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APRIL 1969

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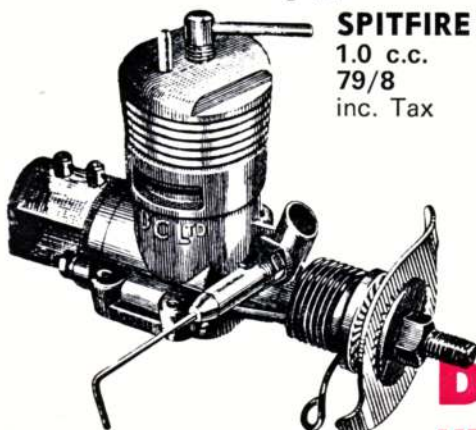
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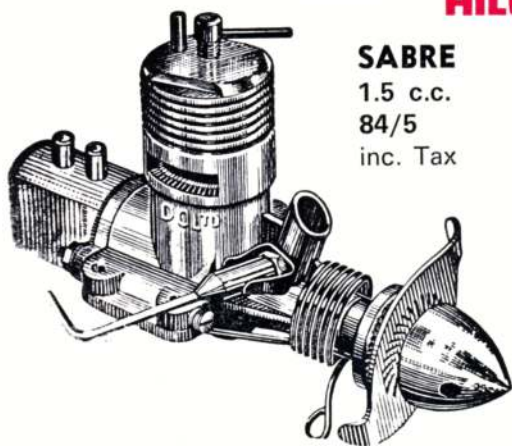
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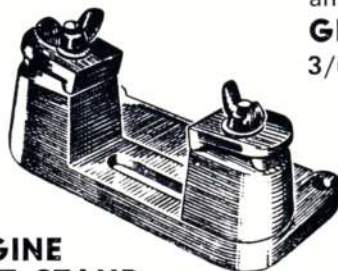
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# Aero Modeller

INCORPORATING  
MODEL AIRCRAFT

April 1969

VOLUME XXXIV No. 399

## CONTENTS

HEARD AT THE HANGAR DOORS	177
'BRAT' RAT RACER	178
READER'S LETTERS	180
U.S.S.R. CONTROL-LINE CHAMPIONSHIPS	181
ISAACS FURY Mk. II	184
ENGINE TEST - Super Tigre G.15RV-D	186
GOLDEN WINGS CLUB	188
NURNBERG FAIR NEWS	189
TOPSY .375 c.c. DIESEL	192
FREE-FLIGHT COMMENT	194
LATEST ENGINE NEWS	196
TOPICAL TWISTS	198
MODELLING WITH PLASTIC CARD	199
THOMAS-MORSE S-4C SCOUT	202
CLUB NEWS	204



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## COMMENT

Our recent warning concerning the possibility of model flying close to, or actually on active airfields becoming dangerous in the eyes of authority did not go unheeded in the National Press. The 'Daily Express' ran a story concerning a model which had taken a photograph of a VC 10 coming into land at London Airport (Heathrow) and was waiting to be claimed *last night*. The 'Times' offered a perfectly correct précis of our own statement and added a brief statement from the Board of Trade which confirmed our own view that it did not, as yet, propose to widen regulations to stop model flying within three miles of an airfield or higher than 200 feet. By confusing an incident which was pictorially covered in our companion journal *Radio Control Models & Electronics* in May 1965, where the aircraft involved was a DC 8 or 707, the 'Daily Express' added a trifle too much colour to a subject which is already an embarrassment. Nevertheless, we hope that the warning light has been well observed by the modellers concerned. What a pity it is that only adverse publicity reaches the Nations millions with their breakfast table news. How we look to the day when the same tabloids burst forth in support of a hobby that has produced key men in the aviation industry, air transport and the Air Forces of the World.

## on the cover

But for the leather-helmeted pilot's head, the *Isaacs Fury* might well be taken for a flying scale model, not that it is anything other than that in reality, for John Isaacs created this 7/10ths full-size replica of the Hawker Fury fighter as his contribution to the Popular Flying movement. Several modellers are currently engaged in making further replicas of the *Isaacs Fury*, and at least one R/C version is to be entered at the '69 National Championships. Control Tower background is useful for static scale modellers wanting to reproduce typical R.A.F. Station tower.

## next month

A treat for the combat fliers - Frank Dowling's famous *Liquidator* both on the cover in colour and in the plan of the month. For Golden Wings, Ray Malmstrom's *Long-John* for indoor or outdoor rubber power, and for free-flyers, more **three views** of interesting designs. Report on the Anglo-French *Coupe d'Hiver* Challenge, plus a fascinating account of **air-to-air model photography** achieved as a 'World first' by the Boddington Brothers are supported by all regular features, on sale, April 18th.



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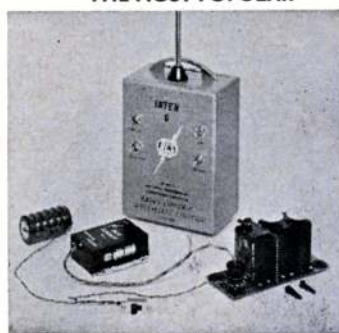
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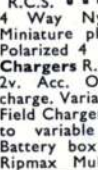
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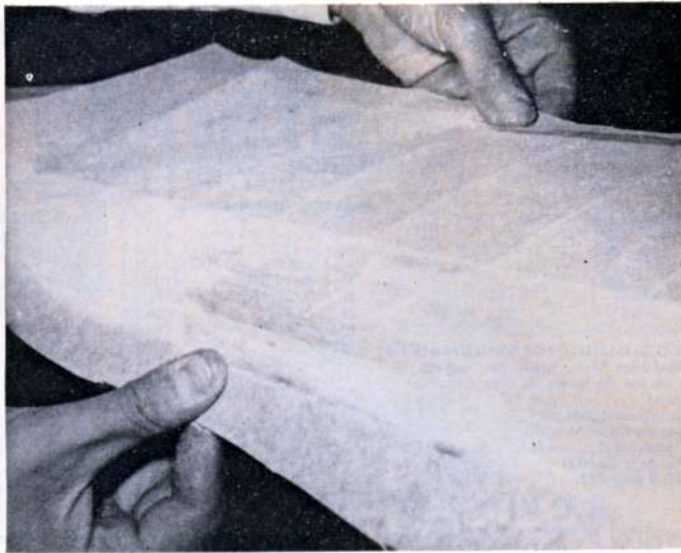
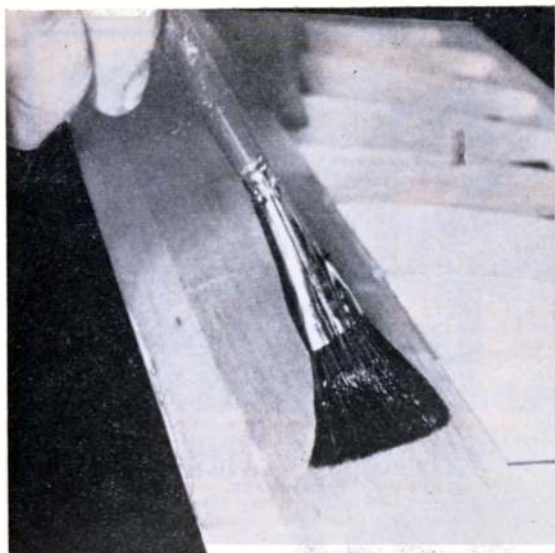
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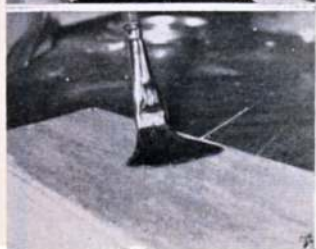
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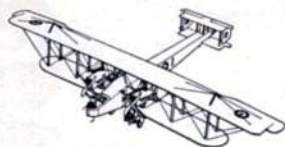
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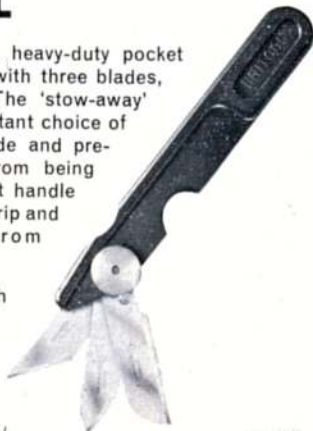


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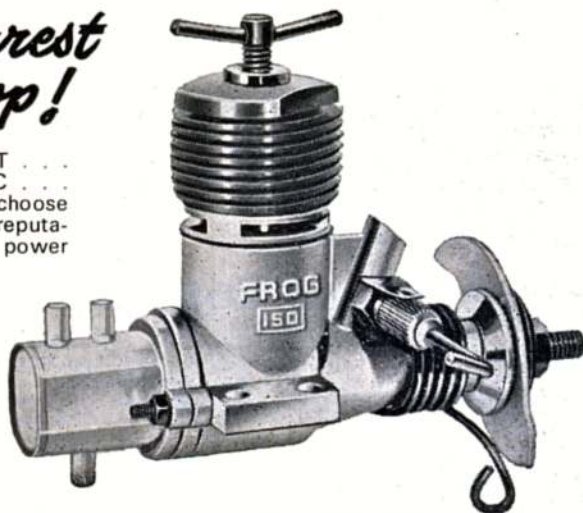
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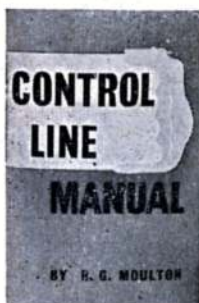


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## Heard at the HANGAR DOORS

A SMALL, but keen party made up the Aeromodeller annual trip to Paris for the 25th Coupe d'Hiver contest at Chavenay on 23rd February. Mild, and often bright weather over the weekend made a welcome respite from the snowfields of England. Pre-contest hopes for calm were dashed when the breeze increased to around 12 m.p.h. The British contingent were short of recent trimming and generally found lift detection difficult. John O'Donnell managed top British and top proxy scores! The contest was won by Christian Menget with a fairly typical French model of orthodox design, but larger in size than British ideas. Entries in person or by proxy came from France, Great Britain, Holland, Germany and the U.S.A.

### C. d'H. Challenge results

1. C. Menget (F)	357
2. L. Dupius (F)	347
3. J. P. Challine (F)	344
4. A. Landeau (F)	327
5. P. Pailhe (F)	324
6. J. P. Templier (F)	316
7. J. O'Donnell (GB)	313
13. F. Monts (USA)	292
(Proxy O'Donnell)	
39. H. Tubbs (GB)	231
42. T. Medley (USA) (Proxy Tubbs)	223
56. D. McDonald (Proxy Menget)	193
60. F. Monts (USA)	191
(Proxy Kenward)	
63. B. Lumb (GB)	184
70. R. Firth (GB)	163
75. W. Rozelle (Proxy Kenward)	158

THOUGH foreign imports into Britain are increasingly affected by levys, duty and taxes, the market remains otherwise 'free' and is highly competitive. In fact, as we've said before, the British Modeller is lucky enough to have the pick of the world's markets, a unique situation. Friends in New Zealand are not so fortunate. Import Licences are required. The N.Z.M.A.A. is endeavouring to arrange for Licences whereby New Zealand modellers can import R/C equipment. It is of interest that Radio Control Units, made in the United Kingdom, are admitted free of Duty, those from Japan and the U.S.A. are charged 20 per cent Duty.

SHUTTLEWORTH Collection fans are going to have a full year if the 1969 calendar is anything to go by. Eight flying displays at Old Warden, plus two model meetings will attract

The magnificent Trophy purchased to commemorate the memory of Eddie Keil, together with some of the replicas, to be awarded to the team winners in International F.A.I. Radio Scale competition.



thousands to the popular Bedfordshire air museum near Biggleswade. Dates to note are:- March 30th, Military Flying; April 27th, Grand Air Pageant; June 22nd, AERO-MODELLER SCALE RALLY; June 29th, Private Flying Day; July 12th, Members' Day; July 27th, Military Air Pageant; August 31st, Flying Day; September 28th, Flying Day; October 5th, Model Aircraft Day, organised by Performance Kits.

RUMOUR rebounds from the Continent of Europe that the F.A.I. has abandoned control line Scale. What nonsense! There are three official scale classes, for C/L, R/C and Free-Flight. Where possible, International contests have been run in conjunction with World Championships, for example, C/L at Swindon in 1966 and R/C to come with the 1969 meeting at Bremen. There are also several important C/L scale events in 1969 and it is hoped that the organisers of the Criterium of Aces in Belgium will incorporate C/L scale. There's little doubt that R/C Scale is booming toward a World Championship status and this may be even as close as 1970 but this does not mean the F.A.I. will in any way abandon either C/L or F/F scale.

GENEROUS response from 150 members of the model trade, 30 Clubs and a few individuals has brought the total to date in the Eddie Keil Memorial Fund to over £500. The Georgian Silver Cup and replicas are now prepared for presentation, and the balance of monies

received will be invested and the income used under the direction of the Trustees to assist British Teams in the F.A.I. R/C Scale event. In the hope that further donations will continue to come into the fund, the subscription list is to be kept open until 1st April at least. Enquiries can be addressed to the Editor.

FLY-FOR-FUN Rally at Sywell, near Northampton, where aero-modelling as well as lightplane and glider construction will be displayed has been moved to 13/14th September. Make a note in your diary, for this is one event all modellers should visit.

DREAM TOUR to the U.S.A., departing by 28th July and returning 12th August takes in the fabulous E.A.A. convention for home-builders at Rockford, the Piper factory, three aircraft museums and the famous Cole Palen collection at Rhinebeck for a cost of £230. We have a few leaflets for those who can't resist the temptation.

SKYFAME Aircraft Museum Supporters Society is forming a flying scale group at their Staverton H.Q., a current project being a quarter-size Hawker Hart with scale metal structure. Enquiries re membership to L. Earles, 33 Church Street, Evesham, Worcs.

INTERNATIONAL event for R/C duration (glider and power) to rules as we published last December is organised for 1/2nd June in Italy, details from Magli Vinicio, Via S.Vicenzi 11, 42100 Reggio Emilia, Italy.





## EIGHT FIRST PLACINGS, ONE SECOND AND TWO THIRDS MAKE THIS THE TOP RAT RACER

designed by David Rudd

THE ORIGINAL Brat design has been flying for over two years and during that time has had many contest successes.

It started life with a built-up wing, being nylon covered; but this proved to be too flexible. It was changed to a built-up wing covered with 1/16 in. sheet balsa and two models were made like this. It was still found that built-up wings were unsatisfactory due to them being easily damaged by pitmen during landings.

Construction was difficult so eventually a solid wing version was produced. Throughout the various modifications, different construction techniques were carried out, all to benefit the strength and flying capabilities of the model. Various tailplanes have been used, but due to vibration on earlier models because of large leading edge taper, the tailplane was made so that no vibration would be apparent and this has proved to be satisfactory in operation.

The fuselage was at first very weak due to plain, balsa construction but now incorporates full length bearers to withstand hard landings and fast pit stops. The u/c was made detachable because of fatigue and hard landings, changing from 12 s.w.g. to 10 s.w.g. because of breakages.

Wing tips have had a good testing and they have ranged from just left square to rounded (as per *Hooptee* in M.A.N.) or just curved, or bevelled, with an outboard tip 'bomb'. For pitmen, a rounded tip is not to be desired because a wing can just slip through his hands so the 'bomb' tip has been retained with a bevelled port wing.

The plan shows the Mk. II Brat in its latest form; and as detailed, the model is both simple and easy to build. If you want to use a well tried and tested model, Brat is flying the machine for you.

Begin construction by joining spruce leading and trailing edges to a 4 in. centre area of balsa. Make sure the balsa is not too soft or hard and use a white glue such as Humbrol 55 for all joints and either bind or use elastic bands to hold together. Allow to dry overnight. While the wing is drying, the bearers can be cut to shape and glued together with the three distance pieces (made to suit your engine mounting spacing). Again bind and set the spacers correctly to allow the wing to slide through the gap. Cut out tailplane of 3/16 in. hard balsa and the elevator from 3/16 in. spruce. Carve and sand to shape maintaining a flat bottom section, drill holes to take strong thread and sew elevator to tailplane using figure of eight stitching.

Carve wing to shape and section leaving centre portion untouched, cut out for the plywood bellcrank mounting plate and glue ply section into the wing. When dry, fit bellcrank and carve away so that free movement is obtained. Mark and cut out for 14 s.w.g. lead-out tubes. Attach doubled 7 strand Laystrate to bellcrank, bind and

solder, thread through tubing but do not at this stage make end loops. Cover over tubes with strip balsa. When dry, sand to final shape. When soldering the push-rod in place use a cup washer for the bellcrank end, make sure at this stage that 4 B.A. is secure and well soldered so that it will not undo.

While bearers are drying, the tail skid can be made up and stitched to  $\frac{1}{8}$  in. ply. Epoxy into position and glue to bearers. Rear of fuselage can be finished by sandwiching  $\frac{1}{8}$  in. balsa between two pieces of  $\frac{1}{4}$  in. as shown.

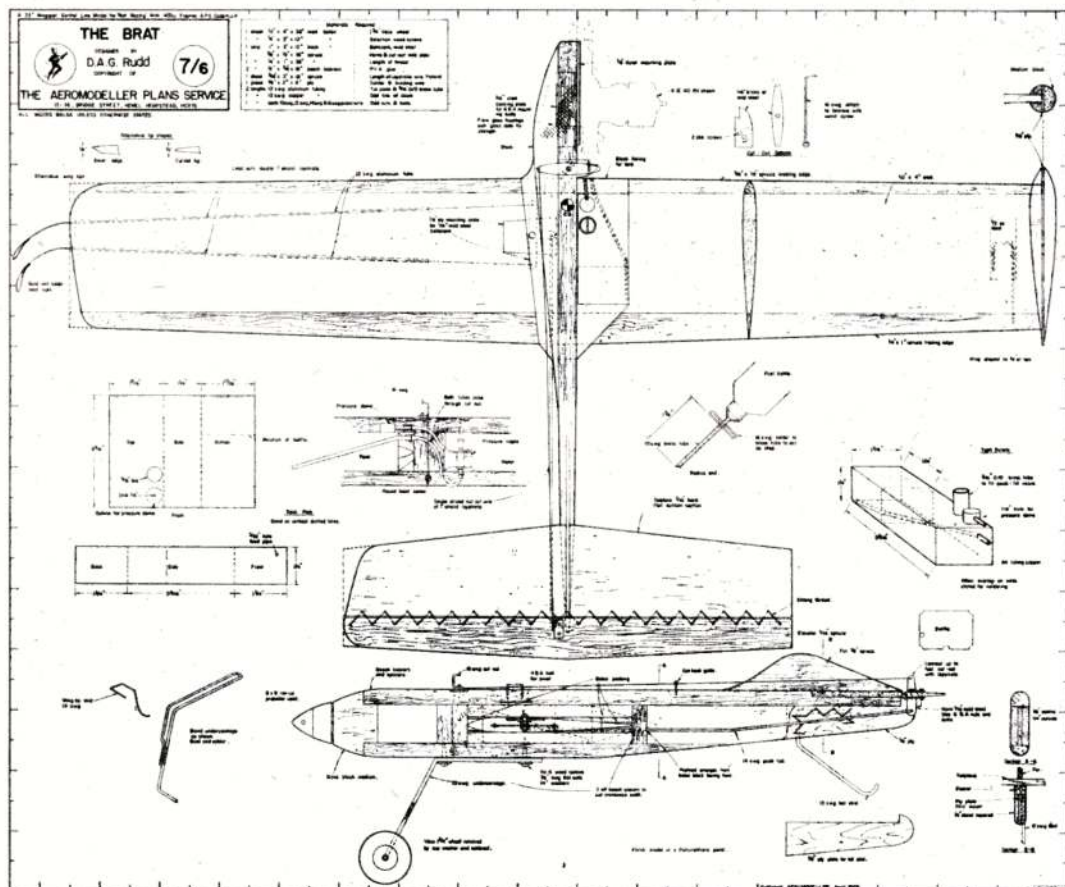
Now cut out packing strips for positioning of wing, making sure that fits are good, and keep wing parallel to bearers. Fill edge gaps with scrap balsa. Check bearers are square to wing, join tailplane to fuselage using glass-fibre and glass-tape to retain the tailplane to fuselage. Use drawing pins to maintain alignment then leave to set hard.

Next comes the important tank which is made from .010 in. tinplate cut as detailed on the plan and bent along dotted lines. Make holes in tank before soldering, i.e. 9/16 in. dia. for 'quick-fill', 1/16 in. for Pressure dome, and 3/32 in. for feed pipe. Make sure everything fits together before soldering. Tin all joints before soldering together; you want a tank to stay in one piece! First install baffle in position, then solder feed pipe into baffle soldering also to bottom of tank. Next, join side and ends to tank, passing feed pipe through end, and soldering. Solder pressure dome and 9/16 in. O/D tubing. Test complete tank for leaks by blowing into it whilst sealed, under water. The pressure dome is from a lipstick!



Dave Rudd and Richard King confer over Brat Mk. II. Note the tip 'bomb' to aid pit stop catches and the cut-out lever on top of fuselage.





Full-size copies of this 1/6th reproduction are available through A.P.S. as Plan CL999, price 8s. inc. post.

Cut out hole in wing for tank to fit, fill in gaps with balsa sheeting then fibre-glass into position (epoxy is essential). When dry, glue fairing blocks around tank and sand to shape. Fuselage block is made up of pieces of  $\frac{1}{8}$  in. and  $\frac{1}{4}$  in. sheets. Make sure that the fit to the wing is good and taper to T/E is flat, not curved. For the joining of  $\frac{1}{2}$  in. x  $\frac{1}{2}$  in. fairing pieces to wing, use white glue and pin into position, carve and sand to shape, don't forget to make up a steel backing plate and drill holes in bearers and plate. Use fibre-glass cloth for more covering, this gives rigid support to the engine. Make up cut out pieces and screw to bearers, mount engine on  $\frac{1}{8}$  in. dural plate to give a nice firm mounting.

Cut the fin from  $\frac{1}{8}$  in. spruce and shape to airfoil section. Glue to tailplane using Humbrol 55, making sure that fin is at right angles to the tailplane.

Bend and solder 10 s.w.g. undercarriage leg as shown on plan, solder washers either side of wheel, bind and solder u/c leg; attach to model with two round-head No. 6 wood screws.

Make up elevator horns from 1/16 in. mild steel and fit push-rod to horn, also join up cut-out strip with a length of Laystrate.

Bend and mount the tip skid on 1/16 in. ply. Sand and fill grain all over model. When ready to paint, remove everything that is detachable and give model four coats of clear Polyurethane paint, rubbing down between each.

This gives the Brat a sound fuel-proof base for applying a colour Polyurethane paint for finishing as desired. Most of the originals have had natural finish on wings and tailplane with colour for the fuselage. When transfers are applied, don't forget the S.M.A.E. No., then give another coat of clear for fuel proofing and to stop transfers lifting. The longer such a finish is left, the more resistant the paint becomes for use of high Nitro fuels. When model is completely dry, assemble the u/c and cut-out, plus engine and mounting plates.

Both feed and pressure tubes pass between the cut-out wire so that when the engine is cut, pressure still remains in tank and when cut-out is released again a jet of fuel enters the engine so making re-starts easier.

## Engines

Engines that have widely dominated the Rat circles are the ST 40RR, ST 21/40 and the K & B 40 (both front and rear rotary) all of which are max. capacity.

The motors used in Brat are standard with just a few adjustments, i.e. running fits checked and mating surfaces lapped. (No gaskets are used on these engines). Special alignment jigs made up to achieve this.

It has been found that these engines need very little running in; it's no use letting the engine four-stroke for long periods, this does not run-in an engine.

I've found a 10 x 4 in. or 9 x 4 in. wooden prop best for



**BRAT** *continued*

running a new engine in. Balancing is essential (my first attempts with Nylon 9 x 4 in. and 9 x 7 in. sheared their blades). After initial break-in for 10 minutes let the engine run to peak speed for short bursts, stopping the engine between bursts to test temperature of bearings (front housing) and cylinder head and allow to cool if too hot. Continue with this process until the engine has obtained compression (due to wing becoming bedded-in), it should be satisfactory after not more than 20 minute break-in period.

Fly on a 9 x 8 in. or 8 x 9 in. wood for best performance (first motors turned 9 x 8 in. Top Flite wood with a better performance achieved by cutting down to 8 1/4 x 8 in.). Now the 8 x 9 in. Rev-Up or Punctillio 8 x 9 in. are used. Speeds should be around 120+ m.p.h. on 15 per cent nitro fuels as long as model is built to specification and weighs 26-28 oz.

The Brat is one of the easiest models to handle and can be flown 'eyes-off' during a race (a Pilot with some T/R experience is essential for these high-speed models). Get to know the model and engine set-up by regular practice, knowing when to cut an engine and getting the pitman to

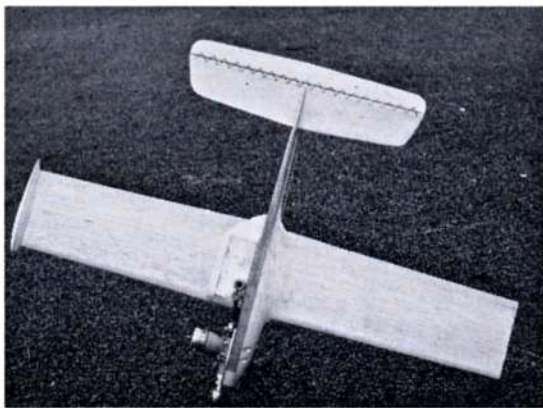
know the engine starting characteristics from cold or hot. Many teams go very well in practice, only to make a hash of their heats due to their engine not starting at the start signal. One must find out *why* engine doesn't start. Many starter systems for plug ignition have been tried, the best way is either to use a Jack Plug facing to rear of model (for easy removal by pitman) or a hot glove system connected to the wing.

There are many variants on these ideas and at the 1968 Nationals many ingenious ideas were being tried out. Most impressive was the use of a clothes peg with electrical contacts to clip on either the T/E of wing or better still with contacts on the fin. This is all done to save ground time and saves valuable seconds.

When on warm-up period and just before a race, make sure your plug is O.K. It is time saving to have a switch fitted to clip and accumulator - make sure it is 'on' at the pit-stops!

Hope to see you in the Rat circles soon, get building and find out what it's like to circulate at 120+!

Close-up of pressurised tank system, showing cut-out mechanism and undecorated structure, other view illustrates the Brat's functional features.

**Popularising contests**

Dear Sir,

Over the past few years the majority of thinking aeromodellers have been worried about the decline in club membership and contest entries, particularly in the Free Flight field. Most of the blame is usually placed on the new relation - radio, and of course, apathy on the part of modern youth. This is why we were all pleased to read John O'Donnell's salutary warning about the results of prohibiting tactical flying and running contests as 'match play tournaments'.

The time has come for introspection allied with the history of aeromodelling. For the first, do we want a hobby which is so competitive that only the out and out expert stands the remotest chance of winning a contest, or getting into a fly-off? Or are we going to encourage the beginner by keeping things as simple as possible and letting him go home at the end of the day with a feeling of satisfaction at having maxed out and at least having some reward for his efforts and cash outlay. If the former, we can look forward to fewer contest entries and diminishing prize money culminating, quite possibly, in the death of free flight as a National sport. A further point would be the inability of small clubs such as my own to raise sufficient manpower to even attempt

running such events. Consequence - fewer galas and later fewer clubs.

Secondly, in the immediate post-war period, aeromodelling had its heyday. At that time competition rules were considerably simpler and quite often honours were decided by one lucky flight before the introduction of the max. BUT PEOPLE DID FLY. Then rules were introduced stipulating maximum flight duration and cutting down the length of permissible engine run. Consistency and high-power have ruled the day ever since, together with the expertise needed to meet these requirements. At the time of screams in the Model Press about professionalism and the death of the movement went unheeded. Today, we still fly, but our numbers are considerably diminished and the number of juniors that one sees can more than likely be counted on the fingers of one hand. The moral would appear to be to leave open contests alone.

There appears to be movement afoot in open rubber to introduce a 40 gm. class of model. The performance of these models at Chobham makes it apparent that they will not cut down on the number of people in the fly-off, which was the original intention. If this class becomes accepted as standard it

will only mean an additional category in which to fly such as A/1 glider or 1/2 A power. Do we require additional classes?

B. Edwards

Chairman, Richmond & District M.A.C.

**Warning note**

Dear Sir,

Your February issue has been an eye-opener to me over the degree of dedication expected from enthusiasts of our hobby.

In *Free Flight Comment* Mr. John O'Donnell, after advocating a method of warp removal involving crouching over the exhaust pipe of a fast revving car, sees fit to reassure us that the black spots on the model can be removed. The chance of fatality from carbon monoxide poisoning (about 50/50 at my guess) is deemed to be unworthy of even a mention.

If this idea catches on, I dread to think of the consequences. Questions in Parliament about the number of hospital beds being taken up; posters in the Underground; medical programmes on the television depicting cross-sections of a deceased aeromodeller's lungs - all sooty and clogged up.

Thank you very much and all that, but if I get a warped tailplane on the flying field I think I'd bring it home and fix it and at least be sure of living to fly another day. Wickford, Essex

Geoffrey A. Battson

**LETTERS**



# В ПОМОЩЬ АВИАМОДЕЛИСТЫ ПУТЬ ЭКСПЕРИМЕНТОВ — САМЫЙ НАДЕЖНЫЙ

Revealing translation of  
report on U.S.S.R. C/L  
Championships criticises  
Soviet modelling standards

## We must experiment more in the future

THE CHAMPIONSHIPS of the Country evoked the wide interest of veterans and novices alike. If a sportsman is able to pass this test, he can call himself a real master.

The 37th All-Union control line Tournament took place in Kharkov. An excellent flying area had been provided by the hosts. It is, in fact, the best in the country and the brainchild of the Kharkov Defence Society, under the leadership of the regional D.O.S.A.A.F. committee (chairman: I. Ryaschenko). The club's instructor, B. Belman, is a keen aeromodeller.

For five days the flags of the Union Republics flew above the flying area. The Championship was dedicated to the 50th Anniversary of the Lenin Young Communists League, and the atmosphere was, therefore, especially jubilant. Many competitors showed that they have achieved a very high degree of skill.

This was certainly so in the case of the high-speed merchants. Speeds showed a general improvement upon last year's results — from 225 k.p.h. to 238 k.p.h. (achieved by Siberian modeller A. Lapinin). He took 4th place in the World Championships in Finland with a speed of 242 k.p.h.

Engines of a special construction were fitted to the models of the champion and his runner-up (V. Natalenko from Leningrad); in the air they develop approximately 27,000 r.p.m. Lapinin's model weighed 380 gm. (Natalenko's model was 10 gm. heavier), and the wings were made of 0.2 mm. thick titanium foil. They were able to reduce drag and increase thickness by 4 per cent.

Twelve of the 37 high-speed merchants used tuned length exhausts (last year there were six). These are intended to increase engine power and flight speed. Unfortunately, only four or five modellers were able to gain any advantage. The reason for this would appear to be a lack of knowledge about the use of the 'resonator', setting the feed system and excessive fuel supply. On the ground, fuel feed is excessive and this can make take-off more difficult. In the air it can be too much or too little.

The competitors who used 'resonators' had made the engines themselves. But what about the majority of modellers without the necessary facilities to do this?

Obviously, we must produce engines with three channel scavenging capable of accepting a resonator — like those of Lapinin, Natalenko and Malanchuk. Even without tuned exhausts fitted, tests have shown that their engines develop more power than the Italian 'Super Tigre'.

### Scale

A new model of the TU-16 flown by Yu. Sirotkin earned him the title of National Champion. The model was made by Muscovites Yu. Sirotkin, Yu. Sokolov, E. Yurchuk and V. Tunik. It has rocket-type engines which operate on solid fuel, and thrust can be adjusted to provide the necessary conditions for flight. The thrust available on one engine is from 12 oz. to 4.4 lb. A test bench version enabled them to build engines suitable for the actual model. The length of this model's fuselage is 75 inches.

Many of the models have appeared at previous All-Union competitions. There is nothing wrong with this if one stops to consider the amount of work that has been put into these models. A. Chayevsky from Kiev spent more than three years building his AN-2; the modellers from Moscow spent four years working on their TU-16. Alas, they have been unable to acquire an ability to simulate the flight conditions of a prototype aircraft. Many scale models are not even capable of flying, and what a disaster this would be in the real world of aviation! The modeller spends about two minutes preparing his model for a flight, the model flies for 3-5 minutes until the fuel has been used up. The real effect of the flight has been lost. The models have no brake mechanisms, the undercarriage and flaps do not



The Kharkov control line circles.  
Aerial photograph taken by A.  
A. Tatarenko (Pilot — P. Motovilov).



lift after take-off. All this can reduce the overall impact of a flight. We must improve the construction and flying characteristics of our models.

## Combat

None of last year's champions were able to defend their titles with success. The new list of 'aces' is evidence of the keen competition about. Even the Gold Medal for Combat was awarded to a complete newcomer, A. Dubinetsky from Kazakstan.

Dubinetsky went straight into the finals. The effect of this could well have put him off his stride. But he retained his self-control for what was to be a difficult dogfight. His opponent was besieged with a vicious onslaught of accurate aerial attacks. Dubinetsky conducted the final battles with great skill, and it was through this and his great sporting enthusiasm that he earned his success.

As best mechanic, V. Yuzva, was awarded the 'Wings of the Fatherland' prize. Last year's champion took 9th place, E. Mikolaitis, the 1967 runner-up, took 15th place and S. Bereznyoy, 3rd last year, took the 8th place.

Combat is a fascinating and useful form of competition. It calls for great endurance, faultless eye, decisiveness, quickness of wit and all the other qualities needed of a true defender of our homeland. That is why we should encourage this form of sport.

The first three places in the aerobatic class were taken by K. Plotsin, E. Kondratenko and V. Yeskin. Master of Sport, K. Plotsin from Riga earns a special place in 1968. He was placed second in the World's Team Race Championships, and he also became the Soviet Union's champion flyer.

Our veterans were ahead in the team race class: V. Timofeev and Yu. Sirotkin, A. Babichev and B. Krasnorutsky, A. Zolotoverch and E. Kobets. The winning teams, including their mechanics, showed a high degree of co-ordination. The outstanding sportsman was, however, Muscovite V. Timofeev. Like Plotsin, he gained two honours in 1968; second place in the World Championships, and first in the All-Union Competitions (Plotsin's place in the Kharkov Championship was taken by Yu. Sirotkin).

The Team Race flyers were making greater use of a mechanism which stops the engine and enables frequent refuelling operations to be performed more quickly. One important thing was noticed; these flyers are putting little thought into developing new models, and tend to be sticking to the designs used by our leading flyers.

In the aerobatic class there are two main trends; the Ukrainians and Latvians favour heavier models, whereas the Muscovites prefer lighter ones. But they are all agreed that the model must be perfectly balanced.

The relationship between area, weight and flight speed must be in such a proportion so as to give the model the best flying potential. A steady hand and enthusiasm are equally important.

The model of the champion, K. Plotsin, weighs 48 oz. and has an overall area of 643 in.<sup>2</sup> In flight, control line tension is minimal – using a 21 metre length line. When the line is lengthened, manoeuvres are carried out more slowly, the model is not so susceptible to the influence of wind and is, therefore, capable of good flights in adverse weather.

The aerobatic, speed and T/R flyers are all in need of better quality engines. The engine which was used in Kharkov by E. Kondratenko would be suitable for the stunt flyers. In fact, this engine should find wider use amongst stunt flyers (the 'Super Tigre' is basically obsolete) (*sic!*).

As far as team rivalry is concerned, there has been little change of late. Without knowing who will represent such and such a team, we can forecast fairly accurately that the main competition will be between the Ukraine, the Russian Federation, Moscow and one or two other teams. Place positions may change, but as has happened at the Kharkov events the same teams will remain the leaders in this field. This clearly confirms the excellent training being provided by these teams as opposed to their rivals. All right, there was one exception at Kharkov – the Air Force Team which was formed recently took a first prize.

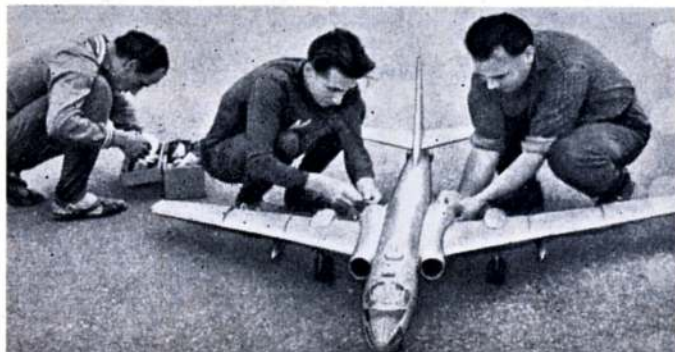
The Kirghizian team made an amazing jump from 9th place last year to 5th place this year. Its club instructor, I. Ivannikov, is providing the young members with some excellent training. For example, schoolboy K. Kydyraliev has recently made a name for himself.

*At first, his trainer said, the lad didn't take anything seriously. He was just the same at school where they wanted to throw him out. But the example which was being set by his school friends gradually had an effect on him. The lad transformed and applied himself more to his work.*

*When we select a team, continued I. Ivannikov, we always think about our reserves, about tomorrow.*

At the Kharkov tournament, all entrants from this Kirghizian club were high among the leaders in the different events. Last year, Kydyraliev was 14th in the aerial combat event. This year he took 4th place. The team is now regarded as one of the five best.

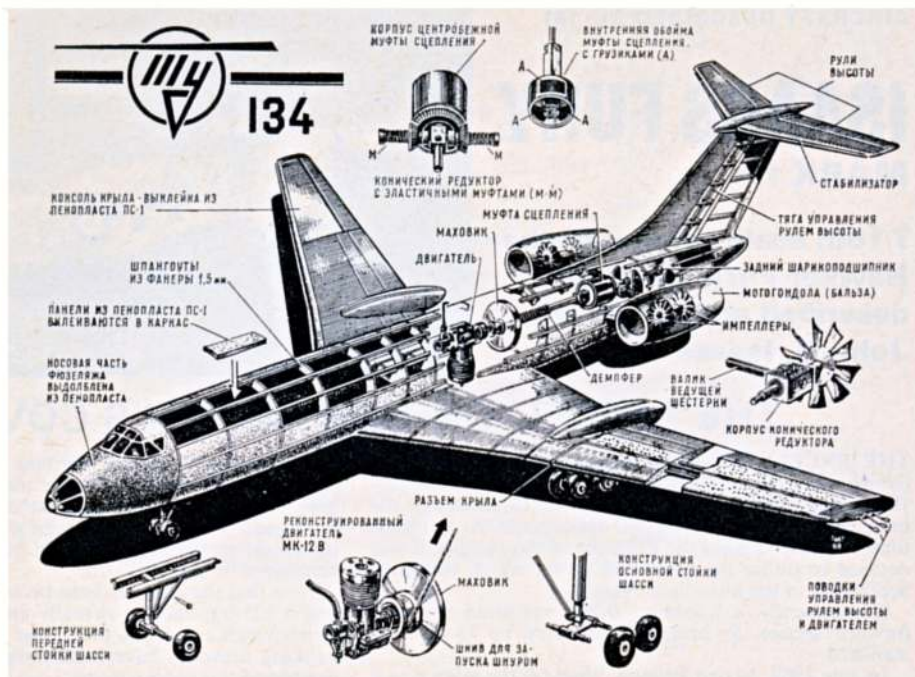
In those clubs where the instructor's role has not been developed, the results are very different. It is probably for this reason that one of the leading clubs in the past from Leningrad has fallen behind. The Leningrad team didn't even get into the first 10. The teams from Moldavia and Tadzhikistan were completely outclassed. The regional D.O.S.A.A.F. committees and the clubs' administration know full well that nothing is being done to rectify this.



Muscovites Valery Timofeev, Eugene Yurchuk and Yuri Sokolov prepare their TU-16 with propellant – Hydrogen Peroxide?



Though propulsion method might be considered optimistic, this Tupolev TU 134, with mixed plastic, hardwood and balsa structure is indicative of new and original thinking among USSR modellers.



There were not all that many novices capable of offering stiff opposition to our veterans at the Kharkov events. There were very few newcomers from the Moscow, R.S.F.S.R. and other republican clubs. Young sportsmen from club training units and other suitable circles should be integrated into the main clubs, and less reliance should be placed upon our veterans. It is especially important for the Central Aeromodelling Club to establish a given standard, and spend less time participating in our national events. The question of training our reserves must be given absolute priority.

We must put more overall effort into providing a thorough basic training. At the U.S.S.R. Championships, A. Lapinin used a foreign model\* (even the engine and the control line had come from abroad). Competition rules (and these leave much to be desired) make no reference to the use of foreign model aircraft. This means that the rules had not, therefore, been infringed. But this is not entirely a question of the sport itself. It is a question of the sportsman's morals, ethics, honour and dignity. Are our models in fact of poor quality? Nothing of the sort! The above sportsman from Novosibirsk is one of the five best speed flyers in the world. But the model that brought him this great success did not appear at our own events. There is a lot of ill feeling about the way in which A. Lapinin has acted. His actions, so it appears, have even been sanctioned by V. Kolpakov, the trainer of the combined Russian Federation team.

\* As is customary, the U.S.A. and U.S.S.R. modellers swapped models after the 1968 World Championships; Lapinin exchanged with World Champion Arnie Nelson. This is not confined to Control-line. Leading U.S.S.R. Wakefields are influenced by an American 'Gift' as are many U.S. A/2 gliders by the Sokolov design. Arnie gave Lapinin the World Champs winning airframe, with one of his spare engines. Lapinin gave Nelson his 4th place model, complete with engine, as used. It was capable of 240 Km/h, beautifully made, and as Arnie says 'Maybe he did not have another one'.

What is the typical Soviet aeromodelling sportsman really like? Little is required to simply build and launch a model. First of all he must be a man with high moral standards, who, as a citizen of the Soviet Union, values his honour and dignity.

The control line Championships have shown that the existing rules governing competitions must be drastically revised. In aerial combat events, for example, the rules to a considerable extent are quite irrelevant. There's something wrong with our system of judging these control line events. Our chief arbitrator, V. Eskov, whose job it is to select panels of judges, was given a completely different task. The panel at the Kharkov events was sanctioned by the Central Committee of the D.O.S.A.A.F. but of our 20 invited judges only five turned up! The unsuitability of our existing system of refereeing was most apparent in the scale model, perfectionist flying and stunt flying classes.

Why is it like this? We are not training our judges through seminars, discussion groups or proper courses. It is imperative that we do something positive about this. But who are the men we must train? To name but a few, we suggest the following: B. Kraslavsky, V. Piltenko, Yu. Skotnikov and B. Taradeyev. Unfortunately, it is these people whom we rarely see at the judges' tables.

First of all, training should be provided by our club instructors, by the aeromodellers themselves and their clubs. Their training schools should be the All-Union competitions, but as a rule club instructors are not invited to these championships. This is indeed, very strange. It is also important that our judges specialize in judging only one or two classes of events.

Let us heed the results of the Kharkov control line events and analyse the implications!

KHARKOV

M. LEBEDINSKY  
Special Correspondent  
Wings of the Fatherland



AIRCRAFT DESCRIBED No. 181

# ISAACS FURY

## MARK II

**7/10th scale version of the Hawker Fury, designed described and drawn by John O. Isaacs**



## THE 'MODEL' ON THIS MONTH'S COVER

THE EXCELLENT flight characteristics of the FURY, (which was originally described in *Aeromodeller*, January 1965), led to the desire to improve the suitability of the more readily available flat-four type motor. At the same time, in order to meet the demands of the pundits, it was decided to utilise the maximum power which would be acceptable in the ultra light category.

Consequently, a Lycoming O-290 was fitted in a new forward section to bring the airframe up to FURY II standard.

In July 1967, Vivian Bellamy lifted off the FURY II in a dirty, uncowed condition. It at once became obvious that the effort had not been in vain. After a 50 yard run, the little biplane was climbing out at some 1,600 feet per minute and was soon carrying out aerobatics. In due course Mr. F. I. V. Walker flew it and gave it the official stamp of P.F.A. approval.

Cowlings and final painting were not completed until the summer of 1968. The aeroplane was then resprayed silver and given Royal Air Force red, white and blue National markings together with black and white diced pageantry of the famous No. 43 Squadron, *The Fighting Cocks*.

For the constructor, the FURY presents no special problems and it embodies the usual biplane advantage of small components in that the wings are separate port and starboard panels, the longest being a mere 9 feet. Even the fuselage, less motor and rudder, only occupies a 14-foot space so a really practical modest sized shed can be used.

The Lycoming powered 7/10th scale FURY bears a much closer resemblance to its famous forebear than did the Mikron version. The engine cowling on the prototype is aluminium, but since the two-way curves demand an unusual specialised skill, it is considered that fibre glass techniques would be a more practical proposition for future builders.



The original 10-gallon fuel tank has been retained on the prototype despite the more thirsty Lycoming. However, it is possible to increase the capacity by installing a redesigned T tank and still keep within the 1,000 lb. all-up-weight to which the FURY II has been restressed for aerobatics by Ray Hilborne.

Now that the type has been proved with both a 65 h.p. and a 125 h.p. motor, virtually any of the popular flat-four aircraft engines in this range may be fitted and the working drawings have been completely revised to suit engines of this configuration.

As yet the prototype G-ASCM is the only one flying and her present owner, Mr. W. Raper, has been kind enough to comment:

"Once the aircraft has left the ground I cannot praise its handling enough. It must be near perfect to my way of thinking. On the ground a good deal of caution is required and with no brakes or tail steering all turns have to be wide and care taken not to let too much speed build up. On take-off, the tail lifts almost as soon as the throttle is opened and care must be taken not to wind on the throttle too quickly or she will swing and a little delicate rudder/throttle co-ordination is required. However, if one opens the throttle slowly but steadily, it is quite easy to hold straight and there is no need to unstuck it at all, as, at about 45 knots, it will just fly itself off the ground. At 60 knots I have stop-watched the climb to be 1,500 ft. per minute with a full fuel load. At 55 knots climb out speed this is increased to 1,650 ft. per minute, although the cylinder head temperature will jump up slightly.

"I have done a loop, stall turn, barrel roll, aileron turn. Control was delightful on all these manoeuvres and there was a feeling of taughtness in the aeroplane and at all times the control was very easy.

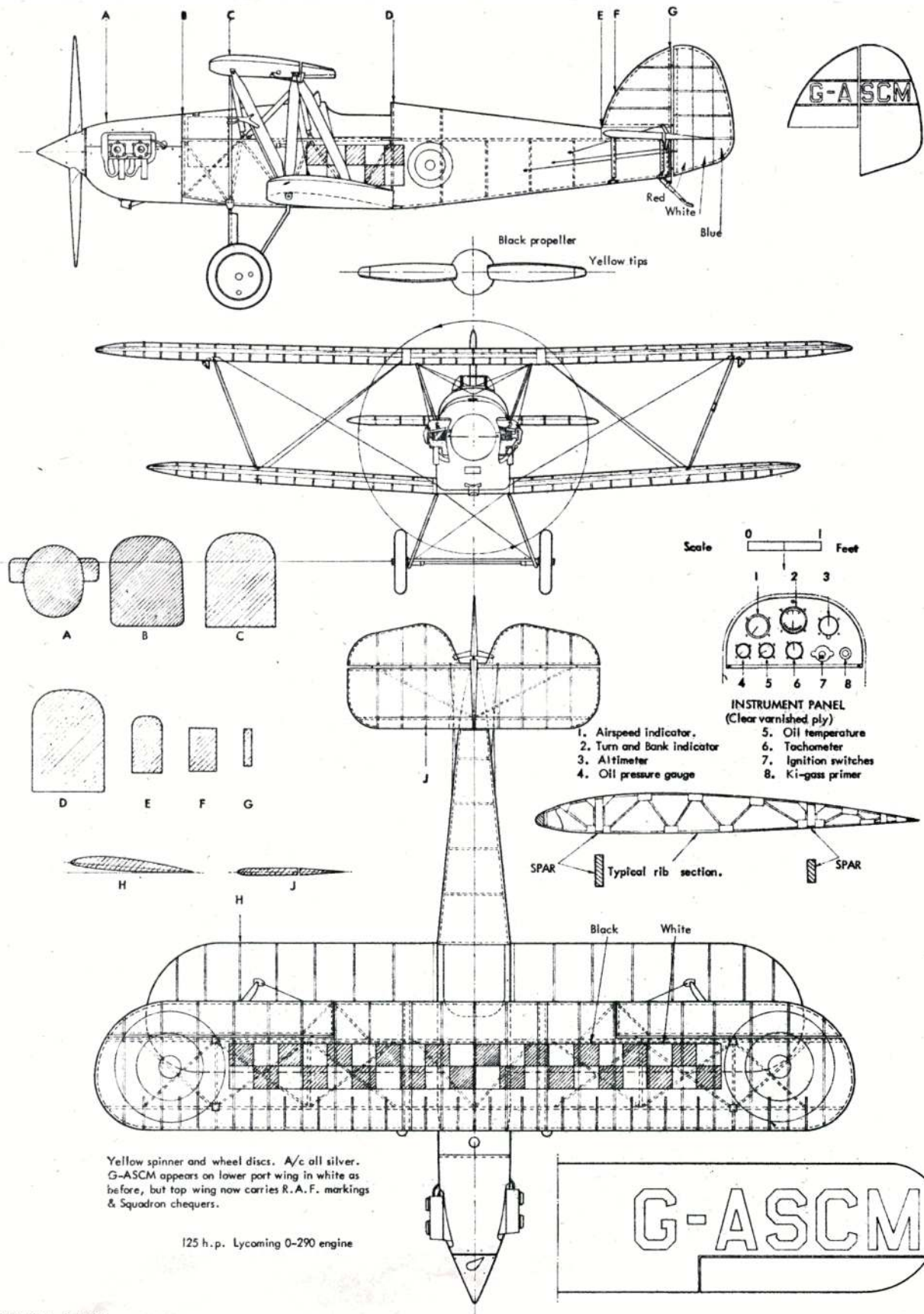
"If anyone wants an aeroplane which is intended to make him feel young again, I cannot think of a better one."

### SPECIFICATION (125 h.p. Lycoming)

Wing Span (Upper) 21 ft. Maximum A.U.W. 1,000 lb.  
Wing Span (Lower) 18 ft. 2 in. Stall Speed 42 m.p.h.  
Length 19 ft. 3 in. Cruise 100 m.p.h.  
Wing Area 124 sq. ft. Vne 160 m.p.h.  
Height (flying altitude) 7 ft. 1 in. Engine 125 h.p. Lycoming O-290.  
Empty weight 720 lb. Propeller 76 in. dia., 3.48 ft. pitch.

The proportions of this pert biplane fail to convey its small size adequately. John Isaacs has sold the prototype in order to proceed with other projects, including more Furies. Reprints of this feature, together with dyeline prints of the 1/24th scale original drawing are available from Aeromodeller Plans Service price 2/6d. plus 6d. post. Quote AH2888 when ordering. Similar drawings for the Fury Mk. I are also available as AH2786 price 2/6d. plus 6d. post.



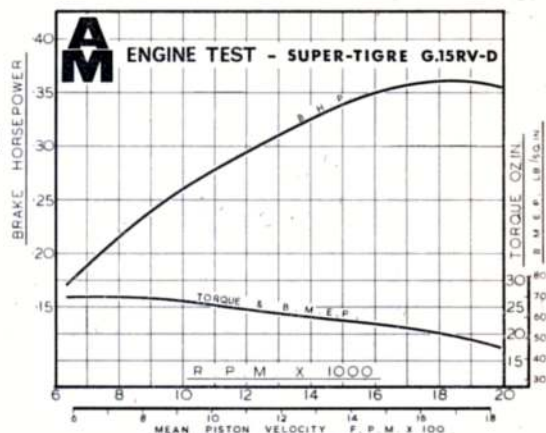
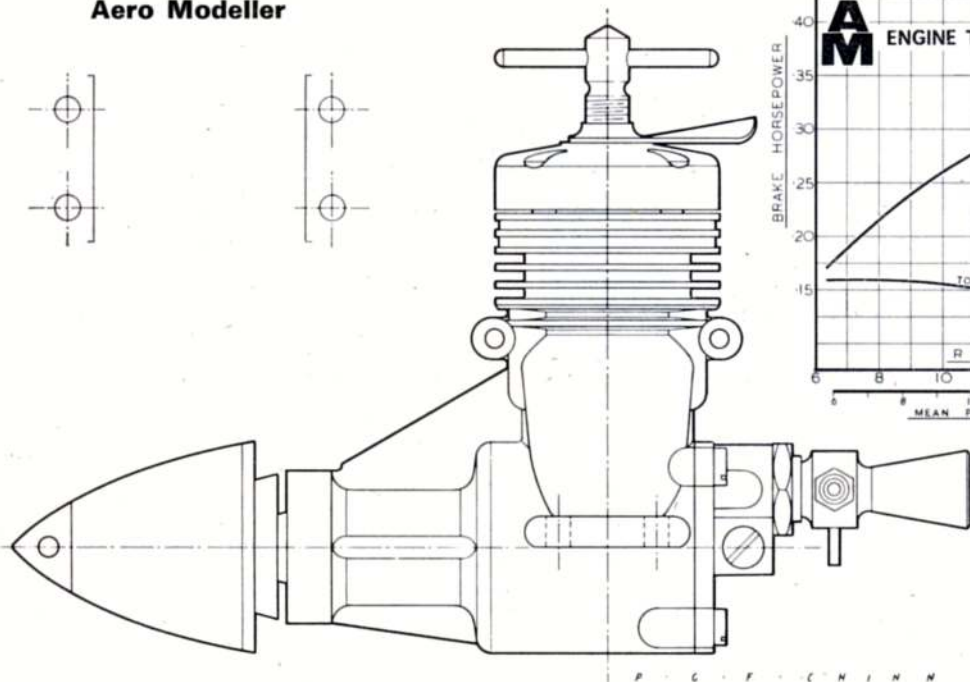


DRAWN BY J. O. ISAACS.

ISAACS FURY MK2

FT.





**ENGINE TEST**  
by Peter Chinn

THE REAR rotary-valve Super-Tigre 2.5 c.c. contest diesel, together with its companion glowplug model, was first put into production more than a year ago but the motor described here is a further improved version introduced a few months ago. The G.15RV is supplementary to the standard front rotary-valve G.15 and G.20/15 models which have achieved so many successes over the past few years.

Whether the G.15RV-Diesel has anything to offer, performance-wise, over the shaft-valve G.20/15-Diesel (an engine that has, in the past, been used with some success in F.A.I. team racing) is a question which our present report does not resolve. The G.20/15-D is rated by the manufacturer at 0.35 b.h.p. at 17,500 r.p.m. but we have not had a recent G.20/15-D for test and, in any case, one would be hesitant about making a firm decision on this point on the basis of tests of single examples of engines of this particular type. As team-race enthusiasts are all too well aware, individual examples of even the best of racing 2.5 c.c. diesels are apt to vary in performance to a very considerable extent.

The maximum power output of the G.15RV-D, as shown by our graph, is roughly comparable with that of

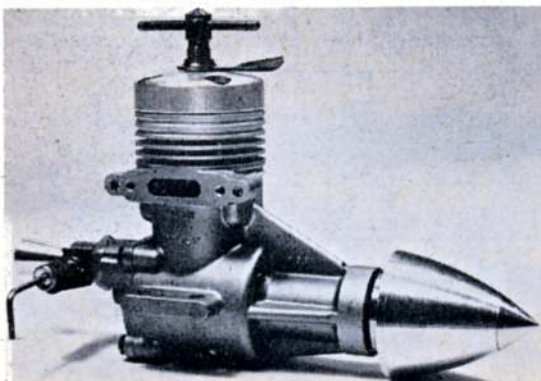
## SUPER TIGRE G.15RV-D

other current high-performance 2.5 c.c. diesels, where a fairly small bore carburettor choke is used in the interests of maximum lappage for team-race work. On the G.15 RV-D, the choke diameter is 4 mm. and its total effective area, with jet and needle added, is about the same as that of the plastic type intake fitted to the Eta Elite's special 'Long-Range' carburettor. On this carburettor, the Elite Mk. II, as tested in this series last year, recorded just under 0.35 b.h.p. at 15,000 r.p.m., whereas, with its standard large-bore ( $\frac{1}{4}$  in. i.d.) carb., an impressive 20 per cent improvement in power at about 1,200 higher r.p.m., was obtained.

Whether such a substantial improvement would result from fitting a large-bore intake to the G.15RV-D is questionable. That its breathing is not unduly restricted, with the standard small-bore intake, is suggested by its very high peaking speed and the explanation for this is that, unlike the Eta, the Super-Tigre incorporates supplementary air induction via the exhaust port due to having a short cutaway piston skirt that opens the crankcase to atmospheric pressure for about 50 degrees of crank angle at the top of the stroke.

No alternative intake is offered for the G.15RV-D and it is not practical to bore out the existing standard carburettor since its o.d. at the throat is only 5.6 mm. For those who wish to experiment, however, it is possible to fit the backplate and 7.5 mm. choke carburettor from the G.15RV-Glow engine.

Clean pressure diecastings are most evident in these photos of G.15RV-D, complete at left, dismantled at right.





In general design, the G.15RV-D is a development of the G.15 shaft-valve engine. It uses the familiar Super-Tigre scavenging system of a deflectorless piston in conjunction with large inclined transfer ports and identical exhaust and transfer timing periods. The combustion chamber is of the simplest shape; the piston crown and contra piston surface both being quite flat. Only four (instead of six) head screws are now used. The main casting of this latest model is completely new. It comprises crankcase, bearing housing and cylinder casing and there is a substantial strengthening web between the front of the cylinder casing and the front housing.

The casting also incorporates the new, smaller exhaust duct as seen on the latest front rotary-valve G.15 described in the November 1968 *Latest Engine News*. This has a flange for attaching an exhaust system although, in view of the engine's present porting arrangements (which are not ideally suited to a silencer or tuned exhaust pipe), we would assume that it has been incorporated mainly in anticipation of future development.

The rear rotary disc induction valve is a reduced scale version of that now fitted to the G.60R and G.21/29RV engines and described in detail in the January 1969 *Latest Engine News*. The carburettor body is now a screw-in machined venturi, held by a locknut and fitted with an open type jet and ratchet type needle-valve assembly.

The G.15RV-D is not a cheap engine but construction, throughout, is to high standards and each motor comes complete with an integral machined aluminium spinner assembly.

## Test Performance

Our test G.15RV-Diesel was an absolutely stock example and, quite obviously, had not been specially selected for this report. We can say this with some confidence in view of the fact that it had actually escaped from the factory minus two head screws.

Running qualities were good, right from brand new. Very steady speeds were held, especially at the higher levels, with negligible power loss on warming up. Most high-speed diesels have a period, in the r.p.m. range, through which they have a tendency to spit or misfire as they warm up, but no such tendency was detected with the Super-Tigre.

Starting characteristics were checked on a wide variety of prop sizes. On all props having diameters of

## SPECIFICATION

**Type:** Single cylinder air-cooled compression ignition two-stroke with disc rotary-valve induction and twin ball-bearings.

**Bore:** 15 mm. (0.5905 in.) **Stroke:** 14 mm. (0.5512 in.)

**Swept Volume:** 2.474 c.c. (0.1510 cu. in.)

**Stroke/Bore Ratio:** 0.933:1.

**Weight:** 7.06 oz.

### General Structural Data

Pressure diecast aluminium alloy one-piece crankcase/cylinder/main bearing housing with drop-in non-hardened steel cylinder-liner and non-hardened contra piston. Hardened steel crankshaft with 10 mm. dia. main journal, 5 mm. crankpin and full disc internally counterbalanced crank sealed by aluminium cover. Shaft runs in one 10 x 24 mm. ball journal bearing at rear and one 5 x 16 mm. ball journal bearing at front. Lapped cast-iron flat-crown piston with hardened 4 mm. dia. tubular gudgeon-pin retained by wire circlips in piston bosses. Machined duralumin connecting-rod with plain eyes and lubrication slit at lower end. Hardened steel valve rotor running on hardened steel pin mounted in pressure diecast aluminium alloy backplate and retained by set-screw. Machined aluminium alloy screw-in carburettor venturi retained by locknut and fitted with brass open jet type needle-valve assembly. Plain aluminium alloy cylinder head secured to main casting with four screws and threaded for 6 mm. compression screw with locking lever. Machined aluminium alloy prop-driver/spinner-backplate mounted on shaft by means of alloy split taper collet. Steel prop retaining washer and 5 mm. hexagon nut. Machined aluminium spinner retained by conical tipped sleeve nut. Beam mounting lugs.

## TEST CONDITIONS

**Running time prior to test:** 2 hours.

**Fuel used:** Manufacturer's recommended mixture: 45 per cent kerosene, 30 per cent ether, 18 per cent castor-oil, 4 per cent nitrobenzene, 3 per cent amyl-nitrate.

**Air temperature:** 48 deg.F.

**Barometer:** 29.90 in. Hg.

**Silencer:** Nil.

nine inches or more (that is to say, on props allowing static r.p.m. up to 11,000 or so) starting was straightforward and reliable. On smaller props (e.g. for static speeds above 12,000 r.p.m.) there was some deterioration. The G.15RV-D could then be a bit vicious and a painfully rapped finger could be the result. Even so, we were able to hand start the engine on props down to 7 x 4 - i.e. on sizes well below those that would actually be required in a model.

Typical prop r.p.m. recorded on test included 9,400 on a 10 x 4 Tornado nylon, 9,500 on a 9 x 6 Power-Prop wood, 10,900 on a 9 x 4 Keilcraft nylon, 12,000 on an 8 x 6 Power-Prop wood, 13,600 on an 8 x 4 Top-Flite nylon and 17,100 on a 7 x 4 Top-Flite nylon.

As the power curve shows, the Super-Tigre needed to turn pretty fast to reach its maximum possible output. Developing its full power at approximately 18,500 r.p.m., the G.15RV-D in fact peaked at a speed that has not been exceeded by any other diesel we have tested to date.

Both controls were non-critical and positive in operation. The needle-valve was easy to turn but held its settings firmly against vibration. The contra piston had no tendency to seize in the bore when the engine was hot and the compression lever was not uncomfortably stiff to operate. At engine speeds above 15,000 r.p.m., the compression lever had a tendency to run back, but this was easily checked by using the locking lever provided.

The Super-Tigre G.15RV-D is, presumably, intended for F.A.I. team-race and international class F/F power contest work, primarily. The next few months should show whether, in fact, it is competitive in such events.

**Power/Weight Ratio** (as tested): 0.82 b.h.p./lb.

**Specific Output** (as tested): 146 b.h.p./litre.







Are you between 10 and 16 years of age? Then don't delay, join today

Dear John,

For Christmas I was given a *Mercury Matador*, free flight/radio control plane with a 1.5 c.c. *Taipan* glow plug engine. I am worried about the propeller size which would be suitable for the plane. In the engine instructions they recommend an 8 in. x 3 in. or 7 in. x 4 in. prop. In the plane instructions they advise a 9 in. x 5 in., 10 in. x 4 in. or 10 in. x 5 in. prop. Which of these would be best. I hope to install the R.S. Navigator and Conquest escapement into the *Matador* in a few week's time.

S. Kime

We can understand your confusion over the different recommendations on propeller size but it is usually better to follow the advice given for the airframe rather than the engine in just the same way as cars will select rear axle ratio according to their relative size and weight.

The *Matador* will undoubtedly be best on a 9 in. x 5 in. propeller. We do not think that your 1.5 c.c. engine will suffer by running at lower than usual r.p.m. It is not a fast airframe and as your first radio control venture, you will be best served using the larger propeller.

Dear John,

I am at present building the *Apprentice* which appeared in August 1968 *Aeromodeller*. It will have Cox 'Pee Wee' power and RipMax Radio Control (*Pathfinder*). How should the top of the fuselage be sheeted? On the plan it says: 'Top sheet omitted this side of Centre Line', however, it is drawn as if it were completely sheeted on top. Can you explain this please? Also, at what stage should the R/C be installed?

I own a Cox 'Pee Wee' and a Frog 80 engine and would like to know if throwing an old rag into the prop arc to stop the engine damages the prop or engine in any way.

I have read the M.A.P. Booklet on R.T.P. Flying and I am considering experimenting

with smaller models and engines for 'in the home flying'.

Please could you tell me what the ratios given with duration contest results mean. Bristol.

Brian Fisher

Your problem is really one of plan interpretation. The top sheet is omitted to one side of the centre line on the drawing to indicate the inside of the fuselage so that you can see the sheet across the bottom.

Install the radio control at a relatively early stage in order to make sure that you establish proper balance.

Stopping an engine by arresting the propeller with a rag is not particularly damaging since most engines are designed to have a reserve of strength to withstand any impact. We would not suggest models smaller than 15 in. wing span for R.T.P. flying.

The expression 3:47 should be interpreted as 3 minutes 47 seconds when you read competition results.

Dear John,

After reading the article in *Aeromodeller* about R.T.P. flying, I have become interested in this type of flying. I have often wanted to go to the flying field with my K.K. 'Firebird', but due to this snow and cold weather I have been unable and I think R.T.P. flying would solve this problem.

Could you please advise a suitable aircraft for R.T.P. flying. I intend to use a *Rikowhip 16D* motor, also could you give me some information on designing an aircraft of this nature.

Camberley.

M. James

You will get a lot of pleasure out of electric R.T.P. flying but the 'Firebird' is not really suitable. You should choose a model which will weigh no more than 3 oz. complete with electric motor and be from 15 in. - 20 in. wing span and possessing a slender nose, unless you intend to modify the motor to accept gears. The *KeilKraft 'Sportsman'* or 'Swallow' could be modified quite easily,

## TIPS OF THE MONTH

Miniature cockpit covers for solid models can be made by the simple process of making a Plasticine form shaped to the desired cockpit cover profile and painting the Plasticine with a coat of warm Vaseline which will go thin. Now apply a series of coats of thick dope, and when this is set with the desired thickness built up by successive coats of dope you can remove the top skin in the form of a cockpit cover from the Plasticine.

Yet one more tip for disused ball-point refills. Use the end caps from the tube as a neat weight box plug. The dimensions of the threaded portions allow a .177 lead air gun pellet used for ballast to pass through the  $\frac{1}{8}$ -in. hole. The plug can be screwed into the balsa so it cuts its own threads.

Dear John,

I started control-line flying about two years ago with a *Mercury 'Mamba'* powered by my Cox .049 Special (with modified fuel system) with reasonable success. Since then I have built three more models, a *Mouse Racer*, a *Combat* (own design) and a *Veron Pinto* fitted with a *Frog 150 Mk. II*. When I do r.o.g.'s with this it will not climb. The one time it did it zoomed up, dived and ended up buried in three inches of soil. Could you please tell me what is wrong. Utensford.

P. Dunwoody

Your problem with the *Pinto* is probably that you have arranged it to be too nose-heavy. Check the balance point and see that it is about  $\frac{1}{2}$  in. back from the leading edge, and if necessary, shorten the engine bearers or add weight to the tail to adjust this. If a control-line model is excessively nose-heavy, elevator control becomes marginal.

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 enamel club badge, two coloured transfers and membership card.

NAME IN FULL .....

ADDRESS .....

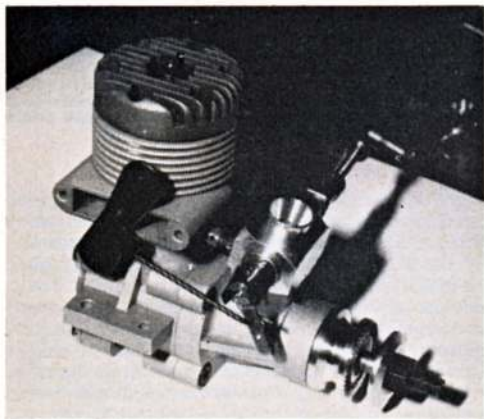
YEAR OF BIRTH ..... SCHOOL .....

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

4/69 2d. in the 1/- Rebate  
plan purchase coupon  
for Golden Wing Members  
G.W. No. ....





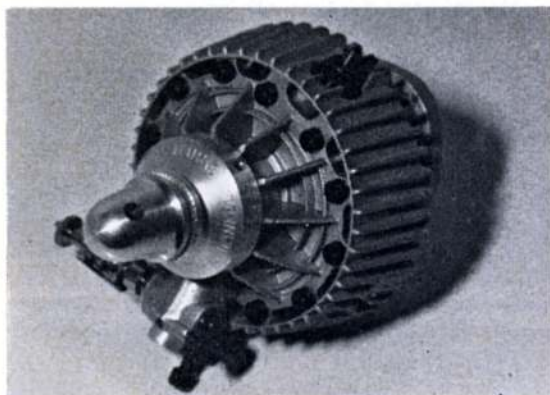
# Nürnberg News

**THE VAST TRADE FAIR  
BRINGS FORTH NEW  
KITS AND ENGINES  
PLUS A GALAXY OF  
GLIDERS**

WE HAD BEEN advised before this, our first visit to the *Internationale spielwarenmesse* during the second week of February, that this Trade Fair was the most important and certainly the largest held in the World; but even with such forewarning, the enormity of the show left us a little confused after a first appraisal. Allowing for its capacity to embrace a large variation of subjects allied to the Toy and Hobby trade, one can dispense with much that is exhibited in the seven halls and concentrate our aeromodelling interests in the Europahaus, and still be overwhelmed by what is revealed for the 1969 manufacturing programmes.

Bearing in mind that 95 per cent of the exhibitors are from West Germany, and about 80 per cent of the pro-

**New Webra .61 model '69 Black Head** has internal changes, more exhaust port 'bridges' new con-rod and piston, improved performance. Right, is production model 5 c.c. single-rotor Graupner NSU/Wankel unit, made by O.S. Actual engine is 2½ in. dia., with fins, 2¼ in. dia.

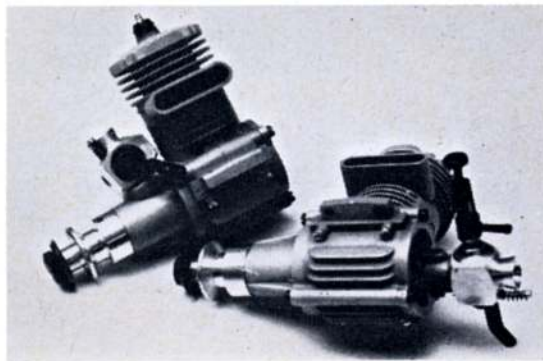


ducts inclined toward radio control, the Fair becomes even more impressive in terms of productive effort. We have much more to say on this subject in our companion journals *R.C.M.&E.*, *Model Boats* and *Model Cars*. Suffice it to say here that West Germany has developed an indigenous trade which appears to be self-supporting in all aspects, and is flourishing to the extent of many times the turnover and following enjoyed in Great Britain.

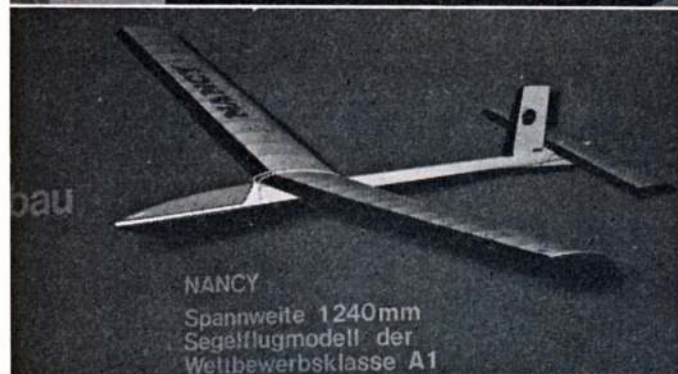
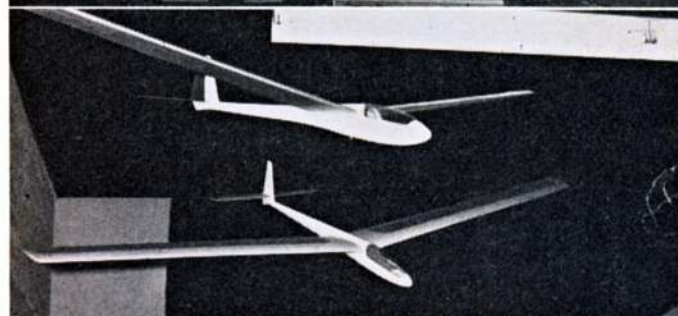
The novice is *not* forgotten either. Who would imagine that there would be a market for a Jetex powered duration design. The World's largest manufacturer of model kits is not given to making mistakes, and the Graupner 'FAN' has not been produced cheaply though all one will find in the box will be a few pre-shaped and die-cut pieces. The sheet balsa wings are cambered, have incorporated wash-out at the tips and are chemically im-

pregnated to hold shape. Model is 25 in. span and uses the PAA loader unit. Graupner also has a new A/I glider, the 'NANCY' with a fully shaped fuselage nose, machined to elliptical section, plan view and profile, and his investment in the 'CIRRUS' probably amounts to as much as Airfix put into a 1/72nd plastic. The fuselage is injection moulded in three parts of 'Novodur' plastic and is one of the most elegant to be found in a country where the sailplane is almost part of life itself. Three metres span, for up to 6-channel R/C, this one is near scale (1/6th)

Cox 3-line system for throttle control on .020 Ryan ST-3 is similar to methods described in this magazine, not like Roberts system. Below are Cox .35 Front Rotary R/C and .40 Rear Rotary R/C, showing extensive finning, crankcase division under bearers and head integral with upper case, has 5-port transfer system.







**GLIDERS GALORE!** Top to bottom, Rowan's 112 in. Windspiel, full multi with ailerons. Next group are Engels' Scout 110 in., with 3-metre FK-3 and 5 ft. version of FK-3 plus Polly R/C trainer against wall. Two in formation are K.D.H.'s 67 in. Kolibri and 110 in. Elfe, both without ailerons. Graupner's neat Nancy is an A/I kit that will be popular and his Cirrus in powered version at bottom is quite likely to become a World favourite with a new formula plastic fuselage.

of the 1968 World Champs. winning Open Class glider. Power pod for the OS Pet adds appeal to a model we've already reserved for our personal building programme.

Hit of the show, and star of the large Graupner stand was the NSU/Wankel rotary engine of nominal 4.9c.c. The neatness of this 'Three-cylinder' unit is enormously appealing. It develops 0.63 b.h.p. at 16,000 r.p.m. and will be produced in quantity from June. Second only in attraction is the new 'VARIOTON 6' with plastic-cased Tx. for boat, glider or sports power models at a price that had us envious. In fact all the prices had us afflicted with a small case of jealousy.

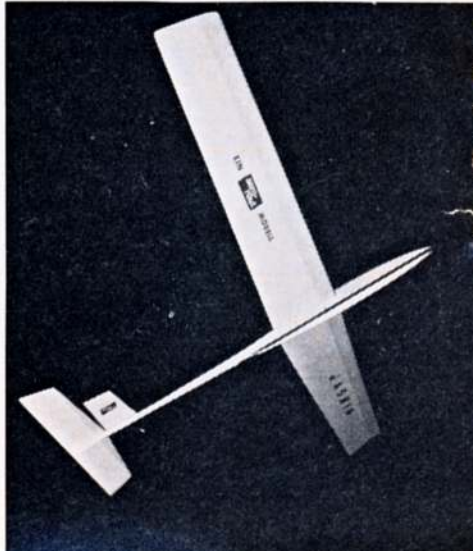
Next largest manufacturer is Schuco, their Hegi section introducing two scale radio control models, the 'ZLIN 526' and the 'PIPER TWIN COMANCHE', each with new forms of plastic construction. The Zlin has a fuselage in 'Terluran' and foam wings covered with glass fibre. It arrives practically ready to fly. Third aircraft model is the 'MEXICO' nine-foot glider, which has an epoxy fuselage and balsa sheeted wings all finished and ready for colour doping. But it was not only in models that Hegi produced new ideas, they have a vibration-proof glowplug clip that incorporates a test bulb. Squeeze the switch, and if the bulb lights, the plug is okay! Also on the stand was the new Italian 'KOMET' 2.5c.c. racing engine with pipe, very much like a T.W.A. in external respects.

Elsewhere we found the latest 'WEBRA .61', with black head, forged con-rod and piston, relieved ring and transfer passage changes. On Winkler's stand, the new 'O.P.S.' engines from Italy, also the piped versions of the 'ROSSI .60' for 1969. The latter have a 2.5 'on the way'.

No surprises were in the Super Tigre range at the Simprop stand, only the confirmation of a pipe for the G.21 series and a new throttle. Simprop themselves were concentrating on the Nautic R/C set for boats, and the 'SUPER I' single-servo digital set for gliders and single-channel equivalent. And here's a point, the only single-channel gear in the whole show was a smattering of Futaba at the Robbe stand, and the all-British E.C.S. range at Mainstream Productions stand.

Robbe are kitting Heinz Elsaesser's 'MAXI' German Champs winning R/C multi-model and have a fine range of other designs aimed at the sports flier. Similar approach

Edgenweiller's Aero-Naut company has a fine range of sport and novice flyer designs, among their new ones for 1969 is Jasmin of A/I class proportions. He has also kitted for some years, the APS Seraph and also has a design similar to Jasmin but with built-up fuselage, called Nova, for single-channel R/C slope soaring.



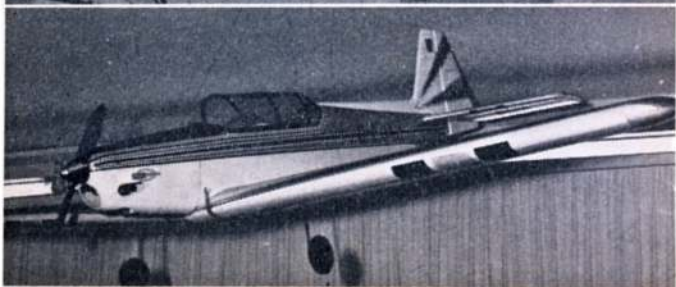
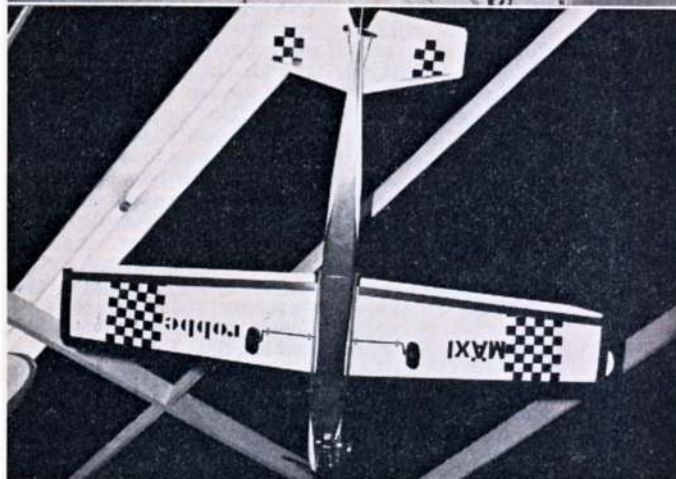


**STRICTLY MULTI**, at right, Klinger's superb Fournier RF-4 prototype, unhappily difficult to reach with a camera! Next, Kussmaul of MultiPlex markets a range of R/C propo gear plus this 110 in. Alpha glider and a whole range of RTF all-balsa gliders as in background. German Champ, Elsaesser's Maxi, has a familiar plan form, to be kitted by Robbe to prove that balsa flies better! Bottom are the Schuco revelations with plastic fuselages, the Twin Comanche and Zlin 526.

can be found in the ranges of Engel and Eggenweiler, where one is gratified by the attention given to the novice. A common theme among all for '69 is the radio controlled glider with glass fibre fuselage and a tailplane mounted on the fin. There must have been a score of these at Nurnberg, and most are about nine-foot span. We were taken by the 'ELFE' and 'KOLIBRI' at the Klaus-Dieter Horn show, where accessories of all types abound in profusion. K.D.H. produce some of the most clever retractable undercarriage mechanisms as well as decorative transfers, parachutes, spinners, etc.

Among many ingenious novelties introduced by Klaus Krick were a retracting aerial for R/C models, a truly universal engine mount which allows thrustline movement in all directions and an electronic rev-counter with electric eye which gives a precise reading without loading the engine. For cleverness in kitting, we must credit Wilfried Klinger who is the first with the 'FOURNIER RF-4' motoglider to perfect scale at 86 in. span to suit 2.5 to 5c.c. It's a beauty! Fully aerobatic and yet capable of soaring. Also under the 'Wik' name is a remarkable, ready-to-fly plastic multi, the 'COMMANDER S' made to a standard that places it ahead in its field and very low priced by our standards. Like several other firms, Wik make 'KRAFT' R/C gear under licence, converting the Tx. system to the long control stick belly-mounted style of operation, and called 'DIRIGENT'. Rowan produce Kraft gear in more identifiable form as 'PROP CONTROL' and are another firm with a ready-to-fly plastic multi, the 'ROWIN II' which is perhaps the most elegant of its type. We met Mike Schlesinger on the stand, demonstrating latest 'MONOKOTE', and he told us of his new Topflite 1/6th scale 'S.E.5A' at 53 in. span which Dave Platt has engineered for him. There were many prominent American trade reps. present, but the only one with actual samples to show was at the Cox stand. Here the new .35 and .40 'CONCEPT II' plus throttled exhaust Medallions, Pee Wee, Golden and Babe Bee were revealed as well as the 3-line system for ready-to-fly plastics and surprise, surprise, - Cox 'SHOWCASE MINIATURES', a series of six beautifully hand-painted, 1/100th scale models of famous U.S. aircraft, and dare we mention them? Cox electric Yo-Yos! Yet another Nurnberg surprise.

Elsa Klinger of the Wik company obliges with the all-plastic Commander S ready-to-fly, multi-channel model, a development of the well established balsa kit of the same design. Above her are the Jonny box-style sportster and in the background, the Susi slope soarer which uses Jedelsky solid balsa wings.







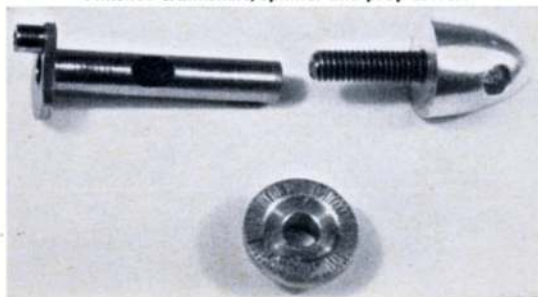
### OP 9 Finish Crankcase to final dimensions

In chuck, held firmly, turn true screwed bung to suit crankcase rear. Mount crankcase on bung with paper washer to protect rear tank location face. Remove extension at front and face and turn to final dimensions. Deburr and polish front face. The four square corners around cylinder locating boss can be blended to a rounded shape, tapering out to nothing towards C/Line of crankcase. This op presents some difficulty. Unless you are good with a file it is difficult to achieve a uniform shape. Therefore, job should be mounted on faceplate towards tailstock, and clocked true. Top slide was set to 35 degrees, inclusive angle and a narrow trepanning tool held in toolpost. However, no matter how narrow the tool is ground, the job cannot be rotated fully without cutting into carburettor. Author accomplished this rather tricky op by doing one corner at a time, rotating faceplate back and forth a  $\frac{1}{4}$  turn and feeding top compound slide forward a few thou at a time on each forward rotation. Remove and deburr. Outside of crankcase can now be polished all over with fine emery paper, avoiding damage to important surfaces, finish off on a rotary mop and metal polish.

### OP 10 Crankshaft

From good quality steel, turn main journal of crankshaft  $+.010$  in. on diameter. Drill and tap, and chamfer first thread to  $.140$  in. dia. Turn O/D of crankweb to size  $\times .200$  in. long. Part off and reverse in collet and drill  $\frac{1}{8}$  in. hole to depth. Chamfer  $\frac{1}{8}$  in. hole to 60 degrees inclusive,

Finished crankshaft, spinner and prop driver.



## Part Three of our series on a make-it-yourself diesel

### Ten more stages of machining operations

# TOPSY

## .375 c.c.

Specially designed by G. Hugh  
for construction on a centre lathe

by approximately  $.015$  in. deep. On centres, turn main journal to size  $+.001$  in. The nearer you can keep this diameter to size, round and parallel, the less you will have to lap off at later stage.

### OP 11 Big End Crank Bearing and fixture No. 2

Make bush with offset hole, turn O/D to a convenient size to suit large collet, or soft jaws, approximately 1 in. dia. Offset hole by setting in four jaw chuck and checking offset with clock in toolpost and using lathe index to measure the correct amount between the high and low points. Keep square by traversing clock along outside. Hold crankshaft in bush and lock securely with short screw at rear of bush. Mount in true collet or jaws, and face crankweb to final size and produce big end to finish drawing, noting roundness, good finish and size. Drill  $1/16$  in. dia. hole thro' big end.

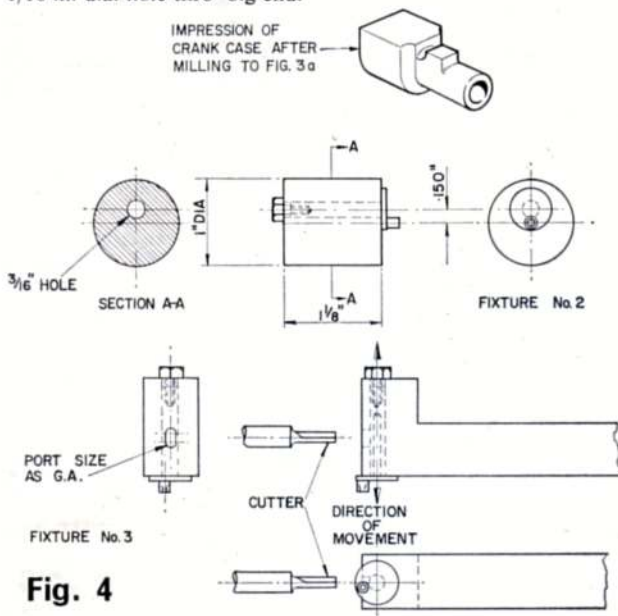


Fig. 4



### OP 12 Crankshaft port and fixture No. 3

Refer to Fig. 4. Make fixture No. 3. Using lathe to drill and ream, first make sure that fix is square in all planes. Mill slot in end to same C/Line as that for port in crankshaft, and truly on C/Line of crosshole. Scribe short line on crankshaft at correct position from web and on C/Line of big end. Mount crankshaft in fixture and rotate until line is just visible at lower edge of slot in end, with crankweb towards operator and big end below C/Line (in other words, the port will be in advance of big end). Now rotate crank a few degrees in the opposite direction until line just disappears below bottom of slot in fixture. Position is not all that fussy as long as you do not err in the other direction, which would mean that the inlet port would shut off too far above top dead centre). With port towards chuck, drill end mill to final size. Remove job and having moved fixture with crossslide, mill other end of fix to expose cross hole to about 3/32 in. wide over a short length. This will facilitate easier milling of small slot at other end of crankshaft main journal. Mount crankshaft in fixture and mill small slot at thread end. Position relative to big end is unimportant. After removal this slot is filed right thro' one side of journal to clear thread. Deburr completely. (The theoretical position of port is 41 to 41½ degrees relative to big end, and is also the amount of overlap after T.D.C. of finished motor).

### OP 13 Crankweb and final lap

The crankweb was formed by eye—using the edge of emery wheel, finished off with emery paper glued to round dowel. Finally, lap main journal to size. Reverse lap on job end for end, occasionally to maintain roundness and parallelism. When finished it should be a fairly tight fit in main bearing with both components thoroughly cleaned and smeared with oil. Finish off with metal polish, working the crankshaft into the mainbearing slowly, while rotating crankshaft by hand. Don't try to force this too hard or it will seize.

### OP 14 Con rod

Turn a parallel disc of dural to .120 in. wide by 1½ in. diameter of drill and ream .125 in. dia. hole thro' to suit big end. Mount fixture No. 1 in toolpost and drill and ream ½ in. hole to take ½ in. dia. Silver Steel dowel at approximately 15/16 in. from centre of existing hole. Note index setting. Mount dural disc on dowel and clamp in position. Refer to Fig. 5. Having noted index position on cross slide, move to centre of small end and drill and ream 3/32 in. through disc and into fixture for a further ½ in. or so. Insert 3/32 in. dowel. Mill 1/16 in. slot between holes to final drawing. Reverse job on fixing locating on dowels, and mill 1/16 in. slot at the other side. Remove from fixture and scribe in outline of con-rod on face of disc, using dividers where necessary to produce true profiles. Now by rotating job around 1/8 dowel, with 3/32 in. dowel removed, position until one outer edge of con-rod, H section, is parallel, and by juggling fixture to

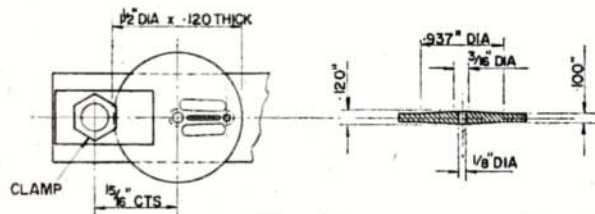


Fig. 5

correct height above or below C/Line, mill ½ in. slot right through job, just kissing fixture, and of sufficient length to touch scribed line around both end profiles. Repeat for other out edge of 'H' section in a similar manner. Hold disc in chuck and clock true and turn side of disc to produce to dimensions shown on cross section at Fig. 5A. Producing slight rad on mouth of big end eye. With saw and file, finish con-rod to final drawing, blending all sharp corners to a smooth shape not forgetting 'H' section at section AA on main drawing. Smooth to good finish with emery paper.

### OP 5 Main bearing bush

Turn main crankshaft bearing, polish O/D to a good finish plus .001 in. above crankcase bore. This depends a lot upon the finish of the two components. With precise diameter and finishes, ½ to ¾ of a thou' is sufficient. Turn bush plus ½ in. long from front to flange, and after obtaining good size and finish as mentioned, reduce the O/D for the first .100 in. to a good push fit in crankcase main bore. (This must be tried out at prop end at front of crankcase). Drill through leaving approximately .010 in. small for final boring. Polish .100 in., lead in to round the corners to a smooth finish. Part-off and face flange to + .005 in. thick.

### OP 6 Fitting main bearing

Warm crankcase to about boiling point of water and insert main bearing in the following manner. From scrap mild steel, make a mandrell, turning the front ¾ in. long to easy push fit in main bearing. Turn the remainder to ¼ in. dia. x approximately 1 in. long to hold in tail stock chuck, under cut under shoulder slightly. Make a small 'pot' fixture to easy push fit on crankcase front extension, of sufficient depth so that front face of crankcase butts against face of pot. Now holding main bearing on mandrel held in tailstock chuck, and with crankcase located in 'pot' fixture in headstock chuck, and first making sure that the two components are in line by offering up the main bearing to main crankcase bore, warm the crankcase with a low flame and quickly press home, using tailstock as a press.

### OP 7 Final bore main bearing

Hold crankcase in collet on front extension and clock true to rear thread relief (.510 in.). Bore main bearing to minus .003 in. and ream to minus .001 in. (for lapping after machining port). Note good finish at this stage. Face bush flange to length and good finish. Note squareness. The depth from rear face of crankcase to flange face is calculated from finish drawing, i.e. .412 in., slightly radius bore at flange to approximately .010 in., and polish flange face to smooth finish.

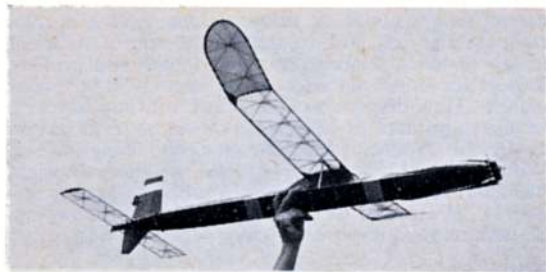
### OP 8 Machine inlet port in main bearing

Hold on Fix No. 1 with adaptor to suit sub assembly of bearing, plus crankcase, and locating on core dia. of thread at rear with paper washer to protect rear face. Rotate clock held in chuck around cylinder locating face until it is at right angles and upright facing chuck. Rotate clock around cylinder locating boss until it is on centreline of chuck and note setting of lathe cross slide index. By using index, move job to carburettor C/Line and drill and mill elongated port in main bearing, remove and carefully remove burrs from main bearing, using reamer and a small scraper, using the latter through carb venturi, but do not round off edges inside main bore. Lap main bearing to size, changing ends occasionally to maintain roundness and parallelism.

*Continued next month with the Cylinder.*

Fig. 5a





CHOICE of the best covering material is one of the problems frequently encountered by the newcomer to free-flight – at least when he has passed the stage of building from kits and using whatever is supplied therein.

In general, free-flight models are covered with some form of tissue paper, sometimes water shrunk, and certainly impregnated and coated with cellulose 'dopes' to further tauten and 'waterproof'. This produces a tight pre-stressed covering that imparts considerable strength and rigidity to the structure.

Virtually, the only tissue currently available through the normal trade channels and model shops is 'Modelspan'. This is widely and readily available, and comes in two grades (light and heavy) and a variety of colours. It is undoubtedly very satisfactory, being easy to apply, and tightening well when doped – even without prior water shrinkage.

However, not everyone uses it – as is readily noticed at any contest. Even the non-traveller soon notices that plans and 3-views frequently specify the use of 'Jap' (the full word Japanese is never used) tissue – usually for the flying surfaces, and especially tail units, of lightweight duration designs. Sometimes double covering with Jap is stipulated for such applications as A/2 wings.

Attempts to purchase Jap through local (and even not-so-local) model shops invariably meets with little success. Reactions from the proprietor can vary from bewilderment ('never heard of it') to amusement ('haven't had that since the war!'). Hobson's choice would, therefore, appear to be the ubiquitous 'Modelspan'.

The would-be purchaser usually assumes that possession of Jap is dependent on having been a modeller for many years, or having been able to obtain remnants from some ex-modeller. Whilst a surprising amount of vintage tissue is still being used by the 'contest fraternity' there is fortunately some more recent material rather more generally available.

Before going any further some descriptions of the characteristics and uses of the various varieties of Jap would seem in place.

Pre-war Jap tissue (both adjectives being quite literal) was of a fibrous nature and with a comparatively limp 'feel'. The fibres were mainly disposed parallel to each other so the tissue had a definite grain. If torn by hand in its natural state it could be split readily along the grain, but was difficult to tear across. Ascertaining and correctly disposing the grain when covering a component was therefore both important and useful.

This tissue was available in white in a number of grades (thicknesses) from 'superfine' upwards. Sheet size varied but could be up to 36 inches square. A wide variety of colours were available, including such exotic examples as khaki and silver, but there was apparently only one thickness and sheets were fairly small at 20 in. x 24 in. The examples encountered nowadays are usually the least visible pastel varieties, being all that most people have left.

To complete the record, bamboo tissue (a thin paper-like material) and bamboo paper (a much thicker version, about the weight of heavy 'Modelspan') were available in the same era.

Present-day Jap is a very different material. It is more like cigarette paper than like cloth, is much more 'crinkly', and has noticeably less grain than its earlier counterpart. One side of the tissue is much smoother and glossier than the other. A variety of colours are available but the size of sheet in the thinner grades is small at 18 in. x 20 in. or 18 in. x 24 in.

Several thicknesses are available of which the thinnest are the most useful. The thickest grade is roughly equivalent to heavy 'Modelspan', but is harder to handle whilst covering, and appears to offer no benefits.

Jap tissue still apparently originates in the Far East and, not surprisingly, is readily available in that part of the world. Much of this tissue is marketed under the trade name of 'Esaki'. Supplies can be obtained by simply writing to a stockist (several suitable firms advertise in *Aeromodeller*) and sending an appropriate remittance by I.M.O. Whilst straightforward this method is unknown to many, and

# Free Flight Comment

by John O'Donnell

usually too laborious and long-winded for individual needs. The way has consequently been open for a handful of enterprising individuals to order supplies in bulk, and to resell tissue to others. Such people occasionally advertise in the 'classifieds', or through the news letters run by areas and clubs. Any purchase made direct is obviously more worthwhile if a group of friends or club members get together and combine on a single order. Customers for such a scheme are sometimes even solicited as for instance in the current (February 1969) issue of *Northern Area News*.

The tissue widely distributed by SIG in the U.S.A. is very similar to that just described and can also be obtained by direct mail-order.

Once having obtained Jap there is the question of its use. Like everything else, there is a time and place for its use, and I for one do not regard it (or anything else) as a universal covering material.

Pre-war, standard 'Esaki', or SIG Jap can obviously be compared with light-weight Modelspan. In sheet form the Jap is much less porous – and heavier. However, the Jap absorbs less dope per coat, and needs less coats to fill its pores. The overall result is that Jap covering is lighter. The finish obtainable, on clear doped Jap, is smoother than that on light-weight 'Modelspan'.

Jap shrinks less than light-weight 'Modelspan' and needs water spraying before doping. This technique is not essential with 'Modelspan' (either grade) but I recommend its use especially when the covering is applied slackly for any reason (or if the tissue is creased).

Being less porous, dope does not readily penetrate Jap and automatically stick it to the underlying structure. 'Modelspan' is often applied by affixing it to the outline only of the component, and relying on the dope to complete the job. This approach does not work on Jap which requires positive attachment to all ribs and spacers.

Sticking the tissue to the structure can provide positive benefits on light structures. Many models are seen with 1/32 in. ribs that have buckled under the covering. This does not occur if the tissue is stuck to both the top and bottom of the ribs prior to water and dope application. Ribs have to be free to move sideways before they can buckle as a whole, and the tissue can be made to provide adequate restraint.

Descriptions of covering techniques could fill a book. All I intend to say at this stage is that I use thick clear dope as an adhesive. Many people complain that Jap is difficult to stick with dope. It becomes much easier if the shiny side is affixed to the structure. There is a very natural inclination to do the reverse. Fears as to the final result are groundless, as the covering after doping looks the same whichever way round the tissue is applied.

Strength of Jap and light-weight 'Modelspan' is roughly comparable – although the pronounced grain of pre-war Jap confers properties that require appreciation to benefit by them. Splits along the grain occur quite readily – especially under repeated impact. For this reason, I would not use it for open rubber model fuselages, and much prefer light-weight 'Modelspan' for this application. Conversely, tearing across the grain is difficult, and tensile strength along the grain is appreciable. This means that sheet covering can be noticeably reinforced by cross-grain covering with Jap, and provides the clue as to the real worth of double-covering with Jap.

Furthermore, the grain requires consideration, especially when covering flying surfaces. Bending, say, a wing up or down puts one surface in compression and the other in tension. This tends to rupture the covering on the tension side. If the grain runs chordwise the tissue is easily pulled apart. If spanwise then the tissue can carry load, and add to the strength of the wing.

Any splits that occur tend to follow the grain, and are easily repaired if they merely run from rib to rib. Most textbooks reckon that Jap tightens most across the grain and hence recommend that the grain should run chordwise to reduce tissue sag between ribs and improve the airfoil section. This does not seem to work out very well in practice, and any slight improvement is soon nullified by chordwise splits whose edges immediately separate and which are very difficult to repair either neatly or to the original contour.



Models with sheet-covered leading edges or the like, therefore, really require the tissue grain to run chordwise on the sheet, and spanwise on the rest of the wing. This implies covering these areas separately which is not such a drawback as it might seem. Anyone who has attempted to cover such a component with a single piece of tissue has probably experienced stretching of the tissue as it is doped on to the sheet and the resultant series of wrinkles that appear elsewhere.

The main drawback with Jap is its behaviour under damp conditions. It slackens sooner and to a greater extent than lightweight 'Modelspan'. High humidity (damp evenings) seems worse than actual rain.

For some reason this effect gets worse as the model gets older. Freshly doped tissue is relatively immune. It seems that the age is critical as distinct from the amount of dope originally applied. Once slack the covering ceases to impart rigidity, and hence wings can twist, alter warp, or even flutter. I have seen several fly-off participants come to grief in this way.

Geodetics provide an adequate answer to this problem (as well as to that of warps) but not everyone is willing to use such measures. If straight ribs are employed on a structure of reasonable strength then 'Modelspan' is probably a better choice for an all-weather model.

Paradoxically extra doping of the straight ribbed model is not a practical proposition — as such a model is not usually sufficiently warp resistant.

Very light (or small) models really need Jap in any case as the shrinkage loads imposed by 'Modelspan' may well prove too much. Many people, especially the inexperienced, tend to err on the side of too strong a covering. They use heavyweight 'Modelspan' on structures that are not really robust enough. Whilst tissue damage is clearly reduced, other troubles can appear such as uncontrollable warping. A crash can produce the once proverbial 'paper bag full of balsa'. Light tissue, even with adequate doping, is certainly one way of avoiding too many warps. It is worth mentioning that the Americans, who probably have to contend with a greater temperature range than we do, often quote the use of single Jap on up to Class C Gas Models.

All tissue that I have used, and certainly both Jap and 'Modelspan' deteriorates in strength with time. Models two or three years old usually have either weak (Jap) or brittle ('Modelspan') covering. The same effect occurs much more quickly whenever a model is lost and spends some time in the open. There is some evidence that ultra-violet radiation (a percentage of sunlight!) is the culprit.

There is a temptation merely to recover models in such a state. But a weight check before and after such an operation is rather disconcerting. It is much easier and little heavier to double-cover if not the whole model, then at least strategic areas. Simply dope on a second layer of tissue on top of the existing covering. I hear from Ray Monks that an even simpler and easier method (on models with weight to spare) is to apply a thick coat of polyurethane varnish. This is said to hold together the tissue fibres.

Double covering has other uses. It permits a single layer to be used on sheeted areas and wide trailing edges with extra thickness and strength in the 'open' areas. Application techniques vary widely but the one I usually use is to give the first layer a couple of coats of dope and then to dope on the second layer in much the same way, as I cover over sheet. There is no need for the two layers to be of the same material. Jap over lightweight 'Modelspan' works well and is economical on difficult-to-obtain material.

For many models, including most large F/F components without much sheeting, heavyweight 'Modelspan' is a much quicker, simpler and more practical solution than any other. Time saved com-

**Opposite: author's 'Maxine' open rubber design which carries more than a usual amount of rubber, has Union Jack construction which goes well with use of pre-war Jap tissue. Fuselage is covered with lightweight 'Modelspan' which withstands rubber impact better. Reflective bands for visibility are aluminiumised 'Melinex'. Right: a good case for lightweight 'Modelspan', — straight wing ribs and reasonable strength construction in author's early A/I glider held by Miss Linda Crook at Northern Area Slope meeting '67, where it won free-flight.**



pared with double-covering continues after the model is finished as the upkeep and repairing of a double-covered model tends to be time-consuming. The main snag is a tendency for heavy 'Modelspan' to become brittle.

To save unnecessary comment, perhaps I should add that I am aware that alternatives to tissue do exist. Silk (or even nylon) is sometimes recommended for the larger and heavier models, and can be considered as a much stronger alternative to heavyweight 'Modelspan'. Silk needs more skill in its use and never seems as tight as tissue.

The newly introduced polyester ('Mylar') coverings sold under the trade names of 'Monokote' and 'Solarfilm' have been used in F/F over all-sheet surfaces. For open frameworks I am rather dubious about getting and keeping the covering sufficiently tight to render the result sufficiently rigid. A new 'Transparent Monokote' has appeared very recently in the U.S.A. and is advertised as suitable for free-flight. I will await its appearance and behaviour over here with considerable interest.

#### To summarise:

Small lightly constructed models, light tailplanes  
Geodetic wings up to 350-450 sq. in.  
Straight ribbed wings from 150-300 sq. in.

Semi-sheeted wings over 300 sq. in.

Non-sheeted wings over 300 sq. in.

Open Rubber model fuselages

e.g.—It will be seen that A/2 wings come into the Double-covered or Heavyweight 'Modelspan' category.

Jap  
Jap  
Lightweight  
'Modelspan'  
Double-covered  
Jap/Lightweight  
'Modelspan'  
Heavyweight  
'Modelspan'  
Lightweight  
'Modelspan'



**Left: Dave Hipper-son with outside power model used in Nats. '68 fly-off, an obvious application for heavyweight 'Modelspan'. Right: conventional A/2 glider by Dave Glue and held by Linda Simpson. Such a model usually has 'Modelspan' covered wings and Jap tissue on tailplane with sheeted wing leading edge, replaced sometimes by double layer of 'Modelspan'.**





# LATEST ENGINE NEWS

by Peter Chinn

## Cox 35 and 40

The first entirely new Cox engines for several years were revealed at the Chicago Trade Fair in the form of the Cox 35 and 40 R/C glowplug units. These engines also mark a turning point in Cox motor production.

Hitherto, Cox has concentrated solely on motors of up to 2.5 c.c. maximum capacity and has not previously produced a genuine R/C engine. Cox 'Throttle-Control' conversion kits have, of course, been available for the Medallion 049, 09 and 15 but, mainly because of the porting system of the Medallions, these conversions have resulted in appreciably reduced power and somewhat limited idling capabilities. New versions of the .049 and .09 with exhaust sleeve throttles were on display at the Nurnberg Fair. In contrast, the new models of 5.8 c.c. and 6.5 c.c. respectively, are much larger than previous Cox model engines and have been designed specifically for R/C work.

In due course, we expect to have examples of these new American engines for examination and test and full details will then be published. Information at present

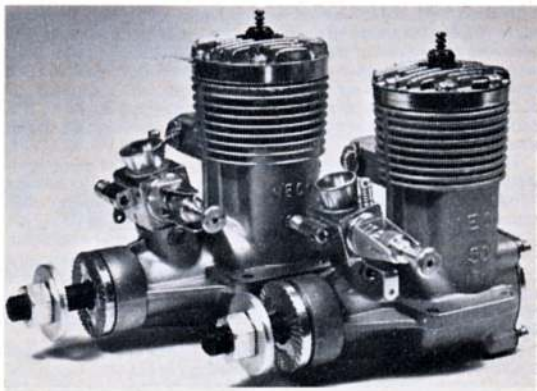


Rear induction assembly of the latest G.15RV features new backplate and a counterbalanced hardened steel valve disc.

available is that the first two models to go into production will be the front rotary-valve 35 R/C and the rear induction 40 R/C. In the true Cox tradition, design and construction are distinctive. The cylinder-head is integral with the cylinder, a practice rarely seen in engines nowadays. A Dykes ringed piston is used and porting is of a Schnuerle type with the exhaust on the left. The crank-



The latest K & B built version of the Veco 61 R/C (left) and the new Veco 50 R/C. A description of the 50 is included in the current issue of RCM&E.



shaft is ball-bearing mounted in a separate front housing attached with three screws to the crankcase which is liberally finned, and separates under the beam bearer line.

## Webra 61 R/C 'Black-Head'

A new version of the West German Webra 61 R/C, identified externally by a black cylinder-head, will become available during the next few months. Cylinder porting on this model has been changed and it has a new forged piston, piston-ring and forged connecting-rod. Power is said to be improved.

## News from Hirtenberger

Paul Bugl, the well-known Austrian modeller and model engine designer, whose co-operation with *Hirtenberger Patronen, Zundhutzen und Metallwarenfabrik AG* resulted in the production of the HP 15 and HP 61 engines, has recently left Hirtenberger. Another organisational change is that Don Jehlik (joint World Champion, with Herb Stockton, in F.A.I. team-racing) has given up the American distributorship of HP engines. The Model Rectifier Corporation of New York has now been appointed in his place. It was M.R.C., of course, who were responsible for putting Enya on the map and, during the past two years, they have been very successful also in distributing Webra engines in the United States.



Above: new G.15RV has longer conrod and new piston with higher gudgeon-pin holes. Head now attaches with four instead of six screws.

## E.D. Super Racer

It is now eighteen years since the original Miles-designed E.D. 2.46 'Racer' diesel was introduced by the old E.D. company. This engine was one of the most successful British diesels ever made. It was also one of the few E.D. models to survive subsequent changes of company management and, eventually, to further evolve under the present E.D. ownership.

The latest variant is the 'Super Racer'. It looks quite a bit different from the older models, largely as a result of changes to the casting and to the cylinder fins and head. It also has a black nylon backplate which is obtainable with either a straight venturi or a barrel throttle. As an alternative to the



Latest G.15RV main casting is entirely new. Crankshaft is now internally counterbalanced type.

standard E.D. silencer, it can be fitted with interchangeable angled or curved manifolds. There are also some internal differences. We shall be publishing a report on this engine in the near future.

## Super-Tigre G.15RV

Elsewhere in this issue there is a test report on the rear rotary-valve diesel version





of the Super-Tigre G.15 and, in the November L.E.N., we included a description of the latest (at that time) version of the standard G.15 shaft-valve glowplug engine. To round off the coverage on this popular Italian 2.5 c.c. contest motor, therefore, we thought it appropriate to include some illustrations of the very latest version of the disc-valve G.15 glow engine.

The origin of the G.15RV goes back to 1966 when, as an interim measure, the manufacturer, Micromeccanica Saturno of Bologna, offered a rear rotary-valve conversion kit for the standard G.15. This consisted, basically, of a new backplate, a bronze-bushed reinforced-nylon valve rotor, a machined aluminium intake with tangent spraybar and a new (solid) crankshaft. In 1967, production of a complete RV version with modified main casting (deleting the unwanted front intake) was begun. The latest model (as illustrated) is a further development with many new or modified parts.

The main casting is completely new. It has a larger volume transfer passage, a higher and smaller exhaust duct and a modified cylinder casing with different finning. The crankshaft now has a full-disc internally-counterbalanced crank, sealed by a riveted-on aluminium cup. The cylinder-head, instead of being finned on the exhaust side, is now plain and only four screws, instead of six, are used to secure it to the cylinder casting. The basic combustion chamber shape, hemispherical, surrounded by a wide squish band, is, however, unchanged.

A new backplate and rotary-valve assembly is used. The backplate casting is deeper and protrudes further into the crankcase. Unlike the G.15RV diesel, the carburettor intake does not screw in. It is pushed in and locked by a set screw. The

rotary-valve is a thin (2 mm.) hardened steel disc instead of the 5 mm. thick reinforced nylon rotor formerly used. Rather different valve timing, with much earlier closure than previous shaft-valve or disc-valve G.15's, is used. Actual timing on the example examined was 35 deg. ABDC to 48 deg. ATDC. The 135 deg. periods for both exhaust and transfer are not significantly changed.

The piston and connecting-rod assembly are also new. The gudgeon-pin is now placed higher in the piston and the bosses and internal annular ribs are relocated accordingly. The higher pin has enabled a longer connecting-rod to be used for reduced rod angle and, for the first time in a Super-Tigre 15, a bronze bush is used at the big end.

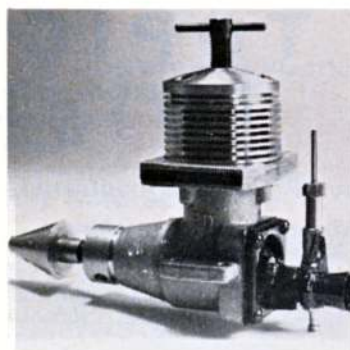
The traditional 15 mm. bore x 14 mm. stroke are, of course, retained. The engine, complete with spinner, has a (checked) weight of 187.5 grammes or 6.61 oz.

#### Tornado Plasticotes Again?

Ten years ago, the racing prop was, unquestionably, the American pressed-wood Tornado 'Plasticote'. We recall the consternation that subsequently greeted our disclosure in print that, due to inadequate supplies of suitable timber, all Tornado wood props had been withdrawn from production. Speed and team-race experts jealously hoarded their remaining Plasticotes and there were frantic efforts to buy up any remaining stocks from retailers.

Tornado props were (and, in other types, still are) made by Grish Brothers of St. John, Indiana. Tony Grish, himself a former C/L speed flyer of some distinction, made several attempts to fill the gap left by the departure of the Plasticote. Already well-known for their Tornado nylon props, Grish Brothers first tried, without success, to evolve a nylon speed prop. This was followed by several speed and team-race props moulded from Delrin but these, too, failed to match the performance of the Plasticotes. As with nylon, they lacked the rigidity of a wood prop and, in order to reduce blade flutter, thicker and heavier sections than those of the Plasticotes, had to be used which reduced efficiency and caused blade shedding through centrifugal force.

That the Tornado pressed wood props might become available again, is a hope that most of us abandoned years ago. It was, therefore, a surprise indeed to have a letter from Aldous C. Kelly, of Western Springs, Illinois, telling us that, by an arrangement with Tony Grish, he is planning to reintroduce certain of these props. Production will, we gather, be on a relatively small scale and



Above: the E.D. Racer first appeared in 1951. This is the latest 'Super-Racer' version. A full report will follow in the Engine Test series shortly.

Below: Plasticote pressed-wood props, produced to the original Tornado pattern by A. C. Kelly by arrangement with Grish Brothers. See text for details.

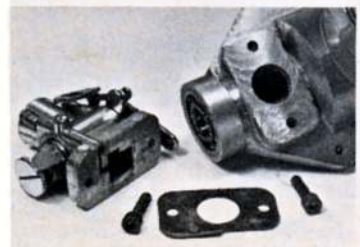


mainly limited to the 7 x 8 thick-hub and thin-hub versions at first, possibly followed by 7 x 9, 6 x 9 and 6 x 8 sizes.

At the moment, the prices etc., of these props have not been finalised: they are, in fact, likely to cost appreciably more than the original Plasticotes (understandable!) but we hope to give more details shortly. Meanwhile, Keen Types may care to write direct to Mr. Kelly at 4616 S. Harvey, Western Springs, Illinois 60558, U.S.A.

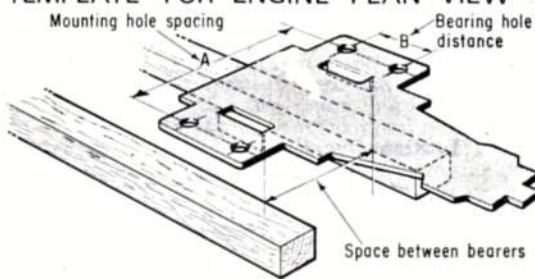
#### 200,000 r.p.m. = B.H.P. x 2

From the U.S.A. comes a report that a group of engineers employed by an Indianapolis firm have developed a miniature exhaust-driven supercharger suitable for small petrol engines of the type used in lawn mowers, etc. The unit has a 1.7/8 in. dia. impeller said to turn at speeds of up to 200,000 r.p.m. and is claimed to be capable of increasing the b.h.p. of suitable small engines by 100 per cent. Now, if it could be miniaturised a bit further for model use...



Left: at 12c.c., the Fox 74 R/C is outside the SMAE displacement limit, but the engine (loaned by H. J. Nicholls & Son) is interesting for its several novel features, including novel carburettor design (below). A full description will be found in the April RCM&E. At right is latest commercial idea in Japan, a series of engine templates in metal.

#### TEMPLATE FOR ENGINE PLAN VIEW





# TOPICAL TWISTS

by "Pylonius", illustrated by "Sherry"

## Mounting Opposition

It's a funny thing, but whenever I'm about to launch a model, a line or horseriders proceeds to cross the flight path. After this had happened to me a number of times I took it to be an illusion; a sort of Freudian daydream, relating to a guilt complex I had over sneaking out for a crafty spot of model flying. So, one day, I decided to destroy the equestrian mirage by launching the model, come what may.

Well, the model couldn't have given the imaginary horse a gentler tap, and, for an imaginary horse, it carried out the most startling series of highly realistic manoeuvres, resulting in an imaginary female rider demonstrating that a high angle of incidence produces an early separation point, causing a sudden downward shift of the C.G. Realism was carried even further with a barrage of horsey language, and I was forced to the conclusion that the horsiness of the model flying scene was not imaginary but a disturbing fact of life.

Viewed, therefore, in the most fundamental sense, horseriding is an expanding affair. Wherever there is a bit of public turf to be whipped up into a gooey sludge you will find a horserider, and wherever there is a bit of whipped up gooey sludge you will find a model flyer. It is this juxtaposition of flying mare and flying machine that poses such a social problem. The seating arrangement on the horse is, by its nature, a rather tenuous one, and horses go all wild eyed and nervy when being used as a mobile couch. And, if there is one thing which will cause even the most placid equine to outjump Foxhunter by a clear six inches, it's the sight of a model plane. This is apt to produce a certain wariness between rider and flyer, not to mention the tension that ensues from the fact that both rider and flyer also consider any stretch of unfenced, unploughed, unconcreted earth his own, absolute birth-right, although it is not so much that tension is mounting as the tension that is caused by the dismounting.

Just how we are to get over this horseriding problem I don't know. Offering the riders an Epoxy pack does not seem to be the answer.

## Correspondence Corner

To the Editor, 'Flitterbug' Newsletter:

Dear Sir,

I wonder if you could help me. I have half completed the model called 'Dimsite' which was published in your XIV½ Edition. I would be much obliged if you would tell me where to put the prop.

Yours faithfully, D. Loss.

Dear Mr. Loss,

I would be only too glad to tell you where to put the prop, but the 'Dimsite' illustration to which you refer is not a plan of a model plane, but a location map of our new Council flying field. In view of this, I must remind you that the Council will only allow bona fide model planes to be flown on the field. Flying maps, even with the Town Hall clearly marked as upon the one we published, would not, we think, meet with the Council's approval.

Yours sincerely, The Editor.

## Roar Recruit

Club committees have two main concerns these days one is getting hold of flying grounds, and the other is keeping them populated. Often the committee gets so pre-occupied in its desperate search for a bit of flying space that it returns to find that there are no members left to use it. Then begins the great recruiting drive, and comes the lucky day when the club membership is the committee plus one. There are congratulations all round, the club room is given a hasty spring clean; and a special edition of the club mag. includes a 'hopeful season ahead' message from the Chairman, in which he makes much of the twin blessings of a flying field and a sharp increase in membership.

Ah, but here's the rub. Will the cherished new member be an asset to the club, or might he turn up at the club-room with a plastic Flying Fortress, or perhaps scourge the flying field with a souped up bazz bomb? It's not only that recruits are hard to come by, they must also be socially acceptable and reasonably enduring to be of any real value. Some clubs prefer the chap who comes in like a lamb, innocently asking which way to wind the propeller, whilst the go-getting club would prefer the fully kitted out, electronic version, with aerial poised and all channel systems go. Each would be a boon to the member starved club, though the former may be merely piloting the way for his eight-year-old son, whilst the other might well have added lustre to the club name had he tried a few less channels and learned which way to put the wing on before passing on to model boats.

Generally, though, you can no longer get hold of the type of ideal recruit who is prepared to do his basic training before making a full-out assault on the flying field. The modern beginner is one with a decided electronic impulse. To him, rubber models and free wheeling kites went out with Leonardo da Vinci. He wants 1969 action in a big Radio way. Trouble is he all too often gets it - his first flight being his last one.

## Sol Searing

When next you see a radio job come spiralling in, it may not be a sticking escapement or massive pilot error, but just a playful bleep from a capricious Sun Spot. Thus, when asked why that chap is jumping up and down and tearing his hair in anguish, you can just say that he's got a 'touch of the sun', although there are some who think that model flying has more to do with a new moon.

'Tactical flyer!'







## MODELLING WITH PLASTIC CARD

TO THOSE whose modelling activities started with the advent of the plastic kit and since, the prospect of building a model entirely from raw material may appear to be a formidable prospect. Yet, those same people often show great ingenuity and skill in correcting and modifying kit models. Some kits are so inaccurate that the effort necessary to correct them is more than would be required to build the model entirely from scratch.

The object of this article is to show some of the older traditional modellers some of the techniques which have evolved since the introduction of polystyrene card (henceforth referred to as Polycard). It is also to encourage plastic modellers to expand their activities, and in so doing, obtain even greater pleasure from their hobby. The 'flying types' may also find a few useful tips here for despite the high standards of construction apparent at many displays and meets, the potentiality of polycard as a useful material appears to have been largely overlooked.

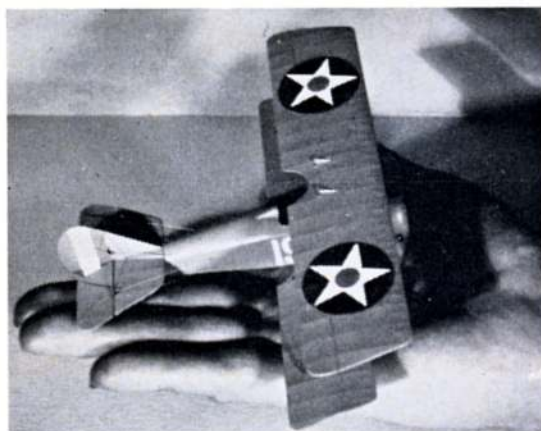
Probably the most outputting fact as far as the kit modeller is concerned is that he has to make virtually everything himself. Keeping this in mind it is appropriate here to mention the first rule of polycard modelling, in fact it is the only really important rule and it is inflexible. *All measurements must be accurate*, measurements must be taken to include distances, angles, curves and circles. The point is that a plastic kit is merely the end product of a great deal of work by draftsmen and designers. The good kit model can be assembled with little thought of correct positioning and alignment for these factors have already been worked out and are built into the kit. The polycard modeller must ensure that the components he makes are accurate so that the first thing is to acquire the instruments to be able to do this. They need consist of no more than a steel rule (also used as a straight edge for cutting), a good quality set-square and an inexpensive pair of engineering drawing dividers.

The list of essential tools is also quite short, a good cutting knife, a razor blade plane (obtainable in Woolworths), a fretsaw and an old or inexpensive drawing pen. There are of course, many other items which are useful for special tasks but these need not concern us at this stage. Fine grade glasspaper, very fine wet and dry emery paper and liquid cement are materials which every plastic modeller should already have.

The 'Tommy' is a useful primer for it is simple to construct and the method described here can be used to model any aircraft of similar lines and this includes a very large number of W.W.I subjects. Polycard modelling is a new hobby and new terms of reference must be invented; the fuselage construction used here can be described as a 'built-up box' for obvious reasons. A Morane Saulnier MS3 has a very simple slab sided fuselage and this could be described as a 'simple box'. The Tommy has the traditional box built up with formers and stringers on top and (less usual), below. Part of the fun of polycard model-

### HARRY WOODMAN

who won both the International Plastic Modellers' Society and the 'Model Engineer' Championship trophies this winter introduces his methods with a specially created model of the THOMAS-MORSE S-4C SCOUT

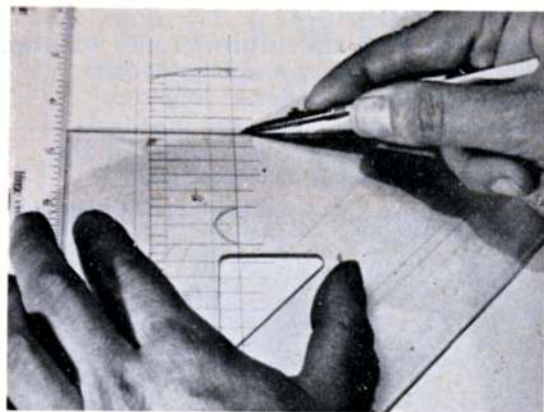


ling is that the form of construction of the original is often imitated in the model, so that detail fails logically into place and the meaning of the phrase 'true to scale' becomes more valid.

The basic material, polycard, is available from most of the larger dealers in plastic kits or railway modelling accessories. There are several manufacturers but all the polycard is the same. The author's model is made from Slater's plastic card for this is the only manufacturer who supplies the card in the large size at present. It is sold in sheets of varying thicknesses graded in thousandths of an inch. For the Tommy in 1:48 scale, 10 thou and 20 thou sheets are required. The method described here for fuselage construction is not recommended for a model in 1:72 scale, two moulded half shells would be more suitable in this case.

The exploded drawing shows the construction of the fuselage. The two side panels of 20 thou card are made together, i.e., the panel is drawn on to one piece of card which is stuck to another piece with a small piece of double-sided Sellotape. When the shape is cut out and sanded to the exact size, the pieces are separated and the two panels are then identical in shape and size. The first step in assembly is to stick the two 'stern posts' together, then the first nose former. This will hold the fuselage panels in true whilst the other formers are placed in position. The cockpit should be furnished before the top and bottom skinning is started. (See photo.) The stringers which give shape to the top and bottom of the fuselage are represented by scoring parallel lines on to a piece of 10 thou card. From this is cut the turtle back and the rear under surface panel. Scoring, especially of the thinner card must be done evenly and not too firmly, using a base with slight give (e.g. a tablet of writing paper). The scoring instrument used in this case is the drawing pen screwed up tight, so as to give one cutting edge. The panels need not be cut to the exact width but should be cut to the exact length. Each panel is laid in place on the formers and held there with just a touch of cement. When the edges are pressed down to the top of the main side panels they should overlap like the eaves of a house roof, they are





Above: scoring of wing ribs using set square and ruler. It is advisable to hold instruments down with Sellotape for even a tiny slip will result in a false line. Scoring right across sheet means that wing rib lines for both wings can be done in one operation. Common error at this stage is to forget that nose ribs only travel for short distance either side of leading edge. Below: thin balsa core inserted between surfaces gives support and acts as bed for struts. All edges of balsa should be sanded to remove corners.



Below: dividers used to cut cowl aperture, using nipple as centre point. No attempt should be made to cut hole in one forcible turn. The circle should be scribed gradually until the centre practically falls out.



then stuck like this with the overhang. The surplus is then trimmed off, not too close, and the final refining of the joint carried out by gently sanding. With care this type of joint can be invisible.

The belly panel which covers the area where the lower wing fits should not be fixed into place at this stage. In polycard modelling, wings should, wherever possible, be constructed in one piece for strength and alignment. In this case the one piece lower wing is stuck to the lower edge of the main side panels and the belly panel, trimmed in proportion, is then put into place ensuring a smooth line along the undersurface. The curved triangular panels behind the cowl are made from 10 thou. card and a hole made in each for the 'breather' pipe. The hole can be made by using a hot needle and this method of making holes can be used for almost all small holes in polycard, and with the use of various shaped files can be made into any required shape. It is strongly recommended that the beginner practises burning holes in scrap plastic before attempting the final effort. The pipe itself can be made from a piece of the finer plastic covered flex with the wires removed. The Cowl from a 'Hawk' Nieuport 17C 1 kit can be used but is inferior to a moulded one.

The method of wing construction employed, varies in accordance with the type of wing being modelled. The method described here for the Tommy is suitable for all aircraft with thin wings which includes almost all bi-planes, many early monoplanes and triplanes. The principle consists of using one sheet of polycard for both upper and lower wings, the fold becoming the leading edge. Ribs and in some cases, panelling, are represented by scoring lines on to the surface of the polycard. The wing plane is traced onto the polycard (10 thou. in most cases for 1:48 scale models). The tracing must also include the rib lines. Using a ruler and set square (see photo) the rib lines are scored *exactly parallel* to each other right across the sheet. Nose ribs of course are scored only the short distance either side of the leading edge. When this is done the sheet should be held up to the light and the wing outline traced through to the other side.

A steel rule is now placed along the leading edge and the card gently folded over, no attempt being made to make this a tight fold or the polycard will crack. To produce the fine leading edge the lightly folded wing is sandwiched between two pieces of thick balsa plank or block with the leading edge only exposed. This is held for a short time in front of a gas or electric fire. The heat will soften the plastic enough to make it fold tightly and the two pieces of balsa ensure that it will be straight as well as preventing the heat reaching the scored surface, for heat will flatten out the score lines.

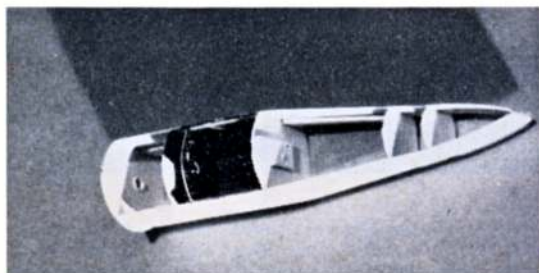
A core of 1/32 in. balsa, sanded to remove any corners and cut to about 3/4 size of the wing is now inserted and lightly held in place with merely a touch of plastic cement. (Slaters *Mek Pak* does stick plastic to balsa wood). A word of warning here; plastic cement should never be used in too much abundance when using the thinner plastic card for it will dissolve it or at best create an 'irriwady' appearance. Surplus plastic is now cut away leaving about 1/4 in. all round for with allowance for camber the wing plan outline originally traced on to the card will be shortened chordwise. The 'wing' is now mounted as shown in the photo. The leading edge held down firm and straight by Sellotape, a strip of balsa inserted underneath to preserve camber, and the trailing edges (still not stuck together) pressed down on to a strip of double sided Sellotape. This will hold the undersurface edge straight. The upper surface should now be pressed down and a touch of cement placed to hold the centre section. Cement is now lightly and quickly run along the



trailing edges and they are pressed together, the wing tips are not stuck at this stage. Both wings can be made at the same time and should be left in their setting rigs for at least one hour. The correct chord should now be checked and the corrected trailing edge lined in pencil. This is then cut with a sharp blade and the wing can now be freed and the remaining trimming carried out. The tips can now be stuck together and final finishing can be carried out with wet and dry paper. Placing a piece of this paper over a roll of plastic foam the undersurface should be sanded, thus flattening out the scored lines to resemble rib tapes. Also the trailing edge should be sharpened. Final finishing is carried out with wet paper smeared with soap.

Ailerons are now cut out being re-attached with polycard 'hinges' in the shape of thin strips inserted between the two surfaces. To make the narrow slots for the aileron levers, holes are made at the ends of the slits and the middle piece cut out. This method should be used for cutting all slots and panels. The tail surfaces are made in exactly the same way as the wings, although the balsa core is not necessary with small surfaces. Shallow holes should now be made to receive struts, the balsa core in the wings acting as a useful bed.

Struts and undercarriage members can be made from stretched sprue which for the uninitiated is the term used to describe the waste material in a plastic kit, the 'tree' which holds the components. If it is heated in a flame (preferably a gas or spirit flame but a candle will do) it will soften, and it can be stretched to quite extraordinary lengths. If a thick piece of sprue about  $\frac{1}{4}$  in. in diameter is shaped before stretching, e.g., to a flat streamlined cross section, it will retain this shape after it has been stretched. There is a definite knack in stretching sprue and many people appear to give up after about three attempts. However, even experienced modellers sometimes have to produce several feet of the material before the correct thickness is obtained. Sprue also provides the bracing and control wires. The sprue lengths must be dead straight and they are cut to the exact length and lightly held in place with a tiny touch of cement. No attempt should be made to rig polycard models by using the stringing method (thread or nylon) for they lack the rigidity of plastic kits.



Fuselage structure complete with cockpit furnishings before top and bottom skinning.

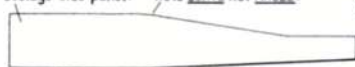
Components from plastic kits can be used and in answer to the old purists it should be pointed out that in the old days of solid modelling, quite a large variety of ready-made parts were obtainable. It is to be hoped that some enterprising manufacturer might consider producing a range of wheels, guns, bombs, engines and propellers instead of yet another P.47.

The author's model utilises an engine from a *Merit Avro 504K*, reversed, so that the clumsy moulded push rods are out of sight. New push rods of thin sprue were attached and a new polycard front plate was fitted. The propeller is a remodelled unit from the *Impact Deperdussin* kit and the wheels are from the *Lindberg Jenny*. Finally, do not forget that a revolving propeller means a revolving engine!



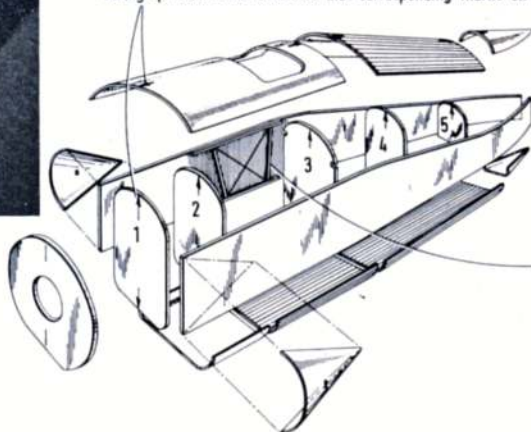
Author's model, above, finished in U.S. Navy colours. This is pale Navy grey (two parts Humbrol Matt white 34 to one part Humbrol L.M.S. Wagon Grey 107). Fuselage number is from Letraset No. 358, rudder serial no. is from Blick modeller's sheet. For instrument faces on dashboards use full stops from Letraset sheets.

Fuselage side panel: Note CURVE not ANGLE.



Also note that fuselage side panel is cut  $\frac{1}{16}$ " longer, (for  $\frac{1}{48}$ th scale.) than the side elevation on the G.A. drawing to allow for fuselage taper.

'Lining-up marks'. It is essential that corresponding marks on formers are dead centre.

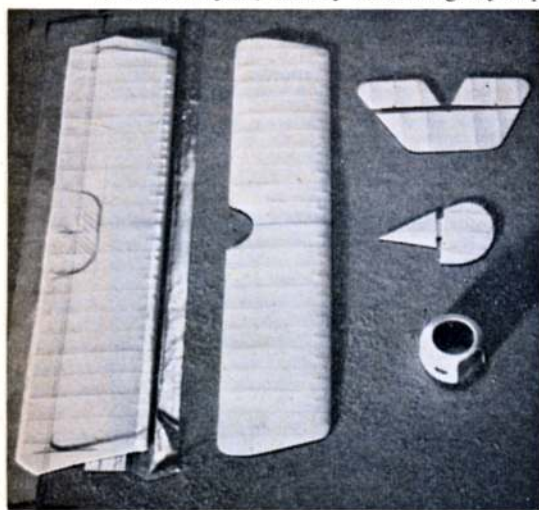


#### ASSEMBLY SEQUENCE

- A Attach rear ends of side panels check EXACT alignment.
- B Attach spacer No.1; again check alignment.
- C Insert spacer No.3; then No.4 & No.5.
- D Insert spacer No.2.

Dummy stringers & uprights made from 'sprue' or fine strip polycard. Inside of cockpit area painted, (pale khaki) wire cross braces are hard lead pencil lines. This must be done before fuselage components are assembled.

Insert Foot runners; Seat; joystick; Compass and Dashboard, before attaching top fuselage decking.



Wing held by Sellotape with balsa strip inserted under to preserve camber. Pencil marks show area of double-sided Sellotape holding trailing edge. Cowling seen here before final finishing, also tail assembly made in same manner as wings, although in small units balsa core is not necessary.





## THOMAS-MORSE S-4C SCOUT

Described & drawn by H. WOODMAN

*Out of the sun dived the Camel like a bat out of hell, straight for the centre of the Kraut circus. Taking a bead on the black-and-white chequered Fokker, the British pilot pressed the firing button and twin streams of lead stitched a deadly pattern along the turtle back. Tracers found their way into the fuel tank and a sheet of flame burst forth from the nose of the doomed ship. The Fokker lurched into a drunken spin, trailing oily black smoke . . . at 1,000 feet it flattened out, the pilot reached forward, switched off the smoke cannister and made a neat three-point landing.*

The 'Fokker' was actually a Travelair biplane, the 'Camel' was a Thomas Morse S-4C and the sun was shining over California and not war torn France. In fact, Hollywood was making another aviation epic, 'Dawn Patrol' and describing it in the typical Vernacular. Not the first, nor the last, time that the Thomas Morse, always known in the U.S. as the 'Tommy', was to appear in a film disguised as a W.W.I scout.

The 'Camelish' appearance of the Tommy was no coincidence for both aircraft had a more or less common ancestor in the shape of the Sopwith Tabloid.

B. Douglas Thomas, chief designer for the Thomas Morse Co. (he was not related to the founders) was an Englishman who had previously worked for Vickers and Sopwith. In 1914 the Thomas brothers moved to Ithica, New York and with the financial backing of the Morse Chain Co., the Thomas Morse Aircraft Co. was incorporated in January 1917.

The possibility that the U.S. might enter the war in Europe led to the Aviation Section of the U.S. Signal Corps making a review of the state of training in the young air service. It became quite apparent that the collection of cumbersome Jennys and Standards were hopelessly inadequate for advanced pursuit training. The pressing need which now arose for a fast rotary engine trainer inspired the Thomas Morse Co. to produce the S-4 scout, the first aircraft specifically designed for fighter training. Powered by a French 100 h.p. Gnome, the prototype first flew in June 1917.

Defects revealed in flight tests resulted in the production of an improved version of the Tommy known as the S-4B. The success of this model led to an order being placed by the U.S. War Department in January 1918 for four hundred of the third version, the S-4C. The U.S. built Gnomes which powered the S-4Bs had given so much trouble that the new S-4Cs were to be fitted with the 80 h.p. Le Rhone. The Nieuport system of aileron control was also adopted.

The rotary engines fitted to the Tommies to enable the American pilots to get used to the peculiar quirks of these powerplants gave the Tommies some odd flying characteristics. Ground looping was extremely common but straight looping was impossible without removing the left rudder stop wire. Pilots were instructed 'never to attempt a right-hand turn during a climb out after take-off and never attempt a right-hand power-on spin at less than 4,000 feet'.

The surplus of military aircraft after the war meant that many Tommies were bought by private individuals for despite the tricky flying characteristics, the small size and economic running costs made them popular. Many were fitted with different engines including inline as well

as rotary, and the profusion of spare parts ensured that many Tommies were to have a long life. There are about a dozen still in existence today in the U.S. of which five are still flying.

### Description

The upper wing consisted of two panels bolted together at centre, there was no dihedral. The lower wings were identical in construction to the upper and were bolted to fittings attached to steel cross-over tubes on the lower longerons. Both wings were of wooden two-spar construction, the leading edges being plywood covered. Interplane and c/s struts were spruce, capped and toe'd with steel fittings. The tail surfaces consisted of steel tubing and wood, the tubing forming the trailing edges. The fuselage was made up of four ash longerons with spruce vertical members braced with wire. Light wood formers and stringers faired the upper and under surfaces. The headrest, cockpit surround and the area to the cowl were of aluminium as were the two lateral fairings behind the cowl. Top and bottom of the rear fuselage were plywood covered and the forward belly was a plywood panel. The remainder of the fuselage was covered in fabric. The landing gear was constructed of steel tubes streamlined with spruce whilst the axle was of the split type bound with tape.

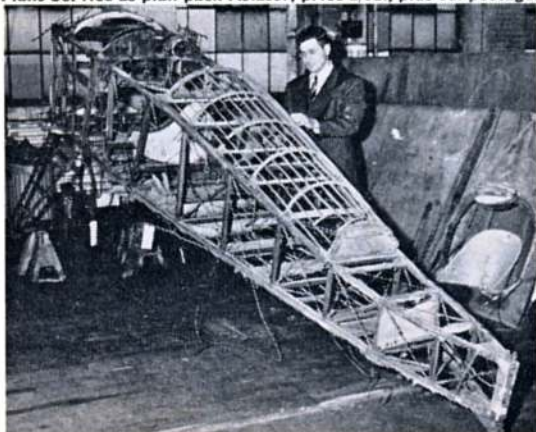
S-4Cs were delivered with an attachment for a .30 cal. Marlin on the starboard side of the fuselage. Some aircraft had a large 'biscuit tin' type cartridge collection box fitted to the side of the gun.

### Serial numbers and production

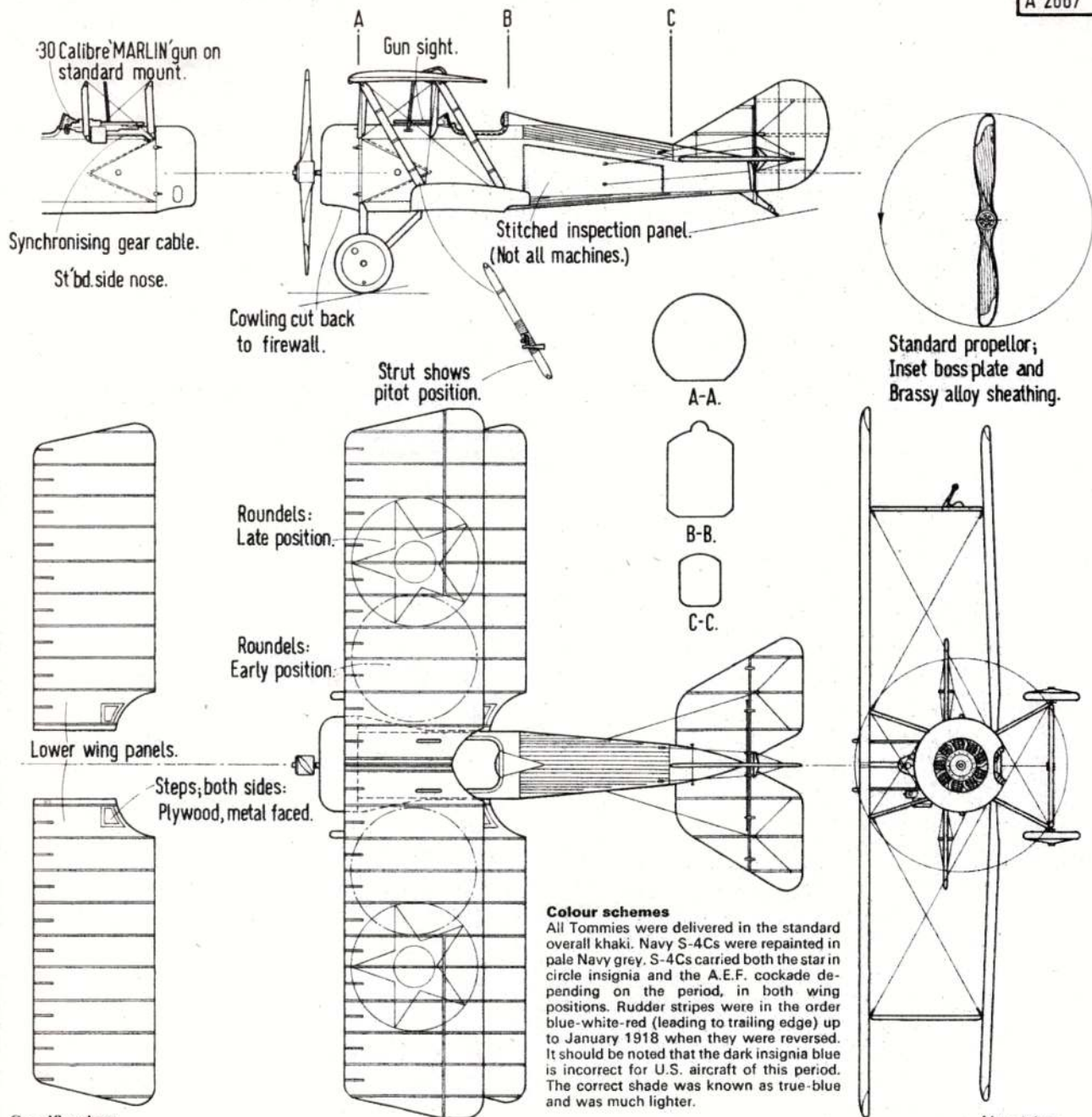
All aircraft built by the Thomas Morse Aircraft Corporation, Ithica, New York.

No. built	Type	Powerplant	U.S. Signal Corps Ser/No
50	S-4C	100 h.p. Gnome	41359-41408
350	S-4C	80 h.p. Le Rhone	38633-38982

U.S.A.F. photographs convey the similarity to the famous Sopwith Camel. The author is grateful to Mr. Royal Frey of the U.S.A.F. Museum and his staff for their assistance in the preparation of this article. Reprints plus dye-line copies of the 1/48th scale original drawing are available from Aeromodeller Plans Service as plan pack AJ.2887, price 2/6d., plus 6d. postage.

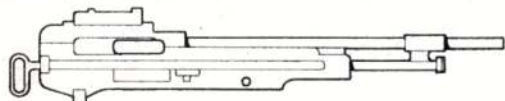




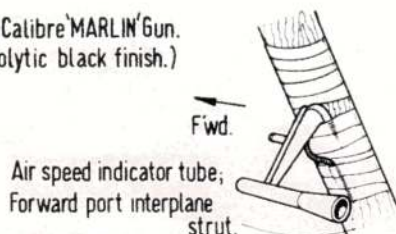


## Specifications

Wing Span, 26 ft. 6 in.; Length, 19 ft. 10 in.; Height, 8 ft. 1 in.; Wing Area, 234 sq. ft.; Max. Speed, 95 m.p.h.; Gross Wt., 1,373.5 lb.



1917 30 Calibre MARLIN Gun.  
(Electrolytic black finish.)



## Fuselage construction.



Position & style of numbers (U.S. Army.)  
Repeated on centre top of rudder.

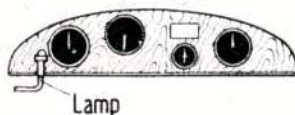
Aluminium.

Plywood.

Fabric.

## Standard dash board:

Instrument faces, —BLACK.  
Characters, —WHITE.



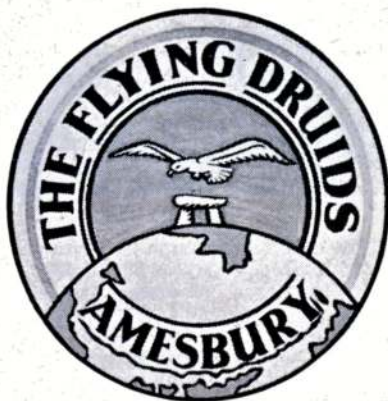
THOMAS-MORSE S-4C SCOUT.

Drawn by: H. WOODMAN.  
Traced by: A. A. P. LLOYD.

Scale FEET.

0 1 2 3 4 5 6





## CLUB NEWS

Two clubs which play their full part in contest organisation are Amesbury (The Flying Druids - with appropriate Stonehenge insignia) who specialise in Radio Control and Feltham, well known in control line circles.



AS WE MOVE more absolutely into the electronic era we must accept it as a natural progression for the erstwhile control liner to graduate to the push button sophistries of Radio. And certainly this would seem to be the situation in the **High Wycombe M.A.C.**, which, a few years ago, was quite a force in the C/L world, but according to the report to hand, is now a predominately Radio group. Naturally, the transition period has been a somewhat quiet one as far as appearances on the outside contest field go, but the home fixture list has provided much local colour and plenty of solid training. You may be sure that when they do venture abroad there will be plenty of evidence of that old C/L expertise. The club is lucky to have three flying fields at its disposal, although none are particularly suited for free flight, (which is encouraged along with all other aspects of model flying) but all are adequate for R/C, especially a tract of farmland in adjacent Oxfordshire. Most club events mentioned are for Radio, with Spot Landing as the prime favourite. Perhaps naturally, as this type of event gives the widest participation. But the more dramatic style of contrast has not been overlooked, and a few Pylon races have been staged. One such Multi was won by Bernie Heard flying a *Super 60*, while Dick Edmonds, the well known maestro of the two wire act, took the honours in a Single event with his *Chaser*. He also won the pre Christmas Spot event, for which the prize was, appropriately, a hamper, again with his *Chaser*, preceded, no doubt, by something stronger. One event, of an altruistic nature, was stymied by the weather: the more advanced flyers were to have given a bit of L-plate instruction to the beginners; taking them out for a spin, as it were. Interested in this go-ahead club? Then contact R. J. Edmonds, Club Sec., 16 Telford Way, High Wycombe, Bucks.

Never tempt providence! is now the watchword of the **St. Albans M.A.C.** Having enjoyed a happy run of calm, fair evenings on the Nomansland flying site, they crowded too loudly over their good fortune, and sure enough for the next succession of evening events the elements mounted attack after battering attack across Nomansland, thoroughly routing the evening schedules. In lighter vein there has been a spot of good-natured controversy over the naming of a certain engine flogging whirly bird as '*Karridbis*' in a previous newsletter. Seems the pundits with a classical turn of mind have been insisting upon '*Charydis*', a six-headed monster that lived on a whirlpool as the correct appellation. And it was a case of heads they win. But as a change from monsters, the club scene has been one of quietude, with Gliders and Coupe's meandering gently over the common. Would not be quite so hush, though, if the Joint Parochial Council would listen to reason - and reason being those not-so-ear-damaging-as-Radio ten-second power duration outbursts. But the Council remains adamant: no power flying on Nomansland. Fortunately, then that recent newcomers to the fold have been mostly engineless types. Even slope soaring activities have been mainly free flight, with John Blagg, Paul Fynn and Vic Driscoll keeping the club flag flying on the hilltops with successes at Clywd and Luton. Good club fixture list, both outdoor and in. Anyone looking for a Beano should enjoy the 'Comic Flying Night'. Take one comic and fold.

We all grumble at our own particular brand of anti-model weather, but the elements deal mildly with us compared with the harsh treatment they hand out in other parts of the world. A letter to hand comes from New South Wales, Australia, where a bush fire engulfed the clubroom of the **Ku-Ring-Gai M.F.C.** Fortunately, the galloping flames bypassed the flying field to leave intact the three grass C/L circles. Survival, too, for the club P.A. system and the much prized

library, containing, apparently, much Aeromodel literature. News of a more cheering nature is of the arrival of a valuable immigrant, Mr. E. F. Bryant, contributor to this magazine and designer of *Dragonette*.

If flying at Bishopbriggs, a haunt of the **Glasgow Hornets M.A.C.**, you could well find yourself in prison. Happily, the prison officials take a tolerant view of the straying model, though no doubt searching same for the odd file. Oddly enough, after a good Fly-in turnout just before Christmas a decision was taken to discontinue using the field because of the large house and tall trees, but exactly to what extent the ban operates we are not told. Mainly it's only the Radio section of the club that's keeping things going, and it is only this section that is continuing the monthly meetings. Radio flying goes on apace at Cowglen, where there's many a slip, particularly with baulky radios and unprintable manoeuvres.

The flying ground of the **Watford Wayfarers M.A.C.**, is known, quite appropriately, as the Moor. 1968, however, was hardly a Moor the merrier year, as attendance on the open space was disappointingly poor, even on the few occasions when the clouds ran out of juice. Partly the low attendance rate was due to the general unsuitability of the Moor for the multi-radio model. Mostly, the heavy stuff is flown at Bovington and Hendon, but as both these are under the axe, a new species of toughened multi may well appear on the Moor. But tread gingerly on the Moor, not only to avoid the broken Coke bottles, but in order to keep on good terms with local residents. Recently a complaint was lodged by a member of the Ratepayers' Association about the noise emanating from an unsilenced multi. The flyer endeavoured to placate the wrath of the complainant by pleading that he couldn't do aerobatics with a silencer on the engine, but the noise battered resident was not impressed. Providing facilities can be maintained, a fulsome contest programme is being planned for R/C flyers in the S. Midland area through the R/C League.

There seems to be a stir of activity down **Southampton** way, not all attributable to damaged turbines, but more to the damaged models that have resulted since the lifting of the New Forest Foot and Mouth restrictions. All good practice though, for the hectic contest programme that has been evolved during the Winter hibernation. And just as a change from the inevitable Radio, there is a spate of C/L building under way, and among other machines coming off the production belt are semi-scale Spitfires, Zero's, Mustangs and a Stuka. But what it means by the Radio boys having a go at '*Daz Liddle Stik*' I haven't the foggiest, but there is a reference in the bulletin to '*Daz Little Ugly Stik*' which appears a kit for a one-off programme. Seems that plenty of Stick keeps the members on their toes. There is even a suggestion of a standardised multi model with ready made templates etc. to cut down building time. Same for Combat. Have we come to the end of the era of the highly individualised model? Beaulieu (an ideal away-from-it-all flying site) was the venue of a contest with the **Flying Druids**. A rite good too, too, with the Druids showing exceptional flying prowess and fine sportsmanship. Mention is made of old member, Pete Cock, who, in an essentially 'wing-over' C/L period, put in that electrifying aerobatic performance in the 1948 Gold Trophy event. The reference is in connection with a probe into the club's quite notable history. It came into being, like so many clubs, in the 1930's, and has kept up a high reputation ever since. What do you think the model scene will be like in, say, 1980? Looking back over some of the old dreams of the future, someone uncovered a prophetic radio event being held in Hyde Park - Some hopes!



A type of knock-out competition mentioned in last month's News crops up again in the **North Western Area's 'Message'**. The system which is known as Mike Reeve's Sudden Death F/F competition, has been given a full set of rules, and it will be interesting to see if the pairs knockout method will prove more satisfactory than the present fly-off one. I do look askance, though, at the five-minute maximum for Open models. One answer would be for the timekeepers to operate jointly rather than singly to each model, thus obviating much cause for controversy. The newsletter raises the issue of the decline in F/F, attributing this to the failure to attract interest at junior level. Understandable, since flying sites are shrinking, and the weather as blowy as ever. Conditions with which the multi-radio model can cope with quite happily. Yet, for all that, F/F has a special appeal which Radio cannot emulate, and we can only hope that it will survive, albeit not in such pop quantity. An ominous letter from the Chairman of the Area warned flyers that unless a full working committee was formed the Area organisation would have to be disbanded. Thanks to volunteers affairs did not reach this sorry state.

A report from the **Handsworth M.A.C.**, (Birmingham) poses a somewhat inscrutable question: can C/L win back its erstwhile popularity, or was it just a steam age form of Radio, now all but wholly eclipsed by the real thing? Certainly a number of clubs which were entirely or predominantly C/L have gone completely over to Radio, and this does seem to be the inevitable trend. However, the Handsworth boys still seem to think that C/L has that irreplaceable something, and are striving to revive the not-so-ancient art in the Birmingham area, where it has lately been in the doldrums. The ten dedicated control liners who comprise the club are getting their bits of machinery in order for the coming season. All forms of handle hanging are getting due attention; Rat Race, Team Race, Combat and Stunt. As far as meeting places are concerned, the club has no indoor venue, but prefers to keep open house at Perry Hall Park on Sunday afternoons, where anyone with a taste for the circuit-and-see sport will find a warm welcome, particularly if he has some contest experience. G. Bryant is the Sec., and lives at 61 The Broadway, Handsworth, Birmingham, 20.

At one time Basingstoke was considered well out in the 'sticks', but with the growth of urbanisation in the South, it is now almost a London suburb. Thus, with an increasing population to recruit from, the **Basingstoke M.A.C.**, has increased its membership to a good, round 50, and has improved its flying facilities, too. In addition to the local common the club has the use of a large acreage in nearby Overton, thanks to the good offices of a local, ex-pilot farmer. And a useful amenity, too, since the common is going the way of all open

spaces these days: the developers are moving in. The club caters for all sorts and conditions of model life, and Mr. E. Champion, the P.R.O., expresses surprise at the amount of Radio interest considering that the country is in such dire economic straits. Now come along all you Basingstoke model flyers. Look in at the Clubhouse in Hackwood Road on Friday evening.

Man who is getting on his feet in order to come under wifely orders is the Chairman of the **Stansted M.F.C.** (Essex), Julian Hopper (2nd place, 1968 Nats. 1/4A), who is relinquishing his post in favour of marriage. Not giving up aeromodelling, though; a resolution which we hope he will continue to observe. Dennis Martin, his successor, is organizing an open evening at Ugley village hall in order to advance the local image of aeromodelling. The hall, or rather Ugley, is on the A.11 between Stansted and Newport, and is where the club meets on the 1st Friday of every month at 8 p.m. New members welcome. All interests catered for.

In England for a short holiday, and writing to us from Battersea, Mr. V. C. Hale, from Oregon, U.S.A., tells us of fun afloat with the **Sky Knights R.C.**, back home. The club, with a membership of 40, go on long week-ends to the lakes and reservoirs of Oregon to fly float planes on these wide stretches of calm, uncluttered water. Models are radio controlled and mostly Scale. They are equipped with a special type of float which renders them unsinkable; foam-cored and balsa-sheeted. The photographs sent testify to ideal conditions for a fascinating sport. And a great time is had on the trips: wine, flying and song (all very much above board!).

Some hard re-thinking is going on in the **Belfast M.F.C.**, according to the latest newsletter. The cost of amenities, which give particular benefits to the active flying members, is soaring higher than the space restricted models. What is needed it is thought is a dose of affluence to get the club off the charity list and on to a self-sufficient status. This would mean the acquiring of a spot of land with clubhouse and C/L circles, not to mention a bit of space around for f/f sport flying. A fee of £5 per year is suggested as a possible way of meeting these requirements which would give benefit to all types of members. One thing in its favour, if I'm not mistaken, and that is that Northern Ireland hasn't got quite the population per acre problem that we have over here.

The **Lone Stars Model Club** might conjure up visions of miniature stage coaches and cowboys at home on the miniature range, but is, in fact, an aggregation of lone model builders from round and about the Birmingham area. An all action group, too. No fussy old minutes and all that time-wasting jazz at the fortnightly club meetings - its all solid building and instruction sessions. And

*Continued on page 206*

## CONTEST CALENDAR (Imminent Events)

- March 23rd** LONDON AREA C/L CHAMPS Rd. 1, F.A.I. T/R, 1/4A T/R, Combat, Charville Lane, Hayes
- March 23rd** S.M.A.E. CENTRALISED EVENTS F.A.I. Glider Open Rubber Open Power
- March 30th** WHITEFIELD KNOCK-OUT Open classes for Glider, Rubber Power, starting 11 a.m., after 10.30 a.m. draw on field at R.A.F. Chetwynd - note not A/2 as previously announced.
- April 6th** S.M.A.E. R/C CENTRALISED MEETING - R.A.F. North Luffenham - was April 13th.
- April 6th** DEVON RALLY all-in F.A.I., Open R/G/P, C. d'H. x Chuck Glider, Woodbury Common.
- April 6th** SOUTHERN C/L RALLY. Rat Race, Combat, Leigh Marshes, Leigh-on-Sea, pre-entries 3/- to C. Heinrich, 49 Juniper Road, Leigh-on-Sea; field entry, 5/-.
- April 6/7th** WOKING EASTER GALA Sunday: Open R/G/P, C.d'Hiver, A/1 & 1/4A Power; Monday: F.A.I. R/G/P in rounds. 10 a.m. each day at Chobham Common
- April 6/7th** TWO-DAY SHEFFIELD SLOPE SOARING CONTEST. Single Surface Pylon, Multi Pylon, Single Surface Spotlanding, Multi Aerobatics, Scale, Novelty, Free-Flight and Magnet. 10 a.m. Callow Bank, Ringinglow. Tickets from P. Scaife, 44 Todwick Road, Sheffield 8. Send S.A.E.
- April 13th** S.M.A.E. CENTRALISED C/L MEETING, including trials of Criticism of Aces - R.A.F. Upwood.
- April 20th** LUTON & D.M.F.C. SLOPE SOARING CONTEST. Multi, Single R/C, 5/-; Magnet, free; Flight, Chuck, 2/6, to C. Rudd, 38 Windsor Road, Barton, Beds.
- April 20th** CONGLETON MAC RALLY, Chuck Glider, Open R/G/P, C/L Aerobatics, R. A.F. Chetwynd, Newport, Shropshire, 8.0 a.m.

- April 27th** F.A.C.C.T. COMBAT RALLY. Class A Combat only 4/- to G. Johnson, 37 Oxford Road, Kirtlington, Oxon. Event at New Barn Farm, Weston on the Green, off A.43 Near Bicester.
- May 4th** SOUTHERN GALA, S.M.A.E. Open R/G/P, 1/4A Power, Chuck Glider, R/C Multi (Aeromodeller Trophy) 1/4A T/R, F.A.I. T/R, Combat C/L Stunt at R.A.F. Odiham.
- May 11th** CROYDON F.A.I. GALA. R/G/P/ 7 rounds, start 10 a.m. Chobham Common
- May 11th** EASTBOURNE SLOPE SOARING RALLY. 'Long Man', Wilmington, Sussex
- May 18th** NORTHERN AREA VINTAGE MEETING, plus R/C, C.d'Hiver, A/1 Glider, Open Power (Pannett Trophy), R.A.F. Topcliffe
- May 25/26th** THE NATIONALS, at R.A.F. Hullavington

### CANCELLATIONS

- April 13th** NORTHAMPTON COMBAT RALLY, cancelled
- June 8th** S.M.A.E. R/C, moved to August 10th at Southend, Leigh Marshes.

### ANNOUNCEMENTS

- June 1st** SUTTON COLDFIELD R/C RALLY, Spot landing, Limbo, Spins, Pylon Racing at Fradley, Near Lichfield
- June 29th** FINCHLEY D.M.E.C. C/L RALLY, A & B Combat, B Rat Race, Stunt, Silencers over 2 c.c., 3/6d., pre-entry to J. Goodwin, 77 Gallants Farm Road, East Barnet, Herts. Venue, Glebelands, Finchley

### R/C SYMPOSIA

- March 20th/30th** SCOTTISH R/C SYMPOSIUM, Castle Hotel, Greenlaw, Berwickshire
- April 11th/12th/13th** ESHER D.M.F.C. R/C SYMPOSIUM, Brooklands Technical College, Weybridge, Surrey



#### CLUB NEWS—Continued

an all action flying ground, too, to offer to new members, both male and they'll-be-lucky female. Mr. T. Beatson, who sent us this information, is also interested in making a collection of any loners living in the Ludlow, Craven Arms, Clay Hall area to form yet another club. Details of both concerns available from Mr. Beatson at 'Four Winds', Mocktree, Leintwardine, Nr. Craven Arms, Salop.

Of special interest to keen contest types down South is the series of evening contests to be staged by the **Croydon & D.M.A.C.**, on Chobham Common during the summer (See Contest Calendar). Events will not start before 6 p.m. with visual aids, namely, binoculars, used for sighting the competing models. This, because the object of the exercise is to time the exact stay up time of the model rather than a timekeepers' eyesight test. Maxes to be fixed according to the weather, though it is hoped that calm conditions will bless each event. Furthermore, an experimental pairs flying contest—described earlier in these columns—will be flown on June 22nd. Classes for A/I Glider,  $\frac{1}{2}$ A Power, and, new to us—though whispers have been heard—semi-Open Rubber, with the only restriction, a 40 gramme motor. Good to see some new ideas getting an airing.

Urgent message from the **South Eastern Area**. Dates for the South Coast R/C Rally and the South Coast Gala have been revised:—New dates to follow.

Latest club to our lists is the **Three Kings Aeromodellers**. The short newsletter gives some good gen. on the club's main interest, C/L, and lets us know that it uses Mitcham Common for flying purposes.

Also plenty of C/L gen. in **Elliott M.F.C's. 'Circuit'**. Take Team Racing, for instance. Did you know that glass fibre props wear out bearings? And while wooden props give better acceleration they break more easily. And 'Circuit' also has a few pertinent tips on Radio. I, for one, was not aware that an intense burst of sun spot activity can bring your precious radio job crashing in. Ah, but not if you fly Super-het, the new sun resistance strain.

Just a thought from the Newsletter of the **M.A.A., of Canada**. It claims that the model movement has helped to keep many youngsters off the streets. Lucky for them—to have anything but streets!

Yet another pen friend request from Czechoslovakia. A mature 29-years of age, Pavel Bouse is a technical worker, and is interested in exchanging 'Aeromodeler' for the Czech 'Modelar'. His address is Zizkova 1294, Kadan, Czechoslovakia.

See you!  
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## RADIO CONTROL MODELS



Big feature of April R.C.M. & E. will be Stuart Foster's 'Equaliser' multi aerobatic model. This high performance machine will be Stuart's entry at the 1969 R/C Championships and is presented in plan form.

This month's R.C.M. & E. Digital feature covers servo construction, with the option of either S-3 or S-4a type servos for maximum flexibility of installation.

Other features include 'Wave Lengths' for R/C boats and a round-up of new R/C product introductions at the recent Nuremberg Toy Fair.

**2nd Friday Monthly 2/6**

## MODEL CARS



Highlights of the May 1969 issue of Model Cars will include a feature on this superb Pocher Alfa Romeo and will contain Prototype Parade drawings for the Matra 630 V12 Sports Car.

There will be an interesting article on photographing your models using a simple and inexpensive technique, building tips on Champion 507 kit motors and a modern chassis construction article.

All the regular features will be there plus details of some rare Italian models.

**1st Friday Monthly 2/6**

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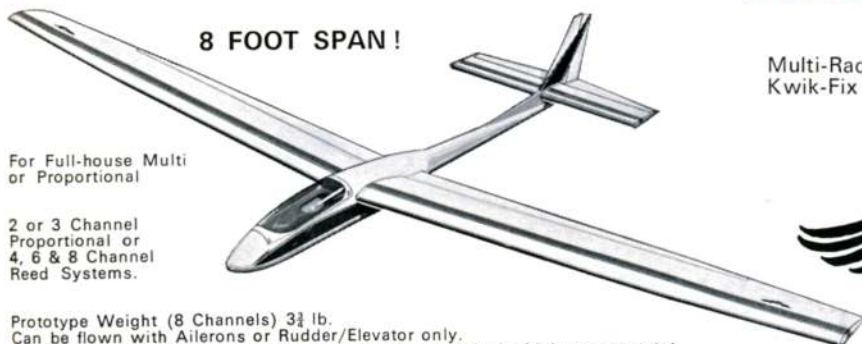




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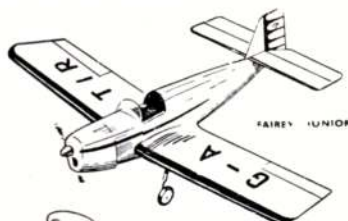
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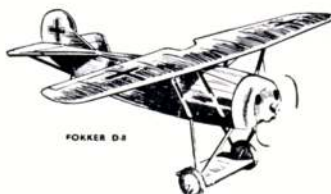
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