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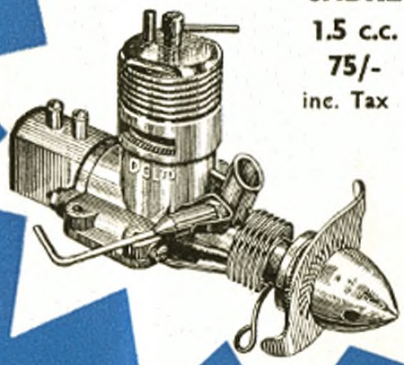

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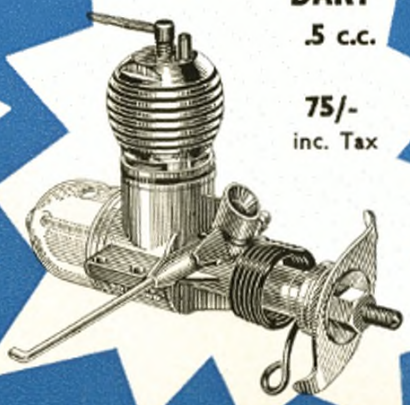

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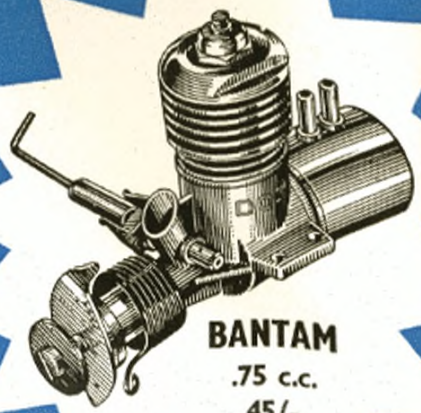

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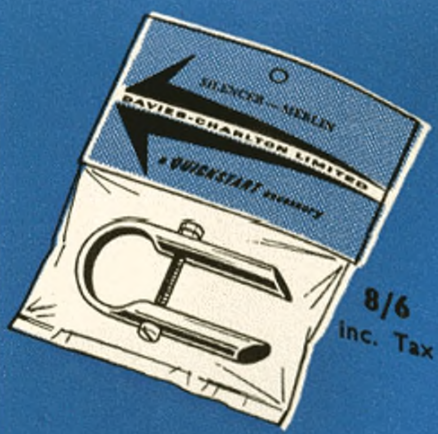

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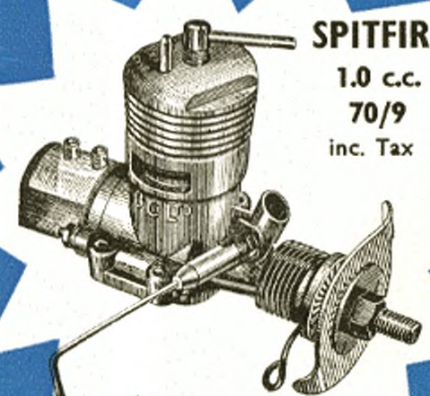

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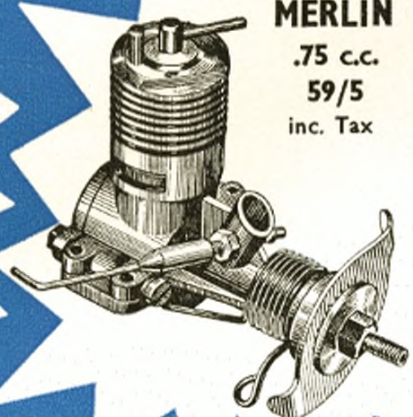

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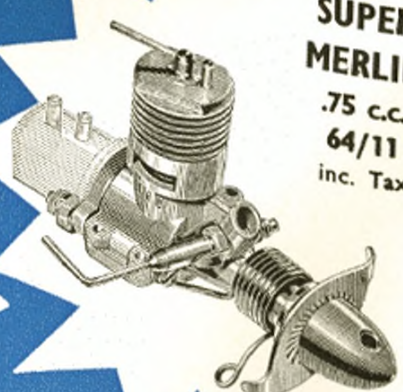

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June 1966 VOLUME XXXI No 365

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COMMENT

It takes a day like the brilliant first of May to inspire aeromodellers to greater hopes for the Summer flying season. Bright sunshine, fresh green grass, light breezes and a crash free flying session are the ingredients for happiness in any aeromodeller and most of us found that on May day. All fingers are crossed in the expectation that the Month will go out as it came in. What could be better for our 1966 British National Championships at Whitsun? The map on page 313 gives locations of the various events at R.A.F. Hullavington—See YOU there?

Success of the Easter meeting and a calendar of rallies that is fuller than ever before, give promise of a great modelling season, the climax of which must surely be in the World Championships for Control line models at the end of August. Plans for this event at R A F. Swinderby are well-laid with the spectator getting as much consideration as the competitor.

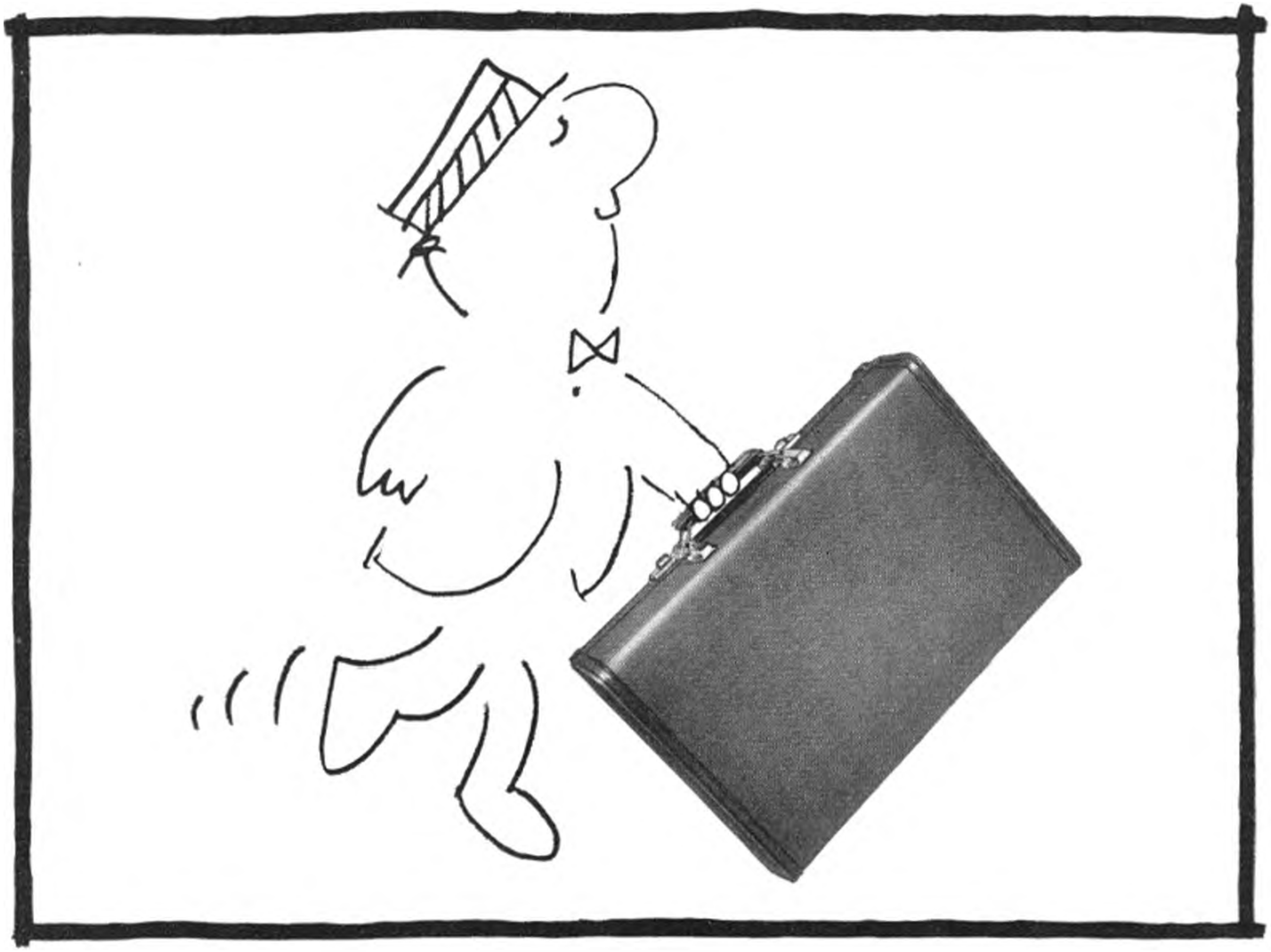
This all important aspect must never be forgotten. For every single contestant there are at least twenty sports-enthusiasts looking on. It is their support that makes possible a strong National organisation, able to look after the demands of the cup-chasers. Those who go to watch, or maybe fly for fun on the side of the 'drome, return to local fields inspired to do better and carry the spirit of aeromodelling into the corners of every county in the land.

cover

Bill Hannan's little all-sheet balsa "Defender" is portrayed in action by artist Laurie Bagley. Note that "Golden Wings" transfer on the wing. This petite easy to build and fly design makes a perfect introduction for the novice modeller and we thoroughly advise all G.W. members to study pages 320/321.

next month

Scale enthusiasts who waxed eulogies on G. Duval's drawing of the P.47 Thunderbolt have a treat in store, for next month we feature the Hawker Typhoon in the series. **Nordic Champs, Australian** and **South African Nats**, a free-flight delta **Opus** by P. Champion, full-size plans as usual and the regular features on Latest Engines, will make this another big edition out on June 17th.



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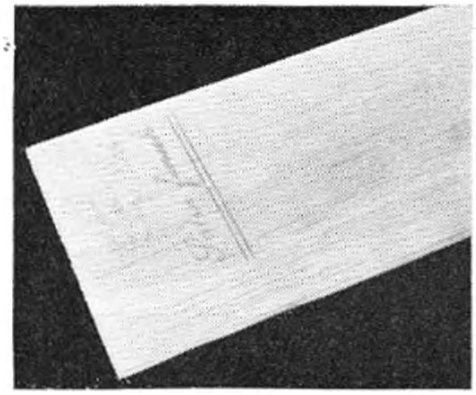

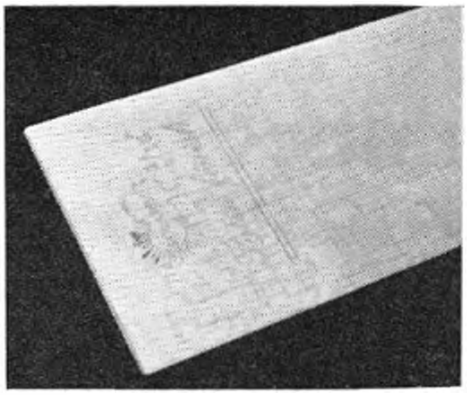

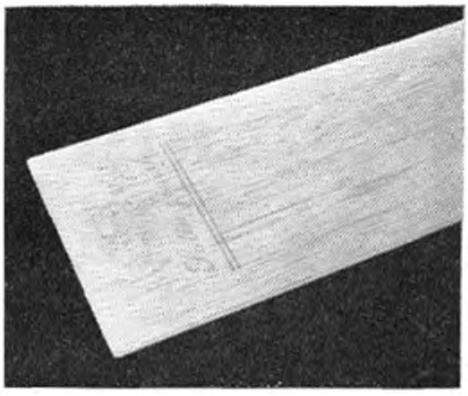

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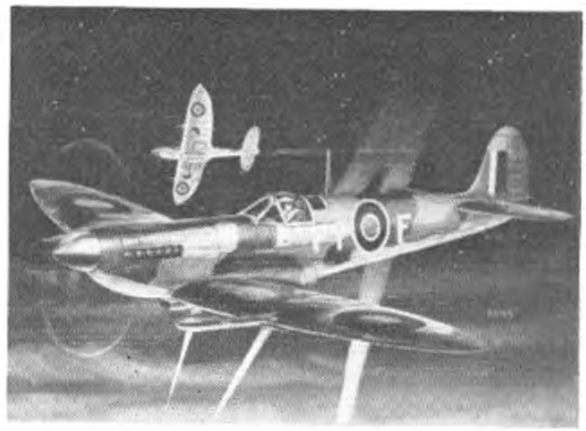

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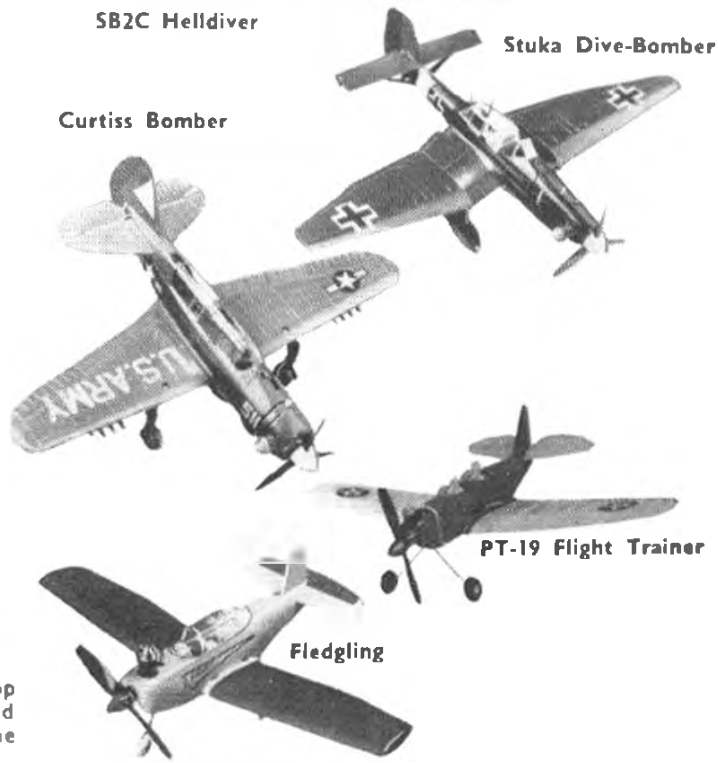

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Heard at the HANGAR DOORS

Prague (Czechoslovakia) control-line circuit was used for the first European International at Easter, attracting five nations. It has been in use for several years but is now destined for bi-section by a railway line to come parallel to that in the background. (See photos, page 346).

THAT SILENCER CONTROVERSY. At the S.M.A.E. Council Meeting, April 23rd, it was resolved that for the 1966 trials to select international teams, models may be operated without silencers and for a period of 4 months prior to the trials, *bonafide* entrants will be permitted to practice at sites established by and supervised by their S.M.A.E. Area Officials. After the trials, only team members may fly without silencers and then only at recommended sites.

WORLD C/L CHAMPS NEWS. Advance information concerning the Championships at R.A.F. Swinderby, August, indicates a very fine response to invitations sent to National Aero Clubs. The Netherlands, Czechoslovakia, U.S.A., U.S.S.R., Eire, Hungary Israel, Denmark, Belgium, Canada and France have already made entries.

Field arrangements, co-ordinated by the S.M.A.E., R.A.F.M.A.A. and the Royal Air Force promise a comprehensive display of all that's best in the world of Aeromodelling, such as has never been seen before in this country. It is likely that there will be five circles in almost continuous operation, allowing on-site practice for the visitors and demonstrations for the general public of various other control line and radio classes.

Official competitors will have a complete hangar set aside for use as a sheltered pit area with direct access to the contest circles and only a few moments walk from the accommodation, dining hall and social centre.

Visitors will be able to see a static display of models in another hangar including the World's largest collection of plastic scale models constructed by Peter Farrar and club displays as well as manufacturers stands and demonstration booths.

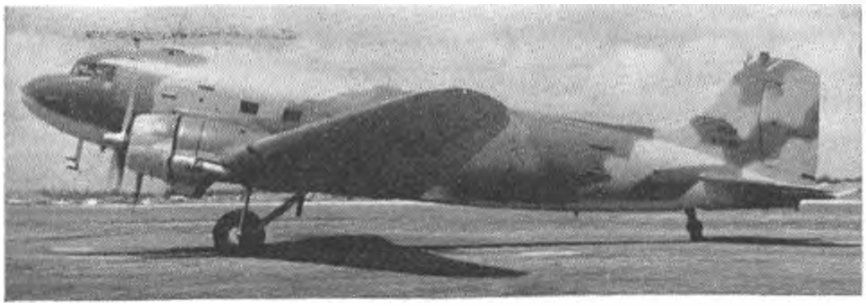
Refreshments will be available for spectators, and those who wish to camp in the area will have a special site set aside in the city of Lincoln with full facilities. For the overseas visitors this has particular appeal as it affords an opportunity to view this famous city which is a great tourist centre, thus combining a holiday with a wonderful modelling meeting.

Those who seek reserved accommodation are advised to contact the S.M.A.E. Accommodation Officer, Mrs. F. Shirt, 27, Athorpe Grove, Dinnington, Nr. Sheffield, S. York.

PUFF THE MAGIC DRAGON. The last aeroplane one might have expected to have been developed as an offensive attack aircraft is the old faithful Douglas C.47 Dakota. Yet, oddly enough, at the suggestion of those most likely to know in the Vietnam conflict, some 26 C47's have now been modified as AC47s. Sideways mounted rapid firing guns can pour out thousands of rounds a minute as the old transport rumbles round in a tight circuit. So much for the purpose of the craft.

We have been lucky enough to obtain an illustration of one taken by Harold G. Martin and it is reproduced on this page to show modellers the general colour scheme in two tone camouflage green and a light tan. The thought of a Dakota rumbling round in a tight circle leads one to immediately think of our Aeromodeller Plans Service version (plan no. C/L 765, price 9/- inc. post), but we suggest pointing the guns out of the circle or else using dummy ammunition so as not to kill the pilot!

National markings are not obvious in the picture, the only identification being the small black lettering on the fin, USAF 0-48801 which our *Air Britain* experts tell us is a very aged military machine dating back to 1943. More details are included in the May edition of "Air Britain Digest", a publication which we can thoroughly recommend to all air enthusiasts. *(Photo at left.)*



RADIO FREE FLIGHT? At the 1965 World Free Flight Championships Stan Zurad demonstrated his single channel equipment in a specially designed Wakefield model. He did not fly it in the contest and made clear to us that the purpose of the radio was to enable him to make practice flights in a confined area, thus bringing the model back fairly quickly,—and safely.

The German magazine *Flug — Modell Technick* carries an article in its March issue of this year by Ing. F. W. Wullner on "Tele Rubber" which is an appropriate title for the class. Taking advantage of the ultra lightweight Webra Picco Radio control outfit (available in Great Britain through Veron agents), Ing. Wullner emphasizes the advantages to be gained and talks of longer flights using the radio, one of which was no less than 72 minutes!

One is left to wonder how much more interest will have been inspired by the German publication and whether we shall eventually see the requirement for crystal control Superhets at the *free flight* championships?

"COMING IN ON RUNWAY 10", might well have been the official approach message had Jack Allen's Coupe d'Hiver model been equipped with radio transmission when it came down to earth after being launched at Chobham Common in the Contest on Easter Monday. Two days later, Jack received a letter from the Chief Officer, Ministry of Aviation, National Air Traffic Control Service at London Airport! Mr. Kirk of the Ministry reported that model aircraft 18007 (we like the appropriate last digits) was found just to the South of runway 10 Right, which was the main take-off runway at London Airport. The model was undamaged. Sounds like the best "Can I have my model back mister?" story of the year. As Britishers well know, the day *after* the model was found, the country was buried under snow—so Jack is a *very* lucky chap. And as if to emphasise the changes in our weather, just two weeks later we were bathed in glorious hot sunshine for the whole week-end.

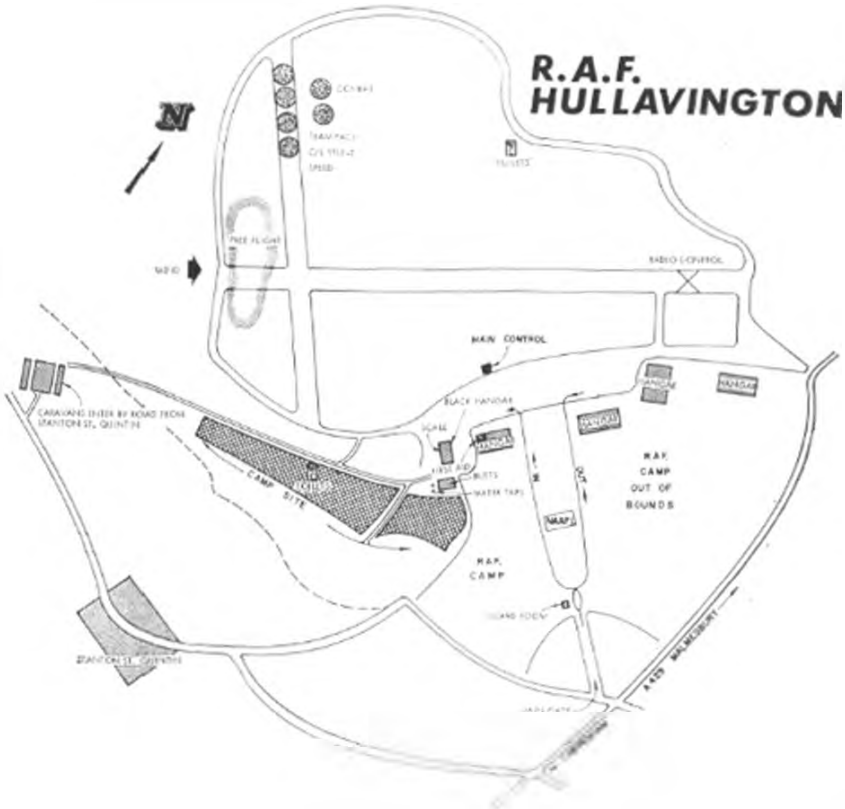
INTERRUPTED PICNIC during that spell of fine weather on May 1st, came when Pat Silver our Secretary was minding her own business in the quiet Buckinghamshire countryside enjoying a rest when what should fall out of the sky but a Blue and White Open Rubber model. Observing the request notice to wait one hour before reporting the model to the police (in this case Pat would have brought it back to our offices) the next disturbance to arrive came in the shape of Laurie Barr and Roy Wootton of Hayes searching for the latter's model. It so happened that Pat had unwittingly laid out her meal in the landing area for the mammoth fly-off in Airtech's free flight Rally at Haddenham! Just shows you can't get away from work even when on holiday. Incidentally the model was Al Wisher's.

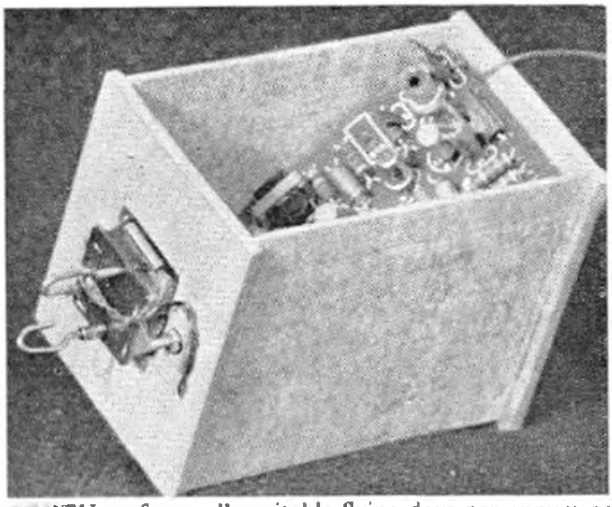
SKYBOLT is the name of one of our two free plans this month, the well proved little stunt control-line model by the ubiquitous Chris Foss. We believe that a lot of our younger modellers will find Skybolt ideal for getting them into the swing of things in the way of first loops and a spot of inverted flying. It's light enough to bounce from most "accidents" and with its small power requirements, is useful for a very wide range of small capacity sport engines. *(photo, right.)*

SMOKE RINGS in the air for control-line and radio control enthusiasts may well be another useful by-product of the silencer rule. Reading the Canadian Newsletter *"The Airfoil"* we discover a note by the editor Frank Anderson of Toronto to the effect that Wilf Alderoft has been able to reproduce the full-scale method of producing a smoke trail. Wilf has fitted a needle valve assembly to a stock O.S. muffler to permit drip feed of a 50/50 mixture of Rislan Carb-out (whatever that may be!) and SAE 10 oil. It produces smoke from an O.S.49. Thin machine oil will produce reasonable effect—as used for scale effect in Model Railway lay-outs.

BRITISH NATIONALS see YOU there? What's on

S.M.A.E. British National Championships R.A.F. Hullavington, Wilts., on A429 between Malmesbury and Chippenham. *May 29 Sunday Events.* Open Rubber (M.A. Trophy). Open Power (Shelley Trophy). R/C Multi (S.M.A.E. Trophy). R/C Scale Qualifying Flights. C/L Scale Qualifying Flights (Knokke Trophy). Team Race Class A (Davies A). Combat (heats) C/L Speed Handicap, plus one unorthodox event. *May 30 Monday Events* Open Glider (Thurston Cup). Combined R/G/P (Womens Cup). R/C Multi (S.M.A.E. Trophy). R/C Scale Judging. C/L Scale Judging. Team Race Class A (R.A.F.M.A.A. Trophy). Stunt (Gold Trophy) Combat (Finals)



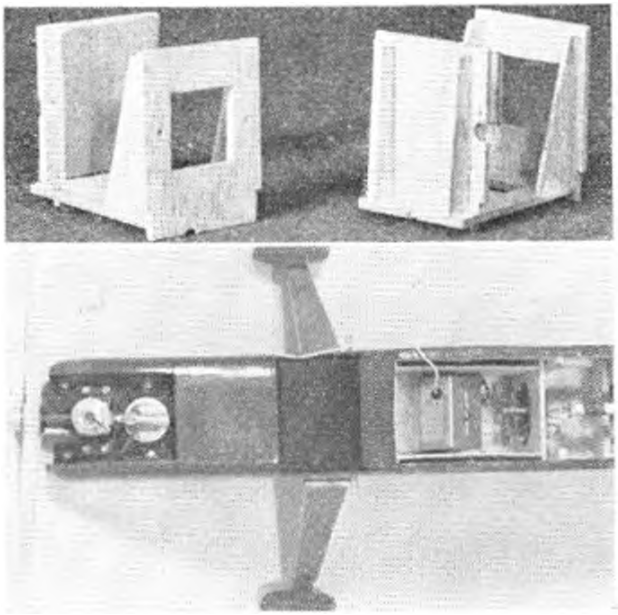


STRICTLY SIMPLE

David Boddington offers two kinds of boxed unit radio control sets for transfer from model-to-model

WITH so few really suitable flying days per annum as far as the weather is concerned it becomes all the more essential for the R/C modeller to organise himself so that he is able to make the most of his limited opportunities. There are frustrations enough on the flying field (does Joe Soap really have to spend an hour carrying out field checks on his equipment that you know was U/S two years ago; he refuses to buy some decent equipment and fiddles away regularly every weekend in the hope of some miracle happening!) so make sure you are ready to go when conditions permit. Most modellers accumulate over a period of time, two or three models suitable for Single Channel R/C flying but not many of them can afford the luxury of a separate complete radio installation for each model. This situation often leads to another frustrating condition on the flying field when, due to minor damage to the airframe no more flying can be undertaken because of the problem of transferring the radio equipment from one model to the other. I have seen the occasional stalwart, with portable soldering iron connected to the car battery; delving into the dark recesses of the fuselage unsoldering joints, fishing out a tangle of wiring etc. and manfully reinstating the jumble into another model but usually by the time this has been achieved the weather has deteriorated or dusk has fallen. The object of the model based radio unit presented here is to overcome these difficulties of transferring the radio equipment without any additional expense or loss of efficiency.

Heading shows the Unit A with MacGregor Rx installed. At bottom: another Unit A with Raven Rx is fitted to a single channel design. Central photo shows the Unit B boxwork.



The two sizes of units described should cover the majority of models available, both plans and kits, with the exception of the ultra small and possibly the switching arrangement may present some limitations on low wing designs. The whole essence of making these units is in standardisation and it is wise to study your existing models, future projects and equipment available to decide which particular unit suits your needs best and whether any modifications are required. You may for instance decide that you would prefer to have the slide switch mounted on the side of the unit instead of the bottom: but remember that this would entail a rather large hole in the side of the fuselage to operate the switch as it would be impossible to have it projecting through the side. Alternatively the top of the switch could be tapped to receive a 6 b.a. bolt, this being screwed through a slot in the fuselage side, to actuate the switch. Naturally there are many variations that can be made on this type of unit. it is equally suitable for housing motorised servos and could also incorporate an engine escapement/servo, etc.,to suit your own requirements.

Tests have been carried out on both units with a variety of receivers, batteries and DEACs in models of wing spans from 32in. to 54in. and have proved their practicability both in the workshop and on the flying field. The only item that has remained as a constant is the Elmic 'Conquest' escapement because of its simple torque rod coupling arrangement (Modified as shown on the drawings for greater security) but alternative couplings could be used for other escapements or servos. The advantages found in using and constructing these units, other than the basic function, included:—

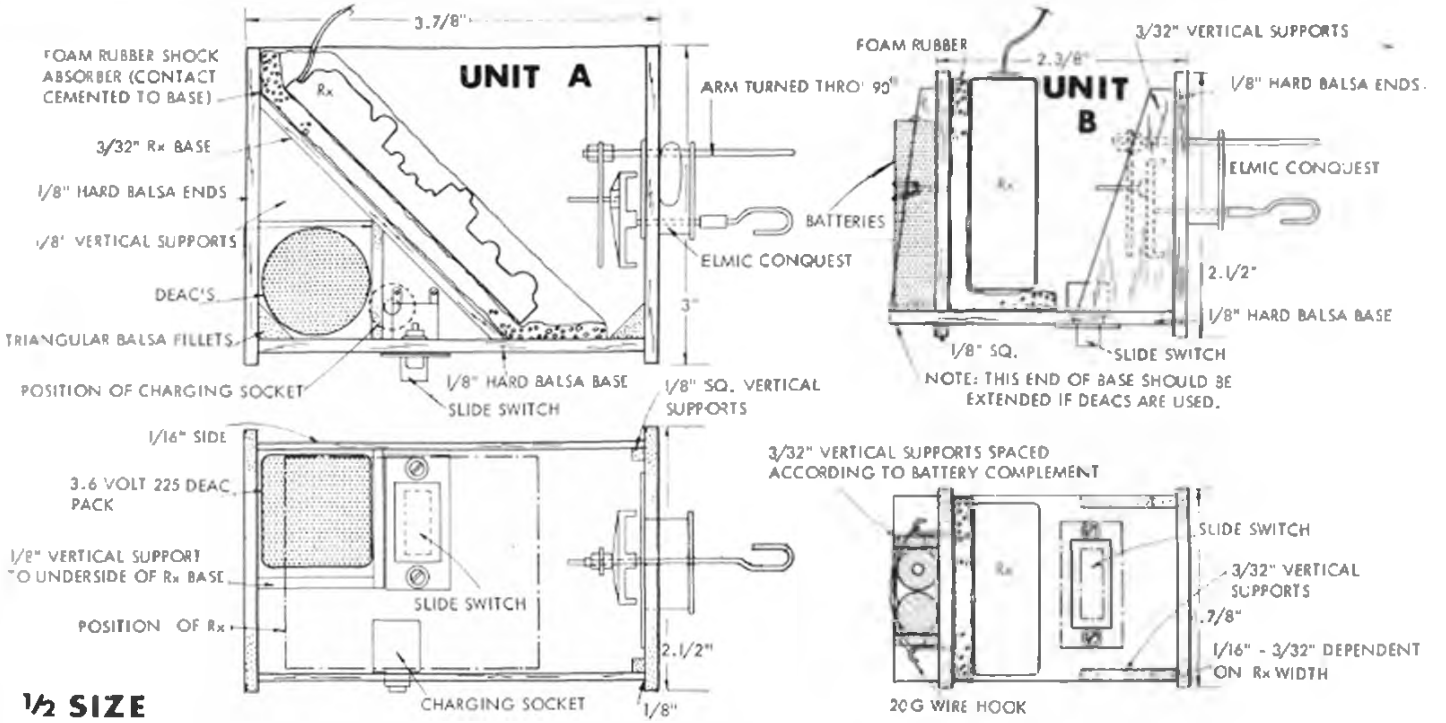
(a) A more compact unit is possible taking up less space than with a conventional installation.

(b) Wiring lengths are reduced to a minimum and can be neatly arranged and fixed to the box.

(c) Soldered joints are reduced to a minimum and are made in ideal conditions, i.e. on the 'bench' with the equipment easily accessible.

(d) No plugs or sockets to wire up, or to give trouble.

(e) Ample strength and shock absorbing qualities when installed in the model. The weight penalty is



½ SIZE

very small compared with the normal installation including mounting plates, foam packing, etc.

(f) The reliability of complete units such as these is greater due to the security of all joints and components. No strain is put on any of the wiring or equipment when a unit is changed from one airframe to another.

The only disadvantage so far encountered has been with models tending to be tail heavy, with the units arranged as they are it is not possible to move the battery complement further forward to achieve the correct balance. This, however, only occurred to any degree on one model and was cured by changing to a heavier engine of about the same output. For most models, having the majority of load around the centre of gravity is advantageous. The ideal arrangement to aim for is to have two similar interchangeable units so that in the event of a radio failure as opposed to a model failure the faulty unit can be removed and the spare one installed, all in a matter of minutes. This may seem to some modellers an extravagant aim but on a long term basis, and in savings through not crashing models due to flying with faulty equipment, it is sound economical sense not to mention all that extra flying you will enjoy.

Construction

Construction of the units is straightforward and should be self evident from the drawings but a few additional comments may prove useful.

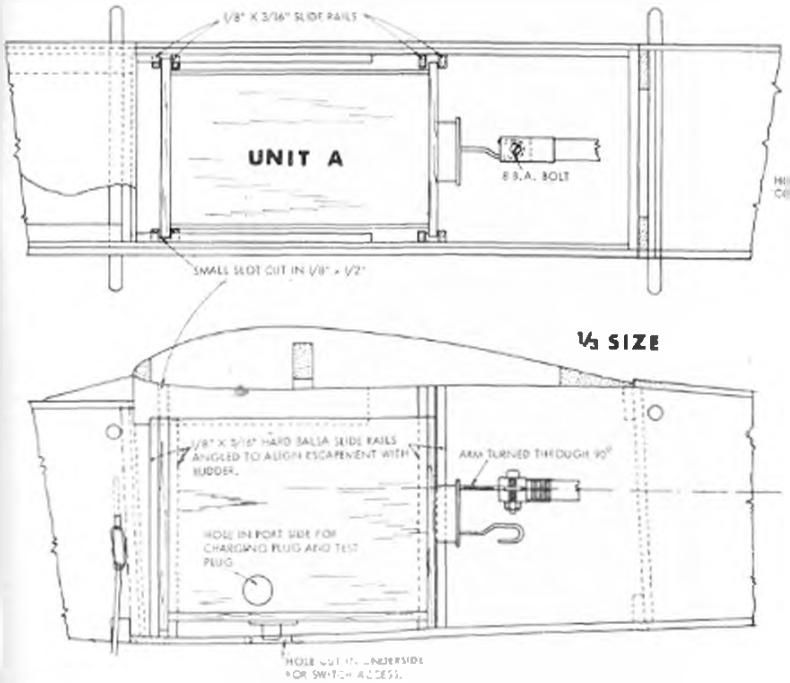
(1) Check the size of receiver and all other components to make sure that the overall dimensions of the boxes are sufficient.

(2) Use medium to hard grade balsa for all parts of the boxes and cut out the pieces accurately as any box that is built 'out of square' may be difficult to slide in and out of the model.

(3) When the box is constructed, with all holes cut and drilled for escapement, switch etc. give two coats of sanding sealer and lightly sand.

(4) Wiring to Unit B is all taken from components to the underside of the box, wiring to Unit A is carried out inside the box before assembly of the right hand side piece and receiver base. Secure the wiring to the box with Evostik or a similar contact adhesive.

(5) It is advisable when sticking a receiver with an open printed circuit board to foam rubber to give ample time for the adhesive to dry before testing the unit otherwise a short could occur.



SKETCH OF MODIFICATIONS TO ELMIC CONQUEST TO PROVIDE GREATER SECURITY

(6) All components secured to the box with nuts and bolts should have the balsa reinforced with 1 mm plywood at the position of the hole.

When fitting the slide rails to the model make certain that these are parallel and at the correct spacings for the box; the two outer rails can be glued with the unit in position and the inner rails fixed after the unit is removed again.

BASIC Aeromodelling

PART SIX

Rubber Motors

Shirley and Bill Horton of Crawley winding the rubber motor of Roger Schroeder's (U.S.A.) Coupe d'Hiver model at Chavenay, France. Note the use of drill winder with trip odometer to indicate number of turns.

THE type of rubber used for model aircraft is specially formulated so as to have a consistent performance and good 'stretchability' (an elongation of about 800 per cent). It is normally made in 'strip' or rectangular sections, because experience has shown that this is more durable than 'square' sections. Standard British (and American) sizes are $\frac{1}{4}$ in., $\frac{3}{16}$ in. and $\frac{1}{8}$ in. wide in either 1/24th or 1/30th inch thick. Thicknesses are often designated by number only, e.g. $\frac{1}{4}$ x 24 instead of $\frac{1}{4}$ in. x 1/24th.

Dimensions are nominal. That is to say the *actual* dimensions of different makes of the same specified sizes of strip can vary somewhat. Dimensions—and performance—can also vary somewhat from different batches of the same make; and in some cases from one end to the other of the same batch of rubber. This is due to the fact that the rubber is formed initially as a sheet, wrapped around a drum for vulcanising and then subsequently cut into strip widths, and variations can occur in processing.

The effect of such variations can be of critical importance for contest flying. The merits of each batch or hank of rubber need to be established by practical tests, in order to be sure that it is suitable; and the best performance usually comes from unused rubber which has been aged. That is to say, given two batches of rubber from the same manufacturer and to an identical specification, the one which is perhaps two or three years old will normally have a superior performance to brand new rubber. Sorting out the best rubber for contest flying, therefore, is a somewhat tedious business of continual trial and error.

For sports flying it is generally unnecessary to go to such troubles. Once a satisfactory motor *size* has been found then replacement motors of the same size in the same make should be satisfactory. Rubber motor weights and nominal maximum turns are also based on a 'standard' rubber representing typical mean average characteristics, and the aeromodeller can use these with confidence when he is not striving to extract the utmost performance from a rubber motor.

Typical strip rubber weights are shown in *Table XX*. These apply to dry rubber, as bought. When lubricated the weight of the made-up motor will be increased by about 5 per cent. As a general rule—and again only for sport flying—the rubber motor weight should be between

TABLE XX
TYPICAL WEIGHT OF RUBBER STRIP (UNLUBRICATED)

SIZE*	OUNCES PER			LENGTH PER
	12 yds.	1 yd.	1 ft.	1 lb weight (feet)
$\frac{1}{4}$ x 24	2$\frac{1}{2}$	5/24	.0695	231
$\frac{1}{4}$ x 30	2	1/6	.0556	288
$\frac{3}{16}$ x 24	1$\frac{7}{8}$	5/32	.0520	306
$\frac{3}{16}$ x 30	1$\frac{1}{2}$	1/8	.0418	384
$\frac{1}{8}$ x 24	1$\frac{1}{4}$	5/48	.0347	462
$\frac{1}{8}$ x 30	1	1/12	.0278	576

* variable with different makes.

$\frac{1}{3}$ and $\frac{1}{4}$ of the *total* weight of the model to get a good performance. That is, if the complete airframe, less rubber motor, weighs 4 ounces the rubber motor weight needs to be between 1$\frac{1}{3}$ and 2 ounces—depending to a large extent on the size of the propeller. The larger the propeller diameter and/or its pitch the more rubber weight you can use, and the better the performance should be in consequence. You can use *Table XXI* for working out the actual length of rubber strip you require for making up motors of different weight.

TABLE XXI
RUBBER LENGTHS IN FEET FOR GIVEN WEIGHT

Motor Weight Ounces	RUBBER SIZE					
	$\frac{1}{4}$ x 24	$\frac{1}{4}$ x 30	$\frac{3}{16}$ x 24	$\frac{3}{16}$ x 30	$\frac{1}{8}$ x 24	$\frac{1}{8}$ x 30
1	15	18	19	24	30	36
1$\frac{1}{4}$	18	23	29	30	37	45
1$\frac{1}{2}$	22	27	28	36	44	54
1$\frac{3}{4}$	25	32	33	42	51	63
2	29	36	38	48	58	72
2$\frac{1}{4}$	32	41	43	54	64	81
2$\frac{1}{2}$	36	45	48	60	72	90
2$\frac{3}{4}$	39	50	54	66	79	99
3	44	54	57	72	88	108
3$\frac{1}{4}$	48	59	62	78	96	117
3$\frac{1}{2}$	51	63	67	84	102	126
3$\frac{3}{4}$	54	67	72	90	108	135
4	58	72	77	96	116	144

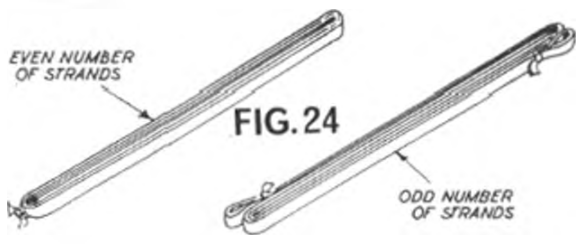


FIG. 24

It is normally most convenient to make up a motor into an even number of strands, when a single knot can be used to join the ends—*Fig. 24*. An odd number of strands would need a loop tying at each end, and knots can be a weak point in rubber motors. It is also important that knots should be tied *before* lubricating the rubber. A reef knot like that shown in *Fig. 25* will then hold, provided it is drawn really tight. To avoid the possibility of tearing the rubber when drawing the knot tight wet the strip first—e.g. by licking it.

Knots made in *lubricated* rubber will always force themselves undone again, unless bound in place. The best form of binding is strong wool, knotted and re-knotted around the original tied ends whilst *held stretched* to maintain a tight original knot. Again a simple reef

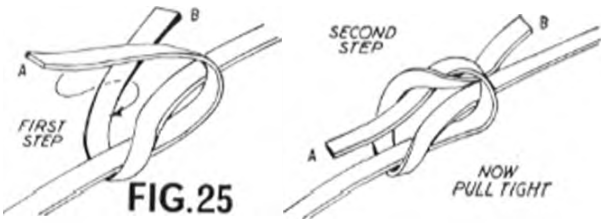


FIG.25

knot is satisfactory for the original knot, and this is the sort of repair job which can be carried out on a broken strand.

Lubricating the rubber *is* most important—and it is even more important to use *only* the right sort of lubricant. There are only two types—a mixture known as 'rubber lubricant' and made up from soft soap and glycerine; and pure (medicinal quality) castor oil. The former is a little more 'slippery', but pure castor oil is a perfectly adequate lubricant and saves the necessity of having to make up, or buy, a soap-glycerine mixture—see *Table XXII*. Which you use is purely a matter of personal preference.

TABLE XXII
RUBBER LUBRICANT FORMULA

INGREDIENT	AMOUNT	MIXING
Pure soft soap (unscented)	4 ounces	Bring to the boil slowly in a clean pan, stirring all the time. Then allow to cool.
Glycerine	4 Tablespoons	
Water	½ pint	

A made-up motor of optimum weight and with a suitable number of strands to match the propeller being used will inevitably be longer than the distance between the rear anchorage and the propeller shaft (unless the fuselage length has been specially designed to accommodate it). In its unwound state, therefore, such a motor

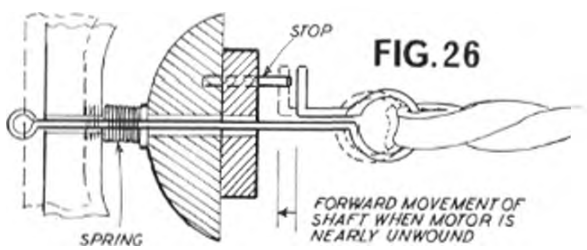


FIG.26

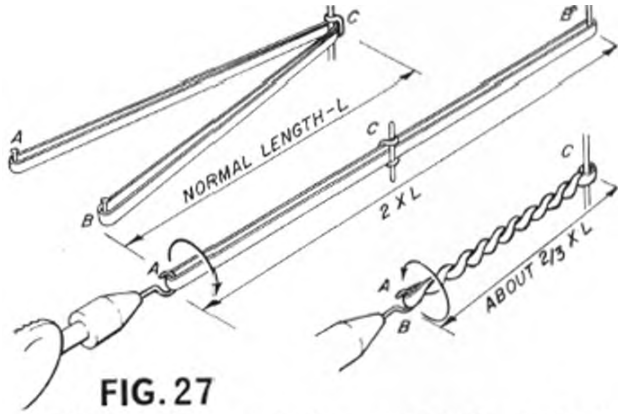


FIG. 27

will fall unevenly onto the bottom of the fuselage and upset the glide trim. This can only be avoided by providing some method of 'tensioning' the motor so that it remains taut when unwound—which really means stopping the motor unwinding completely. This can be done mechanically, e.g. with a tensioning spring and stop on the propeller shaft as in *Fig. 26;* but is much more simply achieved by pre-tensioning or 'cording' the motor itself.

Steps in 'cording' a motor are shown in *Fig. 27*. Initially the motor is made up to *twice* the length required and *one half* the number of strands (this also means that the number of strands should be divisible by *four* to enable the ends to be joined by a single knot). The most convenient way to lay the motor out is in two 'legs'—e.g. AC & BC—with a small marker—e.g., a piece of plastic knitting needle—bound to the centre of the motor with a rubber band. About 10 to 15 per cent of the nominal maximum turns of the motor are then wound on in the same direction as you would normally wind the motor. The two ends are then brought together, the middle indicated by the marker slipped over the winder hook and the doubled over motor allowed to unwind. This will cause the two skeins on the motor to wind up into a rope or 'corded' form with a considerable shortening of its original length. It then only remains to bind both ends of the motor with a rubber band to retain it in a corded state ready for use.

Cording the motor in this fashion reduces the maximum turns by about half the number of 'cording' turns applied initially. The 'cording' turns may need to be adjusted on a trial and error basis—e.g. unwinding and re-cording—to achieve the desired tension. It may also be necessary to re-cord the motor, with slightly more 'cording' turns, after the motor has been broken in.

RUBBER MOTORS WILL BE CONCLUDED NEXT MONTH

TABLE XXIII
NOMINAL MAXIMUM TURNS *PER INCH MOTOR LENGTH. (LUBRICATED RUBBER)

Number of Strands	RUBBER SIZE				
	¼ x 24	¼ x 30	7/32 x 24	7/32 x 30	⅛x30
2	60	63	66	82	90
4	46	48	49	51	63
6	36	39	41	44	51
8	30	33	35	37	44
10	26	30	31	33	39
12	24	28	29	31	36
14	22	26	27	29	33
16	20	25	26	28	31
18	—	24	24	27	30
20	—	—	23	36	29
22	—	—	21	25	28
24	—	—	—	24	26

* Typical mean performance with approx. 5% safety margin.

MEMBERS WRITE . . .

Dear Sir,

I am a beginner to model aircraft building, and enjoy your magazine. Please could you, in some future edition, print a *glossary of terms* for beginners like myself as I think it would be useful.

Towcester, Northants. *R. Folwell.*

A glossary of modelling terms for the newcomer to aeromodelling who is confused with such things as "L.E.", "T.E.", "Gussett" and "Braces", etc., can be found on page 27 of the **"KeilKraft" Handbook** *or in the Faber book* **'Modern Aero Modelling'**. *As well as the above each contains lots of very handy tips for constructing your first model and lists of wood and wire sizes available, kits, engines dope, etc.*

Dear Sir,

I am very pleased that you combined "Model Aircraft" with "Aero Modeller". Before I could not always afford to buy two magazines but now I am able to get the benefit of both publications.

At present I am building my first power model, a *KeilKraft* "*Luscombe Silvaire*" of 40" wing span. It is powered by a *D.C. Bantam* glow-engine and will be completely silver except for blue trim along the fuselage.

If I can successfully build and fly the "*Silvaire*" I hope to but some single-channel radio equipment and the *Veron* "*Mini-Robot*" plane. The R/C gear will probably consist of a MacGregor tone transmitter and receiver in kit-form.

Before I bought the "*Silvaire*" I had made and flown two gliders, the *Keil-Kraft* "*Cadet*" *and* "*Caprice*", and also a rubber powered "*Chipmunk*".

Northolt, Middx. *K. Kavanagh*

GOLDEN WINGS CLUB PAGES

Plan of the month . . . .

FLETCHER FD-25 DEFENDER

A Simple Sports Rubber Model

Designed by W. C. Hannan

Rare photo of the Fletcher FD-25 Defender prototype, an unsuccessful military project later developed into a crop duster.

THE basis for this little caricature model was the Fletcher FD-25 "Defender". First flown in 1951, the FD-25 was designed by John Thorp, of "Sky Skooter" fame, as a potential "COIN" fighter, for close-in ground support work. The prototype shown in our photo, was constructed largely of magnesium, but later editions employed the more conventional aluminium.

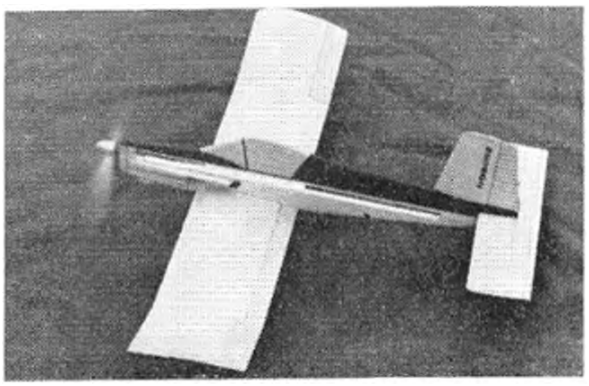
Powered by a Continental E225 engine, the FD-25 had a usable speed range of from 41 to 187 m.p.h. and was capable of carrying a large variety of external armament in addition to its two 30-cal. machine guns. The distinctive exhaust stacks are the visual manifestations of the unique Fletcher "jet-cooled" augmenter system, which added approximately 35 h.p. to the engine output.

Altogether, this was a remarkable aircraft, and one which, had it been put into production, would undoubtedly have been a useful military tool in today's trouble spots. A more comprehensive description (with photos and a 3-view) may be found in the January, 1965 issue of Air Progress magazine.

Now to our model. The selection of balsa wood is important if good performance is to be achieved. The fuselage should be light, but stiff to resist "bowing" under the strain of a fully wound motor, and the tail surfaces should be very light to minimize the need for nose ballast.

The wing should be made from medium weight sheet balsa, with a hard $\frac{1}{8}$ in. square leading edge stiffener. There are two inboard wing ribs per side, spaced just far enough apart to permit the landing gear wire to be inserted. When forming the dihedral, it will be necessary to trim both sides of each dihedral joint to a concave shape in order to obtain the correct angle. (The problem will present itself quite clearly when you try it!) Some quick-drying glue will facilitate what almost must be a hand-held-while-drying assembly operation. Note that two $\frac{1}{32}$ in. wing ribs are used at each dihedral juncture to ensure adequate strength. The section of the fuselage beneath the wing opening is removed temporarily while installing the wing.

In the interests of saving weight, the light grey of the full-size machine is represented by the natural balsa colour on our model. We also elected to omit the olive drab on the wing and horizontal tailplane — not because of the weight penalty, but for fear that the camouflage would be *too* effective against the dark green foliage of our Sepulveda Basin flying field! To those of you who are flying over light-coloured terrain, this would present no difficulty. An alternate colour possibility, is the all-over black that one night-fighter version of the Fletcher carried.



Dear John Bridge.

I am between 10 & 16 years of age and would like to become a member of the "Golden Wings Club". With this application I enclose postal order. (International Money Order) for 2/6d. to cover cost of the badge, transfers and membership card.

NAME IN FULL .....

ADDRESS .....

.....

YEAR OF BIRTH.....**SCHOOL**.....

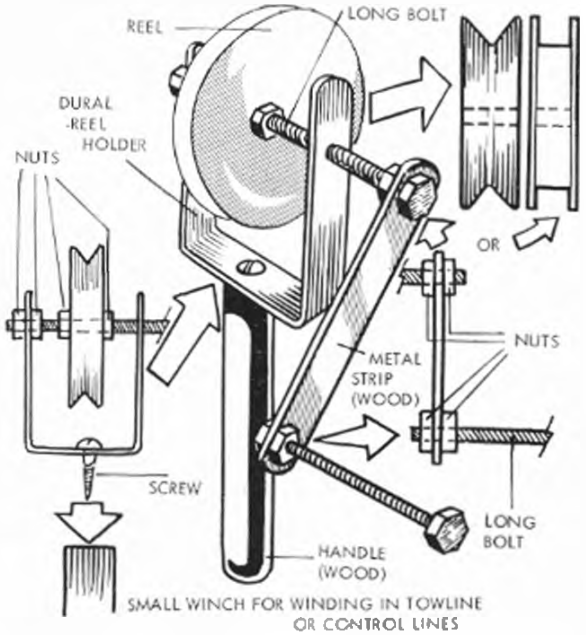
NAME OF ANY OTHER CLUB OR CLUBS TO WHICH I BELONG (if any) .....

SEND TO:- GOLDEN WINGS CLUB, AEROMODELLER, 13-35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

GOLDEN WINGS AEROMODELLER MODEL CLUB

To join, fill in the handy membership coupon and send with a postal order/money order, or cheque to the value of 2/6d. made payable to "Aeromodeller. Post to Golden Wings Club, Aeromodeller, 13-35, Bridge Street, Hemel Hempstead, Herts. Each member will receive his own badge—depicting 'Golden Wings', a membership card, and two transfers to decorate his model or model box, and will make him a member of the largest modelling club of all time. **John Bridge**

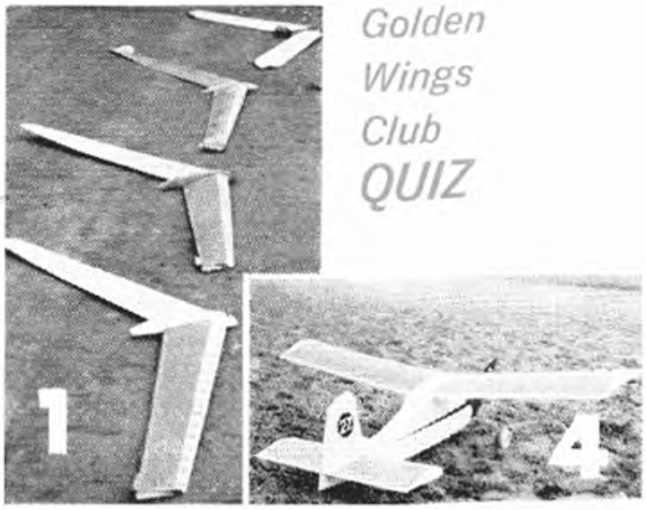
TIP OF THE MONTH



Winding in glider towlines—and control lines for that matter—can be a long and often "tangling" business. This simple quick-to-build winch for doing just that chore of winding is the brain-child of G. Wilkins of Southall, Middlesex. If any reader wants to make one, and this small winch looks good to us, the sketches supply all the "know-how", on construction.

How's your Aeromodelling Knowledge?

test your I. Q. with the . . .



1. **The models seen in photograph '1' are?**
   (a) *deltas*
   (b) *flying-wings*
   (c) *ornithopters*
   (d) *canards*

2. **"Mono-line" is?**
   (a) *a type of glider towline*
   (b) *a single-channel radio-control system*
   (c) *a control-line system*
   (d) *a fuel-feed system*

3. **The following anagrams represent trade names widely known in British modelling. Rearrange the letters to find their names.**
   (a) *BRASOOL*
   (b) *NERVO*
   (c) *REYCRUM*
   (d) *TRIKAFLEK*

4. **The "27" on the fin of model in photograph '4' signifies?**
   (a) *its weight in ounces*
   (b) *radio frequency in M/cs*
   (c) *control-line length in feet*
   (d) *competition class*

5. **The F.A.I. A/1 specification is for?**
   (a) *speed models*
   (b) *rubber driven models*
   (c) *radio transmitters*
   (d) *gliders*

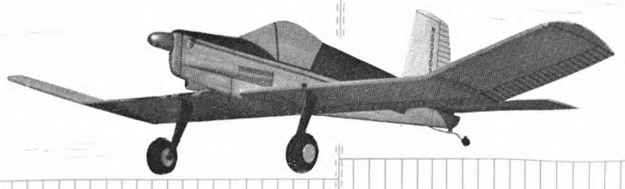
6. **Put the following engines in order of size** (i.e. capacity or swept displacement), **the smallest first:**
   (a) *E.D. Bee*
   (b) *Allen-Mercury 049*
   (c) *Davies-Charlton Bantam*
   (d) *Frog 150*

(Answers on Page 350)

Fletcher FD-25 Defender

drawn by w.c. hannan

all parts are actual size for a 17″ span model



1/16" SQ. LEADING EDGE

1/16" DOWEL MACHINE GUNS

DIHEDRAL JOINT

1/32" MEDIUM BALSA RIBS (MAKE EIGHT)

CENTRE LINE OF WING

WING PANELS ARE 1/32" SHEET BALSA

DIHEDRAL: 1 1/4" EACH TIP

3° RIGHT THRUST

DROP OF GLUE

EXHAUST STACK (CARVE FROM 1/4" SHEET)

1/32" SHEET

A 6" DIA. PLASTIC PROPELLER TRIMMED TO 5 1/2" WAS USED ON THE ORIGINAL MODEL

SPINNER AND EXHAUST STACKS ARE POLISHED METAL. UPPER PORTION OF FUSELAGE, TOP OF WING & TAILPLANE ARE O.D. REMAINDER OF A/C IS LIGHT GREY

POWER: ONE LOOP OF 1/8" FLAT RUBBER WINDER WOUND FROM REAR OF AIRCRAFT

ALL "LINES" ARE DRAWN WITH A BALL POINT PEN

WASHERS

1/16" DIA. ALUMINUM PROP SHAFT BEARING

COLOUR DIVISION LINE

TAILPLANE POSITION

BALSA SPINNER

2°

HARDWOOD OR PLASTIC TAILWHEEL

27 S.W.G. PIANO WIRE

REAR RUBBER RETAINER (STRAIGHT PIN)

HARD BALSA BLOCK

NOTE: L/G WIRE IS INSERTED BETWEEN TWO WING RIBS. GLUE LIBERALLY

L/G FAIRING 1/32" SHEET SECURED TO PIANO WIRE WITH TISSUE AND GLUE

22 S.W.G. PIANO WIRE

DROP OF GLUE

1/32" SHEET

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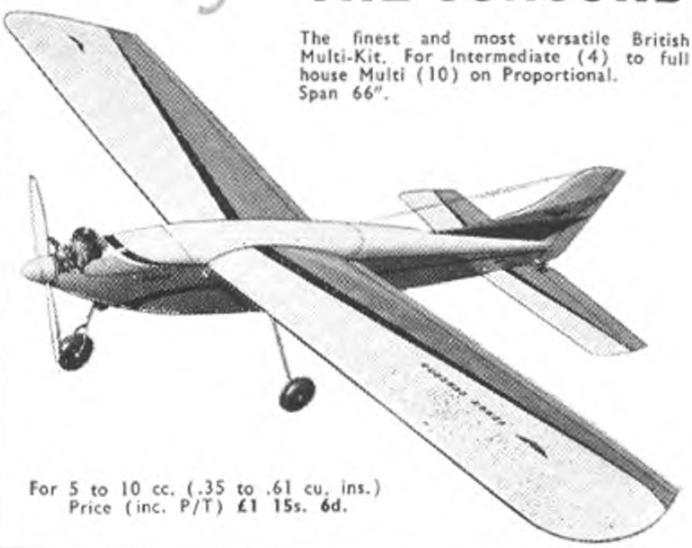

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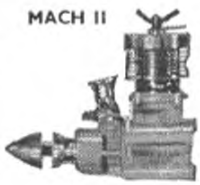

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John O'Donnell comments on the first contests of the year on Free Flight

The first of the S.M.A.E.'s 1966 contests will probably be remembered for a long time by the handful who flew. Participation in area-centralised events under adverse conditions has always been under the shadow of "someone else having better weather". Usually this is true enough—but March 27th had something unique in the way of universally bad weather. From what I have heard it would seem that there was little to choose between different parts of the country.

I went to Topcliffe to fly with the Northern Area. At least this was on the leeside of the Pennines but it seemed to make little difference. Windspeed was estimated (by others) to be 35-45 m.p.h., but it was gusty and there were momentary (comparative) lulls. Three York members tried to fly glider, presumably with eyes on the Plugge Cup, but failed to get away. Henry Tubbs and I fared somewhat better in rubber, although Henry showed remarkable perseverance in continuing after smashing one model on his first attempt. Technique was to wind in the shelter of a car or van, then stand there with the fully-wound model until the wind decreased for an instant, step back two paces and release the model smartly! This gave us two flights each—Henry's second and decisive flight being a max with brilliant afternoon sun giving good visibility. I lost one model, and found the reserve spread in small pieces over half a field. I also found Henry's ancient Wakefield for him; undamaged but too late for another flight.

EASTER AT CHOBHAM and R. Lorente, of Lee Bees, displays his Coupe d'Hiver model. Has motor tube of two laminations of 1/32nd balsa and a pop-up rear fuselage dethermaliser. Wing airfoil is from Jim Baguley's A/2 gliders. At bottom is B. Calais, from Southampton, who was placed 4th in Open Glider flying A/2 with rear fuselage a laminated 1/32nd sheet balsa tapered boom formed over a billiard cue, as with our full size plan this month.

Extracts from Crawley's news-sheet indicate that it was sheer persistence that got Jack Allen and Chris Foss their A/2 scores, whilst Pete Cameron broke two Coupe d'Hiver models. I rather like the description applied to the second—which was run over by a passing car—"at least it died with its boots on".

A little further south Graham Head flew at Beaulieu to total around 4½ mins in power, mainly by virtue of one flight timed o.o.s. at 2:45 (that landed at about 3:20 and travelled, so it is said, 3½ miles). The reason why he doesn't appear in the S.M.A.E. results should be quite interesting—especially to the declared winner, Alan Moss of my club, who flew with the N.W. Area at Chetwynd.

Having mentioned the S.M.A.E. results and already having described the adventures of the contest winners there is only one further point. The entry was almost unbelievably low, there being just 21 scores spread over four events, and consequently the question of declaring the contests void was raised in the S.M.A.E. council. Results are upheld *(see page 350)*.

S M A E events

In comparison the events on 17th April should be well supported. The N.W. (and Midland) had breezy, overcast and cold conditions at Chetwynd—but there was a fair amount of activity from those who attended. Only one treble was scored in each of the rubber and glider events. Fly-offs were held in very cold and uninspiring conditions. Brian Day's 3:11 in the Gamage was very hard to see—whilst Dave Yates did well to do 2:11 in glider. He attributes his success in this event to the silencer rule! He was the National winner anyway!

Joe Savini, as the area's F.A.I. Power specialist, provided top score with about 13½ mins and demonstrated just how important it is to have a good motor when using straight fuel. The fuel caused much discussion both at the contest and the previous day's Area meeting regarding who should provide it—organisers or competitors. In the event fliers used their own. Perhaps the best solution is a quick chemical test for nitro additives.

One aspect of the S.M.A.E. events deserving comment is the revised system of scoring for National Championship. With only six area events (one per meeting) now counting, plus three at the Nationals, the Championship is no longer the endurance test that it was previously. It still demands as many models (to cater for all events) but there does seem a little more interest in it—or there was before March 27th.

As the Plugge Cup (Club championship) is decided on six events at area contests it seems very strange that the same events were not selected for both club and individual championships. It only affects a few people (or clubs for that matter) but might well have been a better system—saving an unnecessary division of interest.

Easter

In between the two Area centralised events came Easter, with meetings being held at different ends of the country. The N.W. Area's annual event is reported separately at some length. The clash of dates with the South of England Free Flight Gala at Chobham was not an unfortunate coincidence—the Southern meeting being deliberately staged as a counter attraction by some of those dissatisfied with previous Tern Hill meetings. Their main complaint in previous years was the restricted car parking (and resultant hike across the 'drome) and it is more than ironical that this year should see the relaxing of these regulations. The result was a much happier meeting and a marked absence of complaints.

A report from Chobham has been sent by Martin Dilly and gives a good enough picture to quote it verbatim:-

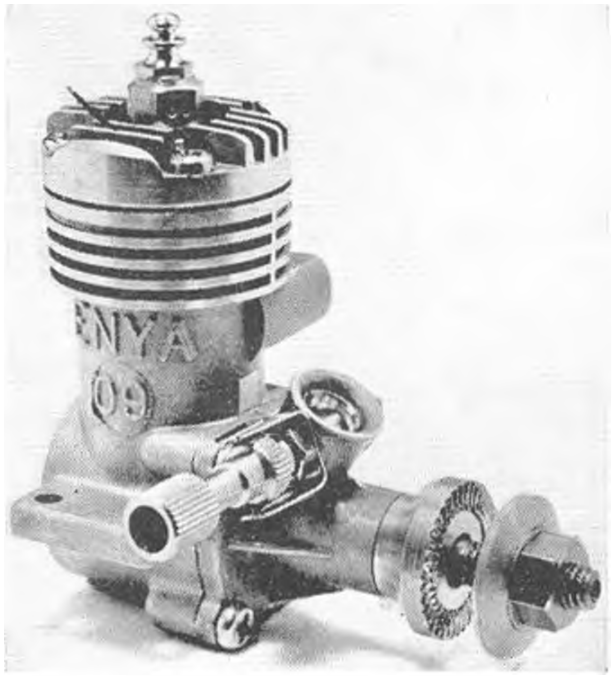
"The first day was generally sunny with winds around 10-15 knots S.W. with patches of strong lift, but towards late afternoon conditions calmed quite a lot and the fly-offs were made in negligible wind and little lift detectable on the ground.

Entries were good and Len Larrimore of Lee Bees topped a list of 47 in Open Glider, flying a six-year old modified "Lucifer" with a fine crop of mildew and a number of interesting warps. Second man Hansford of Blackheath had an impressive all sheet Jedelsky A/2 that did a creditable 4:35 at a height of about 150 feet all the way.

Mike Brown of Maidenhead lost his ½A model on its final max, so John Boxall of Croydon only had to make a nominal fly-off time to win ½A Power.

A/2's led the field in combined F.A.I. but fly-off was not necessary.

Continued on page 326



ENGINE TEST

by Peter Chinn

Enya ·09-III

1.6 c.c. Japanese glow plug engine now completely redesigned

THE 1.6 cc Enya 09-III glowplug motor, as its name suggests, is the "Mark III" version of the well-established Enya 09, an engine that appeared in its original version in the early nineteen-fifties, this being succeeded by the 09-II in 1960.

All three models are shaft rotary-valve, loop-scavenged engines, featuring a unit cylinder crankcase casting with drop-in cylinder-liner and a detachable front housing containing the main bearing and carburettor. Beyond this basic specification, however, each model has differed quite considerably from its predecessor. The development policy of both the leading Japanese engine manufacturers (Enya and O.S.) appear to be quite unhampered by the more commonly accepted practices of model engine production economics, such as the continued use of the same castings through several models and the avoidance of other modifications that would require expensive re-tooling. The 09-III, in fact, contains no parts whatsoever that are common to the 09-II.

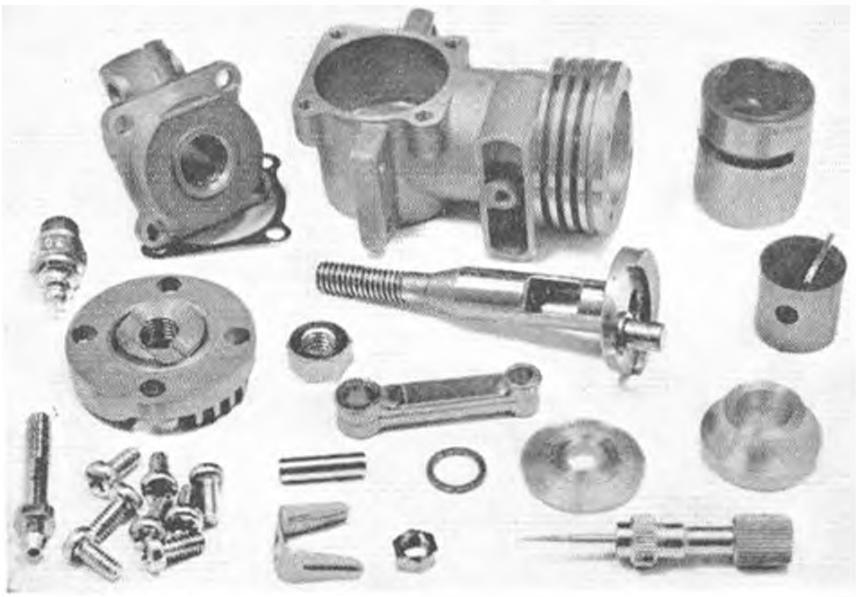
As originally designed, the Enya 09 had the usual arrangement of opposed rectangular cylinder ports with the transfer passage between the liner and casting. In the 09-II, this latter was abandoned in favour of twin transfer flutes formed in the inner wall of a very thick liner. The bore and stroke of the 09-II model remained the same as those for the Mk. I engine and a similar crankshaft was used, but all new castings were used and the engine had a lower cylinder height and a more modern appearance.

Improved Induction System

In the 09-III, the twin internal flute-type transfer system is retained but, as we have already remarked, all component parts are new. This engine is, in effect, a complete redesign of the 09-II and the need for so many new parts is a result of the adoption of a lower stroke/bore ratio and a bigger shaft and improved induction system.

The crankshaft now has a journal diameter of 8 mm. (0.315in.) instead of 7.5 mm. This has permitted a larger valve port and a larger bore gas passage—now 6.2 mm. instead of 5.5 mm., an increase in cross-sectional area of over 27 per cent. The intake aperture through the bearing is still of an elliptical shape (unlike the larger Enya engines it does not feature straight sides for more rapid opening and closing), but is considerably larger. The rotary-valve has been re-timed to close about 5 deg. later at 50 deg. ATDC, the total induction period being approximately 190 deg. of shaft rotation.

A very much bigger bore carburettor intake is also used: 7.0 mm. instead of 5.8 mm. Having regard to the fact that both the old and new intakes are sub-



Parts of the Enya 09-III. Noteworthy are the very thick cylinder liner with internal transfer flutes, robust construction and good finish.

stantially reduced by a 4 mm. diameter spraybar, the actual choke area of the 09-III is more than double that of the 09-II. As supplied, the 09-III is fitted with a sleeve, held in position by the spraybar to restrict the choke area, but a very worthwhile increase in power is evident when this restrictor is removed.

The larger bore cylinder liner is also thicker. Its wall thickness is now a full 2.5 mm., or approximately 1/10 in., and thus very rigid. As before, it is located, not by a flange on the top of the liner, but by an annular seating in the casting. This seating is now widened on the exhaust side and narrowed on the transfer side so that the transfer flutes are in no way restricted. Incidentally, the timing of both the exhaust and transfer ports is quite conservative, the exhaust remaining open for 122 deg. and the transfer ports for only 98 deg. of crank rotation.

Thanks to the shorter stroke and a slightly lower piston height above the gudgeon-pin centre, both the crankcase width and overall height of the engine are slightly reduced. The new crankcase/cylinder casting also has heavier beam mounting lugs, a small lug in the rear of the crankcase which may be drilled and tapped for a pressure nipple (for a crankcase pressurised fuel system) and a tapped lug in the centre of the exhaust duct to which, if the engine is converted to throttle-control, may be attached a coupled exhaust blanking plate.

The engine is well made and nicely finished throughout. Machine finishing is employed on the castings to an extent now more usually absent on modern small engines. Both joint faces of the bearing-housing-to-crankcase joint are, for example, machined, despite the use of a gasket between them. The cylinder head also has a machined surface to make a gas-tight metal-to-metal joint with a raised rim on the cylinder liner.

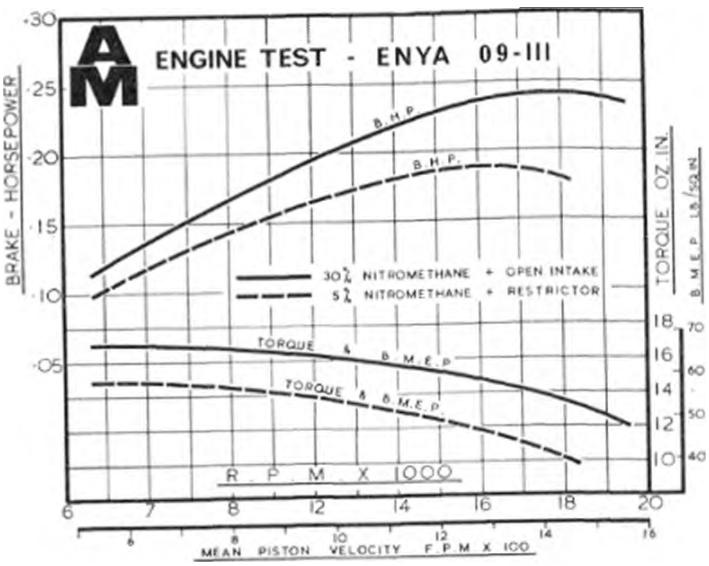
Performance

Received prior to the engine's release in the U.K., our test model Enya 09-III came direct from Saburo Enya, one of the three brothers who run the model engineering business bearing their name. Enya sales in the U.K. are, of course, handled by the KeilKraft organisation. With the engine were two of the new Enya No. 30 platinum filament glowplugs. These have finer filaments than the good, but expensive, No's. 4, 5 and 6 plugs made for the bigger Enya engines and may, therefore, be more reasonably priced on the U.K. market. We used these plugs for our tests of the 09-III and found them very well suited to this motor.

The 09-III was given about one hour of intermittent running-in time and another 30 or 40 minutes was accumulated during preliminary r.p.m. checks on various props using a low nitromethane content (5 per cent) fuel mixture.

From this point onward, it became increasingly apparent that this new Enya was going to emerge as one of the most powerful 09's to date. The nonchalant ease with which it turned quite large props (over 8,000 r.p.m. on a 10 x 3½ Top-Flite wood) left one in no doubt as to its exceptionally high torque at moderate speeds, but speeds of 12,200 on an 8 x 4 Power-Prop and 15,200 on a 7 x 3 Trucut also indicated that this high torque low down was not gained at the expense of top end power. These impressions were, in due course, confirmed by the torque figures obtained at various r.p.m., from which the torque and power curves were plotted.

Starting and handling were, in general, good, but not, we thought, quite so foolproof as with the

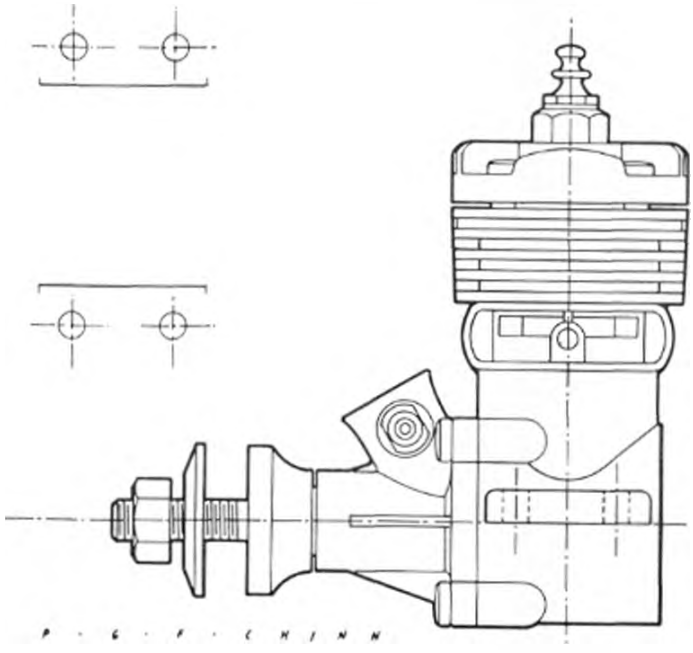


earlier model. When starting from cold, the 09-III was fairly critical to mixture strength. It needed a reasonably rich mixture to fire, but then tended to draw an excess of fuel which could cause it to stop.

Some engines will tolerate an excessively rich mixture and splutter away until they have cleared it. The Enya does not appear to be one of these. Warm re-starts were much easier.

The needle-valve setting for best performance was fairly critical on the 5 per cent nitro fuel used to this point, but became noticeably less so on a substantially hotter fuel. We substituted a "racing" type mixture containing 30 per cent nitromethane (pure nitromethane, not the 70/30 nitro/methanol blend that is the only commercial grade now available). This added 700 r.p.m. to the engine's revs on an 8 x 4 Tornado nylon, 800 on an 8 x 4 Power, 900 on a 7 x 4 Tornado, 1,000 r.p.m. on a 7 x 3 PAW, dropping back to 800 on a 7 x 3 Top-Flite. We then removed the venturi restrictor and ran a further series of tests on 30 per cent nitro fuel. This added another substantial gain, particularly at speeds above 15-16,000 and resulted in the curves shown, including a peak output of just over .24 b.h.p. at 18,000 r.p.m.

(*Continued on page 326*)



This power figure is, in our experience, second only in the "09" category to the Cox Tee-Dee 09 on similar fuel. The maximum torque, registered by the Enya, of 17 oz. in. is the best recorded by any engine in this capacity group. A side-by-side comparison of performance figures recorded under similar conditions for the two engines suggests that the Enya is, in fact, the better of the two up to 14,000 r.p.m., after which the Cox pulls away gradually by virtue of its higher peaking speed of nearly 20,000 r.p.m.

Most noticeable at all times was the very steady running of the Enya. This applied equally with or without the venturi insert despite the fact that, with the open intake, ordinary suction feed was still used. The engine burned out one plug (when running at 17,600 r.p.m. on a 7 x 3 Top-Flite), but the replacement No. 30 plug withstood several successive runs at higher speed on 30 per cent nitro fuel.

No silencer was used during the tests. The existing Enya silencers do not fit the 09-III, but the manufacturer will doubtless be offering a suitable unit for the 09-III in due course.

Power/Weight Ratio

0.82 b.h.p./lb. as tested on 5 per cent nitromethane fuel *with* restrictor

1.04 b.h.p./lb. as tested on 30 per cent nitromethane fuel *less* restrictor

Specific Output

116 b.h.p./litre as tested on 5 per cent nitromethane fuel *with* restrictor

149 b.h.p./litre as tested on 30 per cent nitromethane fuel *less* restrictor

SPECIFICATION

Type: Single-cylinder, air-cooled, loop-scavenged two-stroke cycle glowplug ignition. Shaft type rotary-valve induction.

Bore: 13 mm. (0.5118 in.) **Stroke:** 12.2 mm. (0.4803 in.)

Swept Volume: 1.619 c.c. (0.0988 cu. in.)

Stroke/Bore Ratio: 0.938:1

Weight: 3.7 oz.

General Structural Data

Pressure diecast aluminium alloy *crankcase/cylinder-block* with drop-in steel *cylinder-liner*. Pressure diecast aluminium alloy detachable *front housing* with cast-in phosphor-bronze *main bearing*. Hardened, counterbalanced *crankshaft* with 8 mm. dia. journal, 6.2 mm. bore gas passage and 4.5 mm. dia. crankpin. Lightweight lapped cast-iron *piston* with fence type baffle and fully-floating 3.5 mm. hardened tubular *gudgeon-pin* with brass pads. Pressure diecast aluminium alloy *connecting-rod* with bronze big end bush. Pressure diecast aluminium alloy finned *cylinder-head* with machined joint face and cast-in bronze thread insert for glowplug. No cylinder-head gasket. Machined aluminium alloy *prop-driver* fitted to matching taper on crankshaft. Nickel plated brass *spraybar assembly* with optional venturi insert. Beam mounting lugs.

TEST CONDITIONS

Running time prior to test: Approximately 1¼ hours.

Fuels used: (i) 5 per cent pure nitromethane, 25 per cent Duckhams Racing Castor-oil, 70 per cent I.C.I. Methanol. (ii) 30 per cent pure nitromethane, 25 per cent Duckhams Racing Castor-oil, 45 per cent I.C.I. Methanol.

Glowplugs used: Enya No. 30 1.5 volt platinum filament, 3/16 in. reach.

Air Temperature: 52 deg. F.

Barometer: 30.10 in. Hg.

Silencer Type: Nil (see text).

FREE FLIGHT by J. O'Donnell

Continued from page 323

In Coupe d'Hiver P. Lorente of Lee Bees had a neat model, using a rolled double 1/32 balsa fuselage with a pop-up rear portion for the D.T. and an airfoil of Jim Baguley's originally used for A/2's that has proved quite successful on smaller chords as well.

On the second day the wind had swung to N.E. and was a little lighter but visibility was rather poor at times, a number of models going out of sight below the tree line, and there was an occasional light drizzle or heavier condonsed mist. The presence of an encampment of gypsies/general dealers at one end of the car park didn't result in the expected strife possibly because they were outnumbered.

The only man to do a full house in Open Power was Don Edwards of St. Albans, but the situation was normal in rubber with eight in the fly-off, Wisher of Croydon coming out top.

In A/1 Andy Crisp of Croydon used a Wakefield Wing on a pylon fuselage to win, although his second flight was lost in the murk after 2:38.

No difficulties were encountered with car parking, most people operating straight out of their vehicles, nor were there any cases of exposure, exhaustion from upwind trekking or acute irritation. No programmes were sold!"

It would seem that some people like events organised and some like them casual. One who got the best of both was Glider specialist Pete Trenchard, of Oxford, who went to Chobham on Easter Sunday and Tern Hill the following day. I thought I was the only person who tried such tricks!

South of England Free-Flight Gala—Chobham 10-11 April, 1966. **Results:** *Open Glider*. 47 entries. 1. L. Larrimore (Lee Bees) +9:45. 2. P. Hansford (Blackheath) +4:35. 3. A. Wisher (Croydon) +1:49. *½APower*. 10 entries. 1. J. Boxall (Croydon) +1:23. 2. M. Brown (Maidenhead) 9:00. 3. K. Smith (Croydon) 7:08. *Combined F.A.I.* 38 entries. 1. E. Drew (Bristol & W.) +5:33.2. D. Kidner (St. Albans) ‡ 5:01.3. T. Punter (Hayes) +4:37. *Coupe d'Hiver*. 17 entries. 1. R. Johnson (St. Albans) 5:37. 2. D. Tipper (St. Albans) 5:31. 3. G. Cornell (Croydon) 5:11. *Open Power*. 24 entries. 1. D. Edwards (St. Albans) 9:00. 2. P. Buskell (Surbiton) 8:57. 3. J. West (Brighton) 8:41 *A/1 Glider* 18 entries. 1. A. Crisp (Croydon) 8:38. 2. P. Newell (Surbiton) 6:45. 3. G. Cornell (Croydon) 6:17. *Open Rubber*. 18 entries. 1. A. Wisher (Croydon) +5:48. 2. C. Foss (Brighton) +5:26. 3. A. Wells (Hornchurch) +4:50. *Chuck Glider*. 7 entries. 1. A. McCombie (Blackheath) 3:48. 2. A. Slater (Leatherhead) 3:42. 3. A Wells (Hornchurch) 3:02.

Tail-less winner at Tern Hill was Ken Attiwell with pusher that employs rearward folding prop and side-lifting nose fin for stability.

AIRCRAFT DESCRIBED No. 151

MAURICE FARMAN "SHORTHORN"

drawn by Ian R. Stair

THESE were the "Tiger Moths" of World War One. Their exploits were legion and their duties just as mixed as that of the much later Tiger Moth. Both being early machines and somewhat limited in speed (60 m.p.h.) as well as a rigger's nightmare, the two Maurice Farman designs have tended to become overlooked by modellers and historians.

Originally created by Henri and Maurice Farman at Billancourt, France, the type numbers were officially S.7 and S.11. Made in England by numerous contractors, notably the Aircraft Mfg. Co., at Hendon, these trainers were to provide basic experience for many who were ultimately destined to command our Air Force.

The S.7 or Longhorn came first. It was used by civil flying schools, again notably at Hendon, as well as in the R.N.A.S. long before the outbreak of war in 1914. The Navy had some on floats and though very much a fair-weather machine (with intriguing wash-out in the starboard wings and wash-in on the port side) it was to amass a creditable total of training hours. Powered either by the 80 h.p. Renault or the 75 h.p. Rolls Royce Hawk, the Longhorn had interconnected elevators at front and rear. Supports for the forward control surface were also useful skids, preventing a nose-over as well as a useful flight reference.

The S.11 Shorthorn dispensed with the forward plane and biplane tail. It also introduced a pair of fins! With the 100 h.p. Renault it could reach 66 m.p.h. and as a bomber it would carry up to 288 lbs. of H.E.

Commander C. R. Samson dropped such a load on the enemy at Ostend to make the first ever night raid. This was with No. 1241, a 130 h.p. Canton Unne powered version.

Writing in his book *Wind in the Wires* Duncan Grinnell-Milne, M.C., D.F.C., offers an authentic impression of the Farman as he saw it during the early days of his flying training.

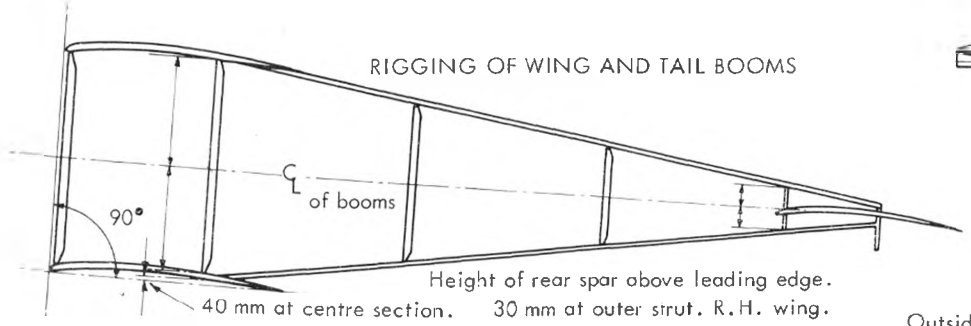
It had an elevator—or stabilising surface -stuck out in front upon curving outriggers of wood, and a double set of stabilisers—or elevators—fixed to wooden spars at the stern. But for the propeller, which drove the machine inexorably forward, and the arrangement of the pilot's seat and controls, it might have been designed to travel in either direction. Officially it was called after its inventor: a Maurice Farman biplane; but it was better known as a "Longhorn", because of the outriggers to the forward elevator. A slightly more modern sister-ship was called the "Shorthorn", because the inventor had, rather rashly we thought, done away with the outriggers and elevator. The allusion was, of course, to famous breeds of cattle and taking them all round, the aeroplanes of Monsieur Farman's breeding were pleasant beasts. But except for slowness and docility the resemblance to cows ended with the horns. To the uninitiated eye the Longhorn presented such a forest of struts and spars, with floppy white fabric drooped over all, as inevitably brought to mind a prosperous seaport in the heyday of sailing ships, whilst piano-wire was festooned everywhere to such an extent that the wrecking of a few of these machines before the lines in Flanders would have provided our troops with an impenetrable entanglement."

Strangely enough the "Longhorn" seemed to be the preferable machine, as evidenced in the following quotation from the same book (published as Panther paperback 684 in 1957).

"The trouble with a Shorthorn was that it had no nice tea-tray elevator in front with which to judge the correct flying angle, and thus the first impression to a Longhorn pilot was rather perilous, as if he were hanging head down over a balcony".

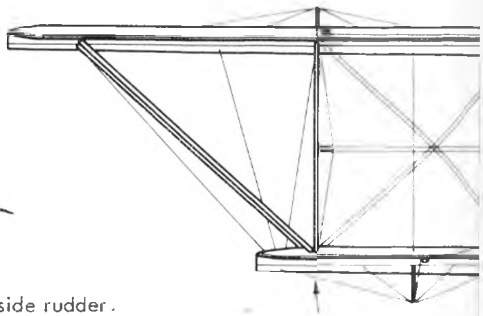
Heading photo shows the brave aviators and Shorthorn 1032 with 70 h.p. Renault engine. This one has the pointed rudders carrying manufacturers' initials on the inside faces. Natural clear doped linen finish. I.W.M. Photograph Q 58597. To the left is a Longhorn taking off from Hendon with "Daily Mirror" photographer on board. Note the foreplane. Above is B 4722, built by the Aircraft Mfg. Co., it has rudder stripes on outer faces only. At left is A 2141 with rudder stripes all round plus nacelle and wing roundels. Acknowledgement is duly accorded to the Royal Aeronautical Society for research material.

RIGGING OF WING AND TAIL BOOMS



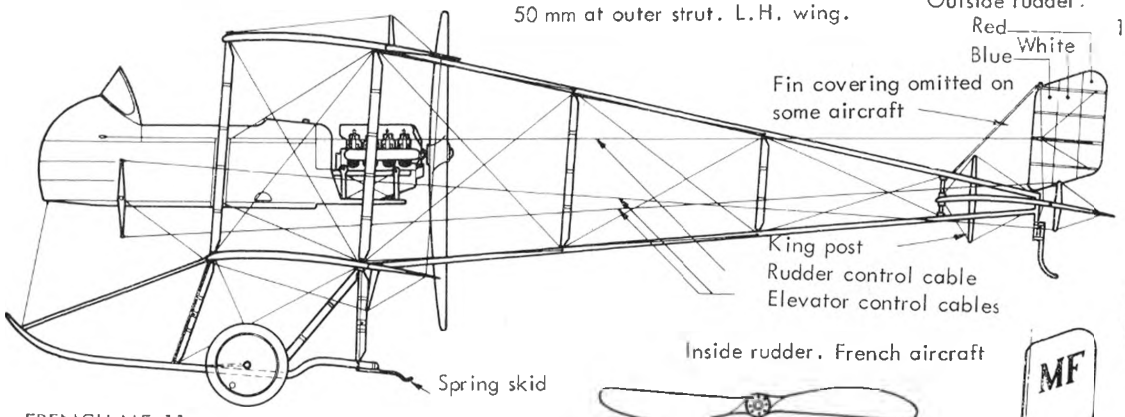
40 mm at centre section.

Height of rear spar above leading edge.
30 mm at outer strut. R.H. wing.
50 mm at outer strut. L.H. wing.



10 mm wash out at outer strut

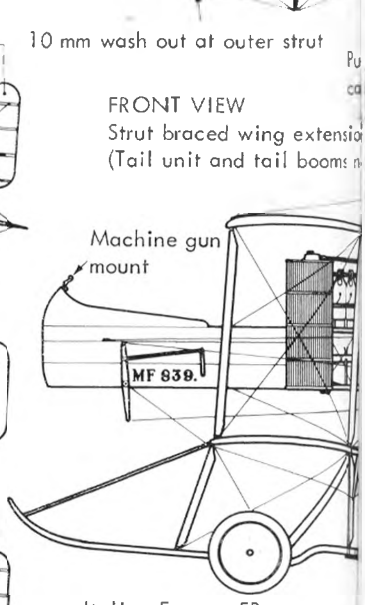
FRONT VIEW
Strut braced wing extensio
(Tail unit and tail booms n



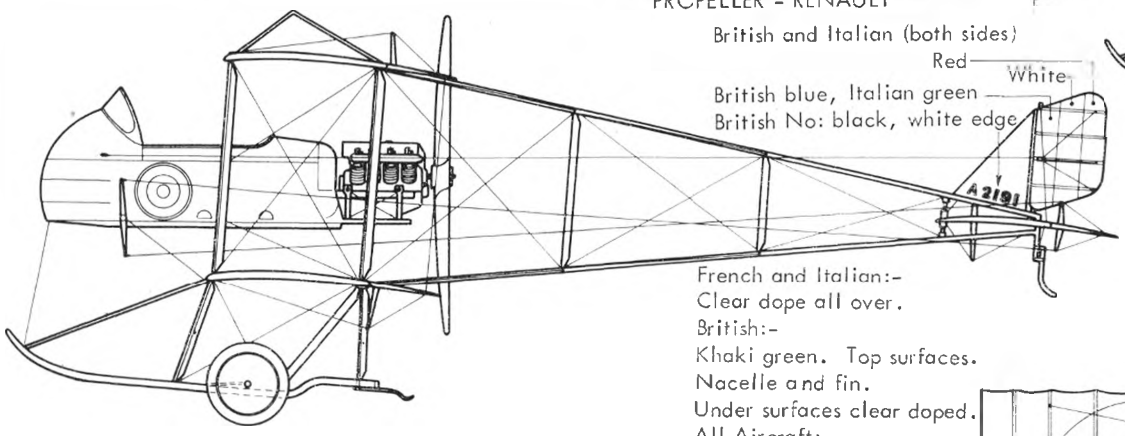
FRENCH MF.11.

Inside rudder. French aircraft

PROPELLER - RENAULT



Italian Farman 5B
Fiat A.10. engine with large
radiators on each side of nac
Observer in front with gun.

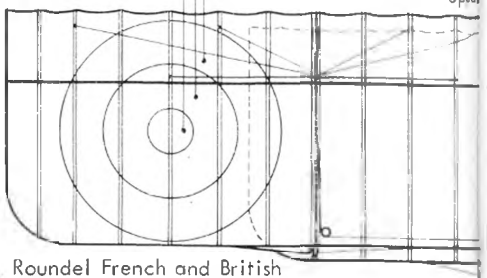


BRITISH MF 11 (WHITEHEAD BUILT)

French and Italian:-
Clear dope all over.
British:-
Khaki green. Top surfaces.
Nacelle and fin.
Under surfaces clear doped.
All Aircraft:-
Struts, booms, propeller
durk polished wood.
Some British training
aircraft were clear doped
all over

French Roundel.
Blue
White
Red

Note: Italia
Carri
mark
upse



Roundel French and British

UNDERSIDE

Italian aircraft had the underside of the L.H. wing tips painted green and the R.H. wing tips painted red. This usually extended to the outer struts on the top wing and to the inner struts on the lower wing.

Reprints of this feature plus 1/48th scale dye-line prints of the original are available as plan pack AJ 2864, price 2s. 6d. from AEROMODELLER PLANS SERVICE, 13/35 Bridge Street, Hemel Hempstead, Herts. *Tracing by A. P. Lloyd*

MAURICE FARMAN MF.11. SHORTHORN.

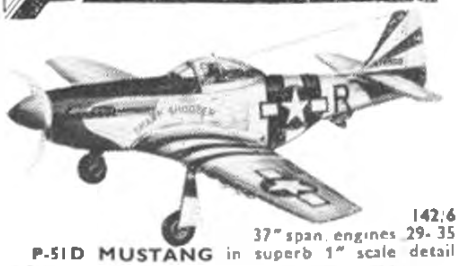
DRG. BY. IAN R. STAIR. 1966.

1/72nd SCALE DRAWINGS CONTINUED ON PAGE 333

AMERICA'S BEST

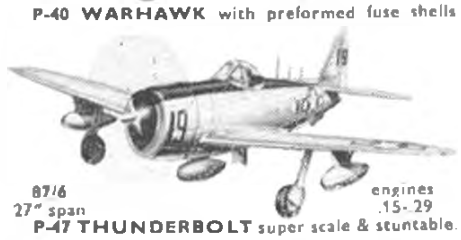
CG MODELS · McCOY's · TOP FLITE MONOKOTE · SCIENTIFIC · Sterling

TOP FLITE CONTROL LINE SCALE



142/6
37" span, engines .29-.35
P-51D MUSTANG in superb 1" scale detail

87/6
28" span. Engines .15-.29
P-40 WARHAWK with preformed fuse shells



87/6
27" span
engines .15-.29
P-47 THUNDERBOLT super scale & stuntable.

All these TOP FLITE control line kits include PREFORMED FUSELAGE SHELLS for easy, accurate assembly.

Semi scale STUNTERS

FULLY STUNTABLE!
42" span
HURRICANE semi-scale for 19's to 35's . . . 65/-

42" span
FULLY STUNTABLE!
CURTISS P-40 TIGER SHARK semi-scale . . . 65/-

½A FORM-FLITES (SCALE U/C)

18" span
Take any 049 engine
Fully prefab kits—assemble in an evening.
Just the job for that spare ½A engine!
HELLCAT - ZERO - THUNDERBOLT
21/11 each

CARL GOLDBERG MODELS

MORE 'CG' FALCONS have been built and flown since 1963 than any other R/C design! Rugged, functional and stable . . . engineered for fast building

ACCESSORIES

FALCON 56 nosegear 5/6

FALCON Jnr nosegear 2/11

¾" NYLON TAPE 2/6

JNR FALCON 54/6
37" span for single-channel and 049 engines. Wing area 250 sq. in. Weight 16 ounces

FALCON 56 . . . 131/6
56" span for single to 6 channel, rudder-only or multi-training. Suitable engines .09's to .19

SNR FALCON 252/-
69" span for 10 channel multi or proportional. .35 to .45 engines. Wing area 810 sq. in.

ALL FALCONS AND SKYLARKS FEATURE: Semi-symmetrical wing section
- Cod sprung nose gear . . . formed main gear
- Shaped and notched leading and trailing edges
- Cleanly die cut ribs, fuse sides, formers, etc.
- New simple "Symmet-TAU" wing construction
- Complete full size plans, step-by-step, etc.
- Folder on How to Set Up and Operate R/C Models

Jr SKYLARK . . . 54/6
37" span 049 or twin 02's.
SKYLARK 56 . . . 153/6
56" span for single to 10 channel Engines .09 to .19 (single or twin)

SINGLE OR TWIN SKYLARK
Build to your choice—a sleek single or an exciting twin-engine R/C model (controllable with one engine out). SKYLARK comes in two sizes as well— a WORLD FIRST!

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63" span . . . 219/6
Two beautiful semi-scale models—the '42' for single channel and 049 engines; the '63' for full house or proportional and engines up to .45.

54" span-Engines .19 to .40
A SUPERB KIT . . . 197/6
Here's the most beautiful R/C model ever kitted—a Goodyear Racer with enough stability for ANYONE to handle! For 6, 8, 10 channel or Proportional. For Contest or Sport flying.

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18" span for 02's-049's

L'IL WIZARD . . . 27/6
21" span stunt-trainer

L'IL JUMPING BEAN . . . 21/6
21" span ½A stunter

COMBAT JUNIOR SATAN 27/6
29" span for 09's up.
L'IL SATAN . . . 16/6
19" span for 049 Combat

CG MODELS

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42" span
SHOESTRING . . . 54/6
Profile stunt for 19's-35's

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TOP FLITE VECO products COMES FROM RipMax

Sterling models — SPECIALLY DESIGNED FOR RADIO CONTROL

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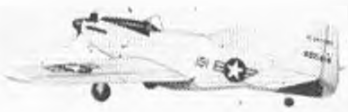
SPITFIRE 64" span . . . **£16.9.6**
Superbly authentic all-action model for multi-channel radio. Plans also show control line conversion.



MUSTANG 66" span . . . **£16.9.6**
Absolutely complete prefab kit for 'multi' radio or control line. Over 160 hardware parts!

FAIRCHILD PT 19 45 span **£5.9.6**
For radio, sports Free Flight or Control Line! Prefab kit includes metal cowl all hardware, fully detailed plan.

WIZARD 54" span . . . **£7.2.6**
Semi-scale biplane for single or multi radio and engines .09 up to .45. A superb kit.

MAMBO SPECIAL . . . £7.2.6
The fabulous 'Mambo' sport or trainer design in 52" span size for .09 to .19 engines. 1 to 6 channels.

L'IL ROUGHNECK 22½" span **£2.3.6** Specially designed to bring out the best in single-channel performance and .10 or .20 engines.

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Superb fully aerobatic performance on 8 to 12 channels with real semi-scale appearance. Takes proportional, too.

DENIGHT SPECIAL
Here's the model to delight 'Pylon Racer' fans. Matches .19 to .40 engines. Super de luxe kit . . . **£10.19.6**

CONTROL LINE

These two scale biplanes offer NEW REALISM and PERFORMANCE for C/L fans. Fully prefabbed kits.

CROP DUSTER . . . **£4.18.6**
32½" span for .09 to .19 engines

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32" span for .19 to .35 engines

NEW from SCIENTIFIC

¡A SCALE C L BIPLANES FOR YOUR SPARE 019!
All balsa construction and FULLY PREFABRICATED . . . as easy to assemble as a plastic kit! Moulded plastic cowl, all hardware, authentic transfers, etc.

FOKKER D.7

WORLD WAR I SPAD
18" span. Take any .049 engine

CURTISS HAWK FIGHTER
Price **21/11 each**

AMCO

SOMETHING **NEW** IN PREFABRICATION !

For R/C — BOX-LOK construction, with parts so accurately finished that fuselage can literally be assembled complete in your hands! The last word in FULLY PREFABRICATED KITS!

NEW! . . . NEW! . . .
AEROMASTER . . . **£18.19.6**
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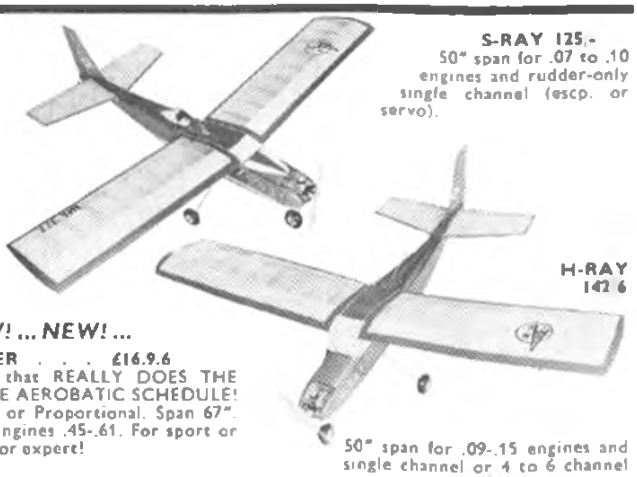
SPORTSMASTER . . . **£16.9.6**
The first model that REALLY DOES THE NEW FREE STYLE AEROBATIC SCHEDULE! 6 to 10 channels, or Proportional. Span 67". Area 740 sq. in. Engines .45-.61. For sport or contest, beginner or expert!



S-RAY 125,-
50" span for .07 to .10 engines and rudder-only single channel (escp. or servo).

H-RAY 142 6
50" span for .09-.15 engines and single channel or 4 to 6 channel multi

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38½" span for .049's 76/6

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25" span for .010's 43/6

LOW or SHOULDER WING

56" span for .45's

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52" span contest stunter by Bob Palmer advanced aerobatics 29's or 35's.

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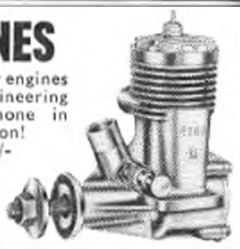
19 BB R/C 259/6
35 Standard 190/-
35 R/C Special . . 231/-
NEW 61 Std. . . . 390/-
NEW 61 R/C . . . 510/-



GLOWPLUGS
VECO 107 Long Reach 5/6
VECO 108 R/C 10/6
McCOY 40/1 6/11

NYLON

5½" dia. — pitch 3", 4" . . . 3/-
6" dia. — pitch 3", 4" . . . 3/6
7" dia–pitch 4", 6" 4/11
8" dia–pitch 4", 6" 7/3
9" dia–pitch 4", 6", 7" 9/11
10" dia–pitch 3½", 6" 11/-
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12" dia–pitch 6" 17/6

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12" dia—pitch 4", 5", 6", 8" 4/6
11" dia—pitch 4", 5", 6", 7½", 8", 6½" 4/-
10" dia–pitch 3½", 5", 6", 8" . . . 3/8
8" dia–pitch 3½", 4", 5", 6", 8" . . . 3/-
7" dia–pitch 3", 4", 6" 2/9
9" dia–pitch 4", 5", 6", 7", 8" . . . 3/4
6" dia–pitch 3", 4", 6" 2/6
5½" dia–pitch 3", 4" 2/3

SPEED

6" dia—pitch 7", 7½", 8" . . . 6/4
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9" dia–pitch 7", 12½", 13", 13½" . . . 8/4
10" dia–pitch 8", 8½", 9" . . . 9/-

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McCOY's

McCOY 19 STUNT
Snappy short stroke engine for free flight or control line. Just watch it flick the other 19's—only 67/6!

McCOY 19 R/C
Same specification as the 19 stunt, but fitted with the special McCoy barrel-type throttle for R/C work. Power to fly a 'Tauri', or similar model. only 109/6!

McCOY 29 STUNT
Rugged power a'plenty for that larger free flight or control line stunt model. Develops over one half horsepower. only 74/6!

McCOY 35 STUNT
Larger bore and stroke (not a bored-out 29) for a genuine 0.6 BHP at only 7 ounces weight! Superb for control line stunt. only 79/6!

McCOY 35 R/C
Handles those 'full house' multi models with lightweight gear, or puts real pep into a medium size R/C job. With full throttle control. only 133/6!

McCOY 40 STUNT
Increased stroke giving that little extra in performance for handling those really big control-liners or larger free flight models. only 105/0!

McCOY 40 R/C
Same specification as '40' with throttle for R/C. This is the ideal choice of power plant for R/C pylon racing or the lighter 'full house' multi jobs around 60" span. only 158/6!

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★ DUAL SIMULTANEOUS WITH TRIM, PLUS MOTOR SPEED
★ TONE MODULATED FOR MAXIMUM NOISE REJECTION, TEMP STABILISED
★ ADDITIONAL SERVO CAN BE USED FOR COUPLED AILERON & RUDDER

Why pay more! This outstanding CITIZENSHIP outfit consists of Transmitter (choice of SINGLE-STICK OR DUAL STICK), Receiver, 3 servos, and ready wired harness board. Simply plug together, add batteries and GO PROPORTIONAL!
With extra servo (£140)

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The World's Best 'Multi' Value

SUPER ECONOMY SIX Tx-Rx Combo
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THE NEW WONDER FINISH!

CLEAR and COLOURS 9/6 FILLER 9/6
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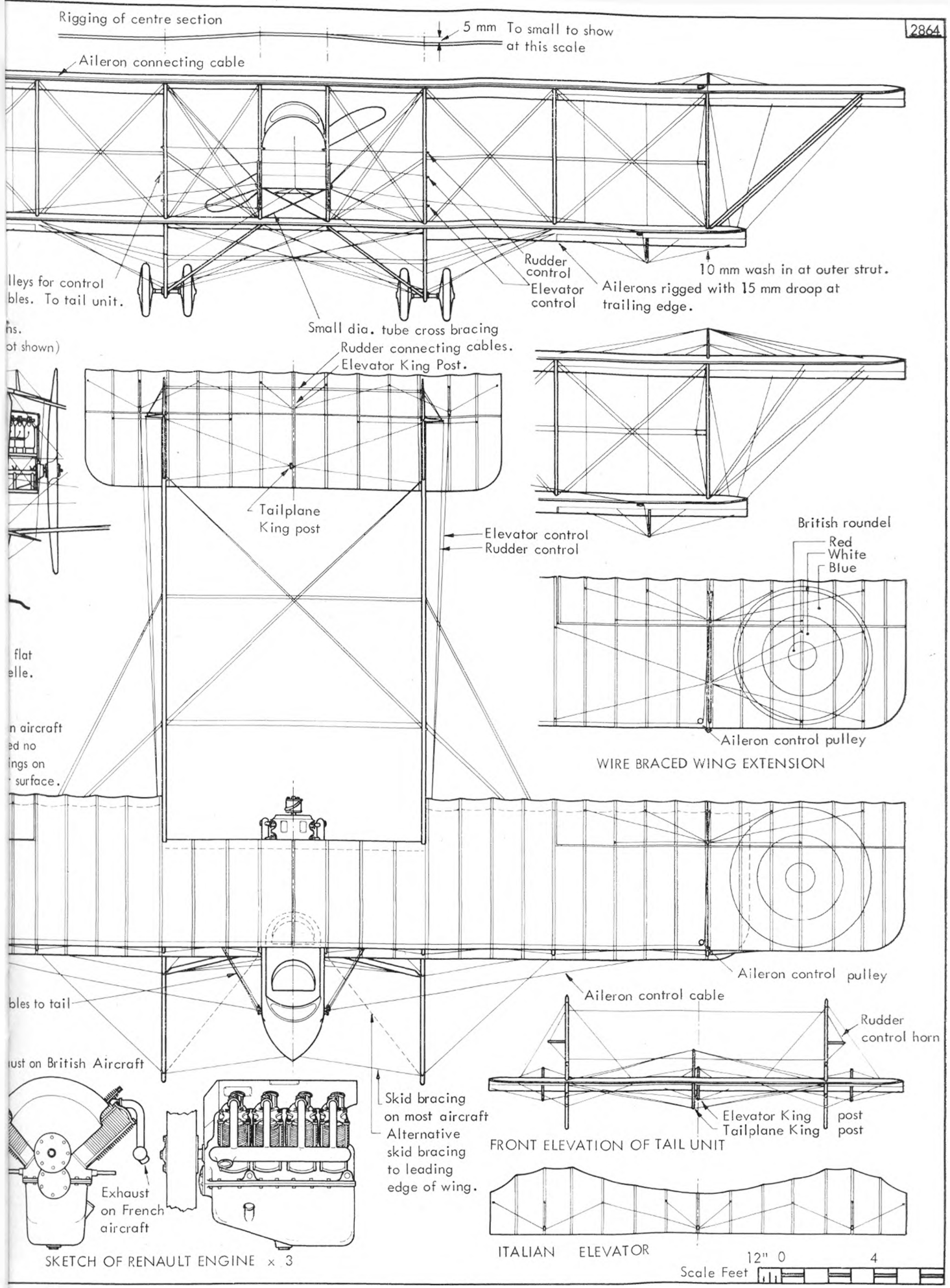


1/72nd SCALE DRAWINGS CONTINUED FROM PAGE 328

YOUR FULL-SIZE FREE PLAN

CUE DOT

a 51 inch wingspan A/1 specification glider

Designed by Martin Dilly

THIS model was constructed because a similar structure and aerodynamic set-up worked reasonably well in A/2 size and the author was interested to see how the Benedek 6456-f airfoil performed with smaller chord sizes.

A sheet upper surface is used for the wing as, with the thin airfoil employed, there isn't enough rib depth at the rib to trailing edge joint to provide adequate strength; by using a strong but light grade of $\frac{1}{32}$ in. sheet, lightly sanded *before* use and weighing 0.55 to 0.65 ounces for a 4 in. wide yard, the structural weight can be kept within acceptable limits.

It is advisable to start construction with the boom. Commence by selecting two yards of the lightest and most rollable $\frac{1}{4}$ in. tangent cut balsa you can find. Cut so they taper from about 2.4 down to 1.4 in. the exact size depending on your particular mandrel; a billiard cue was used for the originals but *anything* else straight and of about the right taper will do. Note that the dimensions at this stage do not have to be very precise, as final seam cutting will take place when the blanks are laid up on the mandrel.

Now look to see if there's any natural curve in the sheets and, if there is, dope the concave side, or any side in the case of a flat sheet, with a couple of coats of unthinned clear dope. This will both curve the wood and waterproof one side: when the sheets are dry, immerse them in a bath of warm water to curve them even more.

The next stage is to roll one of the wet blanks round the mandrel: this requires a little patience and "sympathy for the wood". Starting at the large diameter hold the blank tightly to the mandrel using Sellotape and gauze bandage strip or rubber, but do be careful if you do use rubber, as it's easy to dent the wet wood if the rubber strip is wound too tightly.

When the first blank is dry unwrap the rubber but try to leave the Sellotape intact; now use a steel straight-edge and cut the seam accurately along the length of the overlapping edges, cementing the joint with P.V.A. glue, after having first waxed the mandrel to prevent the whole lot sticking together.

Using a strip of paper as a flexible rule, measure the outside diameters of the ends of the balsa tube, remove the tube, and mark the mandrel where these diameters occur; use these marks for the ends of the second layer, which is made in the same way as the first, direct onto the mandrel, but slid along a little way to give a larger diameter. However, do *not* cement the seam. When this layer is dry remove it, replace the first tube, coat it thoroughly with Casea-mite or a similar cold water resin glue, slide on the outer layer and tape up tightly; surplus glue will be forced out of the seam and will bond both layers together. Wipe off any surplus glue, and fill any gaps with slivers of balsa while the glue is still wet. Also while the glue is still wet, make sure that the mandrel will move, pulling it out slightly if necessary.

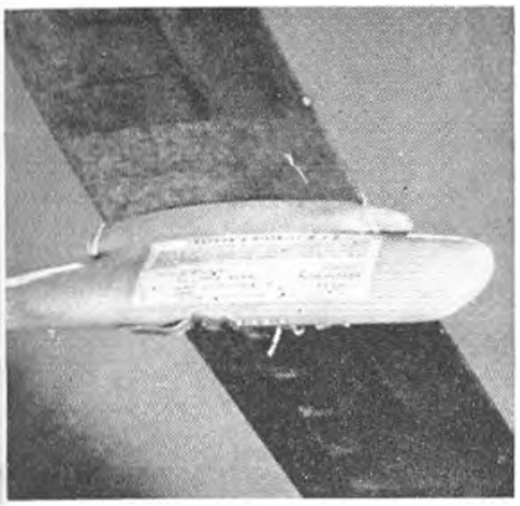
All right, so you've got a boom. Now cut the keel from plywood and the soft balsa side pieces, carving the rear of these to a circular cross section to fit into the boom, but do not cement anything yet. When you're happy that everything fits snugly together, lash the wing, fin and stabiliser into place (these will have been made while the boom has been drying) and hold the skid and timer in place with Sellotape. You ought now to be able to get a rough idea of how much lead to put into the weight compartment before the fuselage is finally assembled.

Final fuselage assembly is as follows:

(1) Cement starboard side to keel.
(2) Hollow out nose compartment and anywhere else you think needs it.
(3) Add lead to nose and cement port side to keel.
(4) Thread nylon lines through boom and tail block tube and out of appropriate holes; make sure the ends can't slip back into the fuselage.
(5) Cement the rear of the nose assembly and slide boom on, after slotting it to take the keel.
(6) Tap the adjustment holes in the dural skid and epoxy it into place.
(7) Using scrap balsa, fill any gaps in the boom to keel joint and carve and sand the whole nose to shape, blending it into the boom.

After that, all that's left is to thread the paper tubes onto the nylon lines and cement them into the fuselage, attach the fin, tailplane mount, wing runners, dethermaliser and auto-rudder release pin tube.

Tailplane construction is straightforward. Use P.V.A. glue for all flying surfaces to prevent warping. Epoxy the D/T hook in place before covering and



Nose close up illustrates adjustable tow hook tapped mounting holes in the Dural skid, and the way the wing mount is carved to form wing band retainers.

cement the plywood trailing edge reinforcement. Cover with jap tissue and give two or three coats of thin clear dope.

The wing is built flat on the board. The upper surface of the leading edge is first carved to rough shape and sanded; it is pinned to the board, with its rear edge lifted as in the cross section. Build the two centre panels and the two tips as separate jobs. The plywood ribs are assembled with the wire joiners in position as each centre panel is made. Note that the undersurface of the leading edge is left flat at this stage, later it is convexed as in the side elevation.

The trailing edge, carved and slotted for the ribs, using a $\frac{1}{8}$ in. Abrafile or a razor saw, is pinned in position and blocked up to the correct angle as shown in the section; at this time strips of scrap $\frac{1}{2}$ can be pinned adjacent to the leading edge to pack up the front of the ribs, and the mainspar can also be packed up and pinned in position.

Thread the double balsa and plywood ribs onto wire joiners and, P.V.A., glue the ribs into place, followed by all the other ribs, noting the pair of thicker ribs at the dihedral break; ensure that all ribs are flush with the lower surface of the trailing edge.

When the glue is dry mark the rib positions onto the light 1/16th balsa chosen for the wing skinning, true up one edge so that a neat joint with the trailing edge will result, and apply a $\frac{1}{4}$ in. smear of contact cement along each marked rib position; contact cement is also applied to the top edges of all ribs. Allow 10-15 minutes for contact cement to dry, then lay a sheet of paper to mask all the pre-cemented ribs; run P.V.A. along the rear edge of the skinning and the pre-carved leading edge, and butt the 1/16th sheet up against the trailing edge, ensuring that the ribs line up with the marked rib positions on the sheet. Then slide the paper out chordwise, gently pressing the sheet onto the ribs and finally pinning into position along the leading edge.

Remove the wing from the board, add tips, centre section sheeting, joiner stops, webbing and gussets and sand the dihedral break ribs to the correct angle; make up a female template for the upper surface and also for the leading edge. Carve and sand the wing to a constant and accurate profile. Cement the dihedral joint, but do not add any nylon reinforcement round the joint; if the wing is going to break it might as well do it where we can mend it again quickly. The centre section however can be covered with light nylon or silk at this stage.

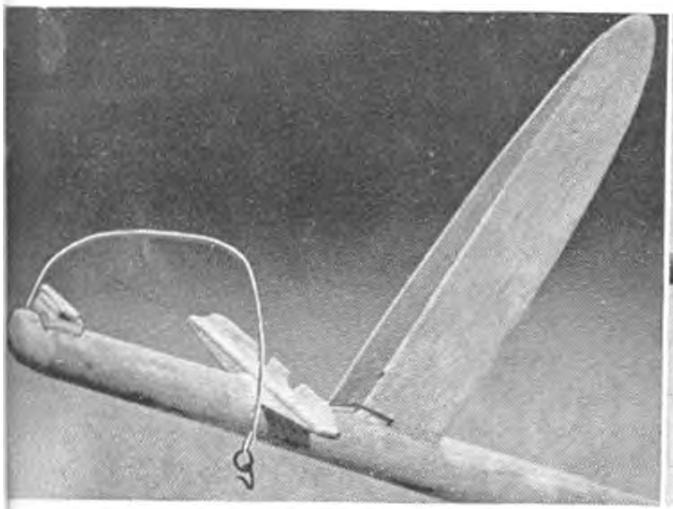
Give the entire structure a coat of thin clear dope prior to covering; cover with lightweight tissue top and bottom but note that the upper tissue stops $\frac{1}{4}$ in forward of the trailing edge, in order to reduce any tendency for the extreme trailing edge to flatten. Dope the underside with three coats of moderately thin clear dope and one coat of 50-50 clear dope and banana oil; use two coats of mixture on top, sanding lightly between coats.

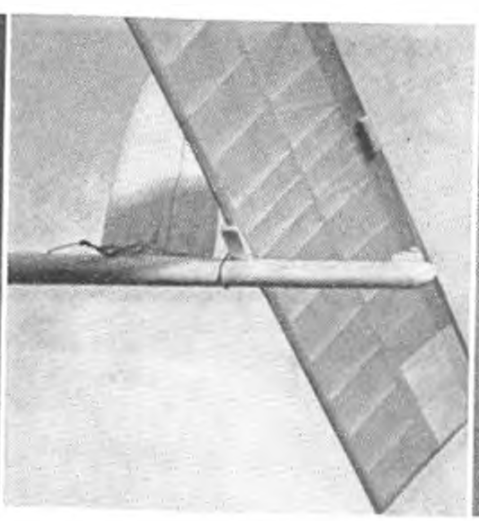
Wind the timer springs, using a piece of 12 s.w.g. wire or a suitable drill shank as a mandrel. Adjust the C of G position if necessary, by adding lead through the timer compartment. Arrange for the tailplane to tilt to about 45 deg. on dethermalisation.

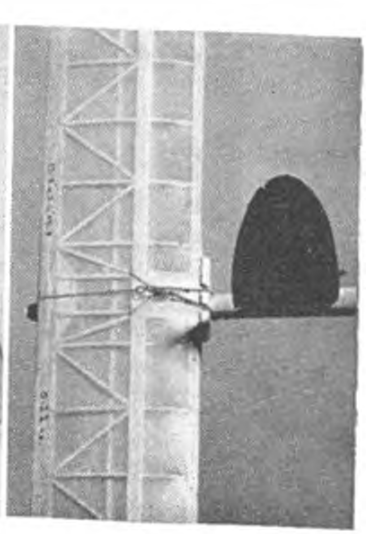
Test glide, to achieve a glide that's just on the stall, and then lose the stall by increasing the turn, to achieve a final turning circle of about 200 ft. in diameter. Make all pitch adjustments by altering the tailplane incidence.

Materials required: 2 sheets 1/32" x 3" x 36" tangent cut balsa; 1 sheet $\frac{1}{4}$" x 3" x 24" soft balsa; 1 sheet 1/16" x 3" x 24" quarter grain balsa; 2 sheets 1/16" x 4" x 36" medium balsa; 2 strips 3/8" x 3/16" x 36" soft balsa; 2 strips 7/8" x 3/32" x 36" quarter grain balsa; 1 strip 3/8" x 1/16" x 36" spruce; 1 strip 3/16" x 3/16" x 24" balsa; 1 strip 5/8" x 1/16" x 36" balsa; 1 strip 1/4" x 1/16" x 24" balsa; 1 strip 1/16" x 1/16" x 24" balsa; 1 strip 3/32" x 3/32" x 24" balsa; 1 sheet 1/8" x 5" x 6" quarter grain balsa; 1 sheet 1/16" x 3" x 18" ply; 1 length of 14,16, 22 s.w.g. wire; 1/16" I.D. alum. tube; .012" C/L wire; 1/16" 20 s.w.g. dural; nylon.

Tail area close-ups illustrate from left to right, tailplane leading edge pivot platform and dethermaliser line with hook that attaches to wire hoop epoxy glued to tailplane structure. Centre: the tailplane in its dethermalised position, note tension band and dethermaliser line both attached to tailplane hoop. Right: the dethermaliser tension band and line attached in flying position.







Peter Chinn's

Latest Engine News

Super Tigre G21/29RV

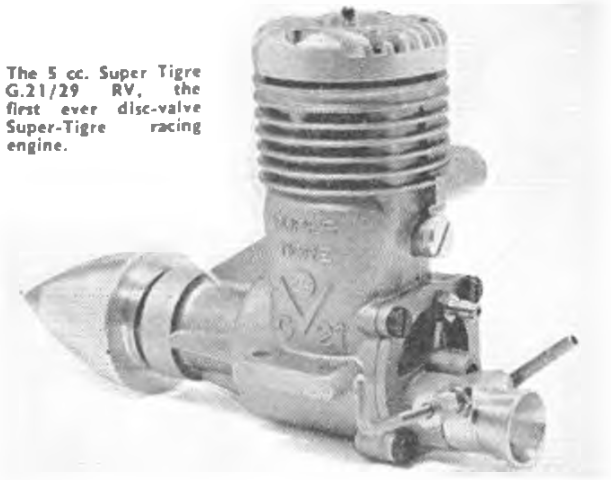
ONE of the new Super-Tigre G.21/29RV engines has recently reached us from the Micromeccanica Saturno works at Bologna. This is the rear rotary-valve speed motor that Jaures Garofali has had under development for the past eighteen months or so and which was held up for some time while efforts were made to overcome disc-valve troubles.

The G.21/29RV has been awaited with some eagerness by speed enthusiasts. We therefore intend to describe it in rather more detail than is usual in L.E.N. and, since it continues the G.21 designation, a short account of G.21 history may be of interest as an introduction.

The G.21 series began nearly fourteen years ago with the introduction of a 5 cc. shaft-valve glowplug engine having twin ball-bearings in a detachable front housing and a ringed aluminium piston. This original G.21 continued in producton for a number of years and an exact copy of it later appeared in the Soviet Union as the Kometa MD-5.

Following the successful launching in 1960 of the "Jubilee" model Super-Tigre G.20 (2.5 cc.) with its one-piece casting, this form of construction was adopted a year or two later for a new 5 cc. engine. This new casting was also used for several succeeding Super-Tigre engines, namely, the G.21/35 (5.65 cc.), G.21/40 (6.5 cc.), G.21/40-R/C and G.21/46-R/C (7.5 cc.). It is, in fact, still current in all these except the G.21/40, now succeeded by the G.40-RR model.

It would, perhaps, have been a little less confusing if the G.21 designation had been dropped from the new rear induction model, but, probably because the crankcase is produced from a modified version of the standard shaft-valve casting and still bears the G.21 legend, it is perpetuated in the G.21/29RV. Modifications have included the deletion of the offset front intake and the substitution of a hefty 3.5 mm. thick web between cylinder and front housing, and the addition of more metal to the outside of the transfer passage in order to allow the interior to be machined out for greater transfer volume.



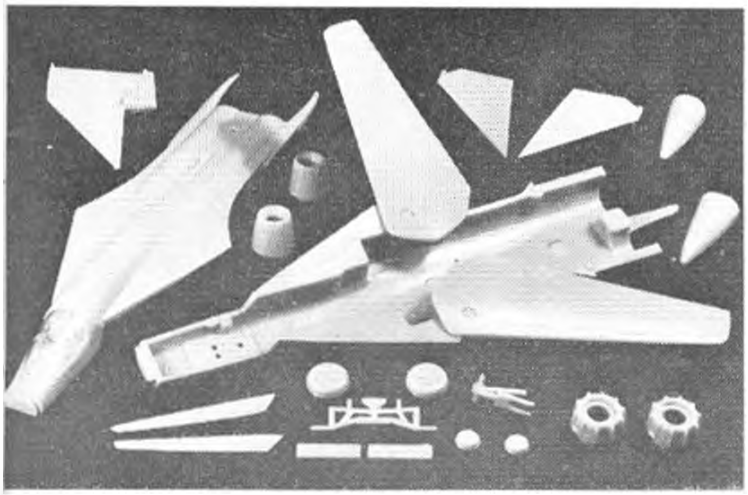
The 5 cc. Super Tigre G.21/29 RV, the first ever disc-valve Super-Tigre racing engine.

The new crankshaft follows the fashion set by the Series 61 and 64 K&B engines (and copied by Rossi and Moki) in using internal counterbalancing within a full disc crankweb, the periphery being sealed by a shrunk-to aluminium rim to reduce lost volume in the crankcase to a minimum and thereby increase primary compression. Main journal diameter is 12 mm., reducing to 7 mm. at the front ball-bearing. At the front, the prop drive assembly includes an integral 1¼ in. dia. spinner of machined aluminium with brass cone retaining nut.

The bore and stroke of the 29RV remains, at 19 x 17 mm., the same as for all previous 5 cc. G.21's. Cylinder porting follows the now familiar Super-Tigre patented system of inclined parallelogram shaped transfer ports, timed to open and close simultaneously with the exhaust port and used in conjunction with a flat crown deflectorless piston. Actual timing remains substantially the same as for the previous shaft valve G.21/29 at 71 degrees BBDC to 71 degrees ABDC. This gives transfer and exhaust periods that are each about 8 degrees longer than for the 2.5 cc. G.15 engine.

(*Continued on page 338*)

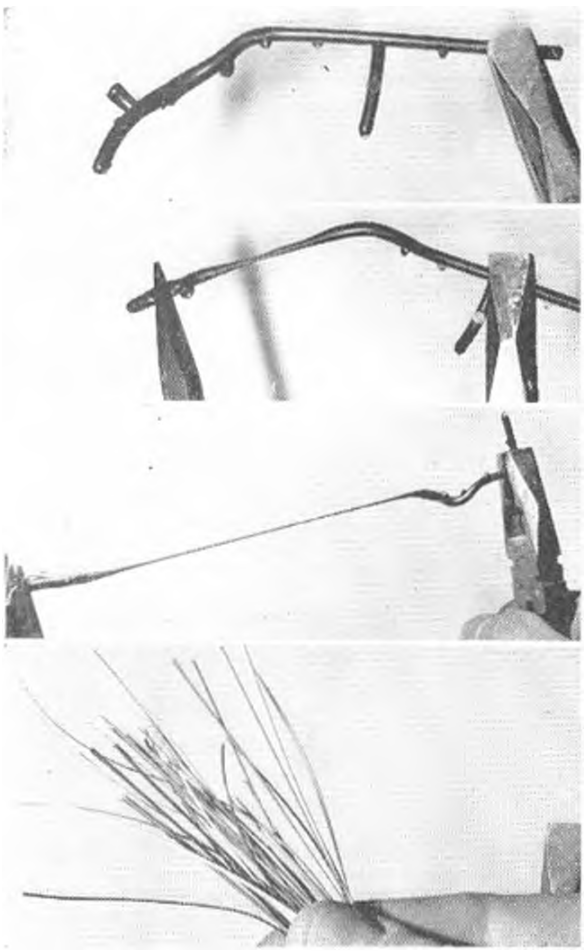
Left, the machined integral spinner of the G.21/29 RV should ensure ridge assembly and true running. Above, crankshaft follows K & B Series 61/64 design, also adopted by Moki and Rossi. Below, the rotary-valve features diametrically opposed drive slots for alternative carburettor locations.



SCALE COMMENTARY

by J. D. McHARD

Editor of Meccano Magazine



THE first plastic kit for the revolutionary and controversial swing-wing *F111A* has appeared in Japan (where else!). It's the first venture into the plastic kit field by the forty year old model house of **NISHIKIYA** and a more difficult subject would have been hard to find. As a gimmick the kit is interesting —the wings *do* swing, but the pivots are a bit crude and allow the wing panels to "flap" quite a lot after a few operations. Forewarned, one can incorporate in the lower fuselage shell, a supporting structure to stabilise the inner wing panels. For this purpose I constructed a horizontal "H" sectioned structure in 30 thou. Plastikard. Each inner wing section slots quite tightly between two arms of the "H" which is cemented in place by its lower surface and allowed to dry thoroughly before fitting the wings. This provides the necessary operating stiffness and maintains the lateral wing setting. The kit retails in Japan for about two shillings and scale is 1/120th but the length even in this scale works out at eight inches! In 1/72nd scale it would be over 13 inches. The same company **(JNMC)** have for many years produced a range of 1/50th scale wooden "solid" kits (my remarks last time not withstanding). These kits are still made, and in presentation are not unlike the old "Skybirds" sets—parts ready-carved to shape from beautiful close-grained Japanese Hoh wood. They are also available in outline-only form and as completely finished, hand-made models!

It is interesting indeed to note that JNMC are not alone in this unlikely field for they have just been joined by another solids manufacturer, **SEGA MOKEI.** who are producing their models to 1/75th scale and also in three forms—basic, semi-finished and finished models. A whole range is available including a *Hien*, *Shinden* (*Kai*), *F51-D.*, *Bf 109G*. They cost two shillings unfinished, six shillings semi-finished, £1 0 0d. finished (F51-D and ME 109G £1 10 0d.). Labour charges would almost certainly prevent the manufacture of such solids in this country at competitive prices even if there existed a market for them, which is very debatable

Before leaving this subject it is interesting to consider some of the plastic conversions now being carried out by enthusiasts. Many such conversions entail almost complete rebuilding of the original kit and demand no little skill. Yet the finished job is *still* a plastic model, and the considerable effort involved in converting the kit is often not apparent to the observer, who thinks his own straight-built model just as good. The whole object of this widely followed "converting" game is to produce something different- a break-away from the thousands of other *Spitfires*, *Zeros* and *Me 109s*. Converters write endless screeds to manufacturers bemoaning the fact that their choices of prototype are so uninspired. The unanswerable reply is that unusual aircraft just don't sell, and it really *is* true. Enthusiasts constitute only a tiny minority of the sales necessary to make a kit a financial success—even so, there are, by other standards,

(Continued on page 338)

At top: the F-111A kit by Nishikiya with swing-wing arrangement. How to "draw" Polystyrene: 1. Holding one end of the sprue with a pair of pliers, heat it in front of an electric fire until it becomes quite soft and floppy and begins to give off smoke. 2. Now grip the other end of the sprue and begin to stretch it. PAUSE when the waisted section reaches the thickness required. If you don't pause at this stage, the sprue will probably part. 3. Draw the ends smoothly apart until a slight resistance is felt—then stop, and hold the plastic strand straight until it cools. The hotter the plastic and the faster the draw, the thinner will be the resulting strand. 4. A handful of samples ready for use.

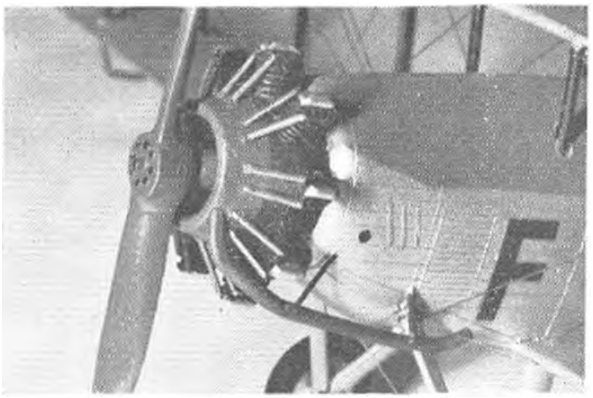
SCALE COMMENTARY (Continued from Page 337)

quite a lot of such people. How many of these avid plastic surgeons has ever *considered* making a solid model from scratch? They would then have complete freedom of prototype choice and today there is wealth of information and accurate drawings of the most unusual aeroplanes. No longer any danger of the crushing comment when proudly displaying their painstaking conversion, that has taken dozens of hours—"Oh yes, I've seen those in Woolworths for two shillings"! The amount of ingenuity, skill and prototype research involved in producing an extensive re-work of an existing kit is no more than that needed to build a really good solid from scratch which, properly finished, will look better than a plastic job and give infinitely more satisfaction.

Having ridden my hobby horse I will now give some hints and tips to plastic carvers! But note that these processes are adaptable to scratch-building, too.

Recently I had the job of building up and elaborating the rather crude representation of a "Jupiter" engine included in the **Frog** *Trailblazers Wallace* Kit. The engine exhaust pipes to the front collector ring posed a problem and I resorted to the following plastic "drawing" technique which, although I believe not my own discovery, nevertheless has not, to my knowledge, been properly described elsewhere.

Basically the process involves heating the plastic moulding sprues that one usually discards, and then stretching them to produce long thin circular plastic rods or wires. By varying the heat and the speed of the draw any thickness can be produced down to a thin, thin thread that *could* be used as biplane rigging—fixing it in place with a drop of liquid adhesive on each end.



Use of drawn styrene and the Kleintex nylon rigging is evident in "Mac's" Wapiti conversion from Frog kit.

Polystyrene drawn in this way takes on new properties. It is now almost fibrous (like bamboo) but it can be bent without breaking and will *hold* its bend. The pictures tell the story of its production and also show some applications of the material. The gun and mount were built up from drawn black plastic, and the engine exhaust pipes, with their thin support struts, were also made from the same material—brown this time.

Good rigging *makes* an old-timer. Without it the whole effect is lost. Bad rigging, with fuzzy thread hawsers, on the other hand will ruin it! The answer can be bought in any milliners and it's called Kleintex invisible thread. This is a nylon monofilament and is available as clear or brown-tinted. It has a slight elasticity and can be tied to strut ends almost invisibly, remaining absolutely tight indefinitely.

Latest Engine News

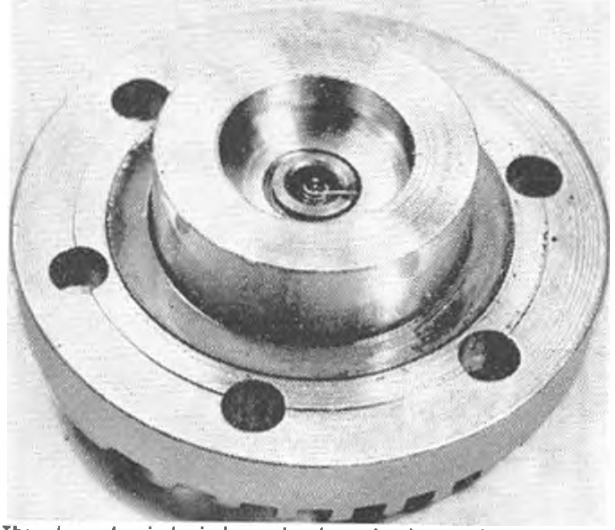
continued from page 336

Rotary-valve timing, as measured on our test sample is approximately 37 degrees ABDC to 55 degrees ATDC. The new rear induction unit includes a reinforced nylon rotor disc running on a steel shaft and has provision, via alternative drive slots in the rotor, for mounting the backplate so that the carburettor intake is at the bottom left hand corner or top right hand corner. The bore of the intake (9 mm. or 0.354 in.) is slightly larger than that of the K&B 29R (0.344 in.) but actual venturi throat area is slightly smaller by reason of the fact that the surface type spraybar used, projects into the bore, whereas peripheral surface jets are used on the K&B.

The cylinder head follows the pattern of the previous G.21/29 and the G.15 in using a wide squish band and deep hemispherical combustion chamber. The squish area is exceptionally large and covers approximately 64 per cent of the piston area. The piston is unusual in that it features annular stiffening ribs both above and below the gudgeon-pin bosses while the gudgeon-pin itself, instead of using brass or aluminium endpads, is located by circlips.

As is usual with the racing model Super-Tigres, standards of construction and finish are high. As one might expect, the weight of the G.21/29RV is somewhat higher than that of the shaft-valve model it replaces and, complete with spinner assembly, the engine weighs 10.3 oz.

Having received our G.21/29RV only a few days before writing this, we have not yet had an opportunity to test it for power output, but Garofali is rating the G.21/29RV at 1.10 b.h.p. at 22,500 r.p.m. which, if substantiated, must make it just about the most powerful commercially made 5 cc. engine to date. For some months, pre-production samples have been in use in the U.S.A. (Garofali's biggest market and now a major influence on Super-Tigre design trends) and these have been putting up some creditable performances in Class B speed. American distributor John Maloney is looking to this engine to provide a challenge in Class B comparable with that which the Super-Tigre G.15 has so successfully demonstrated in Class A in the United States.



The deep hemispherical combustion chamber and very large squish area of the Super-Tigre cylinder head are apparent in this photo.

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FROM .... RipMax

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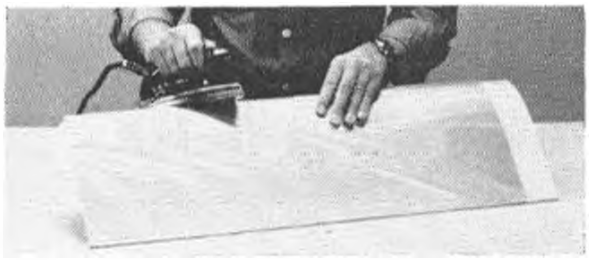
1. Cut to size, remove backing, smooth in place.



2. Heat-seal around edges with an electric iron.

3. Glide iron over surface to pull up taut.

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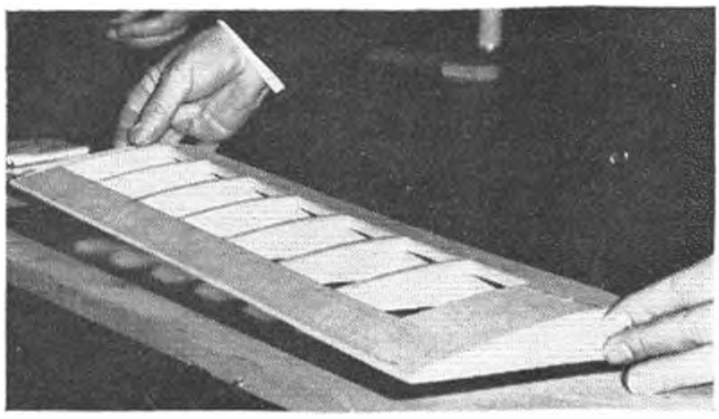
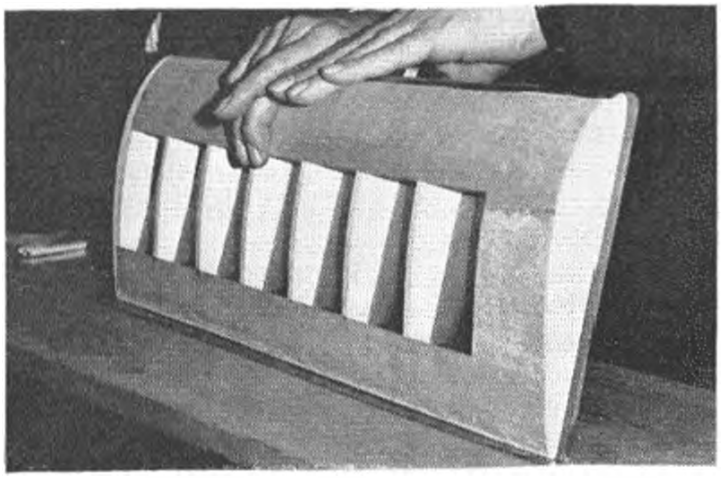


After sheet is cut to shape and backing removed, wing is laid over tacky adhesive surface and gently pushed to make contact.

INTRODUCTION of this covering material at the Chicago Model Trade Fair by Top Flite has seemingly taken the radio control world by storm. Certainly it has received the best press coverage ever known for any single subject and this alone bears out the validity of Top Flite's claims for the "greatest advance in covering and finishing in model building history".

It is a Polyester film made from Polyethylene Terethalate with heat sensitive coloured adhesive backing and supplied in sheets measuring 26 x 36 in. at 25 - each. Six brilliant colours offer adequate choice, each on paper backing and shipped in rolls to avoid creasing. Weight is equivalent to lightweight silk plus a "normal" dosage of clear and coloured dopes, strength is infinitely better than any other material in use and cost is very slightly higher than a top quality silk or nylon process.

The latter aspect is however more than balanced by the facility of MonoKote application. There is no smell, no delay, decoration is easier and the end product is better than the average modeller could ever

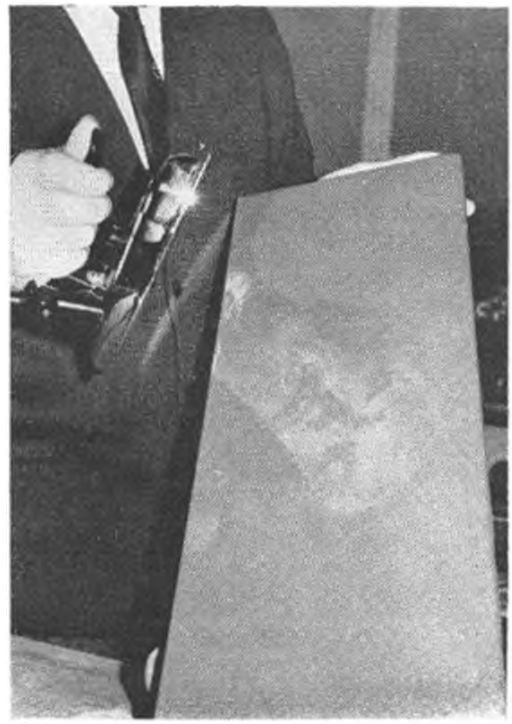


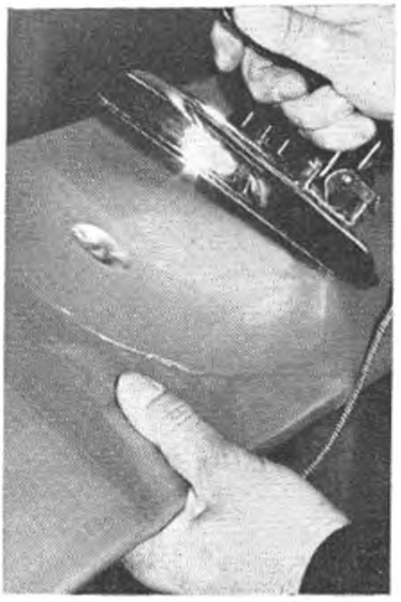
Lifted, with MonoKote attached, ½ in. overlaps are wrapped around. For curved top surface apply MonoKote down on to wing.

Using domestic iron set at "wool", heat seal all wraps with gentle rolling action, start at centre, working to ends.

Set iron to "rayon" and glide over the MonoKote. It heat shrinks quickly. Move iron to fresh area as colour change appears, wrinkles disappear and colour resumes original high gloss as reflection of Max Coote's face indicates at right.

Top surface has similar treatment, only the overlaps are trimmed off as needed, at left.





covering material

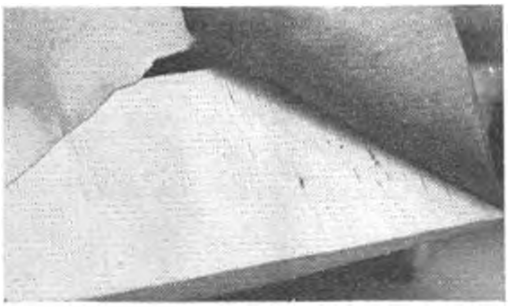
achieve in terms of gloss and fuel proofing. No grain fillers are needed before application so that in many cases one could save weight with MonoKote. In fact, Dave Platt's North American T-28 entry in scale at the British Nationals is covered with MonoKote, *then* painted over (it accepts all finishes) in the correct scale colour scheme to avoid the heavy priming and fillers associated with cellulose surfacing.

What, one might well ask after such glowing terms of praise, could possibly be any disadvantage with MonoKote?

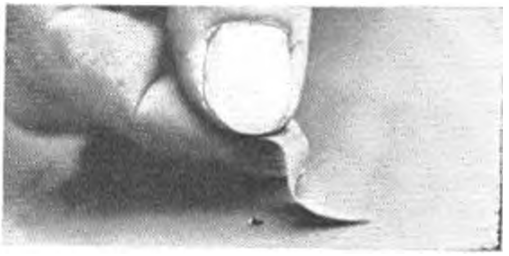
Firstly in terms of cost, the modeller with a shelf load of half filled dope cans, preserved brushes and sundry lengths of left-over silk or nylon will consider it expensive. Secondly, the material only suits the heavier type of model with rigid structure. It would be of little use on an A/2 tailplane unless (as we advised for Melinex covering) the construction is specifically designed for the purpose. Thirdly, a sharp compound curve such as an engine blister cowl or wheel spat of moulded material is difficult to cover without a series of edges appearing. It is therefore most suitable for control-line or radio types and for this reason our test subject was the *Denight Special* pylon racer kit by *Sterling*, built and covered by Tony Dowdeswell.

Finished in red with black and white trim, the Denight used three sheets and fully exploited the application of thin trim lines and leading edge wraps as can be seen above. No problems arose at any stage.

MonoKote is so different it calls for pictorial explanation. Photos on these pages introduce the general stages, for more detailed description of the Denight decorations, see this month's issue of *Radio Control Models and Electronics*.



Dimple caused by hardest possible finger-strike is removed with fresh heat (above), note colour pattern "under treatment". At left: only after great effort we tore a section, adhesive lifts top surface of balsa.



Patches are too easy. Apply same material, heat seal around to retain fuel proof protection. A lightweight portable iron is advised.

Odd pieces can be used for striping, cutting stars or emblems, race numbers, etc. No special technique needed for double layers except for large areas. Max Coote demonstrates smoothing a red stripe over white wing, later heat sealed and wiped with cleanser.

TOPICAL TWISTS

by 'Pylonius' illustrated by 'Sherry'

A lot of Tribe

Whatever vicissitudes and problems may beset the dark continent, at least its T.V. programmes have not yet suffered the Western fate of being smothered by old American movies; but no doubt Foxfam will soon remedy this cultural deficiency. Meanwhile, youthful natives of Zambia are given the civilised privilege of watching a fortnightly programme on the delights of model flying. Odd, though, to think of the old hobby enjoying an extension of life in the emergent states. Satisfying in one way, but in another I'm a bit sorry to see the old gnu and hartebeeste pushed off their stamping grounds in order to make way for six lane highways and ten channel radio models, but we all have to pay the price of progress. In this country it is the rapid erosion of our available flying territory, and I have no doubt that we shall soon hear the same cry from Africa's limitless acres, by which time we can be sure that the youth of Zambia will not be watching telly programmes of model flyers cavorting over the grasslands, but looking at Gary Cooper adventuring over the vast empty spaces of yesteryear.

Swinging Scene

The latest swinging thing in the full size glider world is the super swing wing sailplane, with built in thermal detector and everything for the nimbus lover. The idea of the swinging wing is to give a surge of rakish speed to get from dead spot to uplift, and the only thing missing is the retro rocket, just in case . . .

But what progressive equivalent have we in the model world? We may have the electronics, but the aerodynamics still remain way back in the "What's cooking, Sir William Hayley?" period, in spite of all the inspiration we get from "Thunderbirds".

In the basic areas of the hobby we don't expect anything very revolutionary, apart from the rotation of the time honoured prop. For the Rubber and Gilder enthusiast an occasional change of aerofoil is as much upheaval as his spacious, but not space, way of life can stomach, but I should have thought the whizz kids of radio might have thrown a few gimmicky spanners into the workings of conventional thought. For instance, automatic penetration for Single Channel models. Or is that, like so many of the windblown machines, far fetched?

"Says his name's Leonardo Da Vinci."

Zombie & Son

The fascinating thing about the model flying hobby is the way its traditional styles of aeronauting refuse to be overwhelmed by the slick appeal of the modern electronic machine. Anyone thinking in the sort of progressive terms which sees a multi-storey block of flats on the non-functional open space, might find it odd that the crinoline era rubber model should survive into an age singularly lacking in elastic utility. He might also look askance at the primitive antics required to elevate a goodness-knows-why, motorless model to a viable altitude, and would undoubtedly give a fat, .007 smirk at the idea of the term microfilm being applied to a type of skeletal looking model. It might also occur to him that model flying is not just little brother tagging along in the wake of big brother, Aviation, but has much to offer in its own right, although he may not be the kind to enjoy the diverse fun it gives to suit all pockets, air and otherwise.

Apropos of this, a recent picture of a microfilm model reminded me of my own attempts to produce one of these curious craft. It did not take me long to realise that I suffered from a condition known as Fyffe finger, in which the thickness of the hand deceives the eye. I also had the business of whispering friends to contend with, but this was of secondary consideration compared with the importance of skimming off a bath length of usable film. Whether the craft actually flew remains a mystery to this day, although some theoretricians still aver that the distance achieved was due to the propulsive influence of an open window.

All of which is part of the rich pageant of model flying, in the spirit of that continuity which gives newcomers to the hobby something of those same joys of aeronauting that drove the Edwardian courting couples off Wimbledon Common.

Just Gassing

Looking at the floods of vintage craft to be seen around these days I begin to wonder if the future of aeromodelling does not, in fact, lie in the fledgling past. After all, we each of us have our own building board time machine, and if tiring of today's hectic competetive pace, we can "Dr. Who" it back into a more leisurely ambience.

Currently the time machines are settling down in the American "gassie" period of the mid thirties, and the huge, lugubrious craft now wafting around the airfields give ample evidence of the inflexible belief of those primitive times that a model was only kept right way up by the huge weight and bulk of the airwheels. We can also take it that the portliness of the machines give a clue to the term "gassie", which must obviously be an abbreviation of "gastronomic".

Silencers and Noise

Part one of a series on advanced design silencers and tuned length exhaust pipes by: K. Lindsey, D. Balch and M. Larcombe.

THE need for silencers is becoming increasingly common in various parts of the world and to date at least eight National bodies have adopted silencer rules, either general as in G.B., or partial as in Sweden. Many modellers view the use of silencers with some apprehension for a number of reasons including (1) resulting loss of power (2), unconvincing noise drop (3) engine overheating or distorting, (4) complexity, thus high commercial cost (5) high weight penalty.

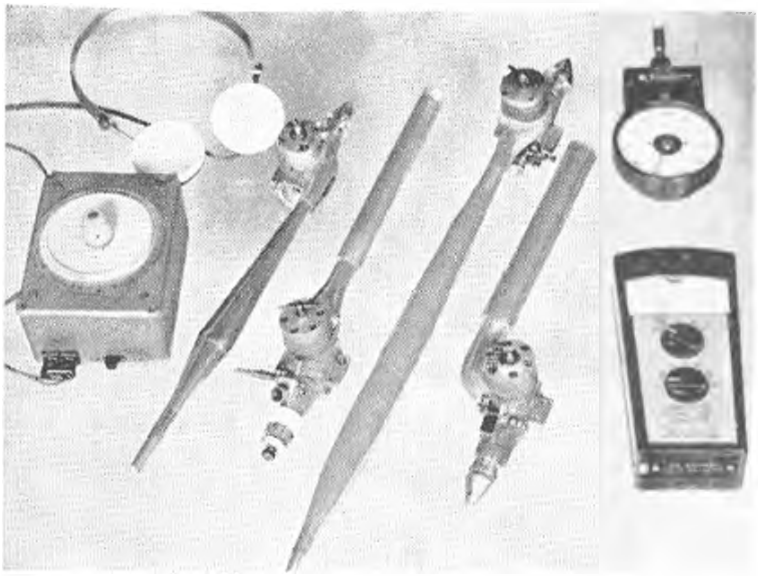
These points were regarded as a challenge by the authors to prove that they were not intrinsic drawbacks of model silencers. The number of feasible design concepts is endless. Each agreed to follow different paths, all seeking to incorporate power improvement features into each system, but to get various devices actually operating they didn't necessarily concentrate on all other features in every unit. The experiments could have gone on for half a decade (and probably will) but to get information into circulation fairly quickly the devices have been deliberately limited. Future parts will explain the theory behind the present system as well as what it means in terms of probable silencer designs of the future. Construction and performance details are provided here as a basis for future development. The tested units can be broadly divided into two types. 1, Pressure Pulse (e.g. tuned exhaust pipes). 2, Bernoulli (e.g. extractor venturi, sucking wing). For simplicity, silencers are identified by the initials of the inventor, e.g. Type D.B.1 a Bernoulli-type made by Dave Balch.

An endeavour was made to undertake all testing on quiet, windless days to make noise measurements easier. Noise was measured with the S.M.A.E.'s Dawe Sonometer on Range C—a delightfully easy-to-use noise meter. Revs were measured with 0-20,000 and 0-50,000 Smiths Tachometers and a home made audio tachometer (which is preferable when one thinks about trying to make contact with a spinner turning up to 27,000 r.p.m. — the audio tachometer is used up to 6ft away). In testing, the authors were helped by Paul Newell (S.M.A.E. Tech. Sec.) Dick McGladdery, Richard King, and John Hodges.

One very important consideration that must be borne in mind is that if you walk round a ground-running motor with a noise meter at about 15ft, the noise level varies about 7 dB and the dB ranges in the tables (e.g. 78-85 dB) show the maximum and minimum recorded around a motor. If you walk round the same motor with a silencer fitted you obtain the same dB range, but the noisiest spots will not necessarily be in the same positions. For instance, on the long pure tuned exhaust pipes (K.L.2, and M.L.1), the noisiest place, with the silencers is *alongside* the pipe, not behind the engine and tail pipe which is the noisiest place without the silencer. To take a spot reading with and without the silencer is not good enough. One either has to move round the motor, or get the brave motor holder to execute a slow pirouette while the operator and the Dawe Sonometer stand still!

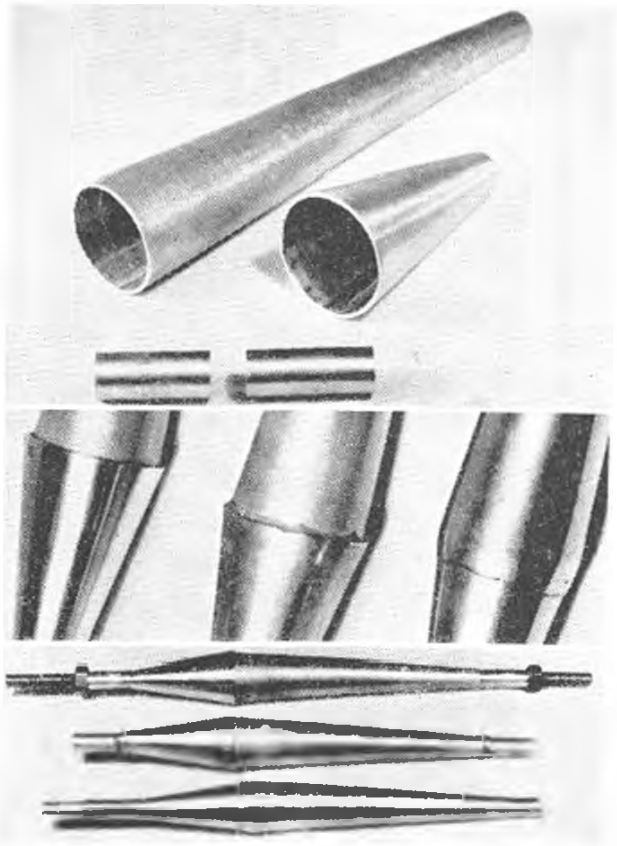
Most widely used of the K. Lindsey types is K.L.3—a hybrid tuned exhaust which gives no power loss from 12,000 r.p.m. to at least 30,000 r.p.m. The prototype, used in an F.A.I. speed model on straight fuel and a 2½ year old G.20 motor officially recorded 120 and 117 m.p.h. in 1965 speed meetings. This prototype K.L.3 was also used on the short lived, but spectacular E type "Early Bird" combat model which clocked 102 m.p.h. (no streamer) on straight fuel and 7 x 6 frog Nylon propeller. The "Big-Daddy" K.L.3 is a pre-production model and favourable comments on its R/C performance have been voiced. Apparently it operates well at very low r.p.m. which is unexpected, as well as losing no power at all, at normal revs. K.L.3 lowers fuel consumption by 10-20%. Pure tuned exhausts are not so flexible. (4-5,000 useful range at speed revs)—but spectacular power rise with very good noise reduction is possible. The K.L.3 hybrid design should properly be called the M.L.-K.L.3 as Mike Larcombe was deeply involved in the concept.

The M.L.1 silencer, as sketched was designed for maximum efficiency at 16,000 r.p.m. and was manufactured from glass-fibre using the "lost-wax" technique to ensure a smooth internal finish. The construction is not too difficult for those with access to a lathe, even a simple power drill woodturning-type. Firstly mould candle wax over a piece of ¾ in diameter threaded steel rod and then machine the outside of the wax to the internal silencer shape; this could be done by hand with a modelling knife. Paint the mould with one coat of resin and leave until almost set. Then, using plenty of resin, wrap on the glass-fibre, preferably the continuous filament type called roving or if unavailable use thin strips of glass-fibre cloth. Wind this on in one direction working along the mould and then back again. Coat the outside with more resin and rotate slowly near a warm fire until the resin starts to harden. When the resin has set immerse the whole assembly in hot water to melt the wax out. Although the external finish may not be smooth the inside should be perfect. A glass-fibre Y piece was also made using this technique so that an Oliver Manifold could be converted to a single ¾ in. diameter outlet ready to accept the silencer. It should be emphasised that although glass-fibre construction

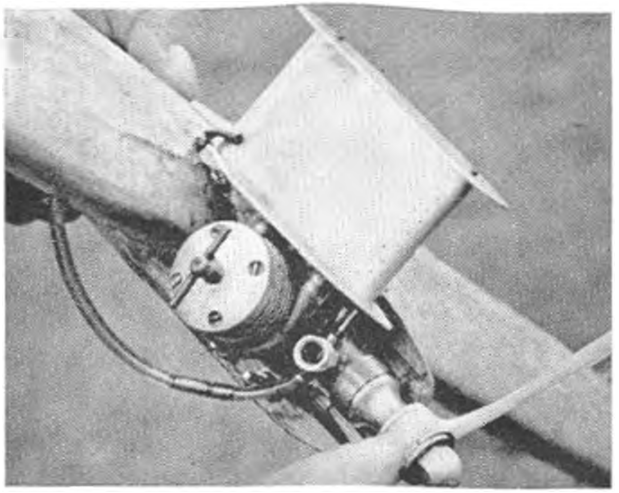


Silencers and instruments used in testing by the three man team. Left to right, K.L.2. on Super Tigre G.20, K.L.3. on M.V.V.S. 2.5 RL diesel, M.L.1. on Eta 15, K.L.3. on G.15, Smiths 0-50,000 r.p.m. tachometer and the Dawe Sonometer.

Three stages in the construction of a K.L.2. silencer. Top, sheet cones after forming and welding on a steel mandrel, with end pieces in foreground. Centre, left; cones butted together, centre; welded, right; smoothed off. Below, threaded rod is used as a clamping jig to assure alignment during welding, note extension restrictor added to lower finished version.



General silencer and manifold test data

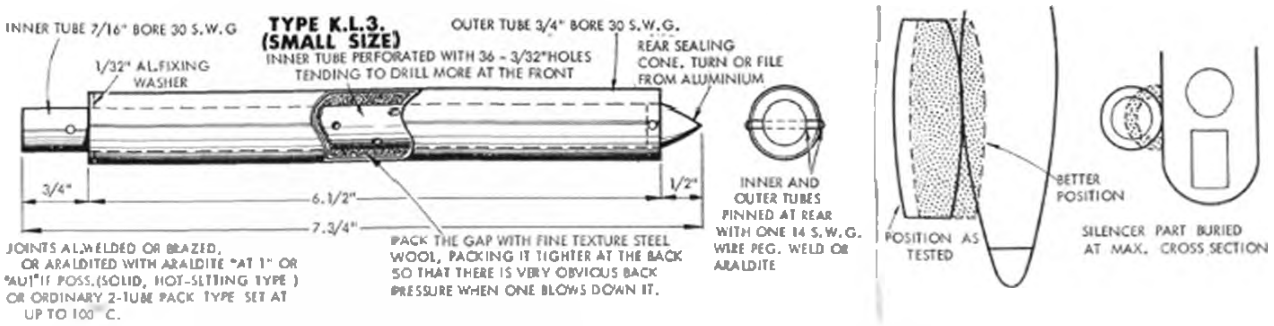


D.B.I. wing silencer on Dave Balch's Oliver Tiger combat model. Note the extractor holes on the leading edge. (See page 350.)

Date conditions Location	Silencer type and weight	Motor fuel propeller	R.P.M.	Noise (dB) figures and distance	Exhaust slate. All manifolds sealed with 'Plastic Padding' or 'Bondapaste'
9.1.66	"Big-daddy" K.L.3.	Merco 61	10,000	90-97 (at 15ft)	Motor without manifold or silencer
Charville Lane	4 ozs.	Straight fuel	10,000	84-88 (at 15ft)	Motor + silencer + manifold
		Tornado nylon 12" x 6"	Not measured	65-70 (flying at 150ft)	Approx. noise + silencer
Below freezing	O.S. large size	O.S. 50	11,250	102-96 (at 15ft)	Motor without silencer
		Straight fuel Tornado nylon 11" x 6"	10,400	92-98 (at 15ft)	Motor + silencer
				78-82 (flying at 150ft)	Approx. noise + silencer
2.1.66	K.L.1. 1.3 ozs.	Super Tigre G.15 Straight fuel 7" x 6" Frog nylon			(Tests showed manifold had no effect upon r.p.m.)
Old Mill Farm			19,100	Not measured	Motor + manifold
Chilly, damp			18,500	Not measured	Motor + manifold + silencer (3% r.p.m. loss)
		7" x 3" Trucut	23,000	Not measured	Motor + manifold
			24,000	Not measured	Motor + manifold + silencer (4 3% r.p.m. gain)
		Cut down speed propeller Approx 5" x 7"	24,900	Not measured	Motor + manifold
			26,100	Not measured	Motor + manifold + silencer (4.4% r.p.m. gain)
22.1.66	K.L.2. 1.3 ozs.	Super Tigre G.20. Straight fuel	23,300	96-99 (at 15ft)	Motor + manifold
Old Mill Farm			24,000	88-93 (at 15ft)	Motor + manifold + silencer + 1" long 3.16" bore tailpipe restrictor; highest dB reading alongside silencer
Chilly, damp		Trucut 7" x 3"			
			24,500	Not measured	Motor + manifold + silencer + 1" long 3/16" bore tailpipe restrictor + one extra cylinder head gasket
			24,100	Not measured	Motor + manifold + silencer + 1" long 3/16" bore tailpipe restrictor + extra gasket, i.e. .0175 thickness
			24,700	Not measured	Motor + manifold + silencer + 2" long 3/16" bore tailpipe restrictor + extra gaskets, i.e .0175 thickness shows r.p.m. gain of 6% with 7" x 3" Trucut at 23,000 (K.L.2 design speed)
22.1.66	K.L.3 1.2 ozs.	Modified M.V.V.S. 2.5 RL diesel	16,000	92-95 (at 15ft)	Motor + manifold
			15,900	85-88 (at 15ft)	Motor + manifold + silencer
Old Mill Farm 40 F. damp	M.L.1 1.4 ozs.	8" x 4" Trucut	15,900	92-95 (at 15ft)	Motor without manifold or silencer
			15,800	Not measured	Glassfibre tuned exhaust + 4" long metal tailpipe
September 1965 Old Mill Farm	K.L.3 1.2 ozs.	New G15 Straight fuel 7" x 3" Trucut	22,000	103 (at 10ft)	Motor without manifold or silencer
			22,000	90 (at 10ft)	Motor + manifold + silencer
Mild	Spinallo silencer 2 ozs.	Straight fuel 7" x 3" Trucut	20,800	92 (at 10ft)	Motor + silencer

Test data for ETA 15D Mk III

Date, conditions and location	Propeller	R.P.M.	Noise dB	Silencer, manifold and silencer type
		10,600	89	Oliver manifold and Y piece to single tube
9.1.66	9" x 6" K.K. nylon	10,900	83	As above with glassfibre M.L.1.
Below freezing	Tornado thin hub	12,300	92	Oliver manifold and Y piece to single tube
Charville Lane	6½" x 8"	12,600	86	As above with glassfibre M.L.1.
20.1.66		14,300	Not measured	Manifold (single ¾" outlet)
Below freezing		14,900	Not measured	As above, with cardboard M.L.2.
Bushy Park	8" x 4" Trucut	15,200	Not measured	Manifold and glassfibre M.L.1.
		15,300	Not measured	Standard motor, no manifold
22.1.66		14,200	87-91	Manifold sealed with Plastic Padding
Average temperature 30-40 F but damp		14,600	Not measured	As above, but with M.L.1. or M.L.2.
	8" x 4" Trucut	14,600	78-84	Manifold and glassfibre M.L.1., 4" extension restrictor
Old Mill Farm		14,800	88-94	Oliver collector
		14,800	Not measured	Oliver collector and Y piece
		15,200	78-84	As above and glassfibre M.L.1. with 4" extension restrictor
		15,100	Not measured	Standard motor, no manifold.



is adequate for diesel motors it should not be used with glo-motors; within 10 seconds on a Super Tigre G.15 the glass-fibre silencer resembled Plasticine due to the extremely high exhaust temperatures. Any of the silencer types in this article could be made by this "lost wax" method with a degree of ingenuity.

A number of double-cone tuned-length silencers have been made using an extremely simple method that is well within the capabilities of even the most inexperienced modeller (to refute certain well-published views by free flight men). The complete silencer is made from thin cardboard rolled into two cones held together with P.V.A. glue and fuel-proofed inside and out. Admittedly these will not stand rough use but they are so easy to make that large numbers could be stocked especially as replacable versions for combat or free flight flying.

The M.L.2 silencer mentioned on the test data was made from cardboard to the dimensions shown and has survived a fair amount of test work without damage. To become an efficient acoustic silencer the cardboard really needs some form of external lagging such as thin felt cemented in place.

Tests on the D.B. Venturi silencer have given interesting results as follows, in Dave's Trident II Oliver Tiger powered F.A.I. team racer, using a 7 x 8 Rev-up propeller.

The Venturi silencer was quieter on the ground than the normal unit but was about the same in the air. Venturi size was I in dia. inlet 0.45 in. dia throat 1.1 in. dia outlet, 6 in. long with 8-$\frac{1}{8}$ in. dia extractor holes.

The Venturi was evidently working quite well, for the in-flight R.P.M. build up was more. However the model speed with the Venturi attached was 83 m.p.h. whereas with the normal silencer and no Venturi the speed was 88 m.p.h. This speed difference was purely due to drag. This was shown by a quick check with the silencer disconnected from the expansion chamber assembly, but still attached to the model; under these conditions the speed was only 82 m.p.h. A quick drag analysis on the model showed where most of the trouble was coming from.

TEST DATA FOR BALCH VENTURI SILENCER D.B.4.

Oliver + expansion chamber + venturi extractor.	11,500 R.P.M. static 13,200 R.P.M. in flight.
Oliver & Collector ring Silencer	11,700 R.P.M. static. 13,100 R.P.M. in flight.

Venturi Silencer gives ; 1,700 R.P.M. build up in flight.

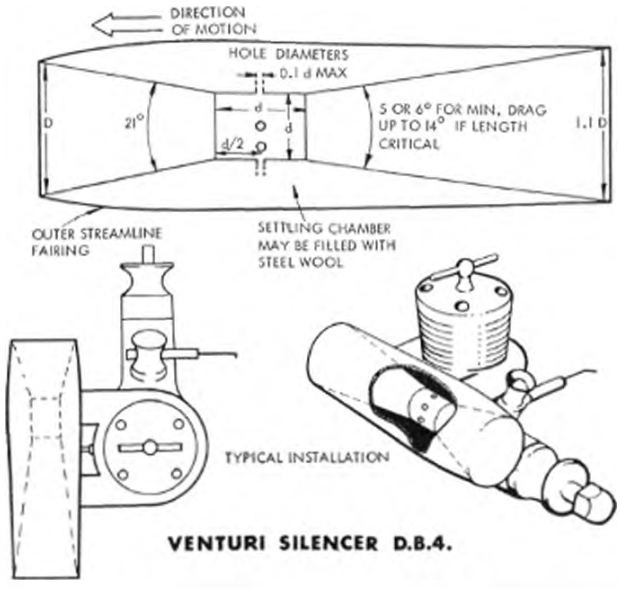
Ring Silencer gives ; 1,400 R.P.M. build up in flight.

The Venturi was attached to an existing model and so was mounted in the most convenient fashion on the side of the fuselage. Unfortunately the funnelling effect of the air between the Venturi and the fuselage caused a large blockage, and this was the main cause of the drag.

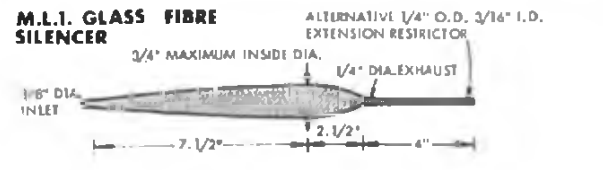
If the side of the fuselage had been cut away to accommodate one side of the Venturi completely then far less drag would have been created. Alternatively if the Venturi was mounted further away from the fuselage as on the commercial ETA units this would also help reduce drag. Naturally on models that do not have cowled engines this drag problem will not arise and the full power advantage can be used.

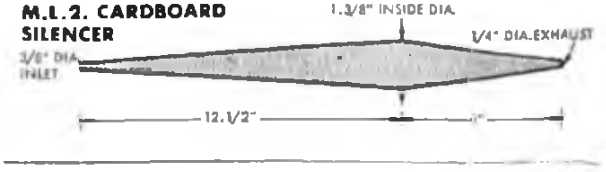
The Venturi itself will naturally have some drag but in most applications the power increase will more than offset this aerodynamic loss.

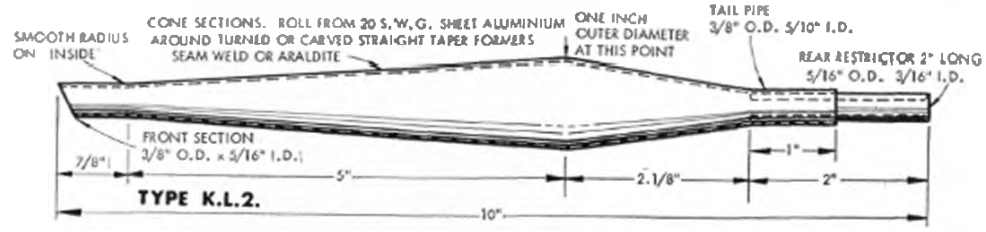
Above right: Dave Balch venturi silencer produced a large amount of drag when mounted in the outer position due to funnelling effect of the air between fuselage and venturi. Part buried position will help to alleviate this.



VENTURI SILENCER D.B.4.







TYPE K.L.2.

Continued on page 350

THREE EASTER MEETINGS

N.W. Area Two Day Meeting

Bristol Goodyear Racer Meeting

Czechoslovakian Unrestricted International

Czechoslovakian unrestricted international speed meeting winner Rolf Miebach (West Germany) fills his 137.9 m.p.h. "Stuppi" design, at left. J. Lenzen, and E. Rumpel, right. With 12 entries from Czechoslovakia, W. Germany and Austria. J. Sladky placed 2nd with 132.4 m.p.h. and J. Frohlich (W. Germany) 3rd with 130.5 m.p.h.

Above: all enveloping canopy on a Bugl powered Austrian team racer. Team Racing had four nations competing, Czechoslovakia, W. Germany, Austria and Hungary. Fastest heat went to Markotai/ Mohai (Hungary) with 4:22, next was Meusburger/ Fischer (Austria) with 4:29. The final gave Drazek/Tenka a win with 9:19 over Markotai/Mohai with 9:34.

N.W. Area Two Day Meeting

Held during Easter, the North Western Area S.M.A.E. meeting at R.A.F. Tern Hill, Salop was one of the best yet, even when taking into consideration the two rival attractions elsewhere for free flight and radio. Sunday dawned with ideal warm flying conditions and plenty of spectators were on hand to enjoy the model flying, trade shows, and refreshments.

The Premier Event for Sunday was **Multi Channel F.A.I. Radio Control** to the latest schedule, attracting 19 entries. Lack of practice with the new manoeuvres showed nearly all the time, only one flight being over time in the first round. Round two produced no less than five overtime flights (!), also, judging was found rather hard for the rolling circle as most pilots did not start and finish in the same place. P. Newitt (LARCAS) made highest score in Rd. 1 but crashed in Rd. 2, after making almost perfect stall turns and a good tailslide. B. Purslow (LARCAS) the eventual winner made a splendid second flight with very good rolling circle and top hat manoeuvres. His custom model has a gigantic fin, uses Orbit 10, Merco 61, and a Gee Dee Pike silencer. T. Cooper (LARCAS) was doing very well and scoring high 8 and 9 marks all the time with his Remcon 12 Tx and home made Rx. Super Tigre 56 powered model but had his engine cut on the last night. K. Jones (Tamworth) flew an own design "Buccaneer" with foam wings and glass fibre cowl to third place using Citizenship radio, but it seemed underpowered. **Free Style Radio** held on the cold Monday attracted 22 entries. D. Hammant (Grimsby) took the top spot from A. Whittaker (LARCAS) after a first place tie with 130 points. Three minutes air time to make the most "touch and goes" was used to solve the situation with D. Hammant making 7 using his O.D. model incorporating a Nimbus wing and Kraft KP6 proportional gear. A. Whittaker made 4 but clipped the propeller and stopped his engine. D. Platt (Wanstead) did triangles and square loops, to get a good performance from his O.S. 50 powered "Kingpin", placing third. Bill Sheppard (Rhyl) would have been placed higher but his second flight let him down due to engine cutting troubles.

Control line events held on Sunday included **Aerobatics, Combat heats, 1A, and B team racing.** Aerobatics with 10 entries were cleaned up by Tom Jolley (Whitefield) on his usual good form with a comfortable margin over second place Harold Dowberkin (Horwich) though he did have a short engine run and consequently had to rush the last few manoeuvres. Harold Dowberkin showed a lack of practice with a bumpy flight over-correcting corners etc. Mick Reeves (Wanstead) was also out of practice and his first flight model rocked a lot on the lines after pulling out from a manoeuvre. His new 56 in. span, Red, Black and White, Merco 61 powered semi-scale racer type stunter was used for the second flight but this also seemed rather shaky. Plenty of newcomers were in the lower results notable; T. Taylor, S. Blade, and B. A. Lister. As a side line Geoff Higgs the judge flew his Delkit "Stuntwagon" constructed from an 18 year old kit. With a Merco .61 and weighing 4 lb. it's reported to extend the flying arm at least 6 inches.

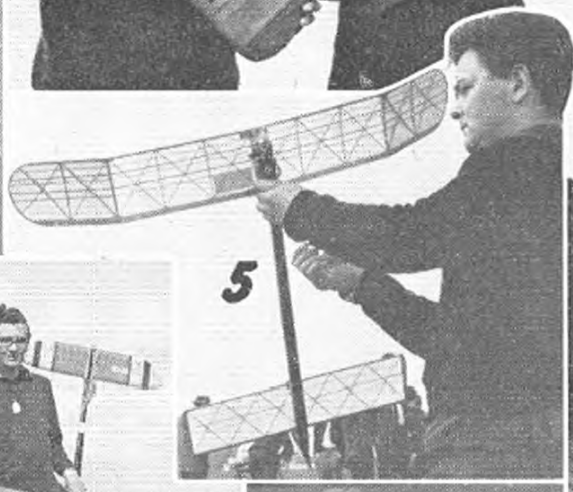
1A Team Racing was well supported with 49 entries but the usual names came through to the final with a junior Feltham/Hayes team the only bright new sparks. In the heats some excitement was caused when a free flight model hooked onto Les Davy's lines and was towed around for three laps, causing a re-run plus a degree of mixed feelings. All semi-final times were below 5 minutes and a fly off had to be held between the two tied third place teams, notably Smith/Brown (Feltham/Hayes) and Turner/Hughes (Wharfedale) who had both made 4:29.5. This resulted in Smith/Brown beating Turner/Hughes by 5 seconds with 4.11. The final saw Place/Haworth win with 8:54.5 chased by Smith/Brown with 9:02.5, Davy/Hudson retired at 163 laps with the engine coming out.

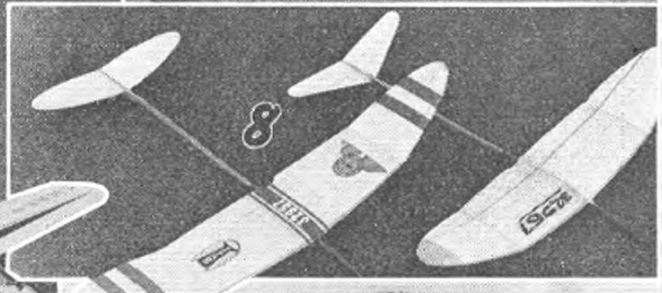
B Team Racing with 13 entries had three teams break lines. Balch/King (Feltham/Hayes) recorded the fastest heat at 5:46.2 with a "Super Trident", powered by Hta 29 with Merco silencer that completed 40 laps at 107 m.p.h., second fastest was A. Dell using an over-size Oliver Tiger with enclosed and rearward facing silencer. In the final, Balch/King were the fastest and well in the lead at the halfway mark, then the model caught an accumulator line and ran-in, breaking the propeller. Hardcastle/Skitt (Wolves) covered 69 laps on one tank but had to change a propeller in the meantime. Alan Dell was droning on with the oversize Oliver diesel model to win by 25.3 seconds with 8:50 over Hardcastle/Skitt in second place.

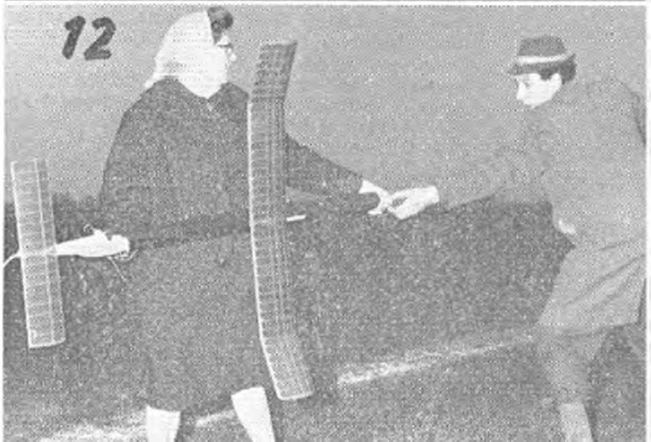
SUNDAY with its very cold and overcast weather featured **F.A.I. Team Racing** as the premier event, and this attracted no less than 57 entries. Unfortunately only 27 flew and of those, 24 recorded times. Several complaints against the organisers were heard, but complainants should remember how few people will devote time to organising, when they could be flying instead. Several heats were flown *four* up and one particularly *idiotic pilot* who shall remain nameless was whipping the model up to half a lap ahead, endangering all the other models by over-lapping **THREE** sets of lines at one time to overtake. He should have been grounded at the first stop but unfortunately this was not done and three teams had to suffer. Fastest heat went to Place/Haworth with 4:38.8 backed up by 4.49.8. Davy/Hudson were really out of luck. After crashing in the last heat a new front housing was put on the Fta . . . and a new model found for the final, after a first round 4:53.7 qualifier to put them in third slot for the final. Turner/Hughes, last year's winners returned 4:41.2. Only the three finalists recorded times under 5 minutes. The final was eventful. Turner's propeller came loose, the engine would not start, then he went off to a "poppy" run. Place droned on at 88 m.p.h. then nosed the model over at a stop, Turner dashed across and lent him a propeller, after a long stop he was up again then Davy was down to retire at 133 laps. Turner/Hughes emerged the victors at 11:19.2 with Place/Haworth second at 11:36.2.

Combat with 117 entries was full of new faces, and the "old hands" seem to be having a rough time these days. The standard of flying in the final was exceptional between D. Leadbeater (Bedford) and S. Crawford of M.C.C., (no not the cricket team but a branch of Whitefield M.A.C.!). Both flew Oliver Tiger powered "Dominators", that survived the ordeal to give D. Leadbeater a win with 418 points to nil from S. Crawford.

Control Line Scale was very close, only one point separating first and second places. Tony Day (Birmingham) took first place







1, Bill Forrester (Wanstead) 2nd in C/L Scale with Fokker EIII Eindekker. 2, Combat finalists: left, S. Crawford (M.C.C.), and right, winner D. Leadbeator (Bedford); both flew O. Tiger "Early Birds". 3, Veronica Sissons holds winning Place / Howarth ½A T/R. 4, G. Miller (W. Coventry) and wife with 3 "Moonraker" F.A.I. models. 5, John Bailey (Bristol) ½A power winner seen flying in open. 6, Pete Brannigan (Ex "Blueprint" now "The Message") with decorated model. 7, D. Hammant (Grimsby) with 2nd place F.A.I. and 1st F/Style R/C. 8, Two of Pete Bayram's Chuck Gliders. 9, A. Brocklehurst (Halifax) with 2nd place glider. 10, Harold Dowbekin (Horwich) holds O.S. 35 Stunter. 11, A. Whittaker with Kwik Fli 2nd. F/Style R/C. 12, B. Day (C.M.) withdraws winding tube prior to fly off.

with his, by now, very well-known "Fokker D7" that flew in its usual faultless manner to total 583 points. Bill Forrester (Wanstead), in his first contest had a magnificent "Fokker EIII Eindekker" that scored mostly 10's and 9's in the static judging (prior to the flying) but lost some on the overall colour, by far the heaviest points loss came in flying when the nose weight fell out, making it super-sensitive. Dave Platt (Wanstead) flew a "Miles Magister" to third place but wrecked it during some aerobatics in an attempt to gain flying points.

Free Flight Scale only had one entry and after discussion the event was run with two stand-in entries hurriedly sought out on the field by the winner, to save a wasted trip! J. Palmer (C.M.) won with 518 points flying a "Sopwith Triplane" based on an A.P.S. plan.

Free Flight *Reported by John O'Donnell*

Sunday's simultaneous staging of both open and ½A power seemed a little strange. It would have seemed more logical to have held them on separate days. ½A seems to have declined even more than open with the advent of silencers—although interest would appear to have suffered more than performance. The home-made "silencer" is now relatively commonplace especially as it is usually less performance reducing than a commercial equivalent.

The pleasant weather might well have been expected to produce high scores. Instead it produced much erratic flying as models warped in the warm sun and humid air. There were many instances of models changing trim between one flight and the next. Even prize winners were not immune to this trouble as some had to check-fly between official flights. The lift was very weak and patchy—nothing like what one would have expected—although downdraughts were plentiful enough.

Only three trebles were managed between the two power events. The open fly-off was held in fairly liftless conditions with the wind, by then, blowing onto downwind hangars and buildings. In the event this did not matter as the models of winner Trevor Payne and runner-up Ray Monks landed in front of the obstructions. Both featured Cox TD15 motors with home-made silencers. Third place, just short of a treble, was taken by Brian Hooley (recently returned to "the fold" after several years' absence) using a P.A.W. 19 diesel.

½A Power was won by John Bailey with a treble—although he couldn't manage to repeat this score with the same model in open. I was second with a downdraught and two maxs—and then spent the rest of the day anxiously watching Ray Monks who had two initial maxs but who developed trim trouble before (and on) his final flight.

Chuck glider saw general satisfaction with the "best three of nine flights" rule. Top two scores were very close with Roy Roberts just edging out Peter Bayram. Both managed at least one long thermal flight outside the contest—Roy's being around six minutes.

The following day was far from pleasant—being overcast all day and bitterly cold in the morning. Nevertheless, lift was remarkably plentiful although few glider fliers could find it consistently. There was only one treble—by Peter Foster flying in his *first* contest. His model was of hybrid design with Baguley style surfaces on one of my style fuselages. The use of a thick-wall fibreglass rod resulted in a very overweight (20 odd ounces) A/2. Following scores by Alan Brocklenurst and Moore were very close.

Rubber flying was not very impressive with only five reaching the fly-off. This was held in cold sinking air as the scores indicate. Winner was Reg Lennox who flew some time after the rest—and in rather lighter conditions. Brian Day and Derl Morley were the only others to clear three minutes.

Tail-less was a mixture of rubber and glider, now a little more equal by virtue of a 250 ft. towline being allowed. Even so, Ken Attiwell and John Pool collected the top two positions, flying rubber. Third, however, was Derek Culpin's glider although his clubmate might have overtaken him if a long second flight could have been retrieved in time.

The large selection of prizes were presented by Group Captain F. W. Deacon, D.S.O., D.F.C., A.F.C., R.A.F., Commanding Officer R.A.F. Tern Hill, to conclude another successful two-day Easter meeting.

Results:- MULTI FAI R.C. 1. B. Purslow (Larcas) 4016. 2. D. Hammant (Grimsby) 3676. 3. K. Jones (Tamworth) 3569. **C/L STUNT.** 1. T. Jolley (Whitefield) 1555. 2. M. Dowbekin (Horwich) 1495. 3. M. Reeves (Wanstead) 1445. **B. TEAM RACE.** 1. A. Dell (Feltham) 8:50. 2. Skitt/Hardcastle (Wolves) 9:15.3. 3. Balch/King (Feltham) 10:29.9. **¼A TEAM RACE.** 1. Place/Haworth (Wharfedale) 8:54.4. 2. Smith/Jones (Feltham) 9:02.5. 3. Davy/Hudson (Wharfedale) Rtd. 163 laps **POWER.** 1. T. Payne (Northampton) +3:14. 2. R. Monks (Birmingham) +2:54. 3. B. Hooley (BAC—Warton) 8:50. **¼A POWER.** 1. J. Bailey (Bristol) 9:00. 2. J. O'Donnell (Whitefield) 8:18. 3. R. Monks (Birmingham) 8:14. **CHUCK GLIDER.** 1. R. Roberts (Whitefield) 3:39. 2. P. Bayram (Lincoln) 3:37. 3. D. Brown (Potteries) 2:21. **FREE STYLE R.C.** 1. D. Hammant (Grimsby) 130 (fly off). 2. A. Whittaker (Larcas) 130. 3. D. Platt (Wanstead) 108. **C/L SCALE.** 1. A. Day (Birmingham) 583. 2. W. Forrester (Wanstead) 582. 3. D. Platt (Wanstead) 565. **COMBAT.** 1. D. Leadbeater (Bedford) +18. 2. S. Crawford (M.C.C.) 0. 3. Melrose (Heanor). 3. Ledger (Heanor). **FAI T/R.** 1. Turner/Hughes (Wharfedale) 11:19.2. 2. Place/Haworth (Wharfedale) 11:36.2. 3. Davy/Hudson (Wharfedale) Rtd. 133 laps. **RUBBER.** 1. R. Lennox (Birmingham) +4:24. 2. B. Day (C.M.) +3:35. 3. D. Morley (Lincoln) +3:16. **GLIDER.** 1. P. Foster (Timperley) 9:00. 2. A. Brocklehurst (Halifax) 8:57. 3. Moore (West Coventry) 8:50. **TAILLESS.** 1. K. Attiwell (York) 6:11. 2. J. Pool (York) 5:25. 3. D. Culpin (R. Royce) 4:26. **F/F SCALE.** 1. J. Palmer (C.M.) 518. 2. G. Lewis (Spitfires) 380. 3. E. Clutton (Spitfires) 377.

Bristol Goodyear Meeting

Eighteen of the original 53 entries originally received for Bristol R/C M.A.C. Pylon Race Rally arrived to fly in the chilly, damp conditions of April 11th.

When racing began at R.A.F. Hullavington, models were flown in heats of four aircraft, released at five second intervals and raced around a 10-lap 2½-mile course against the clock.

Some of the heats presented magnificent spectator appeal as closely matched models flew tight courses around the pylons. Most successful with this technique was Peter Waters, flying a Min-X Astromite VI equipped, O.S. powered *Shoelace*, to record the fastest time of the day. Fastest model of all appeared to be G. Warren's *Lil' Knarf*, but unfortunately he flew a rather wider course around the pylon, and it was D. Brunt, of I.A.R.C.A.S. with *Cosmic Wind* who recorded the fastest time. Third was B. Purslow, another I.A.R.C.A.S. member, also flying a *Cosmic Wind*.

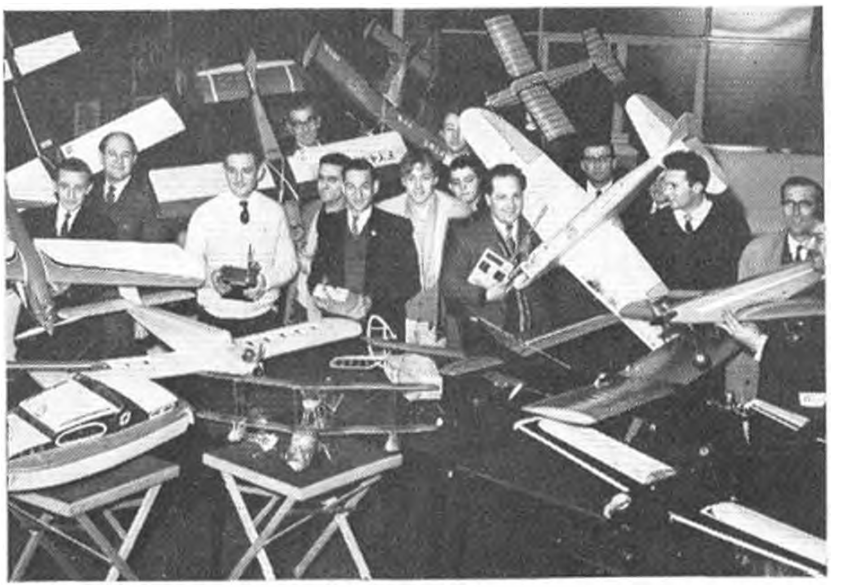
Although the winner used proportional equipment, many competitors were using non-proportional systems and it is quite clear that, unlike the aerobatic schedule, pylon racing gives the non-proportional radio systems a far better chance against proportional equipped models.

Results: 1. P. L. Waters (Portheawl) 3:38 *Shoelace*; 2. D. Brunt (I.A.R.C.A.S.) 3:53 *Cosmic Wind*; 3. B. Purslow (I.A.R.C.A.S.) 3:54 *Cosmic Wind*; 4. G. Warren (Reading) 4:03 *Lil' Knarf*; 5. R. Yates (Eastcote) 4:12 *Aeolus*; 6. R. Gardner (Bletchley) 4:12 *Cosmic Wind*.

Below: "Lil' Knarf" by G. Warren (Reading) used F. & M. Digital 5 proportional radio with O.S. .40 power. Probably the fastest model at the meeting, it finished 4th.

Right: equal 5th placer Roy Yates (Eastcote) with Orbit 10 equipped "Aeolus", also powered by an O.S. .40.

Club and Contest NEWS



Fylde Radio Controlled Model Society from Lancashire are now 40 strong and meet in the Y.M.C.A. building, St. Annes. All classes of models are flown including multi, proportional, single and scale. They also have some boating interests. (Photo: "Blackpool Gazette and Herald").

SCOTTISH NEWS

This year's annual event for the Caledonia Shield was held on March 27th, in the neighbourhood of Greenock, free flight being held on a moor in the vicinity of Loch Thom and control line on the grounds of the I.B.M. factory. Free flight established itself to leeward of a large hillock and had control line men throwing kit models up in an effort to get some extra club points, one or two models went O.O.S., but judging by the number of totals under 30 seconds, a lot did not go far. 1A team racing was well supported and well silenced, but F.A.I. had to be flown on short lines after one bisected itself on one of the lamp standards around the car park flying site. Combat was a bit bogged down, literally, leaving the factory lawn very chewed up. **Glasgow Hornets** emerged the winners for the third year running followed by **Ecurie Reekie** (Edinburgh) and **Larkhall Orbiters.** The previous weekend, and further down the Clyde coast at Gails saw the Radio Control men competing in the rally run by Irvine M.A.C. and sponsored by the S.A.A. This created a lot of interest but very little flying. Most impressive model, both there and when demonstrated to the I.B.M. factory during the Caledonia Shield was Ian Dunn's (Perth) low wing *Gee String* with Digiflve gear and Spinaflo silenced Merco 61.

SLOPE SOARING IN YORKSHIRE

From *Northern Area News* we learn details of their first slope soaring meeting to be organised by Blackburn Aircraft M.F.C. and held at Black Hambleton Hill, commencing at 11 a.m. on June 26th. The site allows for soaring in any wind direction except South East from 1,300 feet altitude. Black Hambleton Hill is situated about 3 miles South East of Osmotherley, on the North Yorkshire Moors. Open for entry by S.M.A.E. members only, the classes are Free Flight Glider, Magnet Steering and Single Channel Radio Control glider. Eric Coates and Graham Freestone both contribute to the latest N.A. News with slope soaring hints and model plans

COPTHORNE M.F.C.

Copthorne M.F.C. reveal themselves as the "Associated Club" of Coventry & D.M.A.C. mentioned last month in "Club and Contest News" under "Outdoors and Indoors". Copthorne M.F.C. was formed 2½ years ago from a model Railway Club of all things, *NO* they *don't* fly HO team racers! Also they don't intend to give their flying site up to Coventry & D.M.A.C. Two flying displays were given last season and meetings are still held twice a week. The only radio job they fly has just been lost O.O.S., this being an O.S. Pet powered silver A.P.S. "Pal Joey" with a Minimac Rx. Any interested locals (especially any who may have found the P-J) should contact Mr. R. P. Smith, Copthorne M.F.C., Copthorne School, Keresley, Coventry.

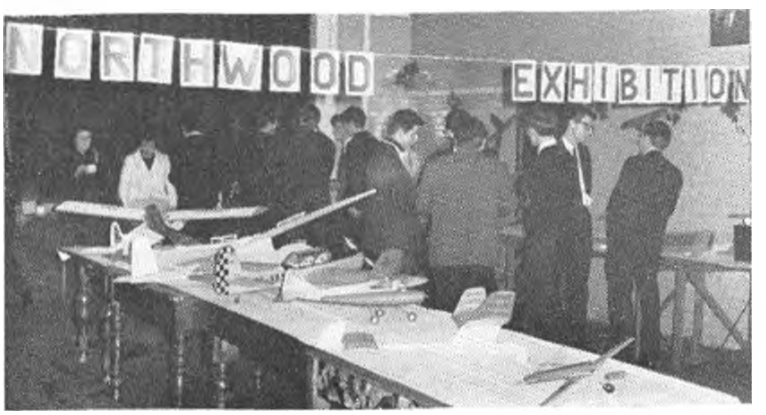
Worthing Bald Eagles Contest Flying

At the latest South Eastern Area S.M.A.E. control line meeting held at the Elliott Automation ground, Rochester, on April 3rd, weather conditions were the normal, wet, windy and really cold. Combat was won by Worthing Bald Eagles chairman John Bashford with T. Clarke flying a large stunter in his first competitive flight, giving him a convincing win over the other area stunt experts.

ESHER

Team Race Meeting

The Esher M.F.C., F.A.I. Team Race took place at the Club's Fairmile Common circle on Sunday, 3rd April, under overcast skies, with light winds. The meeting was well supported with particularly large numbers from Chingford, Wanstead and Hayes clubs contributing to the total entry of 21. The meeting was held in two heats each of 100 laps, the three fastest teams going on to the 200 lap Final. The Balch/King team from Hayes, Feltham provided an object lesson for many with a time of 4.52.5 from their second-string model! Goddard Gillhespey from St. Albans were the next fastest with 5.15. The Final had to be re-run, due to all three finalists breaking F.A.I. rules; however the final results were—Balch/King (Hayes/Feltham) 10.05.5. Goddard/Gillhespey (St. Albans) 12.04.5. Attwell (Chingford) retired 162 laps.



Northwood Clubsters admire fellow club member's models at the Northwood parents and friends invitational night on April 7th. A wide selection of models reflected the club's varied interests.

EVENTS THIS MONTH

May 29 & 30 *S.M.A.E. British National Championships.* R.A.F. Hullavington Wiltshire, on A429 between Malmesbury and Chippenham. May 29 Sunday events. Open Rubber (M.A. Trophy), Open Power (Shelley Trophy), R/C Multi (S.M.A.E. Trophy), R/C Scale Qualifying Flights, C/L Scale Qualifying Flights (Knokke Trophy) Team Race Class A (Davies A), Combat (heats) C/L Speed Handicap, plus one unorthodox event. May 30 Monday Events. Open Glider (Thurston Cup), Combined R/G/P. (Womens Cup), R/C Multi (S.M.A.E. Trophy), R/C Scale Judging, C/L Scale Judging, Team Race Class ½A (R.A.F.M.A.A. Trophy), Stunt (Gold Trophy), Combat (Finals).

June 5 *St. Albans Gala.* Chobham Common, Surrey. Open R/G/P, A/1 Glider and Coupe d'Hiver.

June 12 *East Anglian Area Decentralised F.A.I. Contest.* Postal. F.A.I. Power, Wakefield and A.2 Glider. No rounds. One entry in each class. Full S.M.A.E. members only 2/6d pre-entry, late entry 5/- with results. Results must be in by June 20th to:—S. Bowles, Warren Edge, Brandon Road, Thetford, Norfolk.

June 12 *West Mendip M.A.C.* Slope Soaring Rally, Crooks Peak, Nr. Weston-Super-Mare. Single and Multi R/C. Details from:—P. Heeley, Catcopp, Station Road, St. Georges, Weston-Super-Mare.

June 12 *Croydon D.M.A.C. Gala.* Chobham Common. Open R/G/P.

June 12 *Dunfermline Control Line Rally.* Pitreavie, Nr. Dunfermline, Rat Race, Combat, Stunt and Chuck Glider. Pre-entry to:—Dunfermline M.A.C., 2 Macgregor's Buildings, Woodmill Street, Dunfermline.

June 19 *Elliott M.E.C. Rally.* Airport Works, Rochester, Kent, Rat Racing (all classes), Stunt and Combat.

June 19 *Bath Festival Radio Contest.* R.A.F. Colerne, Nr. Bath on A4. Scale and Concours de elegance. S.M.A.E. rules, F.A.I. Multi Aerobatics, Pylon Racing N.M.P.A. rules. £195 prize money. Pre-entry by 4.6.66 to:—Dr. G. Henley, 47 Pembroke Road, Clifton, Bristol 8.

June 19 *S.M.A.E. Indoor Team Trials.* R.A.F. Cardington, Beds.

June 26 *Northern Area Slope Soaring Meeting.* Black Hambleton Hill, between Hawnby, Thirsk and Northallerton. Free Flight hand launch, Magnet Steering hand launch and Single Channel Radio Control time Nomination, Spot Landing contest. Details from:—E. Coates, 37 Knedlington Road, Howden, Goole, Yorks.

June 26 *S.M.A.E. International Control Line Team Trials.* R.A.F. Swinderby. Official pre-entries only. Team Racing, Speed, Aerobatics and Scale.

June 25 *Midmars Meeting.* Pitreavie, Nr. Dunfermline. Combat and Team Racing. Pre-entry to:—J. Dunker, Kirklands Garage, Kinross, Kinross-shire.

June 26 *Devon Rally.* Woodbury Common, Nr. Exmouth. Open R/G/P, and Chuck Glider entry 2/6d on field.

GOLDEN WINGS CLUB QUIZ ANSWERS

1. (b) flying-wings
2. (c) a control-line system
3. Solarbo, Veron, Mercury, Keilkraft
4. (b) radio frequency in M/cs
5. (d) gliders
6. D-C Bantam, A-M 049, E.D. Bee, Frog 150

COMING EVENTS

Additional to last Month's announcement.

July 3 *Esher Intermediate R/C Contest.* Shuttleworth Collection Airfield, Old Warden, Nr. Biggleswade, Beds. 11 a.m. 5/- Pre-entry, to:—M. Everest, 'Heyst" Coldharbour Road, Pyrford, Woking, Surrey, by July 1st. Note admission 3/6d. to Airfield, also includes car parking, access to museum and collection.

July 17 *1966 Devon F/F Championships.* Woodbury Common, R/G/P Only open to competitors normally resident in Devon. Details from D. G. Baudet, 80, Moorfield Road, Withycombe, Exmouth.

July 17 *East Midland Speed and Combat Open Meeting.* R.A.F. Barkston Heath. All classes speed, special prize for percentage of record flights. Class "A" combat. Entry 3/- per class in speed. Combat 3/- to G. Farnsworth, 29, Balaclava Road, Sheffield. 6. by June 30th. S.M.A.E. Insurance Req'd.

July 31 *Woodford Rally.* Avro Airfield, Woodford, Cheshire. Open R/G/P, combined tailless R/G/P, Chuck Glider, F/F Scale. Combined F.A.I. R/G/P, Class A Combat, F.A.I. and ½A Team Race, Rat Race, C/L Scale, R/C Multi Stunt, R/G Goodyear Pylon Race.

August 7 *Hayes Free Flight Gala.* Chobham Common, Surrey. Open R/G/P Open combined R/G/P, Tailless (30 secs E.R.) and A/1 Glider.

August 21 *East Anglian Area Open Meeting.* R.A.F. Upwood. Open R/G/P. Combined F.A.I. and Coupe d'Hiver.

September 4 *Boscombe Sport Rally.* Everleigh Dropping Zone, Nr. Tidworth, Wilts. Concours d' Elegance and Scale, Single channel R/C time nomination Spot Landing, and Chuck Glider. Field entry.

September 25 *Northern Area Meeting.* R.A.F. Topcliffe. Tony Pannell Memorial Trophy for Open Power. Vintage, Coupe d'Hiver and A/1 Glider. Details from:—J. Moseley, 7, Elmwood Ave., Walton, Wakefield.

October 2 *Canterbury Pilgrims Gala.* Club field, Barham, Nr. Canterbury, Kent. Open R/G/P single channel R/C Spot Landing and Concours d'Elegance. Starts 10 a.m.

October 23 *6th N. Area F.A.I. Meeting.* R.A.F. Topcliffe, Yorks. F.A.I. R/G/P. Team Race Combat, Stunt, Scale. Details from:—J. Moseley, 7, Elmwood Avenue, Walton, Wakefield.

S.M.A.E. CONTEST RESULTS

27th MARCH

F.A.I. Glider K & M.A.A. Cup. (21 entries). 1, J. Allen (Brighton) 2:20. 2, C. Foss (Brighton) 2:17. 3, J. Edwards (Croydon) 1:39. **Open Power,** Frog Senior Cup (9 entries) 1, A. Moss (Whitefield) 1:23. 2, T. Payne (Northampton) 0:57. 3, A. Childs (Brighton) 0:08. **Open Rubber** (15 entries) 1, H. Tubbs (Baildon) 4:17. 2, J. O'Donnell (Whitefield) 4:01. 3, W. Horton (Crawley) 0:47. **Coupe d'Hiver** (11 entries) 1, P. Cameron (Crawley) 2:55 2, A. Crisp (Croydon) 0:51. 3, M. Brown (Maidenhead) 0:20. **Plugge Points.** (One Event) 1, Brighton 185, 2, Croydon 86, 3, St. Albans 51, 3, Whitefield 51.

We apologise to the free flight competitors who attended the S.M.A.E. Area Centralised meetings on March 27th and April 17th with the wrong models, due to our error of mixing the events in the Contest Calendar.

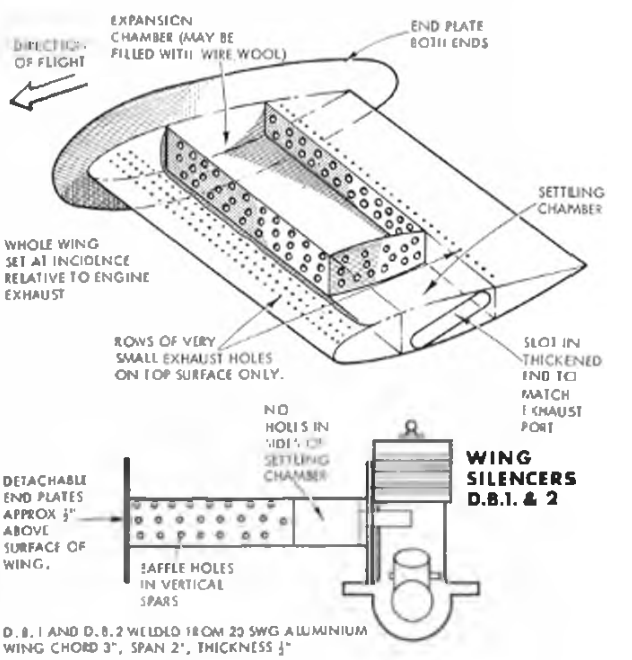
Silencers and Noise

Continued from page 345

TEST DATA FOR D.B.I. WING SILENCER

Silencer Type	In Flight Engine Noise at 50 feet	Model Speed (M.P.H.)	Speeds as a percentage	In flight R.P.M.	Remarks
Oliver manifold	83	65.3	100	12,300	Manifold alone as often used in combat.
Oliver manifold + expansion chamber	76	63.4	97.1	11,900	Worthwhile but at expense of R.P.M. and speed.
Oliver manifold + suction wing silencer—sealed (D.B.I. silencer)	73	67.8	103.8	12,400	Considerable noise reduction, with R.P.M. and speed increased.
Oliver manifold + suction wing silencer—unsealed (Top and plate removed).	82	58.2	89.1	12,200	With silencer unsealed, considerable drag penalty.

Tests utilised Oliver Tiger flying wing combat model, with a K.K. 8 x 6 nylon prop. (23.1.66 at Charville Lane). For comparative noise level, Chingford M.A.C. F.A.I. T'R. Eta 15 and silencer with bored out suction holes.— 80 dB at 52' model speed —80 m.p.h.



CLASSIFIED ADVERTISEMENTS

PRESS DATE for July issue, 1966, May 23, 1966.
Private Minimum 18 words 6/- and 4d. per extra word.
Trade Minimum 18 words 12/- and 8d. per extra word. Display box rate £2.10.0 per single column inch.
Box Numbers to count as six words when costing.
Box replies to be sent care of Advertising Department, 13-35 Bridge Street, Hemel Hempstead, Herts, England. Copy received after first post on May 23, will be held over until the next issue, unless cancelled in writing before 22nd of following month.

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FOR SALE

Veron Robot with 2.49 racer £5. Proton Flying wing 25/-. Flying Flea F/F 20/-. Mini Bipe with 0.49 F F 20/- O.S. pet 0.9 as new £2. Mr. Morrissey, 17, Ardgowan Road, Catford S.E. 6.

Uniflown C/W Macgregor Tx and Rx case, aerial, batteries £7; Rx only £3 O.C. Sabre, M E. Snipe Frog 150 MkIII 37/6 each. Everything v.g.c. 80, Penngrove Road, Hereford.

For Sale Pixie Rx and Tx £12. Futaba relayless Rx and Escapement £6 Elmic compact escapement 40/- Royal single servo 20/- Minicombo II servo 30/- A/M Annuals 1948/64. 70/- Goldberg Junior Falcon and Star Me 109 kits. 20/- each. Mills .75 40/-. Arber, Ingleside Dee Crescent, Farndon, Nr. Chester. Tel Farndon 453.

RADIO Equipment largest stockist in the country. Single, multi proportional, all R/C engines and accessories. Call, write, phone. Wanted good R/C transistor radio equipment, engines, servos, airframes.

Radio Control Supplies, 581 London Road, Isleworth. Middx. *ISL 0473.*

Atwood 10 c.c. glow, 100/-, twin ball bearing Arden. 199, 50/-. Both perfect condition. Herbert, 66, Broadmead Road. Folkestone.

For sale powerful Macgregor tone transmitter. Nearly new offers Kettley, 77, Westlands Drive, Heden. Hull, E. Yorks. Tel. Heden 895460.

Works Tuned Oliver MkIII 2.5c.c. 100/-. Webra Mach I mod. 50/-. Wright, 28, Grace Avenue, Maidstone, Kent.

2 E.D. Racers MkIII 30/- each. 3 E.D. Racers MkII 20/- each. Veron Mini Robot 45/- S. £5 R.E.P. Gemini Tx and Rx £13. Elmic Commander. Westall 84, Papist Way, Cholsey, Berks.

Pagco .09 mint in box 1941 Sky Chief 8.6 c.c., used but complete. Both only, to highest bid over £12. Poynter, 10048. Langdon, Granada Hills, California, U.S.A.

Model Airplane News Plans Recent Addition

M.A.N. 53A.

Petite Parasol:- A radio control single channel, parasol wing sport model, with scale lines and open cockpit. Wingspan 41½ ins. to take .09 (1.5 c.c.) engines, designed by R. J. Fidance Jnr.

Pink Fink III:- Ultra simple control line Rat Racer with profile fuselage. To suit .29—.35 (5-6 c.c.) engines, wingspan 27½ ins. designed by Art Atkinson.

Douglas O-43A:- Free flight power scale model, of Douglas observation aircraft, Wingspan 40½ ins. to take .049 (.8 c.c.) engines, designed by Tom Stark.

Limited stock only, order while they last!

For a full list of M.A.N. plans send 4d. stamped addressed envelope. All plans are priced 7/6d. plus 6d. postage from Aeromodeller Plans Service, 13—35 Bridge Street, Hemel Hempstead, Herts.

GIG EIFFLAENDER REBORING SERVICE
Chester Road, Macclesfield
REBORES, DIESEL ENGINES, 21/- c.w.o. GLOW-PLUG ENGINES from 30/- c.w.o. C.O.D. SERVICE (pay the postman, UK only) 4/6 extra. All engines tested and returned (post free in UK) within three days from receipt; customers abroad please add postage to cost. All our work guaranteed for one month from the time you receive the engine. ENQUIRIES, SPARES, etc., please send stamped envelope or reply coupon.

S & W. Single channel receiver matching transmitter. Built-in pulse unit for optional joystick control Galloping Ghost models. Receiver in model Mills .75 c.c. Conquest actuator. Part-built "Galloper" with AM 15 R/C Mighty Midget and all accessories, plans for details. Reynolds, 49, Dodney Drive, Lea Preston

Taurus S/T 56, F & M Midas Matador Deac 500, 5 Bonner Duramitos Brooks amplified, also another unpainted Taurus, £90. Will demonstrate and sell separately. Orbit 10 relay outfit £20. Biddlecombe, 24, Javelin Road, Thorney-Island, Emsworth, Hants.

F.M. "Hercules" 10 Channel transmitter, F.M. 'Midas' 10 channel superhet receiver, 4 Brooks amplified Duramites, Deace, all fitted in Smog ready to fly powered by Super Tigre R/C 51, plus Merco R/C 35 and several R/C air frames etc. £65. Phone Hayes 4639 during working hours or write, Welham, 45, Sherridan Road, Worthing, Sussex.

Carter Dooling 29—ex Ray Gibbs with speed model, Dollys, Accumulator, gan, props. £12.10.0d. Talfun Hurricane 1.5 c.c. with gazelle and speed model 40/- Mills .75 c.c. 20/-. Cox Tee Dee 20/-. Cox Babe Bee 20/-. Two years Model Aircraft and Aeromodeller 15/-. All in good condition. 24, Brindles Close, Hutton Essex.

"STANT" PROPS.

SPEED — TEAM RACE — PUSHER
All at 2/11d. ea. Inc. P.T.
RETAIL ENQUIRIES WELCOMED
—SPECIAL EXPORT TERMS—
c/o The British Legion Club,
Longmore Estate,
Horsham, Surrey.

MacGregor Crystal Transmitter Minimac Receiver £10 O.S. 19 R/C £4, O.S. 35 Stunt 50/-, Taplin Twin W/C £5 A.M. 15 50/-. A.M. 15 45/-. K & B Torp. 29 50/-. New K & B Toro 29 60/-. Mills .75 35/-. Ed Super Fury 60/-. New Jena 2.5 W/C 90/-. Merco 53 Stunt 60/-. Cox .049 20/-. Frog 1.50 50/-. Chippy, 3, Station Street, Sunderland.

Graupner 8 Channel Rx Tx almost as new. Tone-filters, Servos Deacs, Charger £80. o.n.o. Pearson, 25, Davehall Avenue, Wilmslow, Cheshire.

For Sale A.M.15 practically unrun £2, or nearest offer, A. Keeper, 31, Blackwoods Crescent, Mossend, Lanarkshire, Scotland.

SPINAFLO SILENCERS

42/6d. to 62/6d.
Largest range of Silencers in the world
over 75 types
These bright anodised units are a rewarding investment for all discerning modellers. Fuel economy and model cleanliness are but two of many side benefits. Made to fit any sideslack engine. **Mini** for .09 to .15. **Standard** for .19 to .35. **Super** for .49 to .61
Latest Additions: **Enya 60 T/V E.D. 24S**
All complete with mounting strap, adaptor block machined to close limits and colour anodised rotary flow diffuser.
D.A.C. COMPONENTS,
Albion Rd., Horsham, Sx., Eng.
All leading kits and engines in stock.

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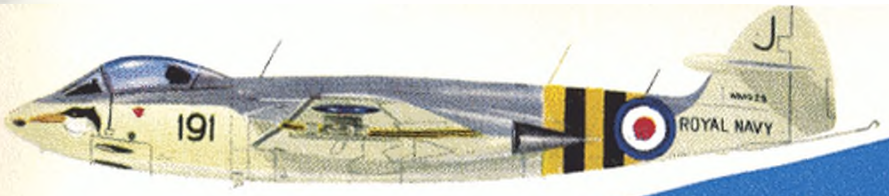

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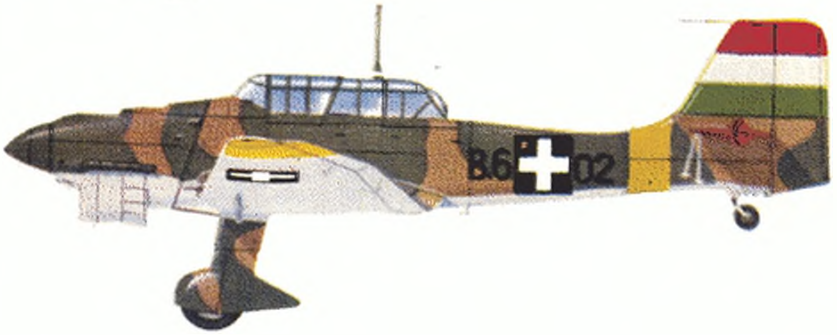

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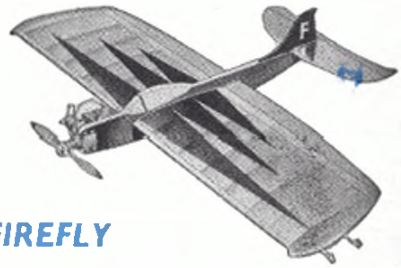

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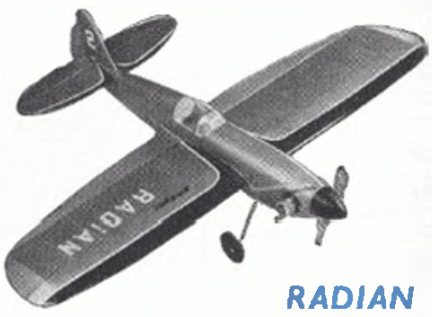

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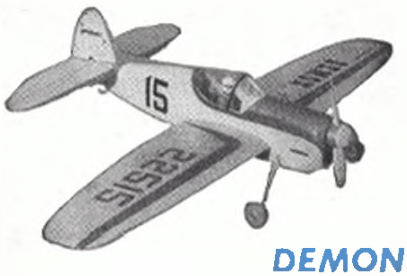

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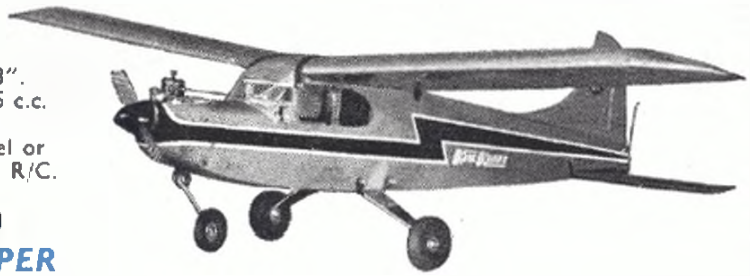

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