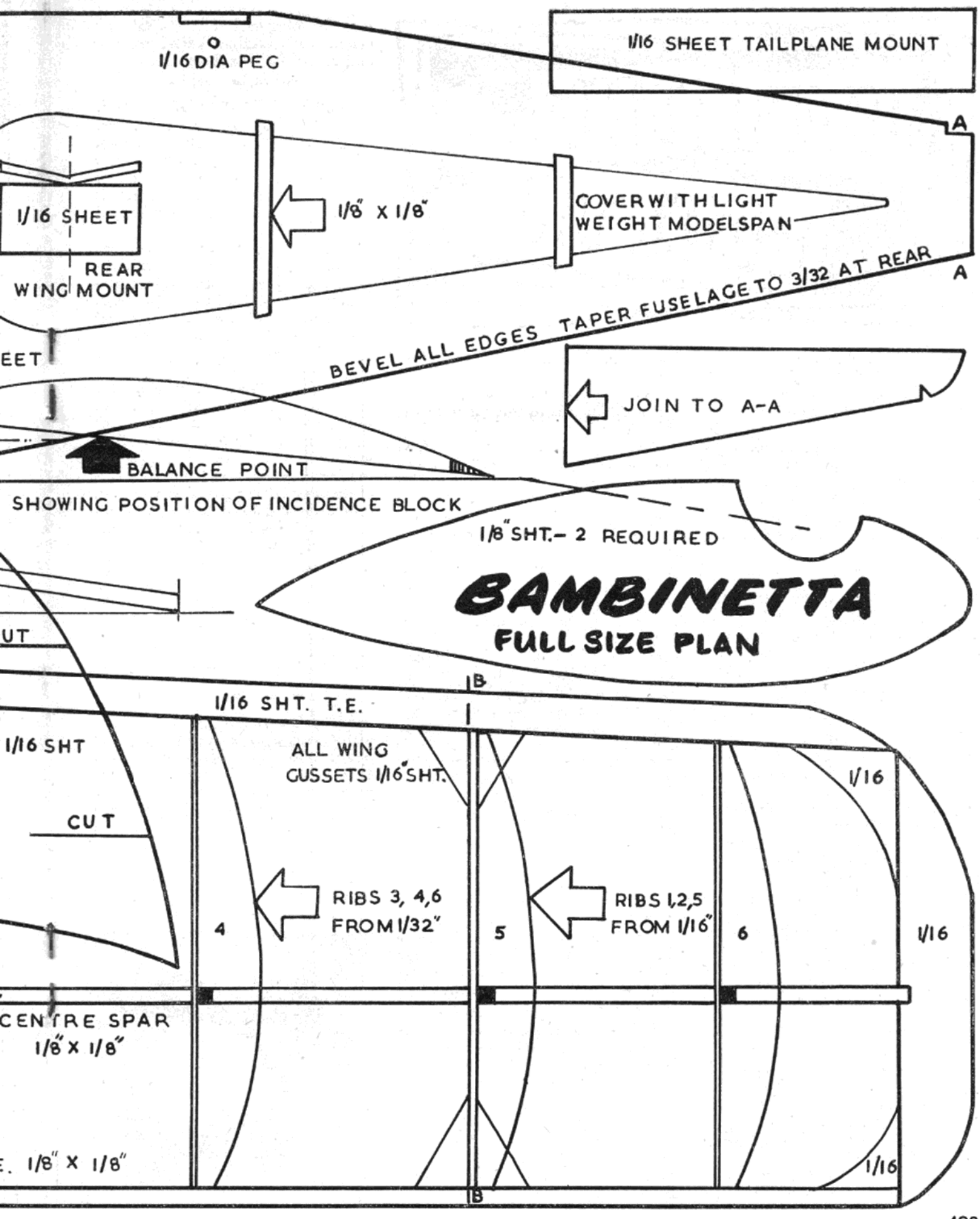
Less than 2 oz. is not much to battle against half a gale so please fly Bambinetta on calm days! It is my hope that Bambi owners will try this little job, as I feel sure they will get a great deal of fun flying it.

I should be delighted to hear from any aerobod who builds Bambinetta. Please write c/o MODEL AIRCRAFT.

FULL-SIZE DRAWINGS OVERLEAF




ENGINE MOUNT
1/8 SHEET
NOTE NO DOWN THRUST OR OFF THRUST
1/32 UNDER L.E. OF TAILPLANE
0-1/16 DIA PEG
1/4" SHEET
ENGINE MOUNT SUPPORTS
INCIDENCE BLOCK 1/4" SHEET
DIRECTION OF GRAIN
FUSELAGE 1/8" MED.-HARD SHEET
SHEET JOINED HERE
GUSSETS 1/16 SHT
CENTRE SPAR 1/16"X 1/16"
ALL RIBS 1/32"
L.E. 1/16"X1/16"
T. E. 1/16" SHEET
1/32" SHT.
3 1/2
1 1/4"
CUT
GRAIN
FIN 1/16 SH
1
2
3
ROOT RIB TEMPLATE
L.E. 1/8"


1/16 DIA PEG
1/16 SHEET TAILPLANE MOUNT
A
1/16 SHEET
REAR WING MOUNT
1/8" X 1/8"
COVER WITH LIGHT WEIGHT MODELSPAN
A
BEVEL ALL EDGES TAPER FUSELAGE TO 3/32 AT REAR
JOIN TO A-A
BALANCE POINT
SHOWING POSITION OF INCIDENCE BLOCK
1/8" SHT.- 2 REQUIRED
BAMBINETTA
FULL SIZE PLAN
B
1/16 SHT. T.E.
1/16 SHT
CUT
ALL WING GUSSETS 1/16" SHT.
1/16
RIBS 3, 4,6 FROM 1/32"
RIBS 1,2,5 FROM 1/16"
4
5
6
1/16
CENTRE SPAR 1/8" X 1/8"
1/8" X 1/8"
1/16
B

OVER THE COUNTER

New from Wilmot Mansour are additions to the 10/6 moulded-fuselage flying scale Jetex models—the Folland *Gnat*, English Electric *P.*1 and the Hawker *Hunter*. The *Gnat* is scheduled to be available by early November, but you may have to be a little more patient for the *P.*1 and *Hunter*. The *P.*1 should be out at about the end of November or early December, with the *Hunter* following very soon.

* * *

The same company are also entering the "solids" market with a range of cut-out, moulded plastic models to be known as "Wimco Hollows." Material is 25 thou. polystyrene sheet, all parts ready formed to final shape. No undercarriage parts will be included, but undercarriage details will be given on the three-view general arrangement drawings. Kits will also include transfers and special polystyrene cement (balsa cement is unsuitable for sticking polystyrene).

Polystyrene has one great advantage over the more common acetate for plastic mouldings: it is far more stable dimensionally and does not tend to warp or "creep." Incidentally, you must not use cellulose dopes or colours on polystyrene as these attack the surface. Finishing must be done with special polystyrene paints or oil-bound lacquers.

* * *

The first scale model aircraft available in prefabricated parts made from polystyrene is a Lincoln Kits *Starfire*—pictured on this page. It is manufactured in Hong Kong using copies of American dies. The 8 in. wingspan model is moulded in silver and comprises highly detailed parts which can be fitted accurately together in a short time, making a convincing model. The price is 3s. 11d.

We are informed that there will be further additions to this range in the New Year.

Also depicted is a 1929 Bentley, one of a series of four "Highway Pioneers" construction kits made by Gowlands. Some two dozen beautifully detailed moulded parts assemble to make the authentic scale Bentley. American dies, used under licence, produce the parts in this country. Other cars in the range are a 1911 Rolls-Royce selling at 6s. 11d., and a 1953 M.G. and Jaguar at 5s. 11d.

In addition to the Gowland range there are available a model T Ford and a Rolls-Royce which retail at 4s. 6d. and 5s. 6d. respectively, packed in polythene with instruction card and complete with polystyrene cement.

The kits are available from model shops and are distributed by Peter Smith of 40a, Parsons Mead, Croydon. The retail prices given do not include the additional purchase tax imposed by the recent Budget.

* * *

Polystyrene cement suitable for assembling kits as those mentioned above is produced by The Humber Oil Co., as part of the Britfix range and by the Celestor Manufacturing Co., who make O-My cements.

* * *

First in the trade to react to the purchase tax increases were Contest Kits who lowered their prices to absorb the higher tax. This reduction was made possible by the installation of new machinery.

* * *

Roadway Models, New Malden, Surrey, send details of the records made with their fuels. The competition glowplug fuel costs 3s. 0d. the comp. and standard diesel 2s. 9d. and 2s. 6d. for 8 oz. bottles.

* * *

Another new kit is available from Davies Charlton, the manufacturers of the well-known Allbon engines. A 20 in. span control-line scale *Chipmunk* designed to take either the Allbon Dart or Merlin diesels is the D.C. choice for their second production kit.

The kit has several novel features, one of which is the inclusion of step-by-step drawings illustrating the construction, instead of the usual plan. A full review of the D.C. *Chipmunk* will be included in a future issue.

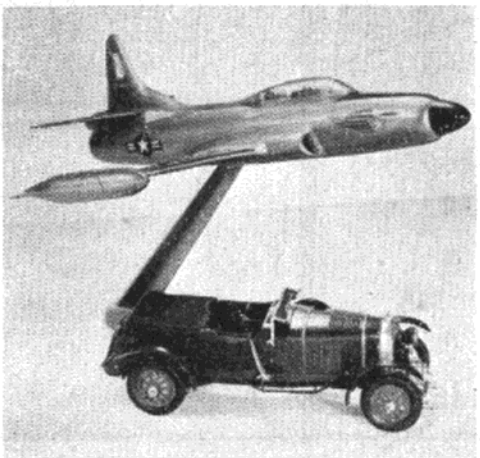
* * *

Model Aircraft (Bournemouth) have just launched a new series of small, easy-to-build semi-scale rubber models in the Truflite range. The first six models now available are the Aeronca *Champion*, Chilton Monoplane, Short *Seamew*, Auster A.O.P. 9, *Bebe Jodel* and Comper *Swift*. Construction is conventional with built-up, tissue covered fuselages and wings, but special features are the first class strip quality (which really *is* outstanding) and the plastic propeller.

Another Veron kit due to appear on the British market in November is the *Combateer* (see facing page).

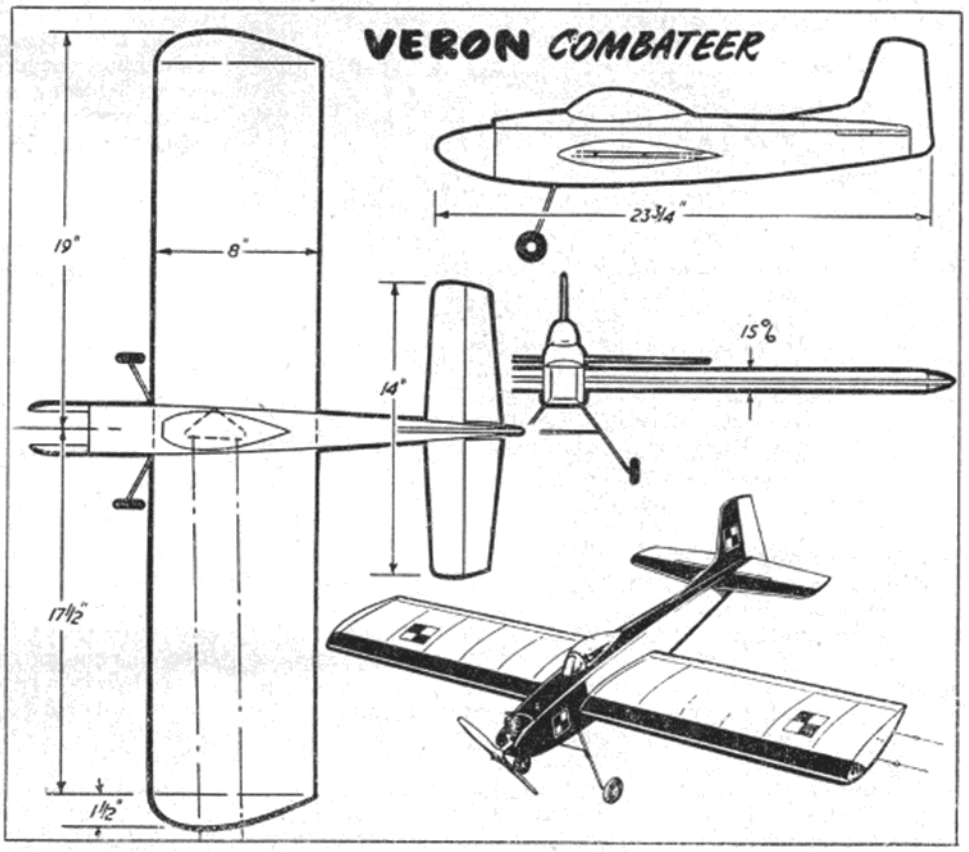
* * *

First Skyrova solid to appear for many years is to be the ever-popular *Spitfire* to a scale of $\frac{3}{16}$ in. to the foot. Considerable pains have been taken to ensure authentic reproduction of the Mark II and Mark V versions—the Battle of Britain *Spitfire* and the main fighter strength of the 1941-42 war period. Plans include full size five-view drawings and step-by-step illustrated building instructions.



OVER THE COUNTER KIT REVIEW

The Veron COMBATEER



PRIMARILY the Combateer was designed for the Australian market and, in fact, the first three months' production of these kits went overseas. It has quite recently been released for home sales.

The original specification called for a simple, rugged, box-like control-liner, easy to build yet fully aerobatic and capable of taking a wide range of motors from 2 to 5 c.c. Designer Phil Smith seems to have met all these points adequately and at the same time come up with an outline shape which is quite pleasing, rather than "utility," in appearance. We are also quite prepared to believe (although we have not been able to complete and check out the test model in time) that the Combateer should be fully aerobatic on a 3.5 c.c. engine and a positive speedster on a "five."

The design is quite conventional stunt model practice, with a fairly generous tail moment to give smooth manoeuvres and, particularly, for maximum stability on low power. It is symmetrical in line-up with an upright engine mounting, although details for "sidewinder" installation are given on the plan. A fixed undercarriage is fitted with rather small diameter wheels. The wing is counter-balanced with an internal weight near the starboard tip and the section is 15 per cent. symmetrical.

The box fuselage construction demands marking out the sides on to ⅛ in. sheet cementing on bottom $\frac{3}{16}$ sq. longerons, building up the motor bearer assembly and then assembling the sides on this and the two other fuselage formers. The wing is built as a flat one-piece unit with die-cut ribs, shaped trailing edges and V section leading edge stock (a good solution for a near-finished section on symmetrical wings). After sheeting the centre section, installing the control plate and fitting the lead-out wires, the wing is passed through the fuselage and cemented in place. The sheet tail unit is then fitted, control wire hooked up and fuselage top and bottom decking fitted. The whole job takes very little time to finish to this stage and is extremely rigid.

Kit contents are comprehensive (except dopes and cement). The lightweight 1½ in. dia. wheels could have been bigger and heavier for the size of model, but it is nice to see good quality wheels in a kit these days. Tyres are soft rubber with moulded plastic hubs—just the sort we have been looking for for a long time for our F/F models!

The clear bubble canopy is a deep drawing in 0.020 in. acetate sheet and simply demands that a "pilot" be cemented on to the decking under it. For more realism we are in favour of cutting away a definite cockpit area under the hood—something which could readily be done. The fully shaped top decking piece is ¾ in. thick and could well take this simple modification.

All tail parts are cut to outline shape and merely require tapering and rounding of the edges. Tailplane and elevators are cut in one piece, which is a little annoying since the two elevators have to be cut off and trimmed to mount on the obeche torque rod. But on the whole you will find this a model which you can quickly get to the flying stage, so that any of those spare 2 to 5 c.c. motors can be put into service again. A little more prefabrication would have made this a "luxury" kit in the straightforward class, but you will undoubtedly be impressed both by the quality of the wood and the cleanness of all the cut parts.

ACCENT ON POWER

(*Continued from page* 480)

where they are divided to pass through upper and lower port segments. The reed itself consists of a 0.002 in. spring steel disc riveted across the horizontal centre-line so as to cover the above mentioned ports when closed. A suitably shaped steel backing ring limits the amplitude of the reed movement.

In general, the engine is of pleasing appearance. A large capacity die-cast fuel tank, suitable for general C/L work is provided, by which the engine can be bulkhead mounted. Alternatively, the bare engine can be radially mounted *via* special mounting brackets provided or it can be beam mounted.

We found the Midjet reasonably easy to start and particularly so when hot. Like all reed valve engines, it will, of course, run in either direction. Due to the generous porting, the potential "free" r.p.m. are very high and on a small fan brake we had the engine running smoothly at 20,000 r.p.m. Speeds on the usual 6 × 3 size propellers were round 13,000 revolutions per minute.

As we have already pointed out, we are bound to regard the reported output claim of 0.117 b.h.p. as decidedly optimistic and quite outside the capabilities of this or any other 0.049 cu. in. glowplug engine at the present time. However, it seems probable, after examining the design of the engine, that our particular example was sub-standard in the performance department and that the output of a tolerably good example would, in fact, be in line with the figures now realised with the better 0.049 class engines.

Topical Twists

Though, gentle Reader, I may unbend
And best of seasonal wishes send,
Your ribald reply will come e'en faster
Than that which met the workhouse master,
Yet may your dimmer airfield antic,
And your club reporting frantic,
Enrich this column, all bolonius,
As a New Year Gift to old Pylonius.

Gently with the Gentry

Modellers with a particular bent for pranging Bentleys, and even less noble breeds of horseless carriage, are asked to resist the wild temptation of flinging their fragile craft against the solid, metal flanks of the parked flivver. Apparently, the car bashing sport has reached such orgiastic proportions that the Bentley owner has serious misgivings about continuing to enhance the flying field scene with the presence of his dignified carriage.

Honoured by this glittering mid-field ornamentation, at least the scruffy boys should have the decency to keep their vicious toy aeroplanes under control or fly them in some other part of the field. If only they had the good sense to take their toys over to the far corner everyone would be happy. Probably the scruffy boys would enjoy the added delight of a spot of tree climbing.

Seemingly, the Bentley bending situation reached something of a crisis at the recent All Britain Car Owners' Festival, where certain stubborn model flying types had the audacity to protest at being pushed downwind by the parking demands of the car-borne gentry. This childish rebelliousness can only be regarded as showing a lack of proper respect to elders and betters, and we can only hope that this infantile petulance is not carried to a point where the scruffy boys refuse to demonstrate their toys for the edification of the windscreen sheltered elite. Such a situation would be disastrous. Without the odd Bentley on the flying field life would become a very grim prospect for the average club member. What would he find to talk about?

A Grim-sby Outlook

Our friend, Eric Fearnley, seems to think that he has at last succeeded in unmasking me. I might warn him, though, that in the past many have vainly tried to unmask me—only to find it is my natural face.

Perhaps one day I shall visit Grimsby—who knows what vicissitudes life has in store for us? If I do, I shall most certainly call in upon the Toy Maker in Chief, and also upon the Toy Shop Proprietor, whom, it is alleged, awaits my coming with a handy piece of 4 in. × 3 in. hardish balsa. Well, to whom else but a functional prop. carver could he dispose of such stock? I would be only too willing to receive such a useful gift.

All-in Flying

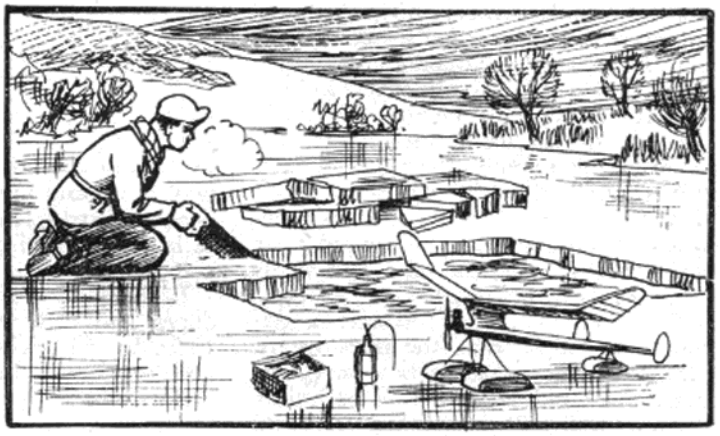
The vast crowds at the All Everything Rally at Radlett indicated a welcome revival in model flying interest. It was, perhaps, a blessing that this didn't coincide with a revival in model flying as already launching space was strictly limited to v.t.o. A situation which in no way deterred the C/L demonstrators, who scythed out their circular patterns amid cries of anguish from the stampeding crowds. And, speaking of cries of anguish, the authorities have at last taken action on the incessant appeals to mind the lines by throwing up a high wire fence along the railway.

With so many odd and unusual craft cluttering the air, the freak specialist found competition somewhat stiff. Though few ducted fans appeared among the risible (but hardly risable) brainchilds, the larger species of delta, or infernal triangle, had quite a field-day, putting even the most nimble footed spectator on his mettle.

Not that you can blame the exhibitionist type for giving the crowd such a hot time. Boggled at with awe and wonder by the yokels on the local common, the super model is carried triumphantly to Radlett for its national debut, but only to meet with the cool indifference of the freak glutted populace. It was chilling to hear his bitter, ironical laughter as the crowds dived for safety.

We were impressed with the sinking speed tests carried out in the seaplane tank. The test models sported a weird array of appendages, optimistically referred to as floats. One buoyant character even had ping pong balls dangling on his tailplane—but the aquatic antics of the model suggested that the remainder of the table tennis outfit might have come in useful—particularly the net.

Detracting from the dignity of the prize giving ceremony—possibly the longest on record—was the shuddering impact of the toys-for-boys title of "Cement Squeezers" emblazoned across the manly chests of the St. Albans dignitaries. Apart from anything else, there is the danger, in these days of monopoly scares, it might be misconstrued by airfield constructors. We can only hope that those few civil servants in our midst bring their influence to bear—in which case we can look forward to a future change to the St. Albans Acetate Adhesive Capsule Compressors.



Half a Moment

Even the long-fuselage experts have now abandoned their elongated nightmares in favour of the more compact and conventional design, and find that the shorter model stays up longer, if you see what I mean.

This seems to suggest that all this lengthy fuselage controversy has been just a lot of fuzz about nothing.

Pass the Sugar

One club, I note, refers to itself as multilateral. Now, although I don't know what this means, at least it's nice to know we have a few civil servants in our midst.

I am asked to state that, in spite of its name, the newly formed Sandiacre Club has no connection with Chobham Common. London clubs, we hope, will be the first to offer their congratulations.

We read of a power model described as a "threat at any contest." Where's that tin hat?

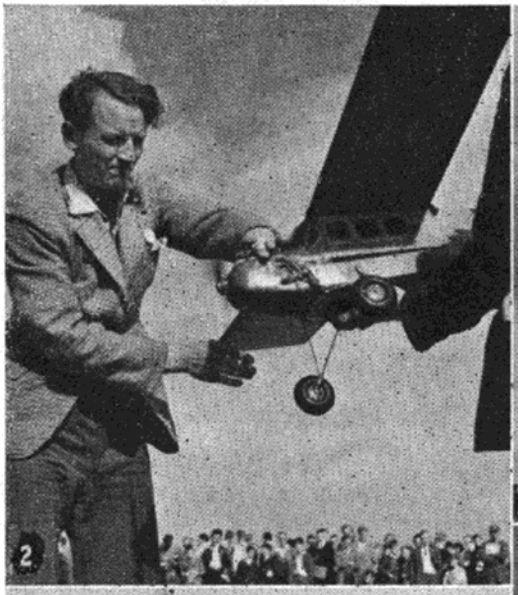
Pylonius

ALL-BRITAIN RALLY

held at Radlett Aerodrome, Herts.

The All-Britain Rally now has an uncomfortably close affinity to its title—spectators, modellers, and personalities were on the airfield in their thousands. St. Albans Club, who, of course, organise the rally, estimated the attendance as 20,000, a two thousand increase over last year.

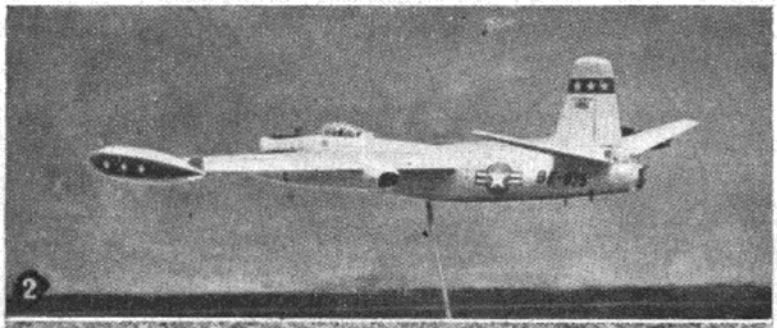
With such a vast crowd to entertain—and the accent is on spectator appeal—the organisers laid on almost every conceivable type of attraction, including the Cheltenham M.A.C.'s carrier. While the carrier drew a respectable crowd, the spectators, on the whole, remained ever faithful to the radio, team racing, and control line scale activities !



1. Miss Carol Carr, herself a model aircraft collector, casts an envious eye on Briggs' "Lincoln" !
2. W. Garner, starts his radio job, but model eventually was o.o.s. over the railway.
3. Roy Nicole launches for Laurie Barr in the glider event.
4. Ray Malmstrom ponders over his "Middy"—an experimental float-plane.
5. The crew of the Cheltenham carrier—a comparative novelty—at "action stations."
6. Derek Allen and his mechanic John Taylor of Boreham Wood club, with their Oliver Tiger-powered T/R model.
7. G. L. Roberts of Lincoln launches in the seaplane power event.
8. Bob Thorogood prepares for the third round in the open rubber, to score three max's.

PHOTONEWS

IMBUED with the Christmas spirit (abstract, not liquid) we just couldn't resist including the heading picture in Photonews. It shows Father Christmas himself just about to set off to visit all you good—and bad—modellers, wherever you may be, and by two forms of transport too. (We're still a little doubtful about the D.C.3 though.) But if you don't personally see the old boy, then you can assume the reindeer just couldn't make the distance. Incidentally, he is an authentic Father Christmas, so, all you dads, take off those itching beards.



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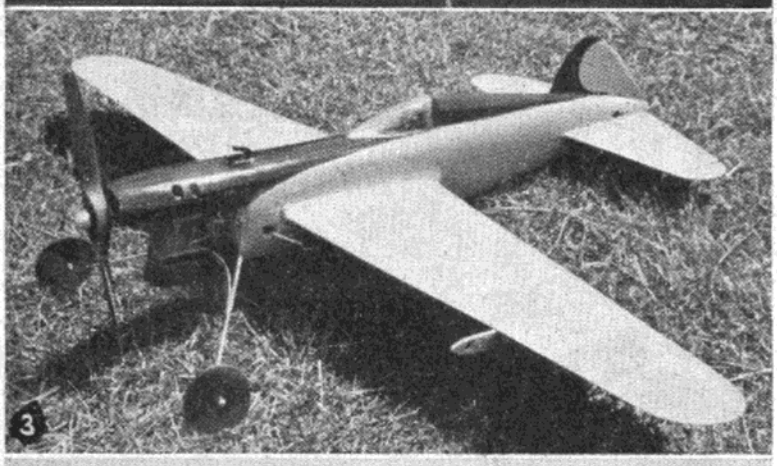

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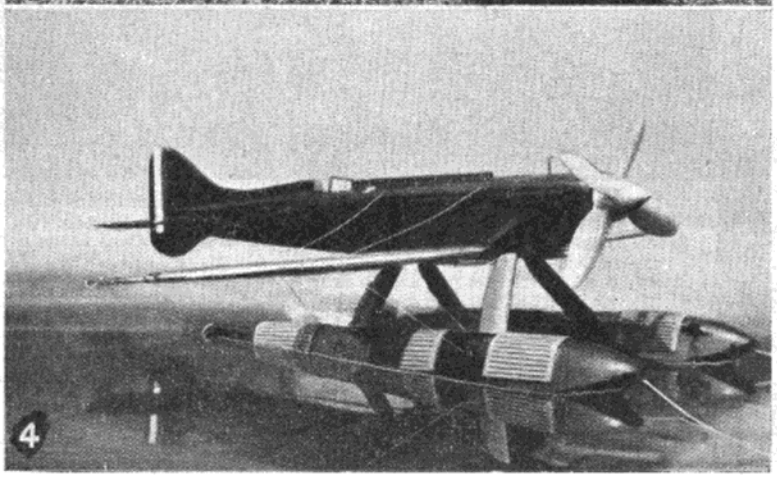


4

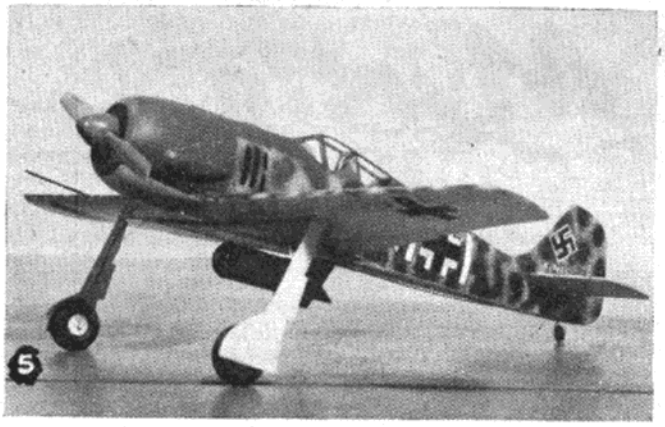
A 1/72 scale model of a North American B.45C *Tornado* based at Sculthorpe, Norfolk, can be seen in photo **No. 2.** Complete with detailed cockpit and pilots, this model was built by John Ling of Chessington, Surrey, and photographed by J. Francis.

Photo **No. 3** shows a class B team race model built and designed by Ron Masterman of the West Hants A.A. Power comes from an Eta 29 and the model has an all sheet covering, with solid wings. The location of c.g. and bellcrank is as speed practice. We are told that the model handles very well and, although not contest flown as yet, is expected to give a fair account of itself.

Built from our feature in the March 1951 issue on the full size aircraft is the Macchi-Castoldi M.C.72 C/L model in photo **No. 4.** The scale is $\frac{3}{4}$ in. to 1 ft. which gives a wing span of just over 23 in. The only parts of the model to deviate from the prototype are the propellers which both turn in the same direction. The model is powered by an E.D. Bee and the all up weight is 15 oz. The designer and builder is Richard G. Halfpenny of Littlehampton.

The Focke-Wulf 190 A3 model in photo **No. 5** was built from a Veron kit by D.R. Platt of Ilford, who has spent many hours at the Imperial War Museum in the quest for information on the cockpit details. The authentic camouflage in grey and olive drab was, we are told, applied with a Celspray. The model is powered by an E.D. 2.46.

The interesting and unusual outfit shown in photo **No. 6** is a flight trainer which was built by B. Hartshorn of Melbourne, Australia, for his nephew's Christmas present. The semi-scale biplane is fitted with a Frog Tornado electric motor which is con-



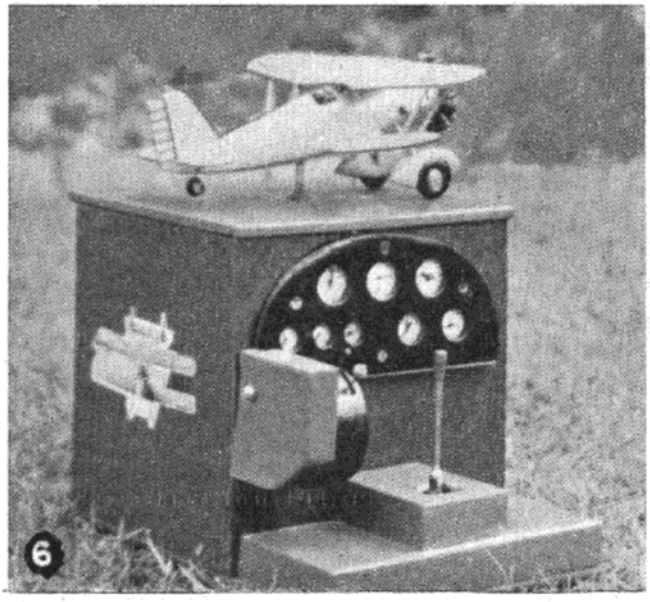
trolled by the throttle, *via* a rheostat, from tick-over revs. to a healthy throb. The stick operates a reversing motor that raises or lowers the model through about 8 in. All the instruments on the dashboard, which include tachometer, altimeter, turn and bank indicator and oil temp. gauge, work in relation to the controls.

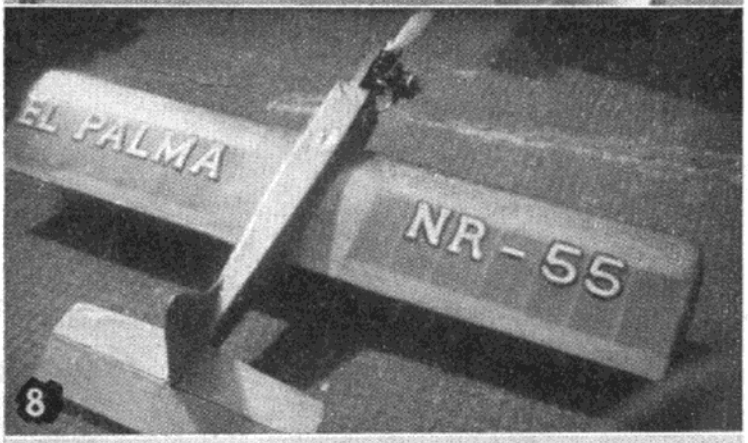
Judging by the number of photographs of models we receive from Colin Read of the Newport Pagnell M.F.C., he must have a large spare room in his house to store them all. The latest photograph, **No. 7,** from Colin is of his *Ah Trax Yah*, a 65 in. pylon model based on an American design. The colour scheme is orange fuselage and fin with white wing and tail. Construction is fully geodetic and a BB Amco 3.5 turns the prop.

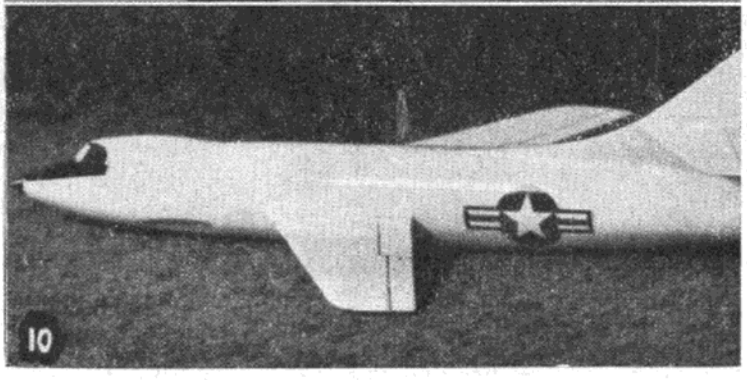
El Palma is the name of the stunt model in photo **No. 8** and 14-year-old Noel Robinson is the designer and constructor. Noel tells us that his model's speed is 45-50 m.p.h. on 45 ft. lines, powered by an E.D. 2.46 driving an 8 × 6 prop. The model spans 35 in. and weighs 18 oz.

When S/Ldr. Eric Cable paid a short return visit to Malta recently he visited the Sliema Model Areo Club and in photograph **No. 9** he can be seen with J. Anastasi, the chairman (left), and G. M. Curmi, P.R.O. (right), with their R/C models.

The Jetex *Skyrocket* in our final photograph this month was built by J. R. Campbell of Barkham, Wokingham, for display only in his local model shop, so, if you are ever in that district, you can take a look at the actual model !







The Story of Myrtle

by P. Sayers

THIS is the story of the biggest discovery that ever hit aeromodelling, but it went wrong, so you never heard of it. Even now you probably won't believe it. It's too incredible.

The first we knew about it was when Weevil Smith announced in a carefully worded minute to the secretary that at the next club meeting he would deliver a lecture on one of his new inventions, code-named Myrtle.

It was the "code-named Myrtle" bit that had us guessing. Weevil Smith is the Club Genius; his inventions range over the whole field of aeromodelling, and his lectures on the latest devices were by then an established part of club activity. None of them were ever the slightest use, but his presentation of them was often hilarious. There was the clip-on undercart, for instance, which clipped itself on to his hand by mistake and had to be sawn off with a hacksaw: and the method of achieving a 50 per cent. economy in the use of dope by warming it over a blowlamp. The Fire Brigade were very annoyed about that one, and it was several weeks before we got another clubroom. But he had never resorted to code-names before, so he had a pretty good audience on the night.

Weevil began by explaining that this invention was so important to the future of the hobby that he had taken the precaution of code-naming it for the sake of secrecy. The spies employed by the experts, he alleged, with a meaning glance at the Club Expert, should not be allowed to monopolise it and so on and so on. When he had tested our patience almost to breaking point, he came to the crux of the matter.

"I have invented," said Weevil, "a substitute for rubber."

There was a hush in the room broken only by the squeaking of the Club Expert's chair as he dragged himself to his feet. He was visibly moved. "Do you mean to stand there," he began, "and attempt to stand there and . . . ." He paused, on the brink of incoherence. "*Substitute*!" he said, as though the word made him want to vomit. "*Substitute*! For rubber! What possible substitute *could* there be for rubber?"

Weevil was unabashed. "The substitute I have invented is approximately twice as good as rubber as an accumulator of energy," he went on smoothly, in dead silence. "That means, for instance, that if you had a Myrtle motor you could use twice as many turns as on a rubber motor of the same size—and get the same horsepower at the propeller at corresponding points on the motor run. I haven't gone thoroughly into the mathematics of it,"—here he coughed modestly—"but I should think that since a Myrtle-motored model will have twice the power-weight ratio of an otherwise identical rubber-motored model, without any increase in weight the performance. . . ."

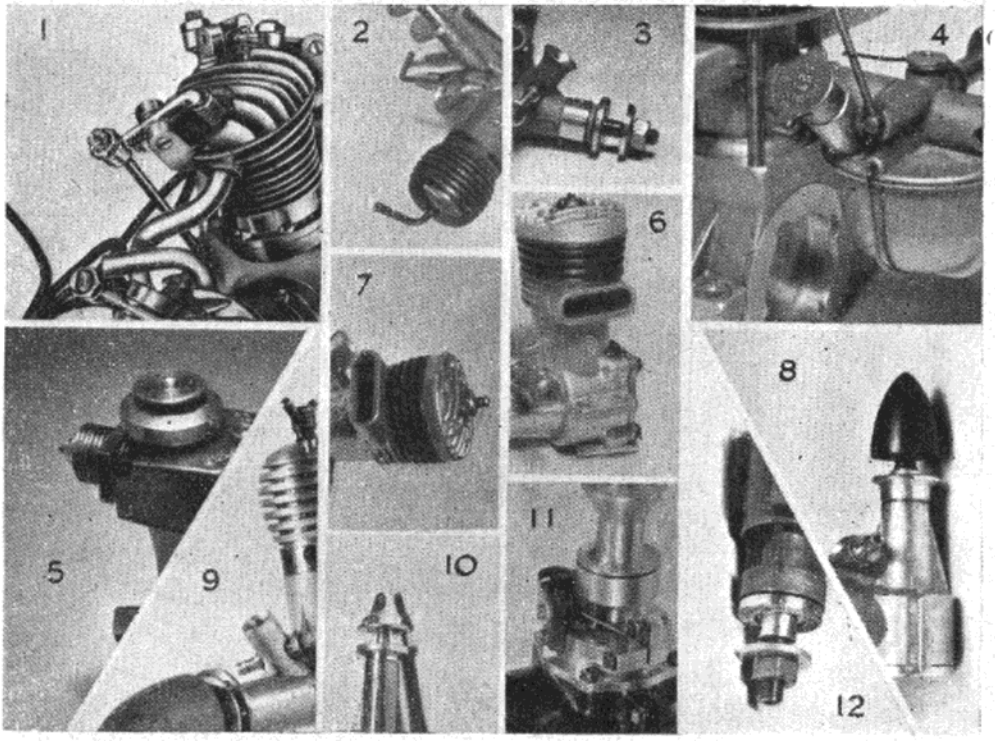
Uproar drowned his next few sentences. The Club Expert is no mean performer when it comes to bawling the odds—one school thinks the volume of his head may have something to do with it—and eventually he restored order by the simple but effective means of shouting everybody down. He then glowered sternly at Weevil. "The formula," he barked. "Let us have the formula, Weevil!"

"No," said Weevil. Uproar again, and this time not even the stentorian bellowing of the Expert could bring silence for a full four minutes. The debate that followed was intense and heated. After a while two distinct opinions emerged. On the one hand there was a body whose view it was that Weevil should be forced to part with the secret of Myrtle by fixing a winder in his nose and applying 800 turns. The opposing faction vociferously contested this, and felt that Weevil could best be persuaded to talk by fixing a winder in his ears and applying a thousand turns. The debate was wandering off into an argument about the different moduli of elasticity of ears compared with noses when Weevil, his voice rising like the wail of a banshee, at last made himself heard.

"I want us to win the Farrow Shield!" he shrieked.

The debate then dwindled into low murmurs. Weevil put his head in his hands, and the members broke away into groups, muttering to each other in low tones. Occasionally the words "Birmingham," "Croydon" and "Leeds" could be heard softly spoken, and gradually the members left their groups in ones and twos and came to sit near Weevil, with shy smiles on their ugly faces. Weevil had won, and he knew it. The contract that was made left him in full charge of Myrtle manufacture, and

Do you know your engines?



If you can identify these engines (which have all appeared in MODEL AIRCRAFT) send the answer in a sealed envelope marked "Know your engine," to MODEL AIRCRAFT, 19-20, Noel Street, London, W.1. The sender of the first correct solution opened will receive a year's subscription to MODEL AIRCRAFT.

The entries must be posted to reach this office not later than November 30th, 1955.

the Club Expert was to produce the first Myrtle-powered design; having test-flown the bugs out of it, he was to turn it over to the club for general duplication, on the understanding that all who made one were honour-bound to enter the Farrow.

I well remember how cock-a-hoop we were in those early days. We all turned out in November, on a bright, still frosty day, to watch the Expert trim the prototype Myrtle-powered model. When he worked up to the high turns, higher and higher, the job began to climb like a shell. I still get a catch in my throat when I think of it. None of us was really worried when, at the top of the climb on the second full-turns flight, heavens high, the wing folded. The job came tumbling and rolling and spinning down out of the sky like an eagle killed on the wing. "Damn funny," said the Expert. "Go and get the wing halves, somebody."

"Must have boobed," said the Expert when he saw the wings. "I've used the wrong balsa. This is just pith. Didn't know I had any so soft." He looked very worried, and we were all rather pleased when his cloth cap began to slip down over his ears.

At the next club meeting the Expert seemed strangely prepossessed. When asked about the progress of the replacement prototype, he exhibited a reserve that was completely alien to him. We heard nothing from him during the next week, and for the following club meeting he arrived late.

But the change in his demeanour was marked. "Where," he asked in thunderous tones, "where is that clod Weevil?" He was angry, hurt, offended; a man who finds himself the victim of a trick. He strode about the room snorting and treating us to a very full and up-to-date appreciation of Weevil as he saw him. He was in full spate when Weevil entered. Weevil looked ill. He put out a hand before him as if to ward off the fury of the Expert's invective.

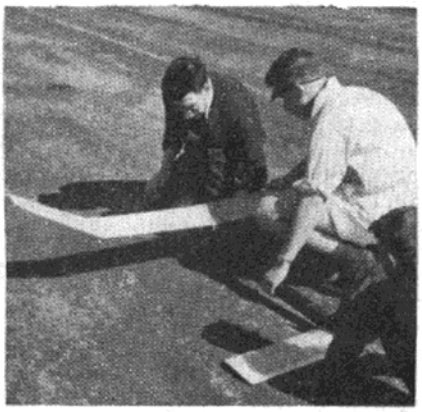
"Don't," he said. "I know . . . it decomposes balsa. How it does it. . . . I've been trying to find a way to stop it but. . . ." The Expert's trumpeting cut him short. "It's rotted every blasted model I've got!" he roared. "Five models, all in trim, and every one rotted, rotted—like so many . . . like so many . . . socks," he finished weakly.

There it was. I told you at the start that it went wrong. The Expert couldn't really blame Weevil, of course. We found later that he'd browbeaten Weevil into letting him have enough Myrtle to re-equip *all* his models, when the rest of us were to be kept to just enough for the Farrow. Served him right that it rotted the lot. Weevil keeps on experimenting to find a type of Myrtle that doesn't decompose balsa, and the Expert has produced a Myrtle-powered hardwood model with a rather lower-than-average performance. And, of course, Croydon won the Farrow after all and Leeds were second. But neither of them knew how close they were to defeat.

Christmas Model Quiz

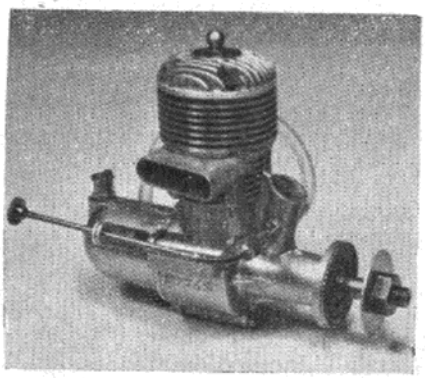
Test your knowledge of model aircraft matters with this interesting quiz. Score 10 points of each complete answer. For two-, three- or four-part questions, score as noted. A total of 50-60 points is good; 70-80 is good, very good; over 80, excellent.
Answers are on page 494.

1. (a) This F/F modeller adjusting his engine at the 1955 Nationals is:
(i) R. Monks; (iii) R. Ward;
(ii) G. Fuller; (iv) I. Lucas.
(b) The event in which he was flying was:
(i) Open Power; (iii) Cargo-Clipper;
(ii) International Power; (iv) PAA-Load.
(5 points each question)



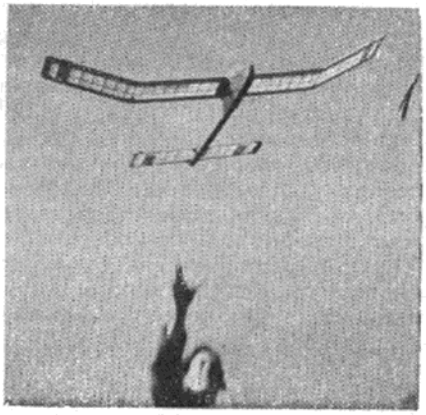
2. Wakefield Special:
(a) When was the last occasion on which the Wakefield Trophy was won by a proxy-flown model?
(b) What was the name of the winner?
(5 points each question)

3. There should be no difficulty in identifying this as a Frog engine built by International Model Aircraft Ltd. Do you know how the name FROG originated and what it originally stood for?



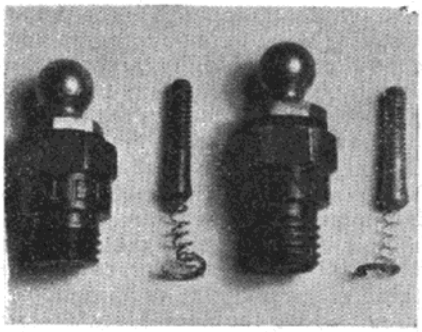
4. Steelwire of 16 S.W.G. is a favourite gauge for rubber model prop shafts. The decimal equivalent of this gauge is:
(a) 0.060 in. (c) 0.064 in.
(b) 0.062 in. (d) 0.066 in.

5. Who designed the following well-known models:
(a) *Civvy-Boy*; (c) *Banshee*;
(b) *Radio Queen*; (d) *Nordic Faun?*
(2½ points each question)



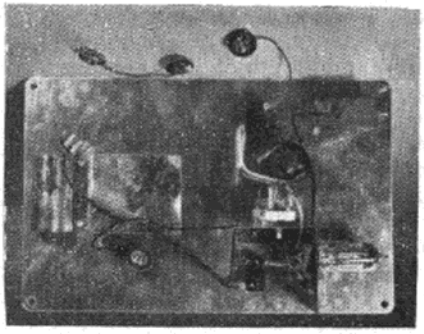
6. This glider, to Nordic A2 specification, was formerly a popular kit design. Name:
(a) the model,
(b) its designer.
(5 points each question)

7. (a) What is the chemical name for essence of mirbane?
(b) What would you use it with?
(5 points each question)



8. (a) What make of glowplug are these?
(b) What is the advantage, besides lower replacement cost, in having detachable elements?
(5 points each question)

9. (a) In what year was the first contest for R/C model aircraft?
(b) Where, or on what occasion, was it held?
(5 points each question)



10. Can you name this popular R/C unit from this inside view?

MODEL AERODYNAMICS No. 12

The most misunderstood subject in model aircraft design is spiral stability—its causes and how to avoid such troubles on a new design. The *effect* is all too clear—models go into a tight bank followed by the nose dropping, a tighter and tighter turn with the nose going down still further, ending in a spiral dive.

To be spirally stable, a model must first of all be directionally stable in the static sense. That implies that the side areas are so balanced that there is a " weathercock " effect present—the neutral point or centre of the side areas coming behind the c. of g. Fig. 1.

The *cause* of spiral instability is a yaw or sideslip, either of which effects may be present when a model is made to bank. On powered models, too, propeller action also tends to produce yawing and banking (which leads to sideslipping) as a part of the torque reaction. Spiral instability troubles, therefore, are more likely to show up on powered models than on gliders, which is proven by practice.

The main *effects* produced by yawing and sideslipping are four in number, two of them stable or " desirable " reactions, and two unstable or " undesirable." The designer aims to balance the desirable effects against the unstable ones, with a positive margin on the side of stability.

The first desirable effect is a positive, and marked, damping in yaw. Fig. 2. This means a good resistance on the part of the aeroplane to being displaced about the yawing axis. Factors which contribute to this are large side areas (more sluggish as regards displacement); a long fuselage and/or a large fin area.

The second desirable effect is a rolling motion produced in a sideslip opposing the direction of slip, i.e., rolling the aeroplane away from the direction of sideslip. This is a normal function of dihedral and ample dihedral ensures this desirable roll reaction. Fig. 3.

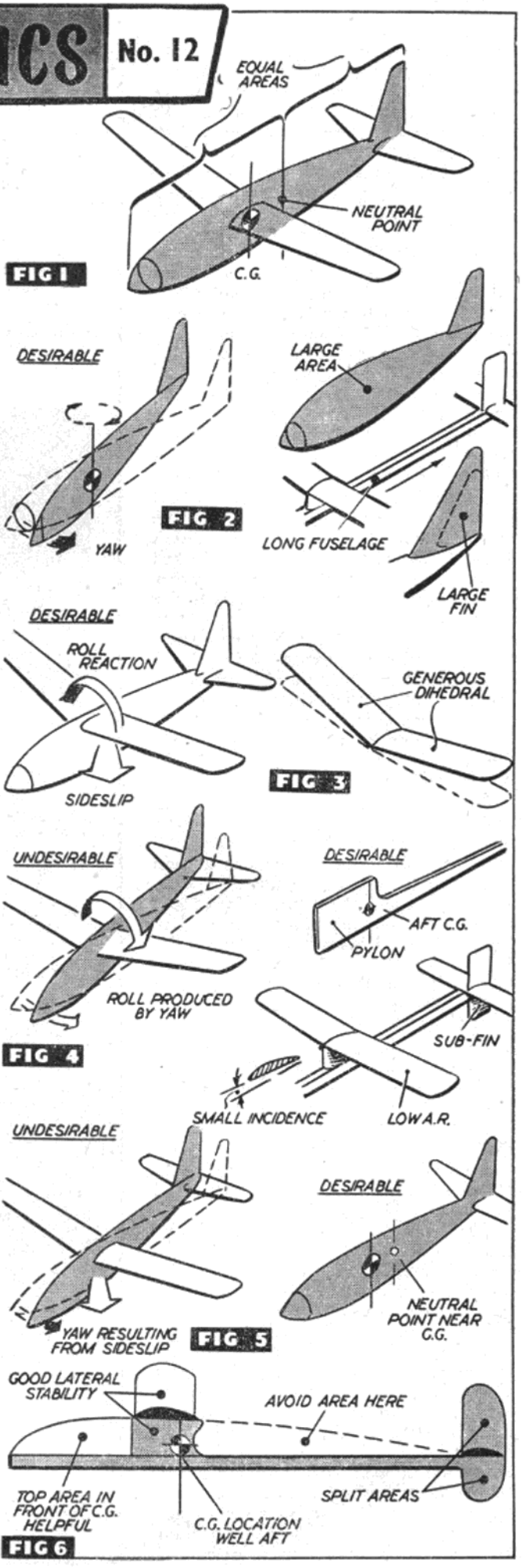
A yawing motion itself, however, will also tend to induce a roll in the opposite or " unstable " direction. Fig. 4. This rolling reaction is directly dependent on the rate of yaw—low yaw damping letting this effect become most marked. The design features which act *against* such an effect are pylon mounting for the wing, low aspect ratio wing, a sub-fin and/or tailplane anhedral, and a low wing incidence. Vertical areas behind and above the wing all tend to aggravate this roll effect in yaw. Pylon area is only really effective if the major part of the pylon is in front of the centre of gravity.

The other undesirable feature is a yawing motion produced by sideslipping (as well as the desirable roll reaction provided by dihedral). The greater the " weathercock " stability, or the farther aft the neutral point, the greater this effect will be. Fig. 5.

Some of these design requirements, it will be seen, are contradictory. A big fin gives desirable damping in yaw, but may well lead to a yaw developing from a sideslip. Large dihedral angles may seem a certain cure as regards making sure that the ultimate roll reaction resulting from Fig. 3 and Fig. 4 is the right way (Fig. 3), but excessive dihedrals lead to " Dutch rolling."

The real secret of a successful design is achieving the right balance between all the factors involved. Too often designers are tempted to extremes, particularly when applying a newly learnt theory. Thus the sub-fin may be good for eliminating a tendency to roll with yaw, but overdone will oppose the corrective rolling action in a sideslip. Excessive dihedral can make the model very prone to roll in both directions by over-correction. Exaggerated " fin " areas located on the fuselage can easily be overdone and become too powerful in effect ; and so on.

In general terms the pylon mounted wing with moderate dihedral angles (i.e., good lateral stability and a certain " forward fin " effect) makes for good spiral stability, especially combined with a long fuselage and aft centre of gravity position. Splitting the fin area to have a generous proportion below the fuselage is also good practice. Top side area aft of the wing is generally to be avoided. Low aspect ratio wings are more stable than their high aspect ratio counterparts, but other design requirements generally call for a value of at least 6 : 1 for wings. Too small a span, for instance, would aggravate torque control problems. There are really no hard and fast rules to apply as one part is linked up with all the others in so many ways. But if spiral instability troubles are experienced, analyse the design from the basic principles outlined and try what modifications seem in order—then apply in moderation.



Club News

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

WESTERN AREA

The area rally held at Swindon in October was blessed by almost perfect weather, and was well attended. The 1st Eliminators were flown on this day, the results being as follows:—

A/2: A. R. Peppitt (Ilminster) 612 sec.; M. J. Croome (Country Member) 548 sec.; P. Lumsdon (Bristol) 479 sec.

Power: R. M. Sattin (Ilminster) 649 sec.; A. R. Peppitt (Ilminster) 512 sec.; D. G. Priest (Ilminster) 394 sec.

Wakefield: L. Jackson (Ilminster) 546 sec.; E. Dwyer (Gloucester) 432 sec.

Two sport comps. enlivened the rally, 1st in the scramble being Blackford (Glerum) and 1st in combat, M. Reeves (Oxford). The combat event, incidentally, was brought to an untimely end by Messrs. Reeves's and Smith's models plummeting to the ground locked in mortal embrace !

ANGUS & DIST. AEROMOD. LEAGUE

The league's comp. season ended with Montrose winning the " Strathmore Trophy " for the third year in succession, this being the first time a club has achieved this since the start seven years ago. Montrose had an aggregate of 5,348 against their nearest rival, Dundee, who had 1,830, which reflected their manpower shortage. Arbroath again managed to clear the thousand mark with 1,041. First five names in the final tally for the season's seven F/F comps. were respectively: 1, D. L. Petrie, Montrose (1,876); 2, C. G. Campbell, Montrose (1,384); 3, K. B. Whyte, Montrose (1,377); 4, W. D. Guild, (Dundee 1,182); 5, D. D. Edward, Arbroath (766). As can be seen Montrose overdid it a bit, and are saying that they are going to ease the pressure on the league next year in order to increase the chances of improving on their performance at events outside N.E. Scottish area. Apart from Whyte's valiant performance in power duration at Heathfield on September 18th, for example, the rest of Montrose's entry could claim little more than credit for getting there and back unhurt and without pranging the models. Hence the idea of deploying more effort outside the area in 1956, when they will justify or explode the unrequested criticisms of certain dyspeptic Ayrshire individuals. (See MODEL AIRCRAFT, July, 1955, p. 295, col. 3, " Club News.")

Final league comp. was open glider at H.M.S. *Condor*, held in warm but windy conditions. T. A. Hendry, Montrose, had a narrow win over club mate Campbell, with D. D. Edward, Arbroath, third. Times were low. Three-flight aggregate of first three were 278, 264 and 210 respectively. Half the models that turned up were original local designs.

Looking back over the league's 1955 events, we note that a large number of entrants pranged their way right out of the competitions, even after the opportunity for trimming allowed by plenty of good weather all along since the spring. It would therefore be good advice to start building and re-organising NOW for 1956, as it would be easy for the clubs to improve greatly on this year's times.

BRIGHTON DISTRICT M.A.C.

A small contingent travelled to Chobham for the Croydon Gala and one of the Boxall brothers managed to win the slope soaring.

A few months back the club held its annual duration contest open to rubber, gliders and power for the Arthur Mullett Rose Bowl, and this attracted an entry of eight. Minch Minchull's new A/2 showed great promise on its first outing, as did Ian Lucas's new *Clot IV*, but Reg Boxall's well tried open rubber job achieved three maximums. Results: 1st. Reg Boxall, 9.00; 2nd. M. Minchull and I. C. Lucas, 8.00.

We have also had a precision duration event for the Lanes Cup. The object was to achieve the nearest to 4 min. aggregate with three flights, so that the less experienced might pit their skill with the experts. Unfortunately none of the younger members turned up, despite perfect weather. Results: 1st. R. Boxall, 3 sec. error; 2nd. P. Brown, 6 sec. error; 3rd. J. Kay, 9 sec. error.

In conjunction with our neighbours of the Southern Cross A.C. we had a stand at the International Trade Fair at Brighton.

WALLASEY M.A.C.

Five members visited Prestwick for the " Scottish Festival " and a most enjoyable time was had by all, since all who flew received prizes ! Colin Bryan was Junior Champ. Pete Nicholson was 3rd in glider with 8 : 20, and Stan Hinds just pipped him into 2nd place with 8 : 26. John Hannay represented England in the U.K. Challenge Match and received a memento. After travelling in crowded trains to this meeting it has seriously been considered upholstering the tops of model boxes !

The club " marathon " is about to start soon; this is the sequence of all four club comps. flown off on successive Sundays.

x

SOUTHAMPTON M.A.C.

A team from the club entered for the " Model Engineer " team glider and the times were as follows: Mr. P. Giggle, 9 min. 12 sec.; Miss M. Pepper, 8 min. 51 sec.; Mr. B. Hay, 3 min. 46 sec. and Mr. N. Worley, 3 min. 26 sec.

We were represented at Radlett by Mr. Worley who placed second in the powered tailless competition.

SOUTH BIRMINGHAM M.F.C.

As a climax to the season's activities the club made its own contribution to the fostering of Anglo-Russian relations. A couple of months ago, at the Manor Farm, Northfield, we put on a rip-roaring flying display at a garden party organised by the Anglo-Soviet Friendship Society. The programme followed the usual pattern, stunt, demonstration flying, team racing, and, as a grand climax, a really thrilling combat display. The latter was enlivened when Frank Lawrence went into the circle wearing his motor cycling crash helmet, " to make it more authentic," and his model, after a mid-air collision, came down the lines and pranged him on the head. Said Frank: " That's carrying realism a bit *too* far."

Robin George, on leave from the R.A.F. (what again ?) handled the microphone and coped very well in spite of the bits of loose wire flapping around the thing. We are not sure whether the organisers were as enthusiastic about the display as the spectators, because as soon as the club went into action everyone on the field clustered round to watch, so the stallholders had rather a thin time. What a pity no one had a Veron *Lavochkin* to fly that day.

NORTHWICK PARK M.A.C.

While new models are rather slow to appear, members have been busy flying the old ones to very good effect. George Upson added a " first " in the open power at the All Britain to his recent successes, the model being a two year-old Elfin 2.49 F.A.I. job. Unfortunately some club members seem almost as reluctant as the new models to put in appearances, consequently we only just managed to find four people who possessed gliders, and could therefore represent us in the " M.E." cup. However these four did quite well and totalled 29 : 11 between them. Perhaps the perfect weather helped and this placed us third in the London Area, one minute behind Surbiton and nearly 10 behind Croydon !

Sport F/F seems to be predominantly scale these days. In addition to the usual models of light- and ultra-light aircraft we also have a couple of ducted fan fighters belonging to Ken Stokes which liven up weekend flying sessions. His 42-in. span Douglas *Skyray* causes quite a stir whenever it is taken out of its specially constructed delta-shaped box. But in spite of the original Dart power unit being replaced with a more powerful *Spitfire*, the model has, as yet, refused to stay airborne for any reasonable length of time.

HEANOR & DISTRICT M.A.C.

We had an enjoyable if unsuccessful trip to Radlett. Anyway, now the All-Britain is over we are settling down to our winter programme of indoor flying. R.T.P. rubber and electric r.t.p. scale are planned and comp. sec. Ron Evans is preparing a set of rules. The electric r.t.p. scale is going down well with the R/C fans in the club.

Hand carved by a member of the Heanor & D.M.A.C. is this Club Glider Trophy which was won in its first year by B. Purdy and in 1955 by Ken Smith.

Club trophies for class " A " and " B " were flown off in October, and our club flying ground is " quite a place " on Sunday mornings.

Our winter contest on January 8th, will be all C/L, the following contests being run: Class " A " " B " and " Half A," team racing and combat. A prize will be given for the best junior performance of the day. Please contact our sec. if you are interested.

CHEADLE AND DISTRICT M.A.S

For a " cheap-rate " coach trip and picnic to the club champs at Lobden Moor a few months ago, only 14 members turned up. Is 2s. 6d. too much ?

From the grandstand the timekeepers and general hangers-on had a good view of the assault course, which included barbed wire, stone walls, ditches, and a nice marsh to run through.

Messrs. Whitehurst and Neild led the way in first round glider with maxes, but Evans (back from Hong Kong) and Seymour pulled up in front by evening, Seymour took home first prize, flying an almost standard *Seraph*.

In power, Fred Pass led all the way with his " Harrison special." Clubmate Harold Green looked like providing opposition, but the *Spitfire* timer stuck and the model frightened the life out of a woman in Rochdale. B. T. Faulkner took the rubber cup. Light refreshment was served en route home.

At the Wakefield trials, the old rubber group was back in the groove. Garth Evans totalled 1,442 with a new long slabsider, Ian Harrison 13.40 with a new short slabsider, and B. T. Faulkner 15 sec. behind with a very old diamond job. Andy went by the wayside for only 9 min.—he

has lost about five models this year !

New member Nigel Skermer showed old timers the way by scoring 10 : 43 in the " M.E." cup, topping the area results, overall team result being 32-23 sec. The weather, of course, was cold and windy.

Noting the various comments by " Pylonius " and elsewhere, this club would like to mention that we have supported both Northern Galas to the extent of eight or nine entries, and that we DO NOT object to travelling to Cambridge for the Nationals. We DO, however, object to losing two nights' sleep to get to the trials south of London, and would like to see this event moved back to its previous more centralised venues.

BRADFORD & LEEDS M.A.C.

Most important item this month is Arthur Collinson's win in the open power contest at the Scottish PAA Festival; his K. & B.-powered *Creep* took top honours with 11 : 40. Silvio (returned to the fold after a long absence in his native land) managed to make 3rd place with his faithful *Swiss Miss*, despite being somewhat out of practice !

For the stay-at-homes, the club ran an open rubber contest the same weekend. Ken Rutter topped the list with 10 : 54 (not to mention another lost model!), Henry Tubbs was second (8 : 47) and C. P. Miller, third (8 : 26).

At the first 1956 Wakefield eliminator, Henry Tubbs this time put up our highest score of 13 : 20, with C. P. Miller second (10 : 56). An all-out attack was also made on the " M.E." cup. Out of a total of 10 entries, the top three were K. Pickles (7 : 36), L. Hey (7 : 17), and M. W. Baines (6 : 36).

The open power contest staged by the area on the same day was rather a farce, as three club members (Messrs. Eggleston, Cameron and Pannett, finishing in that order) comprised the total entry !

NORWICH M.A.C.

About 30 members sallied forth to the All Britain Rally at Radlett with the main intention of scaring everybody else. C. Sparrow flew an E.D. Baby-powered Fokker D.8 which cleared a large area as it spiralled in after the engine cut. D. Massingham, who flew stunt models all day, and Martin Smith and his *Frankenstein*, also caused plenty of crowd scattering. The only serious competitor was K. Nash, who entered the A.T./R. with a new Oliver job. He kept up with the winner for half the heat, and then his engine gave him excessive trouble and put him out of the running.

As in previous years the club put on a display at Horsham St. Faith's as part of the Battle of Britain commemoration. A good show of models attracted large numbers of spectators which were five deep around the tables. The monthly cup competition was judged during the display, and the cup presented by Flt.-Lieut. Coutts-Smith. The winner was T. Carter with his O/D F/F job. Incidentally this model was written off three weeks later in an uneven battle with the runway.

Three annual contests have been held during the past month. The power ratio won by J. Bird; the glider by C. Sparrow and the Jetex by " Creep " Woodhouse. Two contests have also been held during club evenings, an indoor and an outdoor chuck glider contest. Both were won by K. Nash.

ENFIELD AND DISTRICT M.A.C.

As usual we visited the All Britain Rally by coach and two places were gained. Mr. J. Warren took second in combat and junior, and Mr. Hayden tied for first place in the " Junior Mirror " power comp.

" Riser " Rex Gough lost yet another job, it being found next day at Hornsey, 12 miles away. (He owes his nickname to his almost complete inability to keep any model, from power job to chuck glider, for more than about three or four flights; has lost count of total score this season, but is in the region of eight models and five motors !)

A new club " 19 " speed record was set up by Mr. R. Tuthill, of 117.8 m.p.h. on a rather rich run. We'll catch Johnny Hall yet ! Don Walker's class " B " job, which came second at Cranfield, was unfortunately not quite fast enough for the finals, although from what we saw of it, we reckon we would have been well placed if we had been in it.

CROYDON & DISTRICT M.A.C.

After avoiding crowds, cars, dogs, children, photographers and tents at Radlett, Ed. Bennett won open rubber with the usual 300. Other successes included Paul Taylor's 3rd in R.O.W. rubber, and Pete Jellis. Afterwards, the " Cat and Fiddle " was filled to the ceiling with Croydon members, relating harrowing tales of railway lines, sand pits and lunatic asylums.

The previous week-end at Prestwick, Ed. resolved to take up smoking and clock-watching, after receiving an ashtray for being a member of the English team, and a clock for winning open rubber. Ed. now qualifies for an inscribed pair of seven league tyres, as the year's most travelled Croydon type.

Momentous event department: Ron Martin brought out two, repeat two, Nordics the other day. He must have been inspired by his Wiesbaden trip.

FORESTERS (Nottingham) M.F.C.

The Foresters class " A " teams rounded off the season with a 1st, 2nd, 3rd at Cranfield, 1st, 2nd at Radlett, and 1st, 2nd at Preswick in F.A.I. class. This brought their total successes this season to: comps. entered: 10 class " A," 2 F.A.I.; first places: 8 class " A," 2 F.A.I.; second places: 5 class " A," 2 F.A.I.; third places: 4 class " A."

For those that think that " The Foresters only fly for the money," the boys spent £6, repeat, six pounds, on propellers alone !

These team-race successes, together with Tom Woodward's 1st place in the Pilcher, and 3rd in the Queen's Cup, have made 1955 the most successful competition season in our history.

QUIZ ANSWERS

1. (a) (iii) R. Ward. (b) (iv) PAA-Load. 2. (a) 1935. (b) Gordon S. Light (U.S.A.). 3. FROG was the trade name given to a small ready-made rubber-driven semi-scale monoplane introduced by the company in the early nineteen-thirties. The name was derived from the initial letters of the slogan " Flies right off ground." 4. (c) 0.064 in. 5. (a) Paul Gilliam. (b) Lt.-Col. H. J. Taplin. (c) Leon Shulman. (d) J. Van Hattum. 6. (a) Norseman. (b) Phil Guilmant. 7. (a) Nitro-benzene. (b) With methanol and castor-oil to blend a glow fuel. 8. (a) Arden. (b) Elements were in two different heat ratings to suit different types of engines, compression-ratios, fuels and operating conditions. 9. (a) 1937. (b) The U.S. Nationals. 10. (d) E.C.C. 1061 Transmitter.

Crossword Solution

SOUTH BRISTOL M.A.C.

Two r.t.p. meetings were held this autumn, and there is certainly no sign that this branch of the sport is declining. Our only regret is that the size of our clubroom rules out any question of Jetex !

The flying field situation is still tricky, but it is thought that we may be able to secure a site for C/L flying actually in Bristol, with the help of the council. Most of the members are C/L addicts, and a good field, close at hand, will be a great asset.

We might add that although membership is strong, new members, particularly seniors, are always welcome at our meetings, held on the first Friday of every month at St. Mary Redcliffe Church Hall, Guinea Street.

BLACKHEATH M.F.C.

Attention contest fans ! The Bill White and Winter Glider Cup will be held on Epsom Downs on Sunday, January 8th, commencing at 10.30 a.m. " sharp." There will be a special prize for juniors. Entries are:—1s. per comp., or 1s. 6d. both, juniors 6d. per comp. Pre-entry is requested, but is not essential. Enquiries to: P. Crossley, 11, Bradfield Road, Catford, London, S.E.6.

SECRETARIAL CHANGES

Cambridge M.A.C. G. Parker, Bishops Farm, Fulbourn, Cambs.

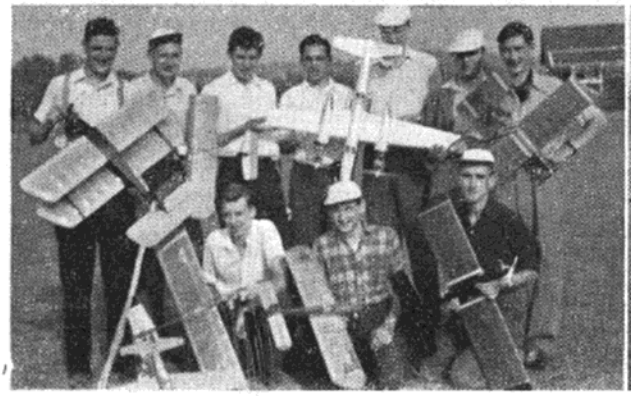
Plymouth M.F.C. A. J. Alian, 8, Western College Road, Mannamead, Plymouth.

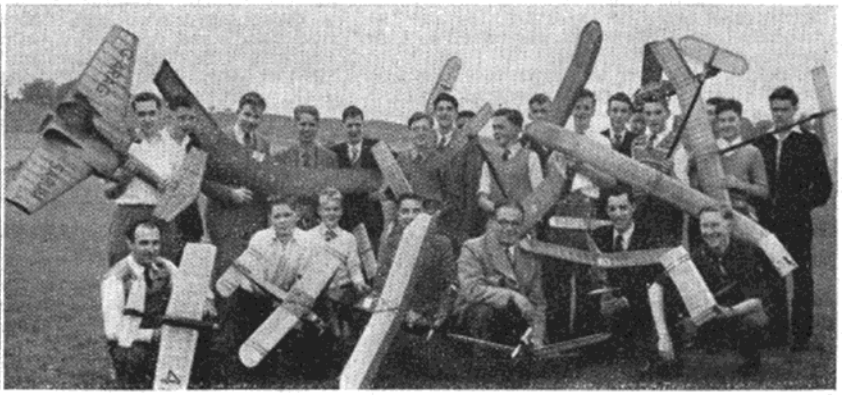
Crystal Palace M.A.C. L. M. Blane, 7, Upper Buelah Hill, Upper Norwood, S.E.19.

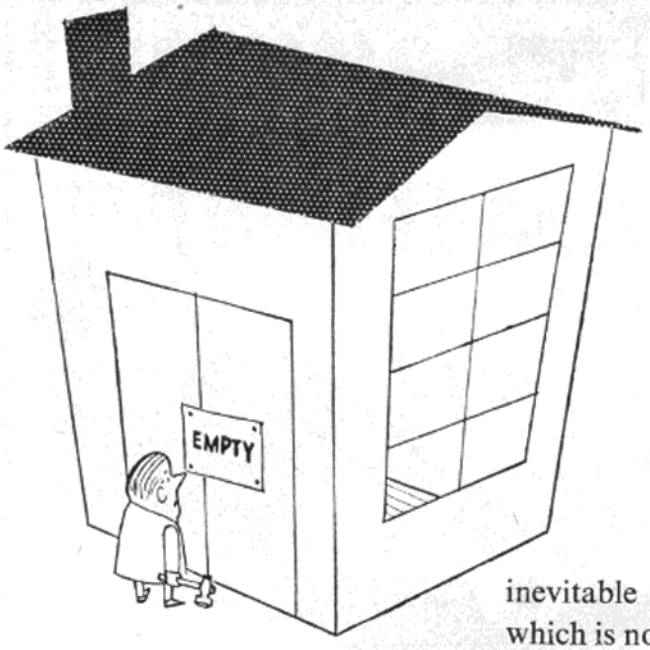
CHANGE OF NAME

Stockingford Air Scouts M.A.C. to **Nuneaton & D.A.C.**

Left: A few of the Enfield & D.M.A.C. members who recently put on a C/L display at the Royal Small Arms Factory. Right: A successful open day was staged by the Salisbury & D.M.E.S. recently and the photograph shows many of the club members with their models.







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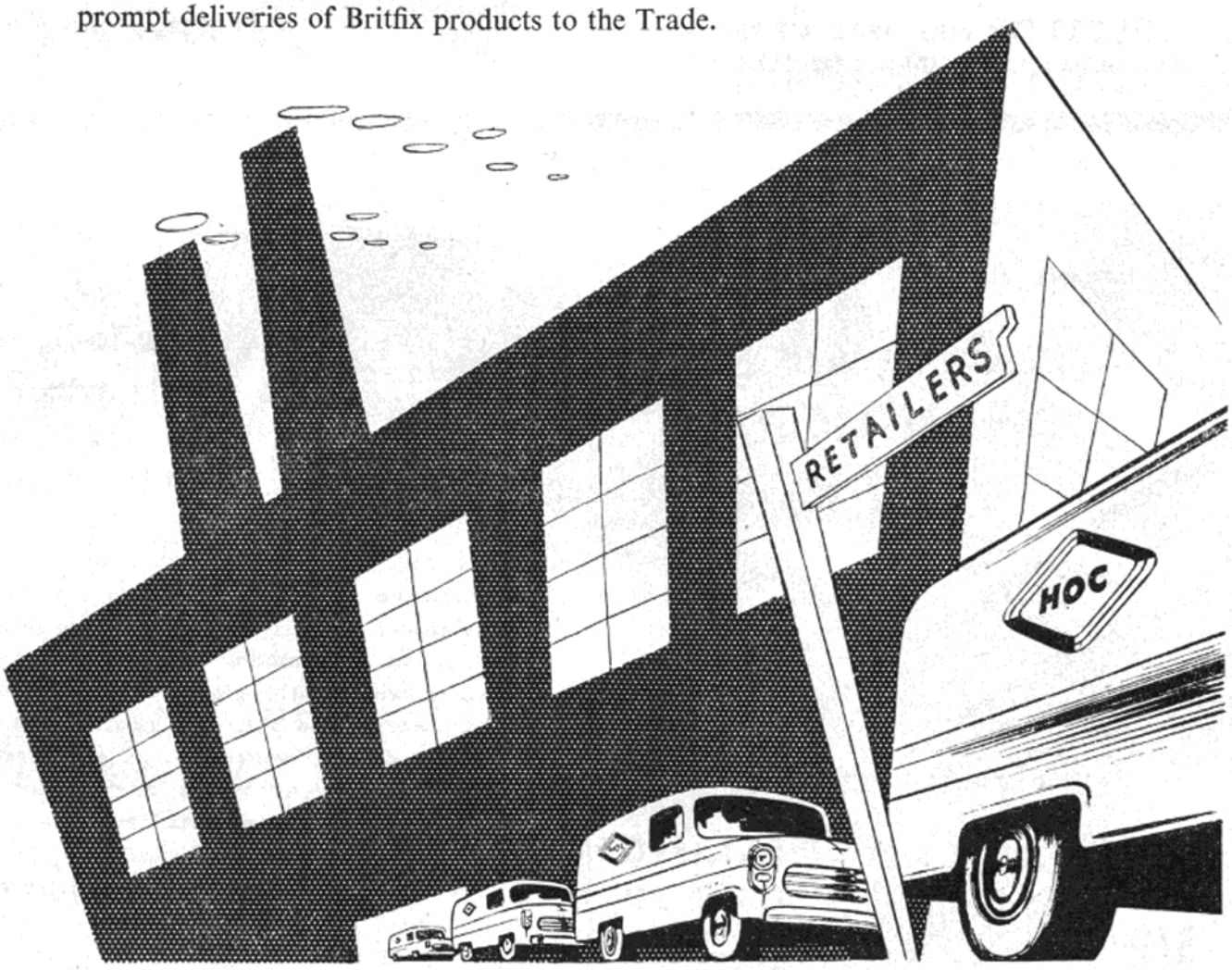

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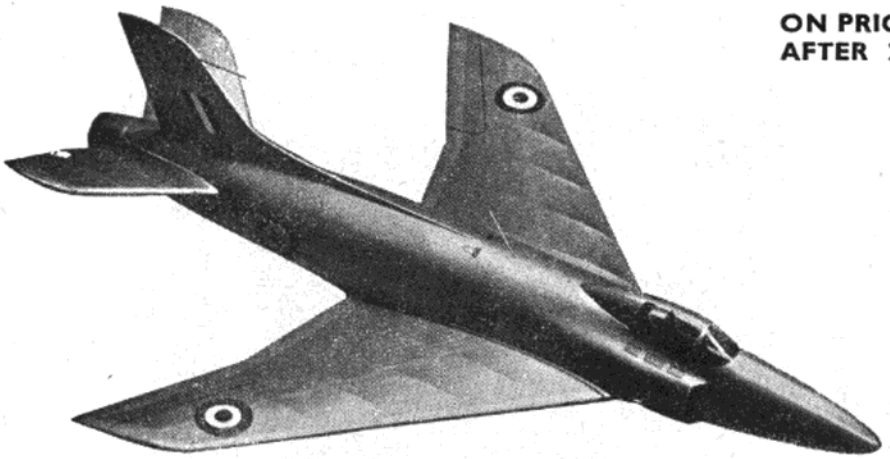

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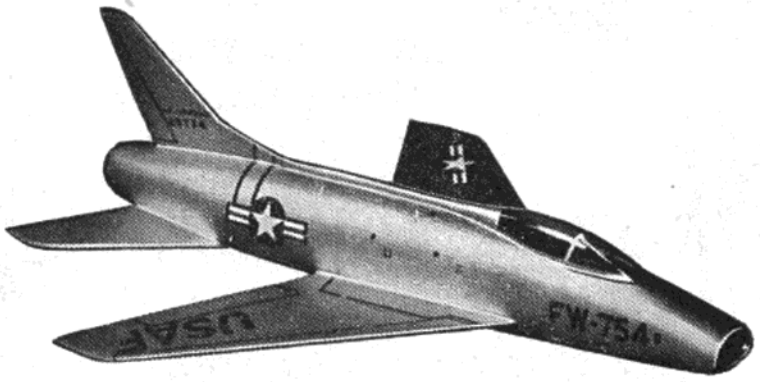

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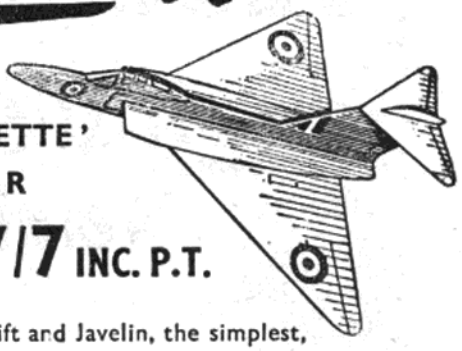

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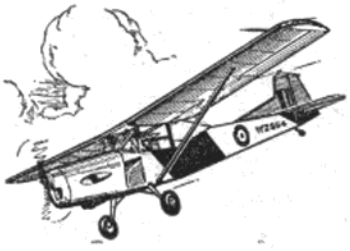

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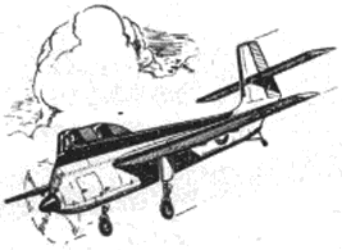

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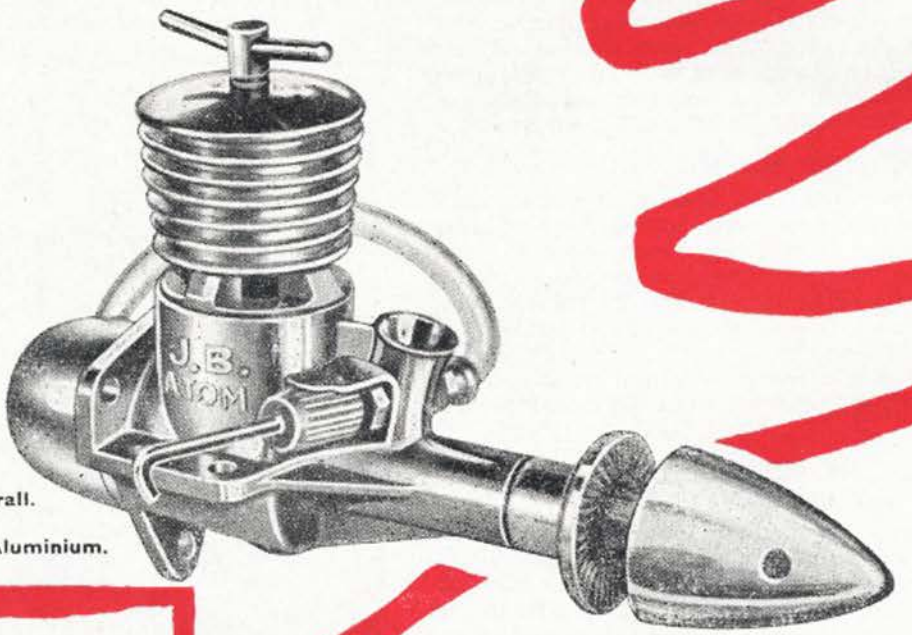

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