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The official Journal of the
SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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In the News

WIDE interest was taken in A. F. Houlberg's article "Modelling the Russian Way," which appeared in a recent issue of MODEL AIRCRAFT, and it was not confined solely to modellers—the national Press, too, commented in various ways. In *The People*, Alan Tillier compared aeromodelling in this country with the movement in Russia, and quoted from the MODEL AIRCRAFT article. After pointing out the technical benefits obtained by Russia through helping modellers on a national basis, and the lack of assistance from Government sources by our own modellers, he concluded: ". . . surely when the world is engaged in a tussle for technical supremacy there might be more sense in supporting future engineers than in subsidising secondary modern schools in such gentle crafts as rabbit rearing and making fireside stools for Mum?

"*Somewhere, someone has got the priorities sadly muddled.*"

How heartily we agree !

S.M.A.E. NOTES

EVERYONE who has attended the Society's annual dinner has admired the fine array of cups and trophies that are displayed for annual awards, yet very few people have any idea of their value. Expert valuation recently placed their current worth at almost £3,000, which is a lot of money, and does, perhaps, put in its correct perspective, the annual bill for repairs and engraving of these trophies, which averages £50-£70 each year.

Few people realised that the total value was so high, and this, taken in conjunction with the recent loss and recovery of the Witney Straight Trophy, lends weight to the suggestion that the presentation at the dinner should be only a token one, the trophies themselves being permanently kept at Londonderry House. Such an arrangement would save the Society a repair bill each year, and also remove the responsibility of modellers for looking after cups they had won. For those who have never seen the awards *en masse*, and for those that go every year anyhow, this year's dinner is on November 22nd.

As reported in out last issue, this year's International Teams will be selected at two centralised trials. It is now announced that the entry fee for both trials will be 10s. for each class of model.

On the subject of teams, a centralised eliminator is being held on June 22nd for International class, speed, stunt and team race. The results of this will decide who will be eligible to compete, at their own expense, in the first World C/L Championship, to be held at Brussels, in conjunction with the World Fair, on September 7th. The venue for this trial has not yet been decided, but if anyone knows a suitable place the S.M.A.E. would be interested to hear.

R/C enthusiasts will have their chance on July 20th, when the trial to select the team for the King of the Belgians Cup will be held. Successful competitors must again pay their own way, and to avoid a repetition of last year's fiasco, they should obtain and read a copy of the F.A.I. R/C Rules (which cover six

pages of foolscap) from the S.M.A.E., 19, Park Lane, London, W.1, price 1s., plus a suitable sized S.A.E.

The minimum size for identification numbers which must appear on all (except microfilm) models flown in contests, is ½ in.

Colonel Bowden has entered the lists by again suggesting that his Trophy should be allotted to a contest for R/C seaplanes. The Council, however, still feel that such an event should prove that it will obtain support before a national trophy is awarded, so it is rumoured that the Southern Area will be organising a contest at Poole Harbour on these lines. This should be worth seeing.

On the subject of R/C seaplanes an International event for these is being held at Monaco on May 25th/26th. The organisers have sought, and obtained, permission from the F.A.I. for the models to be **hand launched !** This will presumably prevent " that sinking feeling " among competitors.

Nats Notes

The venue is again Waterbeach Aerodrome, near Cambridge, so if you want accommodation—book early.

Pre-entry for all events closes on May 10th, but double fee field entries will be accepted where possible, except for Combat and Team Racing.

Contests will take place from 9.30-6 p.m. Sunday, and 9.30-5 p.m. Monday, which will allow time for fly-offs and sorting results before the prize-giving at 6 p.m.

New ground is being covered by running combat on both days to allow for the expected large entry.

R/C is now divided into single and multi-channel events, one on each day. Full details in the MODEL AIRCRAFT Contest Calendar on page 105.

The scale contest is this year also in two classes, F/F (rubber, glider or power) and C/L for a new award—the Knokke Trophy.

On the organisation side, our comment " Whose Pidgeon," in last month's " Here and There," was thrown in sharp relief by William Winter in the February M.A.N. He says: " In the various areas to which the Nationals rotated, there is a noble tendency among A.M.A. leaders and officials to say ' Let George do it.' Modellers are reluctant to work on the Nationals, even the ones who get paid." In the words of the old song, " it's the same the whole world over."

F.A.I. Formulations

In the minutes of the last F.A.I. meeting an unsuccessful attempt was defined as when:

(a) the competitor comes on to the track, and for a reason beyond his control, the model does not take off.
(b) Any attempt during which the model takes off.
(c) When the model does not take off within 3 min.

We confess to being completely baffled by the above—could it be that something has gone amiss in the translating ?

COVER STORY

BEAUFIGHTERS are now something of a rarity to most of us, although a few, such as the one shown in the *Flight* photo on our cover this month, are still flying on target towing duties.

Incidentally we have had a number of requests from readers building the *Mosquito* model, featured in our January issue, for the source of the photos accompanying the plans. The *Mosquito* B.35 on page 20, and the Spartan Air Services *Mosquito* at the top of page 22, were both *Flight* photographs.

Get Ready

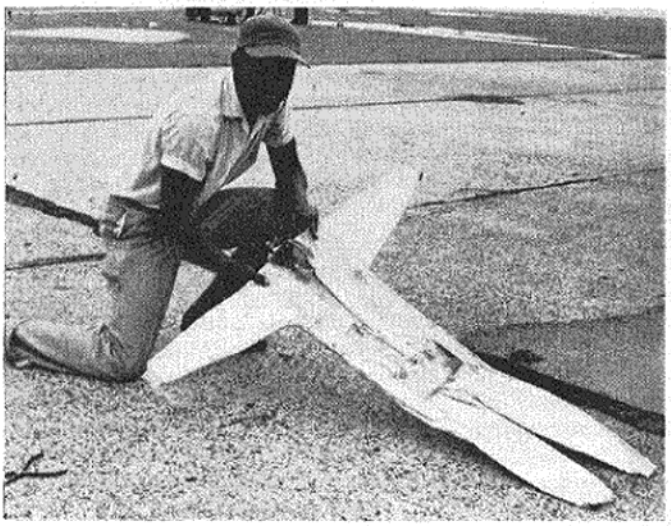
THOUGHT of entering the Model Aircraft Section which will form part of the Model Engineer Exhibition this year ? If so, now is the time to start work on that special project.

The exhibition will be held from August 20th to 30th, 1958, at the New Horticultural Hall, Westminster, London, S.W.1. Entry forms for the competitions will be available by May 1st, and must be received by the Exhibition Manager, 19-20, Noel Street, London, W.1, completed, and with a fee of 3s. 6d., by Monday, July 14th.

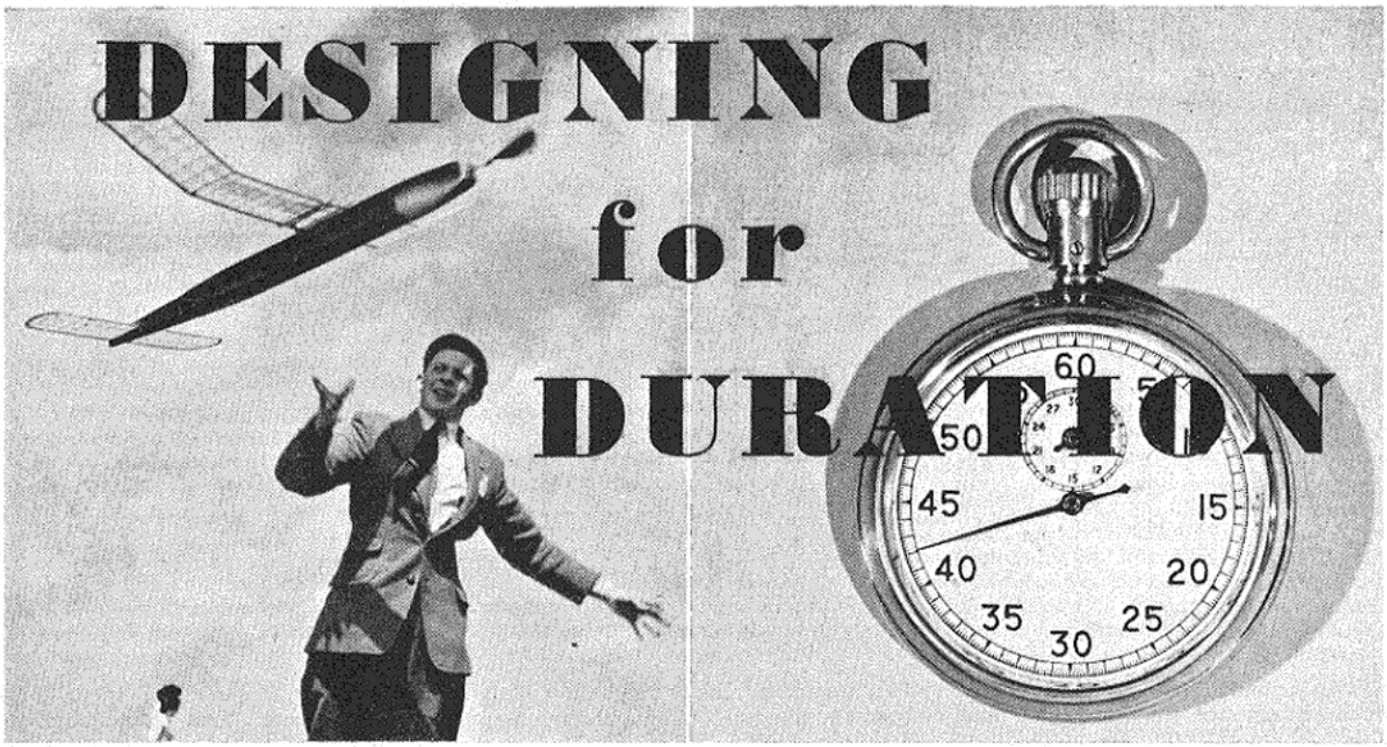
To help those who may have this in mind, we publish in this issue the first part of a feature " Achieve that Life-Size Look." This is by P. M. H. Lewis, who, as the designer of many scale model plans published in MODEL AIRCRAFT, and himself a prize-winner at the Exhibition, needs no introduction to our readers. In these articles the author describes how *everything* is made, from the propeller boss to the tail skid, with the accent on biplanes of the inter-war years.

LONG JOHNS — SILVER ? No underwear

THE Americans at their Nationals have a novelty event, and, judging from the large number of unusual and " joke " designs that we have seen over here, if a similar event was included in our Nats programme it should receive wide support. From the point of view of originality, however, we have not seen anything to approach this pair of flying " Long Johns " which were dreamed up by Larry Nicholls. Bill Dean, now living in America, who sent the photo, says that they really fly, have an arm-spread of 36 in., wire stiffening in arms and legs, ply body and are powered with a Fox 35.



DESIGNING for DURATION



Rubber model enthusiasts will find much to interest them in this article by J. B. POOLE, in which he describes developments carried out over a long period by members of the Halifax M.A.C.

DURING the past two years members of the Halifax M.A.C. have been engaged in the production of the ideal Open Rubber Model. Yes, we know that many other clubs and individuals have been so occupied, but we hope to distinguish ourselves by being among the few who have put their results into print.

We feel that the much complained of fall-off in enthusiasm for contest flying is partly due to the lack of informative and thought-provoking articles in the magazines. We also feel that the reason for this is the reluctance of modellers to provide these. [*How right !—Ed.*]

Although we are not the best qualified people to do it, we offer this Progress Report as being better than nothing, in the hope that it will help someone along, and possibly tempt Birmingham, Croydon and Whitefield to give us the information we seek vainly each month.

Aims and objects are the first main consideration. We have not aimed at a seven minute still air model, because we rarely get still air. We would also drive our colleagues in the Northern Area rubber fraternity out of business—and that would not do at all. In fact, we prefer to set as our standard, the performance of the 1953 style Wakefield —and we take that as being about a four minute average. It might be argued that this is not difficult to attain, yet our difficulty has been to make its attainment easier and, above all, cheaper in time and money.

Size presented little difficulty. Ken Rutter, in his article "Phooey to Wakefields" (MODEL AIRCRAFT, December, 1952), offered a model with a span of 32 in. and a length of slightly less. In his conclusion he stated that the only drawback he could see was that this small model might fly out of sight more quickly. He later told us personally that this was the case when he came to look at the results of a season's flying. The upper limit to size was set by our boxes, and the need to attend some contests by car. Reason enough to stick to the old Wakefield size.

The measure of our success lies in last year's Farrow Shield results. Despite the fact that most of our official flights were trimming flights, the Halifax team were placed fifth. More significantly, we were over seven minutes ahead of our closest rivals in the Northern Area. Of course, the ideal model has eluded us; even the ones we have offer plenty of scope for improvement.

Our heading photo (left) shows one of the Croydon answers ! Ed Bennett with his "Thin Man." (M.A. Plan No. 154.)

High Power/Weight Ratio

First experiments began when the 50 gramme rubber rule was threatened. Rather conventionally, they were a backward step to the 1953 power/weight ratio theory. This was foisted on us at the most entertaining event of our 1955/56 winter programme, when Ken Rutter came to talk about his *Panther*. This model had 4 oz. of rubber and a 2½ oz. airframe. The power, 16 strands driving a 20 in. dia., by 26 in. pitch propeller, was sufficient to take the model up vertically to a considerable height in a very short time. Strength was facilitated by using a small area, low aspect ratio wing, with a wing loading equal to a Wakefield.

We each set about to build one of these, but only mine was finished in the original manner. The model proved almost brilliant, but hopelessly inconsistent. It was only rarely possible to get the power flight and glide in sympathy. Possibly a little further experiment would have solved the problems, but time was limited, and good trimming conditions almost non-existent. A Halifax model must be of the easy-to-trim variety.

In search of this my old faithful Wakefield (Fig. 1) *Mavis Mk. II* was returned to favour. Ballast and undercarriage were removed, and the 4 oz. motor and propeller from the *Panther* installed. Now called *Mavis Mk. III*, the model weighed 8½ oz. and gave a good account of itself with very little trimming indeed. Furthermore, it could be flown on 14 or 16 strands (of ¼ in. strip), was re-converted back to a 2.82 oz. motor Wakefield for the 1956 Gutteridge Trophy with no trimming alterations at all, and back again for the 1956 Flight Cup when it placed 10th. This docility in trim may have been due to the age of the design—but I feel most of it was due to its conventional proportions. I think experimenters might well bear that in mind.

Both these 4 oz. motored models had

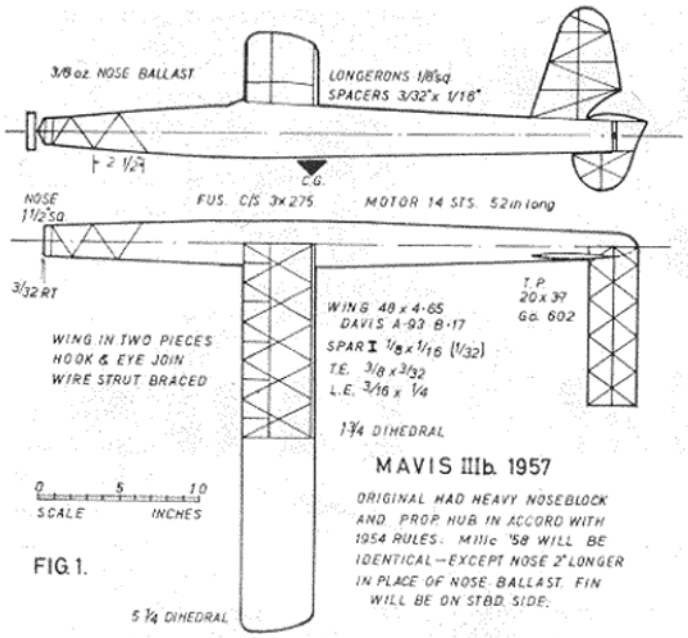


FIG. 1.

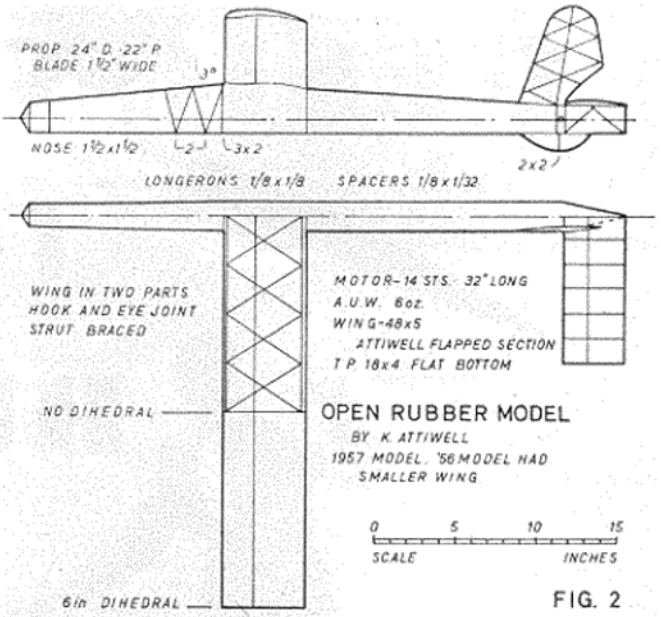


FIG. 2

one basic disadvantage—4 oz. of rubber! Such motors are still expensive, and, although not difficult, are awkward to handle. They are not, as some claim, hard to wind if a suitable winder is used. The other disadvantage of *Mavis III* was that in using a bigger, more docile model than the *Panther*, it was more fragile—especially the 48 in. wing.

Performance was good; so good, in fact, that after abandoning the layout I went back to it in the middle of last season, and it served well enough to persuade me to start another for this season. So docile was it that fatigued rubber only produced a longer motor run, with no great change in total performance. Or, at least, fatigued rubber always took it into *lift*. Similarly, changing propellers showed no change.

A little paper work at this stage produced some food for thought. Consider these figures:—

	Rubber	*P/W*	*Performance*	80 *per cent. turns approx.*	
Mavis II	2.75 oz.	5/1.2	: 40		Wing loading constant.
Mavis III	4.0 oz.	1/1.3	: 30		

Increasing the power-weight ratio by 100 per cent. in favour of power produces approximately 30 per cent. increase in performance. Or, increasing rubber weight by 45 per cent. produces a performance increase of 30 per cent. This did not tie up with the idea that all one had to do to increase performance was to load in more rubber. There *was* an increase in performance, but it seemed a very inefficient way to gain it. It also possibly explains why the 1954 Wakefields were not as bad as the pessimists forecast.

Low Wing Loading

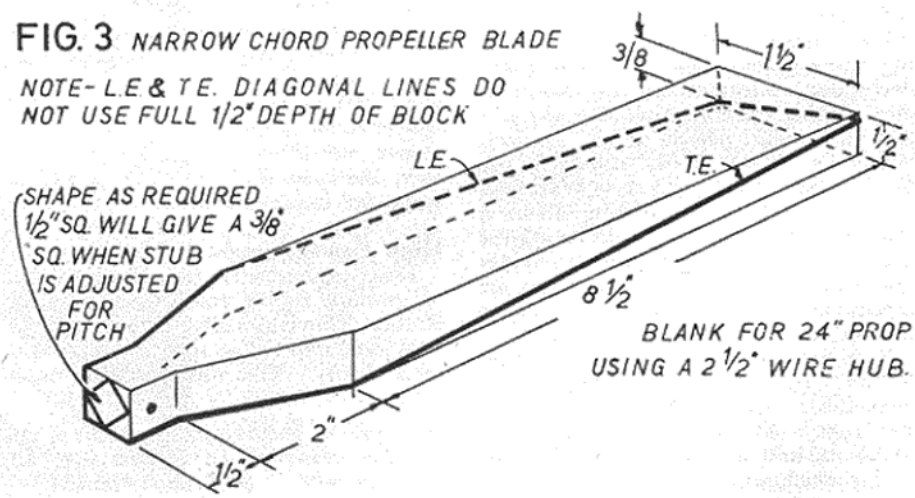
The other two *Panther*-type models come back into the picture now. They represent our "second line of attack." This might be called the Low Wing Loading theory. In particular, Ken Attiwell's version (Fig. 2) which had a more conventional wing than *Panther* (40 × 5 in.) and 2¾ oz. of rubber, made up into 14 strands, climbed almost vertically on a 24 in. dia. by 22 in. pitch propeller, for approaching 60 sec. The glide of this 6 oz. model was all that was desired. At first it was difficult to explain why the model climbed so fast with the low r.p.m. of the propeller. And why was this 2¾ oz. of rubber producing a performance equal to any 4 oz. motored jobs we have seen?

The solution, of course, lies in the low total weight of these quite large models. Because of this low weight, a large propeller can be used. Large propellers, we have been told since 1952, are better than small ones. But they had one very great advantage over similar ones in use on Wakefields—they did not have to drag up 6 oz. of straining "liquorice" with them, and the wings did not have to bring it down again.

The propellers themselves are worth copying. The blank (Fig. 3) is cut from 1½ × ½ in. sheet. This produces rather narrow chord blades, but they are very efficient. The blades are kept full width until close to the root, where they are carved rapidly in to suit the hubs. Pitch change is induced by marking diagonals on the leading and trailing edges in opposite planes. By the way, to be very accurate (and this we have only recently discovered) the diagonals should not go from corner to corner of an 11 in. blank as this produces over much twist.

Ken Attiwell's original used a conventional wire hub, but the blades plugged into the metal part of a motor car bulb. In this "socket" the propeller pitch could be varied slightly to suit the motor, and the wire hinge was let into it. If a more conventional hub is required (Fig. 4) it is an easy matter to set the almost finished blade on a pitch triangle; a tri-square is offered up to the root of the blade and a fore and aft line can be marked. Using this as a guide the blade end can be squared up.

FIG. 3 *NARROW CHORD PROPELLER BLADE*



At this stage it may be as well to mention the problem of flush folding. On a diamond fuselage this is no problem, but a folding propeller with a straight hinge on a square fuselage looks wrong. One blade folds high up on the port side of the fuselage, and the other low down on the starboard side, sometimes trailing below the contour of the fuselage. As regards performance this is not a great disadvantage. In fact, it probably gave Attiwell's model its very desirable left glide. However, it looks odd, and it sometimes results in runway-worn propeller leading edges.

The most difficult way to solve this problem is to make a $\frac{1}{8}$ in. thick × $\frac{1}{2}$ in. wide aluminium backplate for the hubs (Fig. 5). Looking at it from the back, drilling from the left, a hole for the wire hinge is drilled from the back corner at the left, to the front corner at the right. That is not enough. The drill must also be inclined downwards, so that the hole appears $\frac{1}{8}$ in. lower down at the right side than at the left. This compound angle drilling is a model engineer's job. The angle produced will fold—reasonably flush—any propeller

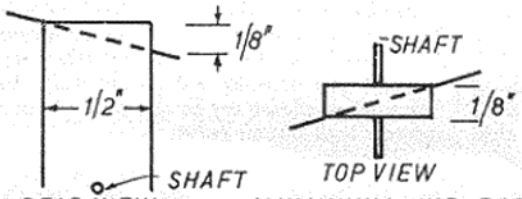


FIG. 5

in the region of 20 in. dia., 26 in. pitch, or 22 in. × 22 in. or 24 in., or 24 in. × 24 in.

The angle can, of course, be worked into a normal wire hub, but drilling the blade shanks at a compound angle is still a problem. The idea in the sketch (Fig. 6) might help, and provided the wire is bent accurately it works very well.

We were a little concerned about the effect of using a low wing loading on the efficiency of the popular wing sections, and on the penetration qualities of the models. From the start Attiwell had used a very thin flapped section, and experienced no trouble at all except from wing-warping. I used an Isaacson section and on initial test the model seemed to fly unduly fast—and sink rapidly. It might have been the day, for later on, with no alteration in trim, the model performed well, but the wing was crushed in the box on the way home. Its successor, with a Benedek wing section, also had a poor, hesitating glide with a feathering propeller, which improved when a folder was fitted. We can only suppose that the propeller slowed the model down, or something, because it had performed well on *Mavis III*, at 8½ oz. We do not advocate free wheelers, then, or featherers for these very low wing loaded models.

As to penetration in windy weather, we had to wait a long time before we found this was no problem at all. In the correct form it seems that most of the conventional thin sections are suitable; this is one of the avenues, however, in which research continues. One point to beware; we have not tried it, but we suspect that too short a moment arm might spoil the windy weather performance of these light models. We use something in the region of 20 in. between the C.G. and the tailplane quarter chord.

Typical weights for a "light" Wakefield are:—

Fuselage, including wing fitting: 0.9-1.0 oz.—40-45 in. long.

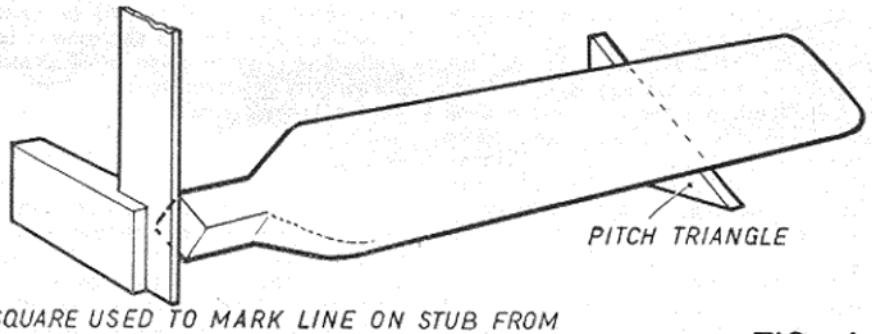
Wing: 0.8-0.9 oz., 220 sq. in.

Propeller—noseblock—shaft: 0.7-0.8 oz.

Tailplane and fin: 0.3-0.4 oz.

Total airframe weight: 2.7 or 3.1 oz.

A motor should be used which, with bobbins and rubber bands, will bring the all up weight to 6 oz. The model will then have a wing loading of 4.0 oz.



SQUARE USED TO MARK LINE ON STUB FROM WHICH THE HUB CAN BE SQUARED OFF.

FIG. 4

per sq. ft. This compares with over 5 oz. per sq. ft. for an orthodox Wakefield.

Fuselage construction is a matter of taste. We have used diagonal longerons, with $\frac{1}{8}$ × 1/32 in. diagonal spacers in 2 in. bays, but more normal fuselages, with $\frac{1}{8}$ in. sq. firm longerons and quite light spacers, have been both light and strong enough. An important consideration is building time—and to cut this down it is best to avoid fancy constructional systems. Go sparingly with ply and sheeting.

The same principle applies to wings. Geodetic or Warren Girder construction can be used, but a perfectly satisfactory wing can be constructed using a $\frac{3}{16}$ in. sq. l.e., a $\frac{3}{8}$ × $\frac{1}{8}$ in. t.e., straight 1/32 in. sheet ribs and two spars, one at 30 per cent. from the l.e. at the top, say, $\frac{3}{16}$ × $\frac{1}{16}$ in., and an $\frac{1}{8}$ × $\frac{1}{16}$ in. under spar at 50-60 per cent. Cover with lightweight Modelspan and two coats of thinned dope. Low aspect ratio wings offer an increase in rigidity and a slight saving in weight. A typical size is 40 in. × 5½ in. Remember, though, that theoretically a low-aspect ratio wing and tailplane need a longer moment arm.

Long Motor Run Theory

At the 1956 Nationals we began to think in terms of long motor runs. Motor runs so far had been in the 45-55 sec. region, climbing fast, but

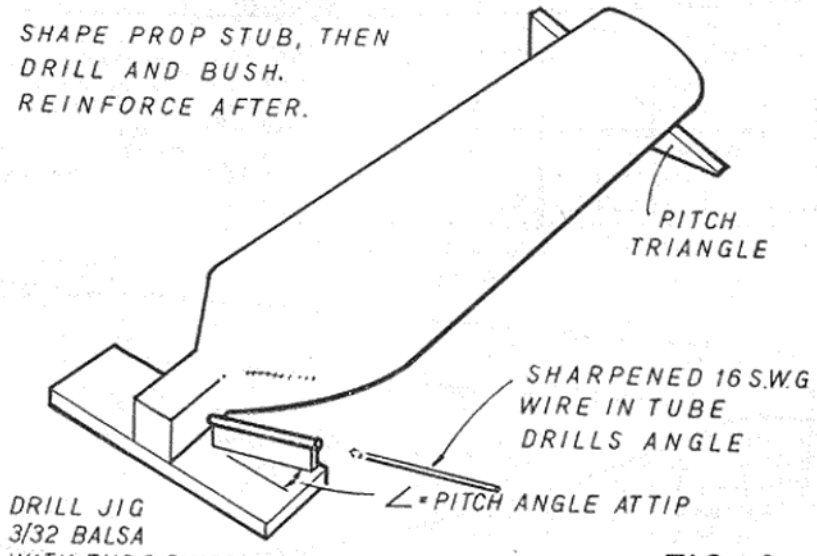


FIG. 6

3 min. is a long time to glide, especially with down draughts around. The argument involved climbing on the propeller, and climbing on the wing. We were using a big wing for a good glide, and it was probably wasteful to drag it vertically into the sky. Could we climb less steeply, but for a longer duration, gaining the same or probably more height, and leaving less to the glide?

One way was, of course, to use a heavier motor, but this was against the low wing loading idea, and we were highly satisfied with that. Making the existing motor run out more slowly meant either using fewer strands and a greater length, without altering the propeller; or using the same motor and increasing the diameter, or pitch, or both, of the propeller.

The bigger propeller probably barks worse than it bites. I rigged up a 25 in. dia. by 40 in. (approx.) pitch propeller, and was told to expect torque trouble. There was none. The model climbed on a very even keel, very steadily, with a run of 75-90 sec. on 600 turns of the 14-strand motor. Maximum turns on this particular model are 900 (14 strands, 44 in. long, 3¼ oz. rubber). I must emphasise, however, that to perform on such a propeller a model must be both light, and have a slow glide.

The same blades, arranged as a 24 in. × 24 in. propeller, fitted to *Mavis III*, which weighed 8½ oz. caused a stall at the end of the power run, and a loss of some 40-50 ft. of altitude. The model appeared to slow down and almost hover, then one wing dropped and down she came. Stopping more turns by the spring did not seem desirable, so another propeller was fitted.

The reason probably lies in a theory about folding propellers to be found in a recent Zaic Year Book. The loss of height at the end of the power run is claimed as being due to the model flying at a speed somewhat lower than its normal gliding speed as the turns run out. We tend to follow this, because Ken Attiwell uses a propeller which moves forward at the end of the power run on his Wakefields. They sink! This problem is exaggerated when the model is flying for a long time in "cruise" conditions.

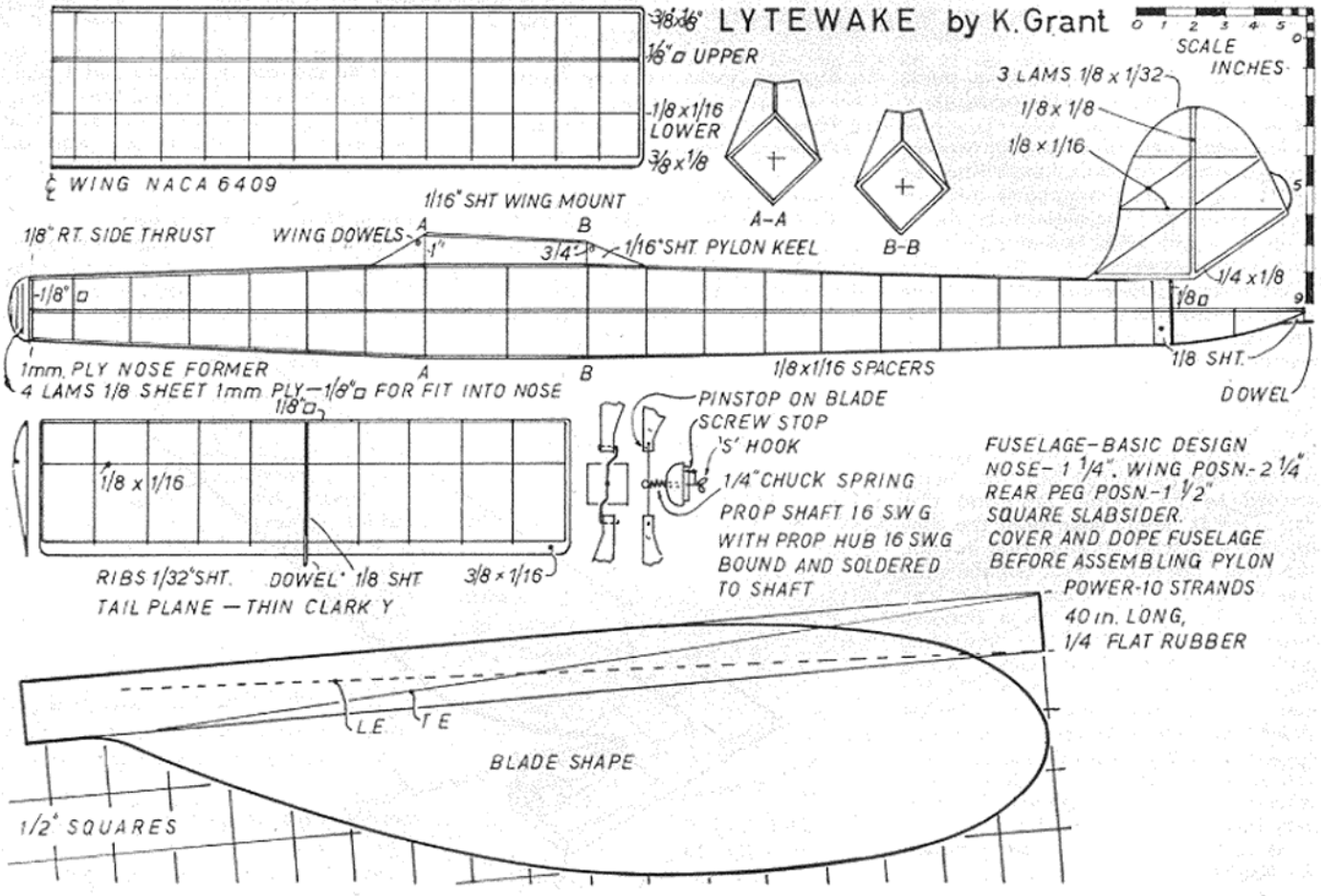
Folding the propeller reduces the model's drag, and enables it to glide faster than it would with a freewheeler. It is impossible to produce a trim which will be effective on the end of a long power run, and also on the glide unless the glide is very slow. This will only occur with a large, light model. For a heavier model long motor runs, unless backed up with lots of rubber, are likely to give poor results.

The newest and most promising development uses the fewer strands method of increasing the motor run. Ken Grant has taken his '54 Wakefield design and produced a lightweight version scaling 2.6 oz. "Lytewake." This has the same 20 in. dia. by 30 in. pitch propeller used on the original—but it climbs on only 10 strands of ¼ in. rubber, made up into a 40 in. length, which fits almost taut in his 43 in. fuselage.

The model is the most conventional to look at, and probably the easiest to build of the whole series. It is also the most docile and was initially trimmed in three flights. All up weight with the 2.4 oz. motor is 5.1 oz., and I have seen it sink to earth, tail first, as gently as a feather after a power stall on low turns. Turbulent air performance is excellent, and it is easy to see. In all, this is the cheapest way, both in rubber and effort, of getting four minutes that we have so far seen. We have not had chance to time the power run, but it is very long indeed on 75 per cent. turns.

Experiment continues, in the shape of ultra-thin wings, to increase the rate of climbs even on low power, and increased cross-country training—to get them back.

If anyone is gnashing his teeth, or tearing his hair over any fallacies expressed here, don't forget much of it is surmise, we hope you will take us up on it. And please follow our example; we cannot get around all the contests to see you, so please try to let some of your secrets leak out in print.



Topical Twists

by PYLONIUS

Gold-Dust

It seems that the chopping up of balsa entails a considerble waste. Not of time and money, as parents and wives will warmly assert, but of the razor fodder itself. That fat stick of balsa which basks so chubbily in the equatorial sun will hardly have the substance to cast a shadow by the time it gets hoisted across the shoulders of that black gentleman in the loincloth. After all the bags of sawdust have been carted away it might be said that from great forests little chuck gliders grow.

This wastage worries the poor old manufacturer no end. In fact, the problem of balsa dust is making him grey headed, particularly as it's so undignified for the boss to wear a cap. He doesn't have to worry about selling off the few pathetic sticks of balsa which survive the sawing up processes—they are in demand for all sorts of uses, from insulating igloos to providing packing for plastic kits. And it is even rumoured that a small quota goes into the making of model aeroplanes.

But getting rid of the mountainous sackloads of dust is another matter. Attempts to find a market for the stuff have not been outstandingly successful. For a time, we are told, it enjoyed a brief commercial prosperity as an explosive and a pig food, but, no doubt, the novelty of porkers flying into free orbit soon wore thin.

Anxious manufacturers are now looking around for new ideas. Needless to say, frivolous suggestions, like dandruff for national health wigs and head filler for combat modellers, are not received with the wildest enthusiasm. What they need is something more concrete.

So, if you happen to know any uses for soft wooden concrete. . . .

Jive Record

Record breaking pilots of the full size stuff must be pretty envious of their model size counterparts. A new world record of 2,000 m.p.h. plus, might get a few lines of honourable mention in *The Little Hogsnorton Advertiser*, but as no one is particularly interested in the escapades of archaic aeroplanes there is not much glory attached to having your seat scorched by the heat barrier.

Yet, for some strange reason, the publicity hounds start baying at the Sputnik at the mere whisper of a model record attempt. Perhaps the reason why the reporters and telly people turn up in droves is the topical flavour of seeing something moving through the air without the use of wings, even if the wings are attached just for the look of the thing.

An added thrill, in these days of robot propulsion, is the grim battle between man and machine. Can man, who has already beaten the four minute mile, jive round a pylon at 200 m.p.h.? Will the 6.5 Special technique match the 2.5 Carter Special in laps per second?

Animal Crackers

A minor hobby of mine is trying to guess the average age of those people who fill up the correspondence columns with full size interests and small size ideas. To judge by their insistence on ten-page features on antiquated relics of the past they would appear to be pretty long in the tooth, but, on the other hand, they have a quaint nursery habit of referring to Tigers as Tiggies and Mosquitoes as Mossies which would suggest a youthfulness too extreme for the wielding of a razor blade, either for balsa cutting or for any other purpose.

It might keep the children happy to know that a Tiggy was a near-human sort of animal and that a Mossie could overtake a Vamp, but what all this kindergarten history has to do with model flying I haven't the faintest idea. Nor can I imagine what the nursery historians do with the sets of modelling knives they win for their non-modelling literary efforts apart from cutting out the circus animals on cornflake cartons.

Other weapons than knives are needed to defend our adult model mags against these Dan Dare invaders. One useful, but, alas, expensive, means of combating the menace would be to supply each of them with that new twelve guinea book, containing everything the air mad boy wishes to know. Instead of persecuting the model mags with puerile pleas on ten-page features on the Sopwith Pup (or is it Soppy Puppy?) they'll have the whole exciting story on the nursery shelf, nestling between the Tiger (or Tiggy?) Tim Annual and the space cadet ray gun.

All-In Flying

As a model flyer I'm not too well genned up on the scale and novelty side of the business, and I'm thankful to a recent contributor for explaining why team racers all look so alike.

My own pet theory was all wrong. I thought that the bloke who designed the original model got the idea from an American pre-war racing plane, and as it looked so jolly realistic there was no point in anyone designing a new one.

Apparently, the real reason for the similarity is not that the team race builder is all that enthusiastic over the pre-war American racer, but the specification is so cunningly devised that his design, however original, will look like any other team racer.

I suspect that the whole idea of such standardisation is to help to make the team race carnival as bafflingly incomprehensible to the spectator as possible. In the early days it succeeded in this purpose quite admirably—the bemused onlooker having not the faintest idea which model was which and what the race was all about. Later on the models began to circulate so fast that you couldn't distinguish one plane from another, even if one had two tails.

Now the engine experts have whacked up the m.p.h. to the point of complete invisibility, the only spectacle remaining is the all-in wrestling match in the centre. As the models are so uncontrollably fast, success depends more than anything else on careful pilot selection.

Three types are enjoying current popularity: Giant, Dwarf and Sputnik. The Giant keeps out of the general entanglement by standing plumb centre and relying on pure altitude. The Dwarf has more down-to-earth tactics, keeping out of the way between the Giant's legs. The Sputnik, who has to be a pretty lively sort of chap, sprints around on the outer orbit.

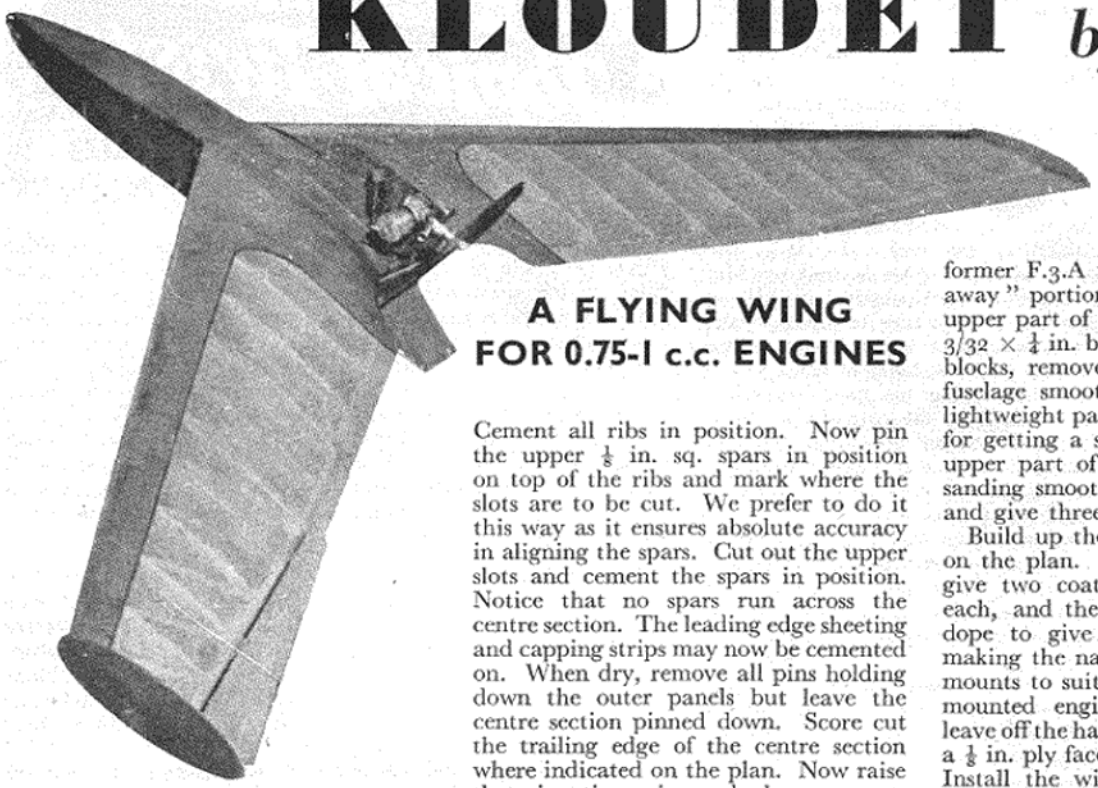
Any normal, standard type pilot finishes up with a pranged model and dislocated shoulder within the first few laps.

Russian Things

One of the live wires of our hobby is not too happy about the Russian way of modelling life. He writes to say that, under the Russian system, some undesirable pressure might be brought to bear upon his building activities.

By our standards his building programme is quite well up to date. His approach is a mature one, waiting for his kits to come of age before building them. He is justly proud of having at long last summoned up the energy to build his 1937 model, but would be afraid of any interference before his next upsurge of energy in 1979.

KLOUDET by *Laurie Ellis*



A FLYING WING FOR 0.75-1 c.c. ENGINES

IT has always been my ambition to beat a conventional contest model with an unorthodox type, and with this in mind I turned my thoughts to a powered flying wing design. Having produced several different "wing" designs at intervals over the past 15 years, I checked snapshots and sketches and finally settled for the machine presented here. That the design is successful is borne out by the fact that on its first outing it managed to take fourth place in a ½A contest. On the same day it disappeared o.o.s but was recovered some time later. Although it has yet to take a first place at a contest, it has always been well in the running.

The original model is quite heavy at 12½ oz., using a Mills 0.75 and a Stant 7 × 4 prop put on backwards and turning clockwise as a pusher, but by keeping the weight down to around 10 oz. by using light, firm wood, one will have a potential winner in the ½A class—and if thermals are around—get ready for a chase. I do not have a D/T on the original.

Before starting construction, study the plans and get an idea of the sequence of construction. Make full size stiff paper templates of all parts, trace on to balsa and cut out ready for assembly. Soap or wax the plans and then start building.

Pin down the ¼ in. sq. leading edge flat on the plan, also the trailing edges. Cement with a butt joint the $\frac{3}{16} \times \frac{1}{2}$ in. elevon T.E. pieces. These are flat on the plan where they join the main T.E. but are raised $\frac{5}{16}$ in. at the wing tip. This gives built-in washout which is necessary on a flying wing for stability. Cement all ribs in position. Now pin the upper ⅛ in. sq. spars in position on top of the ribs and mark where the slots are to be cut. We prefer to do it this way as it ensures absolute accuracy in aligning the spars. Cut out the upper slots and cement the spars in position. Notice that no spars run across the centre section. The leading edge sheeting and capping strips may now be cemented on. When dry, remove all pins holding down the outer panels but leave the centre section pinned down. Score cut the trailing edge of the centre section where indicated on the plan. Now raise the wing tips 2 in. and place supports under them at the leading edge to hold in place. This gives the necessary amount of dihedral. The centre section can now be sheet covered, but notice that it is not sheeted all the way back.

The ⅛ in. plywood inserts are now cemented in place. Cement on the gauze reinforcements at the trailing edge, and also across the leading edge of the centre section where the sheeting joins.

When the cement is set, remove the wing from the plan and install the lower ⅛ in. sq. spars in the same manner as the upper ones. The wing may be covered with silk or medium weight Modelspan. If it is to be covered with tissue then it is advisable to cover across the lower part of the centre section, between ribs W.2, with silk or nylon. This gives extreme strength to this part of the model. Whatever the material of your choice apply sufficient coats of dope to give a smooth finish. The elevons should be covered with lightweight tissue, given two or three coats of dope and installed on the wing. Cement on the hardwood elevon adjusting strips and the wing tip fins.

Before completing the wing, it will be necessary to make the fuselage. This is quite straightforward and needs little explanation. Cement formers 3, 4, and 5 to the 3/32 in. sheet sides and square up while the cement is drying. Then cement the formers 1 and 2 and hold the bend in the nose section with Sellotape while the cement is drying. Cover the bottom with $\frac{1}{16}$ in. sheet with the grain running across the fuselage. Cover the portion which sticks out beyond the prop position with 1/32 in. sheet. Now pin the wing in position and locate the former F.3.A which forms the "break-away" portion of the wing. Cover the upper part of the fuselage with strips of $3/32 \times \frac{1}{4}$ in. balsa. Cement on the nose blocks, remove the wing and sand the fuselage smooth all over. Cover with lightweight paper to give a good surface for getting a smooth finish. Cover the upper part of the centre section, after sanding smooth, with lightweight tissue and give three or four coats of dope.

Build up the engine nacelle as shown on the plan. Sand to a smooth finish, give two coats of filler, sanding after each, and then three or four coats of dope to give a glossy finish. When making the nacelle be sure to space the mounts to suit your engine. If a radial mounted engine is to be used, then leave off the hardwood mounts and install a ⅛ in. ply face for receiving the engine. Install the wing attachment hooks on the fuselage and at the rear of the engine mount.

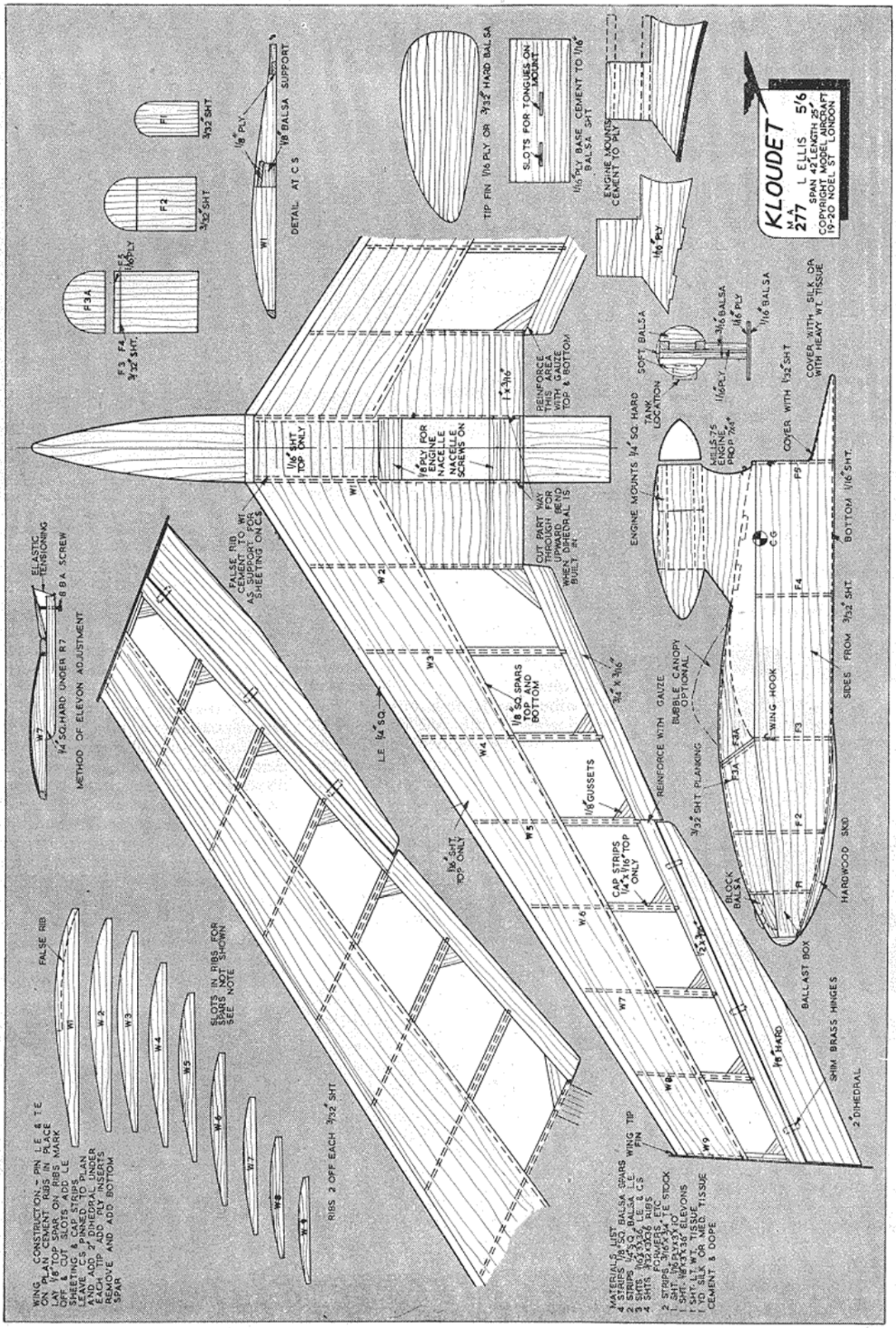
The model may be coloured as desired, the original being yellow Aerolac wings, and blue fuselage with black nacelle and wing tips. If one has only contest performance in mind it will be as well to keep the weight down by not using colour dope. For semi-scale appearance a commercial canopy can be installed where shown on the plan. The nacelle screws into position on the centre section.

Flying

We should have said at the outset that it might be as well for a beginner not to attempt this design as a "first ever." It is not a difficult model to make by any means—as a matter of fact it is simplicity itself as far as construction goes. However, one should have a bit of "know-how" when it comes to trimming and flying a flying wing. We could go on at great length about trimming for maximum efficiency but each machine will have its own little idiosyncrasies which will mean that the individual will have to use his judgment regarding certain trim conditions.

Before attempting glide adjustments, ensure that the c.g. is located where shown on the plan. Under no circumstances should the c.g. be behind this point but it can be ahead of the point shown with no ill effects. Raise the elevons about seven degrees above horizontal. Hold the model at arms' length over head and push into a glide in a slightly nose down attitude. If the model dives, raise the elevons a bit at a time until a flat fast glide is obtained. If the model stalls, lower the elevons, a

Continued on page 106



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

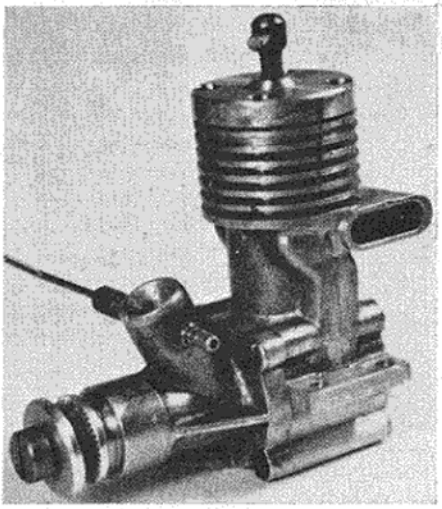
PETER CHINN Writes About Motors AND Models

Our heading photo shows a highly original Japanese F/F model flying boat seen on Lake Suwa. It is powered by four Mamiya engines in tandem pairs.

DURING each of the past three seasons—i.e. ever since they began competing in the World Championships—the Czechoslovakian speed team has been equipped with MVVS engines specially-built for the event and designed and produced at the Model Development Centre at Brno. In three seasons they have recorded two individual wins and two team wins in the World Championships, including last year's impressive 1, 2, 3, 5 placings, plus an all-team 2.5 c.c. record of 146.76 m.p.h.

We have been asked: "How do they do it?"—"Why can't our manufacturers make an engine like that?"—"How can I get an MVVS?"

The answers to all three questions are to be found in one plain fact. These engines are toolroom specials.



The latest Czech threat. The MVVS 2.5 Diesel which is expected to show its paces at Cranfield.

You and I cannot buy them. Nor can the ordinary modeller in Czechoslovakia. In 1956, eight MVVS 2.5 c.c. racing engines were made for the Czech team. Last year a further improved type, the MVVS 2.5/1957, was developed and only *four* motors were completed—one for each member.

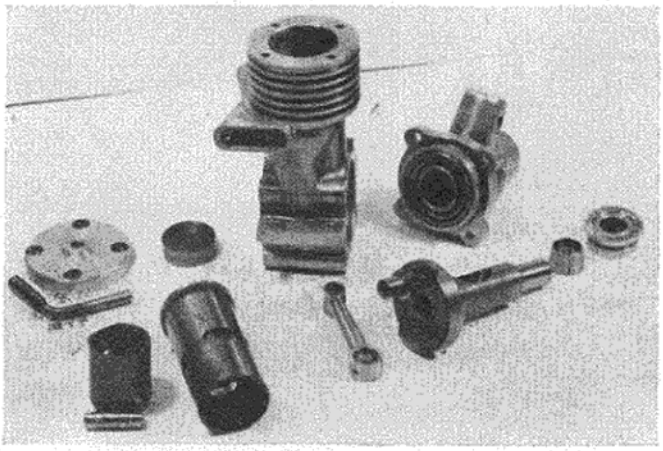
When, after the successful performance of these engines at the 1957 Championships, we enquired as to subsequent MVVS plans, we were informed that no more MVVS 2.5/1957 engines would be made, due to the great expense of building these motors. At the same time we learned, via another source, that to obtain these four top-line engines, MVVS had actually made parts for about 60 motors.

In other words, it is obvious that the success of the MVVS 2.5 c.c. racing glowplug engines is not solely due to markedly superior design. Good as they are in this respect, they depend, as have previous record-breaking model engines, on a pattern of mechanical perfection which, occasionally obtained accidentally in mass-production engines, is more usually achieved only by painstaking selective assembly and hand finishing.

If any further proof were needed of this, one has only to look to the Vltavan factory-built version of the MVVS 5 c.c. and 2.5 c.c. racing-engines of 1954 and 1955, which, Czech modellers are anxious to point out, do not approach the performance of their handmade prototypes.

With the postponement of the next World Championship Speed event until 1960, it is not surprising to hear that MVVS efforts have now been transferred to the requirements of Czech F/F enthusiasts. The MVVS 2.5 c.c. glow engines, outstanding for speed work on tiny props at revolutions in the 18,000 r.p.m. bracket, are evidently not considered a practical basis for the development of a F/F engine and, understandably, attention has been switched to diesels

In actual fact, MVVS research to produce a world-class 2.5 diesel

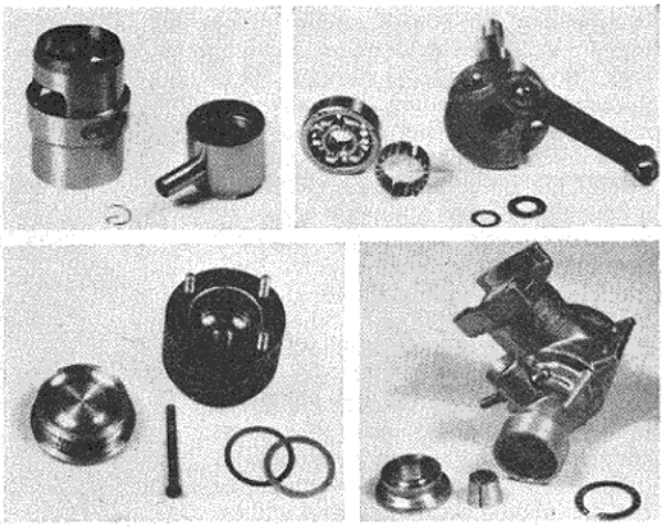


Parts of the MVVS 2.5 Diesel reveal a D.K.W. pattern reverse-flow porting layout.

began two years ago and the fruit of these experiments was given a try-out last year at the European Power Championships in Moscow, when Rudolf Cerny and Vladimir Hajek of the Czech team each had one of their two models powered by a new MVVS 2.5 Diesel.

A general idea of the appearance and construction of this significant new MVVS motor can be gained from our two pictures. It will be observed that the engine is a shaft induction motor with ball-bearing mounted crankshaft. Construction embodies a one-piece crankcase and cylinder casting with inserted liner, flanged at the top and locked by the cylinder head, which is attached with four screws. A heavily webbed front bearing housing, with integral carburettor intake and containing two ball journal bearings, is located in the main casting by a boss and secured by four screws into suitable lugs. The crankshaft is of substantial proportions with a large diameter main journal, disc web and crescent counterbalance.

It will be observed that the exhaust is at the back of the cylinder, discharging into a divided duct, while the transfer is via twin side ports located towards the front of the cylinder. Thus, while remaining a reverse-flow scavenged type layout, it departs from the more usual arrangements of circumferential porting, such as featured by the Oliver Tiger, Frog 249, P.A.W. Special and Webra Mach-1, or the twin opposed layout as featured by the Super-Tigre G.30. The system is, in fact, essentially the same as that first made popular on the Continent (if memory serves correctly) by the D.K.W. two-stroke motorcycle and now well-known in the B.S.A. Bantam.



The B.40TN is unique among present day engines in having ball and roller main bearings, plus a needle-bearing big-end. The current model features a piston crown slightly modified from that on the original type of 1956.

A claim of 0.35 b.h.p. (i.e. at least 10 per cent. more than for any stock high performance 2.5 c.c. diesel currently available) at unspecified r.p.m. has been made for the MVVS Diesel. In practice, users report a performance about equal to Webra Mach-1/Oliver Tiger levels.

Up to the end of 1957, about 20 of these MVVS 2.5 Diesels had been made and it is understood that another 100 will be built. At the Moscow meeting, the Czechs had rather a mixed bag of engines including four AMA 2.5s, a Webra Mach-1 and a K & B Torpedo-15, in addition to the two MVVS, but it seems fairly certain that we shall be seeing more of the MVVS Diesel when the Czechs come to Cranfield in August.

* * *

Talking of high performance 2.5 diesels brings us to a rather remarkable occurrence, the results of which can be seen in one of the photos.

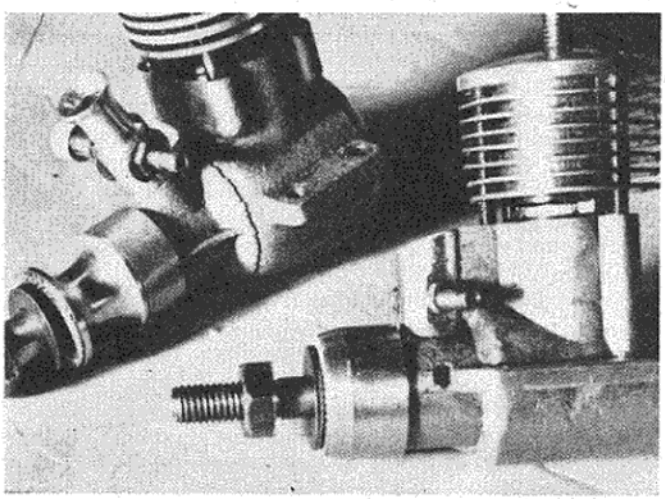
Gordon R. Oswell, secretary of the recently formed Ashford M.A.C., was flying his P.A.W. Special powered model against a friend's Oliver Tiger-III model in the combat event at the Tynemouth Rally last year. The joust ended spectacularly when the pilots contrived to bring the two models into a head-on collision.

The Tiger, as will be seen, suffered a cracked crankcase. Fair enough. But what price the proud battle scar of the P.A.W.? The hole through the casting, seen just below the carburettor, was produced by a piece of nylon prop! The owner reports quite a struggle to extract the piece of nylon.

* * *

Engine news from Italy is that the new "V" series glowplug Super-Tigres for 1958 will number five models. These are the G.20/15, G.20/19, G.21/29, G.21/35 and G.24/60. The last two digits, in each case, refer to the approximate capacity in decimals of a cubic inch and have, presumably, been adopted to clarify, for the benefit of trans-atlantic customers, the various U.S. displacement groups into which these motors fall. Equivalent metric classifications are, of course, 2.5 c.c., 3.25 c.c., 5 c.c., 5.6 c.c. and 10 c.c. The V series (V for *Velocita*) engines are basically similar to the previous G.20, G.21 and G.24 models but have been extensively redesigned as regards internal parts.

Designer Jaures Garofali has high hopes for the new type G.20 and G.21 and gave us some test figures, plus model performance figures, which would seem to justify his optimism. Despite the fact that the Super-Tigre lads, at recent international speed events, may have presented the appearance of a factory team, with all the trimmings, they do, in fact, labour under considerable difficulties



The astonishing results of a head-on collision between two combat models. See text.

in regard to pre-contest preparation, not the least of which is the complete lack of any suitably surfaced permanent flying ground. Usually this means obtaining permission to test their models at places 30 to 50 miles away from Bologna a few days before a contest and the apparent result is, as with many British competitors, insufficient experience with their models and in finding the ideal prop.

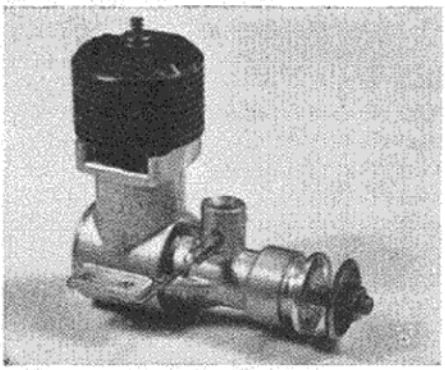
Also new for 1958 is the G.32 diesel, a 1 c.c. motor on the lines of the G.30 and G.31. With its ball-bearing shaft and rear drum valve intake, it must be quite the most elaborate 1 c.c. motor produced to date. We have just received one of the first production batch and will be reporting on it in due course.

* * *

While on the subject of Italian model engines, we are reminded that that other excellent Italian speed motor, the Barbini B.40TN, which, once again, powered the fastest Italian model (Renzo Grandesso) at the World Championships, has undergone one or two minor modifications since it was dealt with in the " Engine Tests " series 14 months ago.

Unlike all the other leading glow 2.5s (unless one includes the Mach-1 Glo) the Barbini is the only reverse-flow scavenged glow motor of any consequence. It is certainly the hottest reverse-flow glowplug motor to date and, at the moment, it seems to be an open question as to which is potentially the faster motor, the B.40 or the G.20.

The B.40's needle-bearing big-end may seem to be an unnecessarily expensive refinement in such a small engine (the last production engine to feature this was the 10 c.c. Dooling) but one must acknowledge the fine machine work that goes into these engines. Compared with the 1956 model, the later B.40s feature a slightly longer effective exhaust period. This has been obtained by machining two more small deflector faces on the sides of the piston crown (similar to those already existing, fore and aft, for the transfer ports) to register with the twin exhaust ports.



The Italian Barbini B.40TN was once again the most successful Western production engine at the World Speed Championships, when Renzo Grandesso took 6th place at 126.76 m.p.h.

Well-known German model designer Karl-Heinz Denzin with his current A/2. Developed from a long line of successful models, it incorporates a Saemann section and suggestions from Lindner. Wings are mounted on $\frac{1}{8}$ in. dia. steel wire rods with brass tubes.

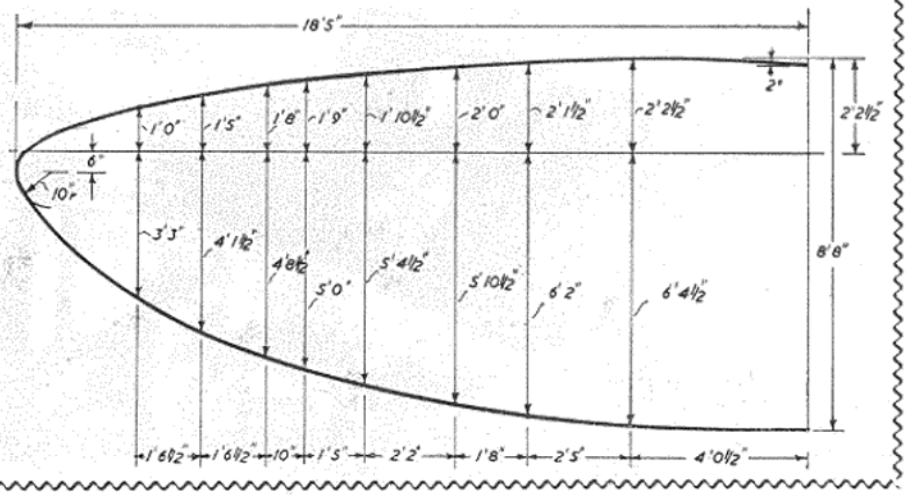
* * *

The rather remarkable and very attractive Japanese built F/F model flying boat illustrated, was designed and constructed by Minoru Sato, inventor, former camera designer and model engine manufacturer. It is powered by four of Sato's 1.6 c.c. Mamiya 09X glowplug engines, installed in tandem pairs in nacelles mounted on the wings.

The age-old problem of synchronising port and starboard engines, to eliminate spiralling, has apparently been solved by an elaborate coupled fuel system, in which pressure tapped from each engine crankcase controls the flow of fuel to the opposite motor. If one motor loses power or stops, both motors are stopped immediately.

The SPITFIRE WING

THE Spitfire is frequently described as one of the most beautiful aeroplanes ever designed, both from the point of view of appearance and the manner in which it flew. The Spitfire wing is certainly a shape worth copying for control liners and layout ordinates of the full size wing are given in the diagram. The aspect ratio is rather too low for normal F/F purposes, but the same basic shape can be preserved by using the same chord ordinates but proportionately increasing the spacing on the span stations, by multiplying by $1\frac{1}{2}$.



MODERN STUNT MODELS

DAVE PLATT follows up his article on design with some hints for building a successful model

WE have already covered the requirements of a modern stunt model from an aerodynamic standpoint, explaining how the various design problems were met in the layout and rigging of the model. Now, we will give prospective designers the information they need to ensure that the wing-loading we quoted of 10 oz./sq. ft. (which is vitally important to performance) is not exceeded.

It is, of course, obvious that the stresses on the model in the sharp changes of attitude, particularly on the wing and wing/fuselage junction, are very high. This means that we are going to have to build down to the required loading. As an example of this, consider a projected model for a 0.19 cu. in. motor, with around 430 sq. in. of wing area. Weight will have to be 30 oz. maximum, and we shall have to tread carefully if this is not to creep up to 34 or 36 oz., as frequently happens.

Some parts of the model, which the writer prefers to call the "ironmongery," we can do little about. Engines, tanks, props, spinners, undercarriages and stout plywood formers cannot be lightened, so disregarding these fixed weights, we are left with only the basic components of wing, tailplane and fuselage, of which the potentially heaviest item is by far the wing.

Due to a coincidental, but very fortunate, aerodynamic requirement, the wings of a stunt model are unusually thick by comparision with almost any other type of aeroplane. This can be used to advantage by using a lighter structure than would be normal for a thinner wing of equivalent area. Added to this, the lowish aspect-ratio already fixed in the basic design of the model will also help to reduce weight. Against these benefits comes the disadvantage of high flight loads previously mentioned.

Without resorting to violence with geodetic-type structures with I-spars *et al*, the best form of wing construction is twin mainspars, sheeted leading edge, two-piece vee trailing edge and capped ribs, with the possibility of another spar between the mainspars and the trailing edge on chords of 10 in. or over.

Nothing less than $\frac{1}{16}$ in. sheet can be used for leading-edge sheeting, and 3/32 in. ribs are superior to the seemingly universal $\frac{1}{16}$ in. sheet ones, especially on 0.19 cu. in. size models and above. Capping strips of $\frac{3}{16} \times \frac{1}{16}$ in. or $\frac{1}{4} \times \frac{1}{16}$ in. most decidedly add to the strength of the ribs, and are light enough to ignore from a weight viewpoint. They are not irksome to apply, and give a slight constructional advantage by making the ribs free of steps between the leading edge sheeting and the trailing edge. Use them!

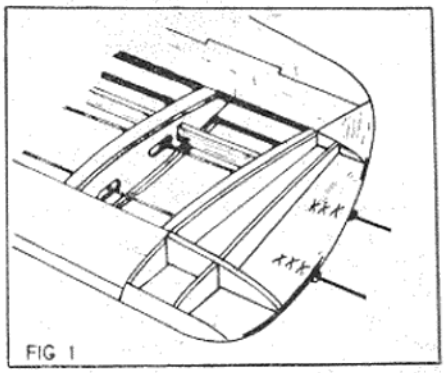
Leading edges should never be designed diamond-fashion to the ribs. If the wing strikes any object on the glide, e.g. an accumulator, or model accessories box, the leading

A Continental version of Bob Palmer's Thunderbird—Belgian flier Henry Stouffs with the machine with which he won the aerobatics class at last year's Criterium of Europe.

edge itself often caves in, also splitting two or three ribs down their centreline. A leading edge flat to the ribs will only break itself, which is easier to mend. I know you never allow silly things like this to happen, but be realistic and design sensibly just in case.

A good habit to get into is to work out the spar sizes you are envisaging in units of weight, i.e. in units of $\frac{1}{16}$ in. square. A piece of $\frac{3}{16}$ in. square has nine such units, while $\frac{1}{4} \times \frac{1}{8}$ in., which is just as good for some purposes, has only eight. This trick can be used throughout the design and often provides illuminating results.

Wing mainspar sizes need only be $\frac{3}{16}$ in. square for 0.19 models and $\frac{1}{4}$ in. square, or $\frac{1}{4} \times \frac{3}{16}$ in. for 0.29-0.35 size models. In the larger sizes an additional spar of $\frac{1}{2} \times \frac{3}{16}$ in. at roughly 2/3 chord location gives adequate extra strength. Sheet



$\frac{1}{16}$ in. thick is used for the trailing edge which thus mates with the capping strips, and can be varied in width to suit strength requirements. Flaps can be of $\frac{1}{8}$ in. sheet. Extensive lightening of ribs and flaps is not worth the trouble involved for the small amount of weight saved.

A good rule to remember is to use only medium or soft grade wood throughout the entire design. The weight thus saved is alone worth more than any other single feature. When laying out the wing spar sizes it is as well to remember two important things. Firstly, that on a wing so thick, the covering adds immensely to the stiffness, and secondly, that a certain amount of vertical flexibility is not a bad thing to have; indeed, it may even help stability a little by providing slight dihedral.

Most well-designed stunt models have wings which visibly "give" a little in flight and as long as they cannot actually fold up this can be regarded as a good sign. Fig. 1 shows a normal wingtip construction, and spar layout.

Of tailplanes, little need be said. Simple sheet surfaces are usual, lightened out in the case of larger models and small ribs inserted. The only trouble that can be encountered is elevator-flutter—an occurrence which can usually be traced to either the tailplane or the pushrod being too flexible, or the rear fuselage design too slim. Wire of 14 gauge is regarded as the safe minimum for pushrods on 0.15 up to 0.35 cu. in. models.

While on the subject of tailplanes and elevators, some mention of control couplings seems worth while. It will have been noted from the first part of this article that the elevators have twice as much movement as the flaps. This condition is fulfilled very simply by making the flap horn exactly twice the length of the elevator horn.

Normal figures are approximately $\frac{1}{2}$ in. elevator horn throw with 1 in. flap horn throw. The pushrod from the bellcrank is pivoted about $\frac{3}{4}$ in. high on the flap horn, but this latter measurement in itself does not govern the relationship between elevator and flap range. It governs the actual movements obtained, in conjunction with bellcrank throw.

There are few really suitable materials from which to make the horns. Mild steel is favourite, and brass, aluminium or wood must be ruthlessly discarded. Sooner or later they make matchwood of your model.

Control surfaces need to be completely free in movement. Tape hinges are a source of possible trouble here, and a better method by far is thread stitched hinges. Best of all, of course, is tube and wire, *and* the method is easier and quicker than any other way! Aluminium tubing of 14 or 16 gauge is used, with 18 or 20 gauge wire as the pivot. Sellotape is used for tube attachment and, surprisingly, adheres perfectly to bare balsa. This operation is carried out before covering the model (Fig. 2).

Now to the vital engine-mounting. The ideal method is borrowed from team-racing practice—that is, the engine is dropped through the bearers from the top, and the upper cowling which runs from the nose to the rear of the tank is held with nuts and bolts or bicycle spokes. The main virtues of this layout are that, firstly, the lower engine cowling is integral with the fuselage and is thus stronger, giving excellent crash protection to a rather vulnerable inverted engine, and secondly, that the fuel tank can easily be made adjustable for height, and also removable for repair or replacement.

If the tank shelf is deliberately

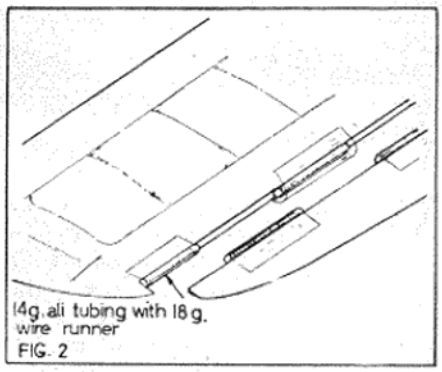


FIG. 2

placed $\frac{1}{16}$ in. or so too low, then thin shims of packing will bring it to the precise level that test-flying will show is required for an even motor-run in both upright and inverted flight.

One drawback of this system is that the engine-bearers themselves are rather short, but if a good adhesive is used, and small screws are fixed through from the fuselage side ply doubler, no trouble should be experienced. Resin-type glues are helpful, if not essential, to good joints between hardwood parts. For those capable of careful workmanship, we commend this system as the best yet devised.

The sheet fuselage sides should be backed up with $\frac{1}{16}$ in. ply doublers back to the one-third chord point of the wing, as this provides excellent resistance to the ravages of engine vibration, and also a firm gluing area for the undercarriage former, firewall and bearers.

For the rest of the fuselage, constructional design will be dictated by the outline shape and section. Large areas of block, unless hollowed out, should be avoided on weight grounds. One small point, often overlooked, is that the pushrod should have a guide at least every 4 in. or so, to prevent whip and consequent elevator flutter.

We have now reached the stage of covering the model, and from here on the methods used depend greatly on the financial position of the builder. Silk is clearly the best covering material for models of over 48 in. span, but is expensive, of course, by comparison with Modelspan. If it happens that you have weight to spare, some of the heavier grades of silk, obtained from department stores dealing in ladies' wear, is invariably much cheaper, and is virtually indestructible on a model. We have on numerous occasions seen combat models extensively damaged internally while the covering "envelope" remained intact. All you need is the nerve to go and buy it!

However, for the great majority of modellers, paper will have to suffice. Heavy-weight Modelspan gives best

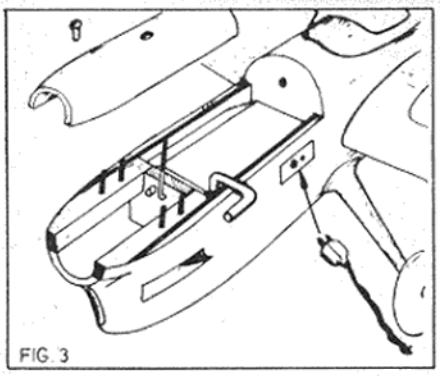


FIG. 3

results when covered wet, and in this condition is flexible enough to take awkward wingtip shapes, etc. It is at this point that those handy 40 points for appearance are made or lost, and although dope is a costly item, it is well worth while finishing the model in a tasteful scheme. This stage has been covered frequently in previous articles, so we shall say no more.

Flying

After doing all you can to make sure of no unpleasant happenings when the model is flown, by checking the balance, removing the slightest warps, and ensuring that the engine runs properly when the model is held in odd attitudes, and given sharp shakes, it must be flight-trimmed.

An Eta 29 powers this 400 sq. in. plus stunt model designed by J. Tech. Higgins of the R.A.F.M.A.A. Will "fly the book" with ease.

The engine should be run at a point *just below* two-stroking. Care here is justified.

Fly a whole flight out without changing from upright flight. The prime things we wish to know are whether the model was flying laterally dead level, whether it was sensitive enough and if the motor picked up to a healthy two-stroke when flying at high-level. Your helper is the only one who can tell you about the first point, but the other two you will know. Slight flap warps can cure any tendency to fly one-wing high.

Assuming that the model itself has been designed and built correctly, we shall know already if it is going to prove a "book" stunter. If the model proved ridiculously easy to fly, gingerly add some weight to the tail and try again. You've got all day, so progress slowly until the model becomes a little unstable. Now remove a little of the weight. Naturally, if the model proved too unstable from the start, the course is to add a large amount of weight to the nose, again gradually taking it away. Most stunt modellers will admit that they don't bother to trim their aeroplane in this way if it proves generally satisfactory. It is often, however, very worth while; after all, these same modellers wouldn't think of persistently flying a F/F model in slightly faulty trim.

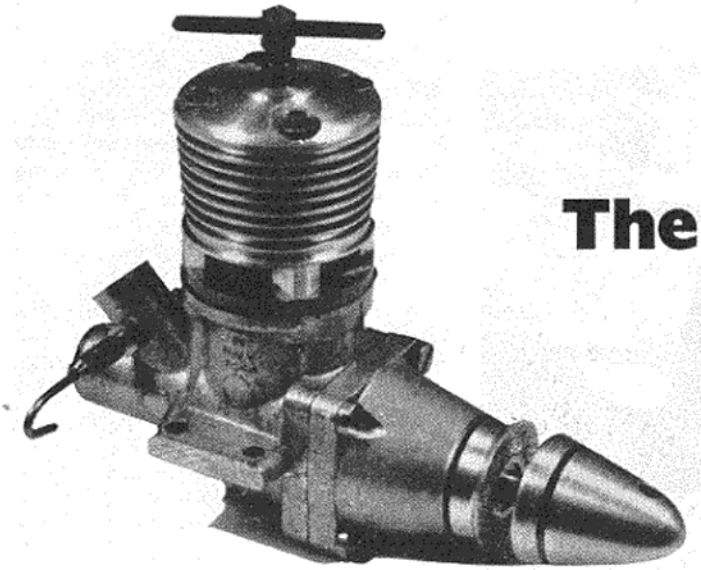
Was the engine-run good? So it stopped after a lap without leaning out to a two-stroke? Then, friend, it was too rich. Close the tap a little and try again. Say this time it leaned out to a nice two-stroke in high-level flight but when you kept it up, the power sagged a little. This is the sure sign of the motor being very slightly lean. Not too bad, or it would have cut altogether after a few laps of this. Open the tap just one tick.

The writer believes that getting the ideal motor-run in a contest is as important as, if not more so than, having a perfect design. A motor which does not show good two-speed tendencies is useless and can only be regarded as a waste of time all round. For this reason, it is wise to build a "quickie" model first to evaluate the engine's properties before committing oneself to an inevitably expensive, pure stunt machine.

Nitro-methane is an expensive ingredient for fuels in stunt use but it is worth including a small proportion—even if only 5 or 10 per cent. —for the easier starting and greater flexibility it affords. Due to the fairly long engine runs involved in this branch of power modelling, the fuel should contain not less than 30 per cent. good quality castor-type oil.

No mention has been made, deliberately, of the manoeuvres themselves. Anyone who does not know where to start his loops relative to the wind direction should have learnt these things from more basic stunt models before progressing to the more complex type described in these articles. But we do sincerely urge the average stunt pilot to build himself a large stunt model, and see for himself if he cannot agree that it provides him with more flying pleasure than any other model he has hitherto flown. See you at this year's Gold?

There is keen interest in stunt flying in Spain, and this is one of their entries in the Criterium of Europe—Fernand Battlo "playing" with the works.



MA ENGINE TESTS

The Super-Tigre G.30-D

2-47 c.c. diesel

". . . handling qualities were very pleasing"

THE Super-Tigre G.30-D clearly qualifies for inclusion in that small, select group of 2.5 c.c. diesels which, for want of a better definition, we shall call "world class." Its specification and performance suggest that this new Italian motor will prove a worthy contender in the F/F and team-racing fields.

Before proceeding further we must acknowledge the fact that it is only four months since we previously featured a Super-Tigre (the G.31) in this series. Because of the interest attaching to International class diesels, however, with the coming World F/F Championships at Cranfield in August, we felt justified in making an exception to our usual rule of allowing reasonable intervals to elapse between reports on the products of one manufacturer.

Like other leading 2.5 contest diesels, this finely made Super-Tigre is a ball bearing engine with rotary-valve admission. However, unlike its rivals, all of which (with the exception of one disc valve motor) utilise a front, crankshaft, intake, the G.30 features rear induction through a separate shaft, or drum type, rotary valve. The G.30 is, in fact, of similar layout to the 1.5 c.c. Super-Tigre G.31.

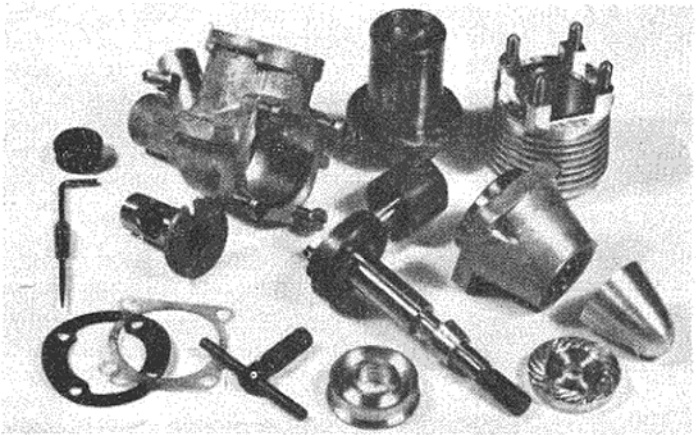
This similarity extends to the design of the crankcase/crankshaft assembly, but not to the construction of the cylinder. Here, in place of the G.31's one-piece, screw-in unit, a separate liner is employed in conjunction with a close fitting alloy finned barrel and head, the whole being secured to the crankcase with four long screws.

Cylinder porting is in accordance with general Super-Tigre diesel practice, insofar as a reverse-flow scavenged layout, with two exhaust ports and two transfer ports, is used. However, in contrast to previous models which have used an internal groove type transfer, the G.30 has transfer passages formed in the casting, fore and aft, that feed steeply inclined ports formed through the cylinder wall and base flange. Aided by a piston having small deflector faces machined on the edge of the crown, this gives a very smooth and unrestricted entry to the combustion chamber.

Perhaps the main point of interest is the drum type rotary valve. Against this type of valve is the increased internal drag it creates, but its big advantage over normal crankshaft induction, in a high performance engine, is that it imposes virtually no limits on the size of the valve port and induction passage. Thus, while the crankshaft journal of the G.30 is held to a maximum diameter of 8 mm., the valve rotor is bored to 7 mm. dia., which is appreciably larger than with any current crankshaft-valve 2.5 diesel. To achieve, safely, a similar bore induction passage through a conventional crankshaft valve would demand a journal diameter in the region of 11 mm. or $\frac{7}{16}$ in.—with consequent difficulty in fitting a standard ball-race.

The design of the drum valve induction system on the G.30 has been particularly well carried out, the carburettor throat being steeply raked and with the valve port drilled at the same angle (45 deg.). This, aided by the large volume induction passage, results in a particularly direct and uncluttered path for the charge from entry to crankcase.

Due to its more complex design, the G.30 is slightly heavier than most 2.5s and actually scales 6.2 oz. Under the new F.A.I. F/F rules, however, which demand a model weight of 26 oz. for engines of this capacity, slight extra engine weight will not worry contest enthusiasts—in fact, it may even be welcomed as a means of maintaining balance



"An exploded" view of the G.30 D which clearly shows the various componants.

without resorting to an extended nose length.

Specification

Type: single-cylinder, air-cooled, reverse-flow scavenged, two-stroke cycle, compression ignition. Induction via rotary drum valve (rear shaft) with sub-piston supplementary air induction.

Swept Volume: 2.474 c.c. (0.151 cu. in.).

Bore: 15 mm. (0.5905 in.).

Stroke: 14 mm. (0.5512 in.).

Stroke/Bore Ratio: 0.933 : 1.

Weight: 6.2 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase with integral rear bearing, bronze bushed, and carburettor intake. Pressure diecast aluminium alloy front bearing housing containing one 8 × 22 mm. and one 5 × 16 mm. ball journal bearings and secured to crankcase with four screws. Hardened and heat-treated nickel-chromium steel crankshaft with disc web and crescent counterbalance. Valve rotor of hardened alloy steel with drive from crankpin via slot and spigot. Valve bearing sealed by synthetic rubber plug inserted into end of housing. Hardened and heat treated alloy steel cylinder liner with closely fitted machined duralumin cooling barrel secured to crankcase with four screws. Hardened and heat-treated Meehanite piston with tubular, full-floating gudgeon pin. Gudgeon pin retained by special circlip in piston skirt. Machined dural connecting rod. Alloy propeller driving hub on tapered split collet. Alloy front washer and spinner nut. Spraybar type needle-valve assembly. Beam mounting lugs.

Test Engine Data

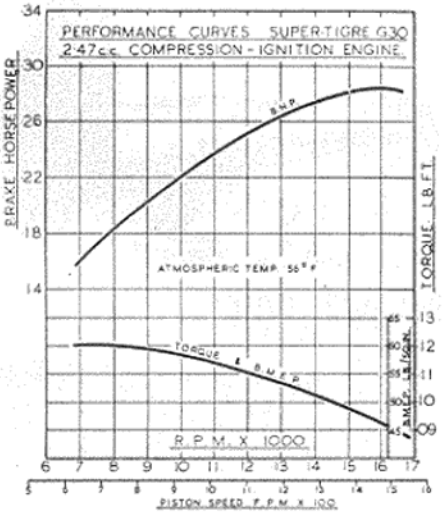
Running time prior to test: 2 hours.

Fuel used: Mercury No. 8.

Performance

First impressions of the G.30 were favourable and these were largely confirmed as the tests proceeded. The engine started readily, using standard diesel technique, on all prop sizes down to about 8 × 4. Below this there was, as is the case with most diesels, some deterioration, but as these very small props would, in any case, be outside the normal operational requirements of the types of models for which 2.5 c.c. contest diesels are mainly intended, this characteristic can be discounted.

In general, the handling qualities were, in fact, very pleasing. Both controls were easy to operate and the location of the needle-valve eliminates any danger of the fingers being nicked by the prop or burned by the exhaust. A somewhat strange characteristic was that, over a wide range of speeds, the optimum running compression varied only very slightly, only a few degrees of movement of the compression screw separating, for example, the settings for 10 × 6 and 9 × 3 props. Above 14,500 r.p.m., the compression adjustment on the test engine had a tendency to work back very slightly, which made it a little difficult to secure accurate torque and r.p.m. readings, but this was undoubtedly a peculiarity of this particular motor and is unlikely to be characteristic of the type.

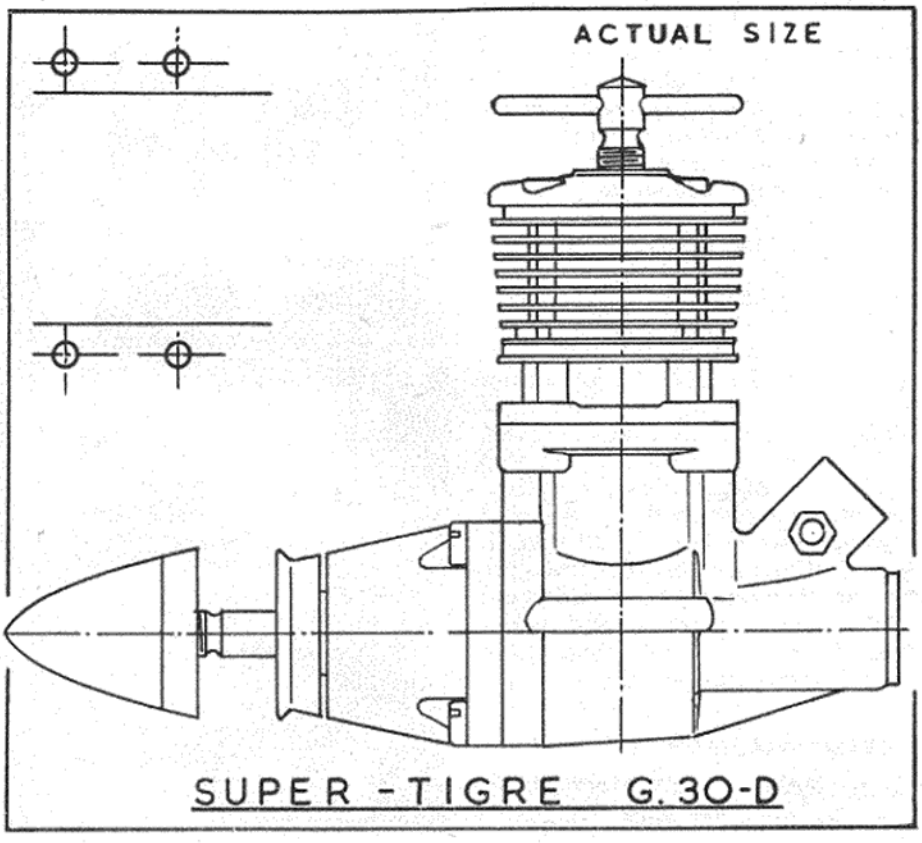


Although the G.30 is essentially a high-speed engine, it developed its best torque at around 7,000 r.p.m. Here, the figure of just over 0.12 lb. per ft., equivalent to a b.m.e.p. of 60 lb./sq. in., is very good, and practical results are seen in an ability to turn large size props, such as 11 × 4 and 10 × 5, at useful speeds. Despite the relatively low speed at which maximum torque occurs, the decline is at an even and modest rate, so that the peak of the power curve is delayed until a speed of 16,000 r.p.m. is achieved. At this point, our figures showed a maximum output of approximately 0.285 b.h.p.

Needless to say, this is a very good maximum figure and an unusually high peaking speed for a diesel. It is, however, only fair to remark that the designer claims an output of 0.31 b.h.p. at some 18,000 r.p.m. and, possibly, with a good example working under favourable conditions, these figures might well be more closely approached.

Power/Weight Ratio (as tested): 0.735 b.h.p./lb.

Specific Output (as tested): 115 b.h.p./litre.



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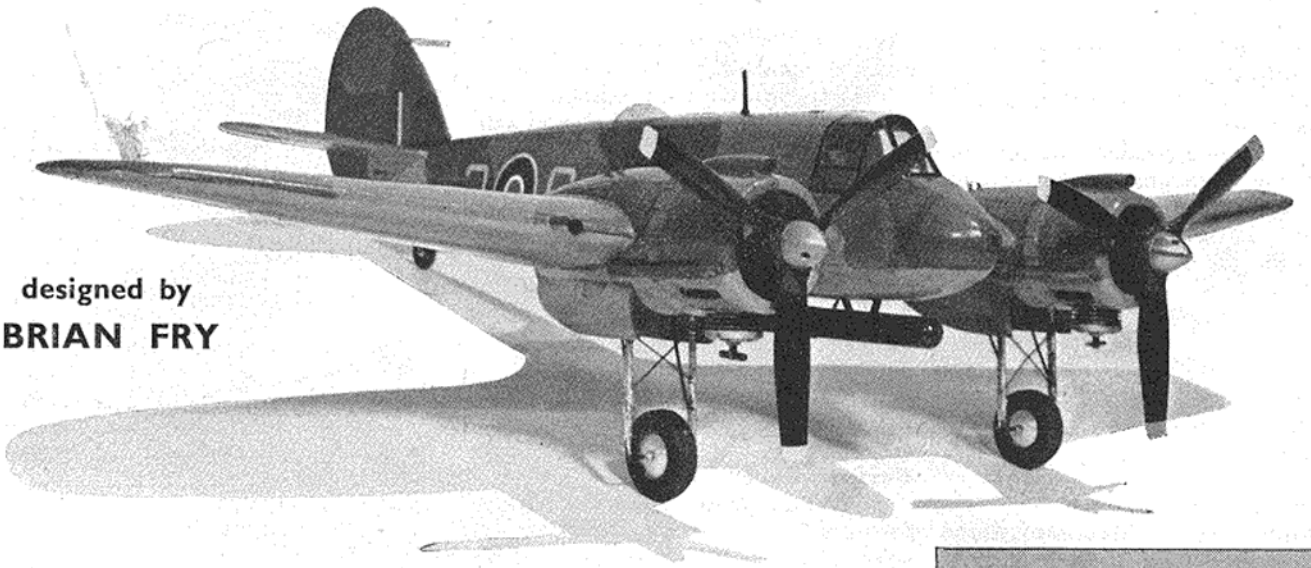


designed by
BRIAN FRY

MULTI-ENGINED C/L scale models have a fascination all their own, both for modellers and the public, and the purposeful lines of this 39 in. span *Beaufighter* are guaranteed to draw the crowds anywhere. If you like your models with "bits and pieces" stuck on, then the *Beaufighter* can provide the lot—guns, bombs, rockets, torpedoes and what have you! Construction is fairly straightforward although not for the absolute novice.

Wing Centre-section

The wing centre-section should be made up first so that it can be put aside to set thoroughly. Cut out and assemble the two $\frac{1}{4}$ in. ply main wing spars and engine bearers, using Durofix or a good hardwood glue. Make a point of using oak or a really *hard* wood for the bearers, and your engines will never leave the 'plane 'till it is matchwood!

Make up the undercarriage units from 12 S.W.G. wire and bolt in place. This is a good time to install the fuel tanks permanently, it may save no end of chopping later! Test them for leaks *now* and when satisfactory, seal up the vents from dust. Put the whole assembly aside to set.

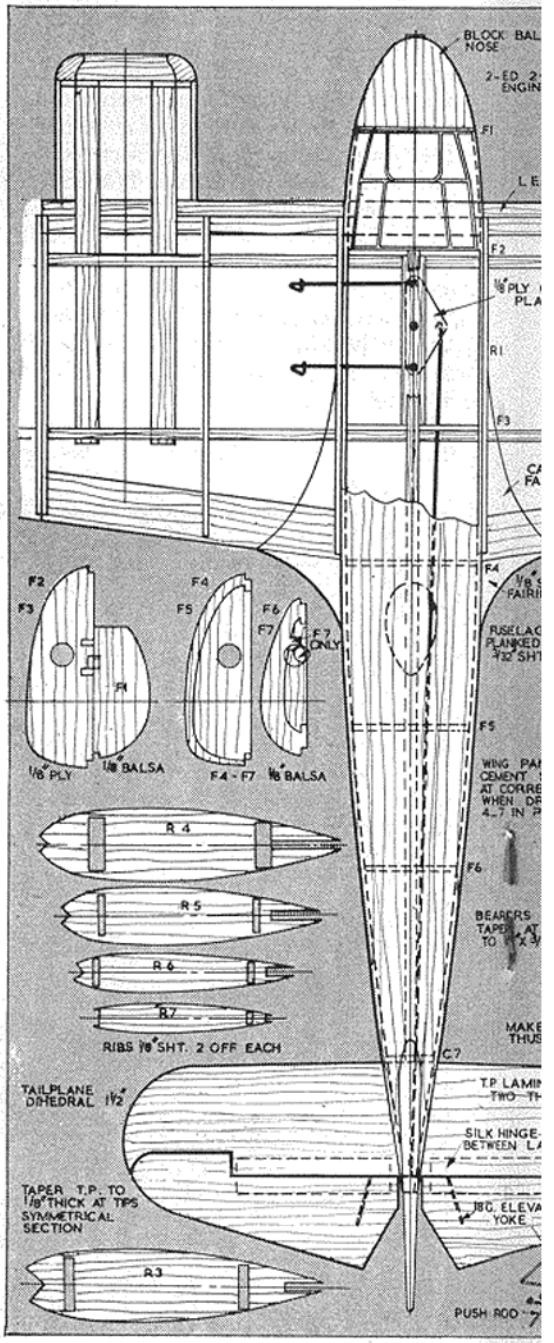
Fuselage

Pin the $\frac{1}{4}$ in. sq. balsa spine and keel to the plan and add the left-hand halves of formers F1-F7. Cement in the $\frac{1}{4}$ in. sq. tailplane support, chamfering it at the rear to $\frac{1}{8}$ in. thick. The rear should be supported off the plan with a scrap of $\frac{1}{8}$ in. balsa so that then the right-hand T/P support is added, the total width of the fuselage is $\frac{1}{4}$ in., later the 3/32 in. planking will bring this up to 7/16 in. wide.

Make up the bellcrank assembly with two $\frac{1}{8}$ in. ply platforms, add lead outs, and after removing the framework from the plan, firmly cement into the slots in formers F2 and F3. The right-hand half formers are then cemented in place together with the right half of the tailplane support.

In order to facilitate the next step, cement a strip of 3/32 in. planking along each side of the fuselage (from F1 to tail) to run flush with the lower edge of the cockpit; this will prevent the fuselage distorting when the $\frac{1}{4}$ in. sq. keel is cut. This is done to allow the wing centre-section to be glued (Durofix) to F2 and F3. Do this now, before the fuselage is planked. Cut the keel at an angle to give a better join when cementing the pieces back in place. The position of the main wing spars should have been marked on F2 and F3 to ensure accuracy in lining up, but sight along the fuselage as a double check.

Make up the tailplane from two laminations of $\frac{1}{8}$ in. sheet, sandwiching in between cloth hinges and separate control horns of 18 S.W.G. wire. Chamfer for dihedral, pre cement, then cement together and put aside to set. Cut the fin and rudder from $\frac{3}{8}$ in. sheet, and shape to an overall streamline section.

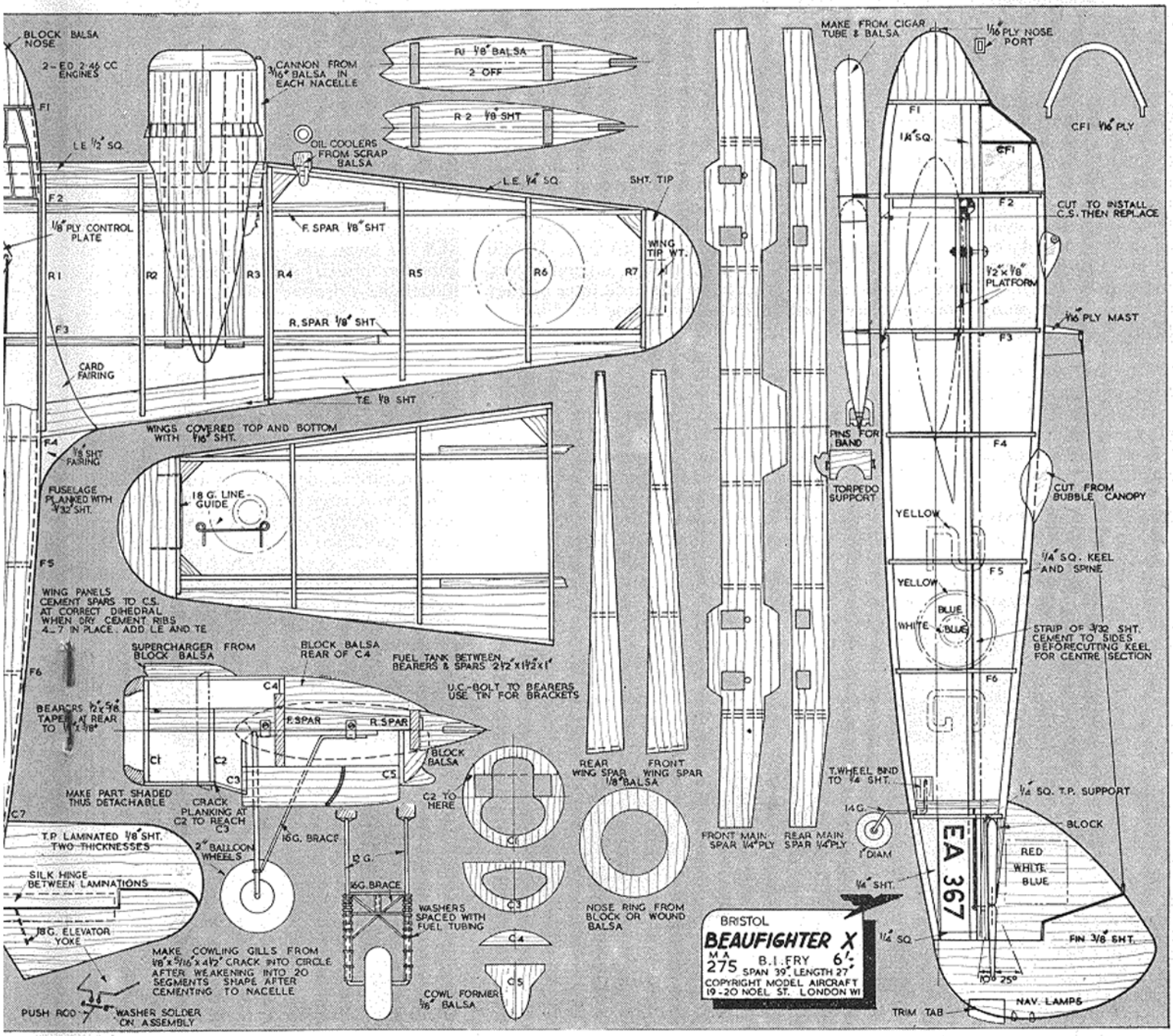


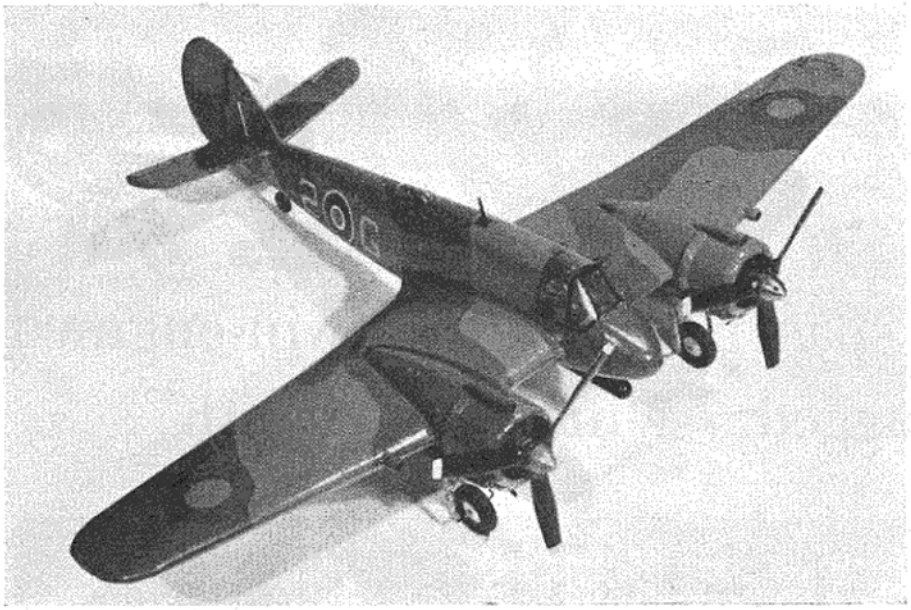
FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20 NOEL STREET LONDON W.1 6s. 0d., POST FREE

The Bristol

BEAUFIGHTER

How to build a 39 in. span model of the twin-engined fighter that was tagged "Whispering Death"





The two photographs on this page show well the detail that can be added to the Beaufighter to put it in the "Super Scale" class.

Thread the push rod through the formers and retain it in the bellcrank with a washer soldered on. At the tailplane end, the pushrod should terminate in a "T" piece which fits into the control horns. Hold the bellcrank at neutral and bend the elevator control horns to obtain precise neutral on the elevator. The tailplane can then be firmly cemented in place. Sight along fuselage to see that it is lined up accurately.

Attach the 1 in. tailwheel, plank the fuselage with strips of $\frac{1}{4} \times 3/32$ in. balsa and after adding the nose-block and the small block behind F7, sand all over. The cockpit and fin are left off for the time being to prevent accidental damage.

Nacelles and Outer Wings

Cement ribs R1, R2 and R3, to the main wing spars and add the $\frac{1}{2}$ in. sq. leading edge and $\frac{1}{8}$ in. sheet trailing edge. Drill the bearers to suit your engines (most powerful one in inboard nacelle) and install bolts locked across the top with solder. Do not fit the engines yet. Cement in place formers C1-C5, and plank back to C4 above the wing, and C5 below, with $\frac{1}{4}$ in. $\times$ 3/32 in. strip. Soft block fairs the nacelle into the wing top and bottom. Cement cowl ring in place and when set, carve and sand nacelle smooth all over. Details such as U/C doors, superchargers, etc., should be left until later or they will be damaged during building.

Sheet the inboard wings top and bottom with $\frac{1}{16}$ in. balsa, using card templates to fit the sheet neatly round nacelles. Plastic wood will hide any small errors here.

Cut out the $\frac{1}{8}$ in. hard balsa wing spars and cement them to the main wing spar stubs, using the lower edge as a guide, but sight by eye along the fuselage as a double check to ensure the dihedral is symmetrical. Also check that when the outer ribs are added, no wash-in or washout is built in.

When set, slide on ribs R4, 5, 6, and 7 and add the $\frac{1}{4}$ in. sq. L.E. and the $\frac{1}{8}$ in. sheet T.E., not forgetting the gussets. Sheet the outer wings top and bottom with $\frac{1}{16}$ in. sheet and add the block tips. Don't forget the 18 S.W.G. line guide and the 2-3 oz. weight in the starboard tip. The fin can now be cemented in place.

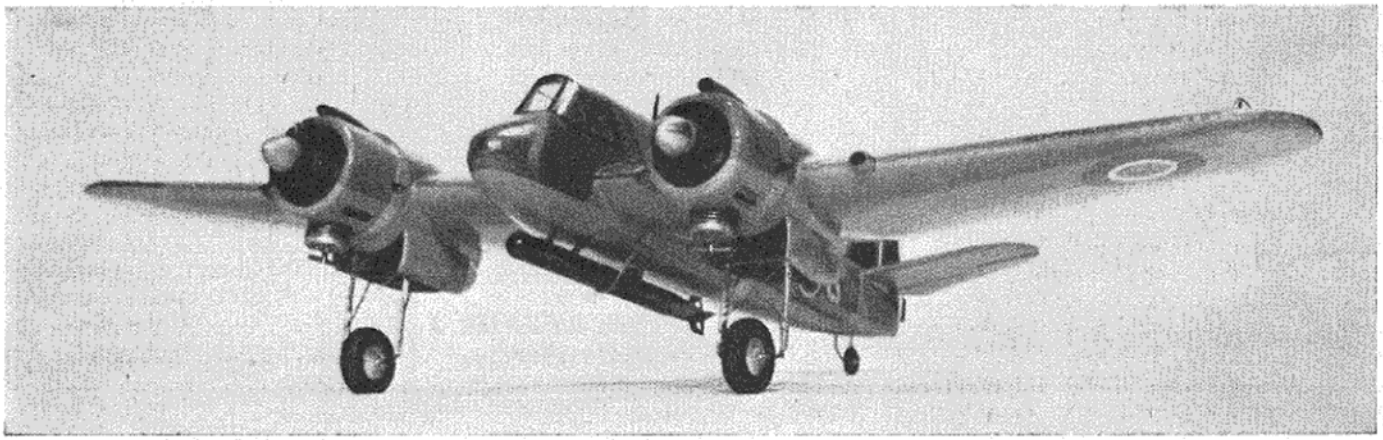
Finishing

Sand the model smooth all over, and give it several coats of sanding sealer to fill the grain. When satisfactory, dope on lightweight tissue all over, give the model another coat of sanding sealer, and rub down. Fit up the cockpit and add all the details, i.e., U/C doors, superchargers, cooling gills, cannon, nose port, oil coolers, torpedo sling, etc. See page 92 for an easy way to make cooling gills.

Next, cut off the lower cowls by slicing along below the bearers and half-way round the circumference just behind the gills, you will then be able to fuel proof inside the cowling; mount the engines in place and cut away the cowls to clear the cylinder heads. Now, before the model sees a drop of camouflage dope get the C.G. on, or in front of, the front line. You may have to fill the nose block with lead shot, but this is as important as the wing tip weight.

Authentic colouring is matt medium grey and olive drab camouflage on the upper surfaces and light grey on the underside. A study of photos will explain this better than pages of writing. If you can spray the camouflage on so much the better, but careful brushwork is almost as effective. Fuelproof where necessary.

Add the W.W.II roundels and astradomes and you are ready for the first flight.

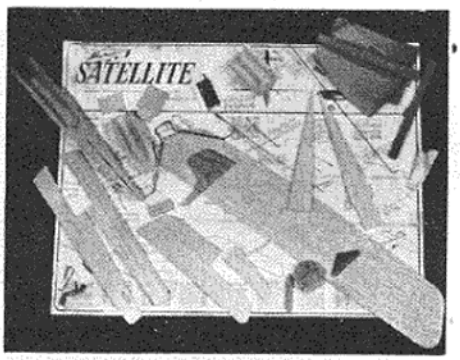


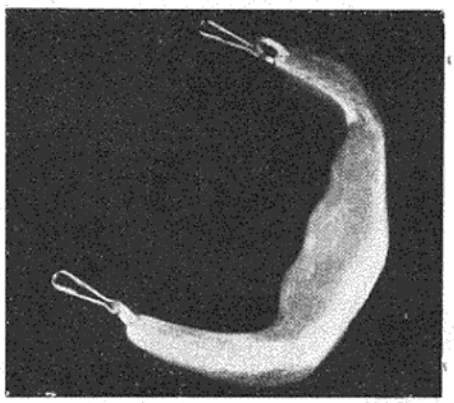
OVER THE COUNTER

The new **Skyleada** team racer which we mentioned in the January "Over the Counter" will be available from your model shop any day now. It has been named the *Satellite*, and will cost 24s. 6d. A glance at the photograph will give a good idea of what you get for your money—and you really do get a lot.

It states on the plan that the kit does not include propeller, spinner, wheels, engine or liquids, but for the rest—well, let's take some of the contents individually. The plan itself is concise and admirably clear, consisting entirely of step-by-step diagrammatic assembly instructions, which are all that is necessary, as this is one of the most completely pre-fabricated designs that we have yet seen. In place of the usual instruction sheet, a leaflet deals with the preparation and flying of the completed model in a way that even a novice cannot fail to understand, and if he follows these instructions he must be assured of success.

The fuselage top is spindle moulded to shape and hollowed; the sides are pre-cut and die stamped with the





Two latest Skyleada products. Top, the Satellite kit. Lower, their C/L handle.

appropriate lead-out and push rod egress holes, while the bottom, crutch and engine bearers are again all shaped. The cowl will require most work, but this has been purposely left rather "thick" because of the various engines that it will have to accommodate.

Apart from sanding down the tips, the wing is completely finished, even to the countersink for the bell crank bolt head, while the tail has only to be sanded to section, and the fin is die cut from ply.

All the wire parts, i.e., undercarriage, lead-outs, push rod, tailskid, etc., are pre-formed and ready to be installed. The 15 c.c. tank is complete, and an envelope contains all the incidental "hardware," control horn, u/c clips, bell crank, nuts, bolts, washers, etc.

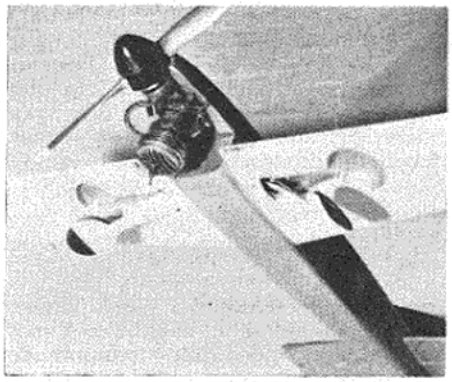
The more we look at this kit the more impressed we are with it. When designer Ron Ward told us that it could be assembled in an evening we were a bit sceptical—now having examined the *Satellite* kit, we confirm that his claim is not an exaggeration as it is one of the few kits which we have reviewed which justifies the use of the word pre-fabricated.

* * *

Also from **Skyleada's** comes a very comfortable C/L handle which sells at 5s. This is tailored to fit the hand, in cast, polished, aluminium, and comes equipped with non-slip links, to which the lines may be directly attached. This handle is already on sale, as is also yet another new Skyleada product—Spitfire diesel fuel. First tests on this fuel, which sells at 3s. 3d. per bottle, indicate that it is well up to the standard expected nowadays from commercial "brews." We hope to be able to report more fully on this later.

* * *

For years the problem of devising an undercarriage system that will retract and detract satisfactorily, while still being robust enough to stand the rigours of C/L flying, has engaged the attention of modellers. It was with particular interest, therefore, that we received details of a new range of C/L kits from **Falcon Models** of Glasgow, which will incorporate this feature. The raising and lowering of the undercarriage is fully automatic, in slow "hydraulic-like" fashion, and requires only the usual two lines. The first model to appear will be a class "A" team racer, the *Fantasia* (think of the extra speed without undercarriage drag), and this will be followed by scale models of the F.W.190A3, 190A4, Me.109E, 109F, and the *Spitfire*, all of which, it is estimated, will sell at about 39s. 6d. each.



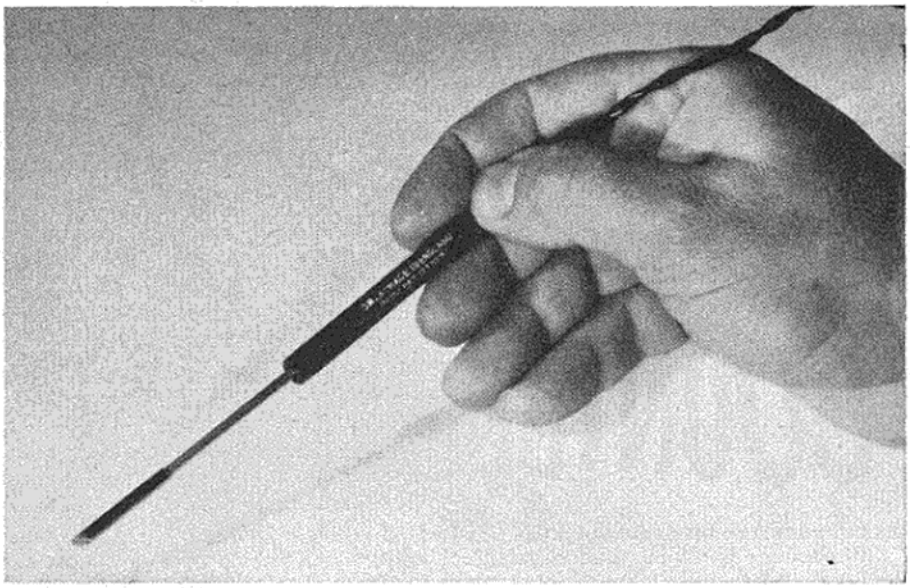
The Fantasia with u/c partly retracted.

We shall be publishing fuller details of these interesting models shortly.

* * *

Judging by the many beautiful paint jobs we see on models, many builders have a strong artistic streak, and here is the ideal opportunity to develop this hidden (?) talent! **Craft Master,** who

are famous for their painting-by-numbers sets, have just introduced one with an aircraft theme. Known as the Blue Box Series, the set costs 15s. 6d. and comprises three mounted canvasses, one of 16 × 12 in. showing a Bristol *Britannia*



Just the job for field repairs—the Oryx soldering iron.

in flight, and two of $5\frac{1}{2} \times 4\frac{1}{2}$ in. showing a Boeing *Stratocruiser* and a Douglas D.C.7 respectively. When carefully executed, all these paintings are very attractive, and are just the job for decorating the workshop wall.

* * *

If in future you are faced with the problem of soldering joints on R/C equipment, or repairing a split C/L tank on the flying field, then the **Oryx** miniature soldering iron will provide the answer. It can be supplied for 6, 12, or 24 volt supply and is rated at 9 watts ($\frac{3}{4}$ amp), so will work satisfactorily from a car battery. The bit is 5/32 in. diameter and, being a push fit in the handle, is easily replaceable. On test the iron heated quickly, and was found adequate for all small soldering jobs. The Oryx is distributed to the hobby trade by Bradshaw Model Products, 40, Waterloo Street, Hove 2, Sussex, and at 25s. it is a most useful addition to any modeller's equipment.

* * *

Although rather large for everyday modelling requirements, the hammer that we have recently received from the **Thor Hammer Co.,** of Birmingham, has several unusual features, and as, speaking from experience, modellers are often dragged from the building board to do odd repairs in the home, it makes a useful addition to the tool box. The hammer is supplied with a variety of interchangeable plastic faces that can be screwed into either end of the cast steel head, and as these faces are of varying degrees of hardness, the result is a tool whose uses range from driving nails to panel beating aluminium.

* * *

For the plastic enthusiast **Airfix,** famous for their large range of cheap plastic kits, are now marketing a boxed set of six enamel paints. The colours are intermixable, so any required shade can be obtained, and on test we found the "covering" and "depth" properties of the paints to be quite satisfactory. At a retail price of 2s. 6d. these should be popular with the "occasional" plastics builder who does not want to buy paints in larger quantities.

SIMPLE COOLING GILLS

MANY scale designs call for cooling gills around the nacelles and to make these up individually, i.e. two sides and a top to each gill, would mean assembling something like 120 minute pieces of sheet—far beyond most model builders' patience!

The idea shown here takes a fraction of the time and as well as being far more accurate than mounting each piece individually, it will also stand more knocking about, and can be adapted to any type of model.

The first thing to do is to find the exact length of the strip required, which will be the distance round the nacelle at the gill position. Even if the nacelle is circular, don't use mathematics, a strip of paper trimmed to the correct length is more accurate. The cross-section of the strip (balsa) should be to the same measurements as the "width" and "depth" of the gills (Fig. 1).

Next mark the strip into equal sections totalling the required number of gills around the nacelle, and cut three-quarters of the way through at these marks (Fig. 2). It will then be possible to crack the strip into a circle which is cemented round the nacelle at the appropriate position (Fig. 3).

When set, the segments can be diagonally sliced, with a sharp balsa chisel (Fig. 4), to represent gills in the "open" position.

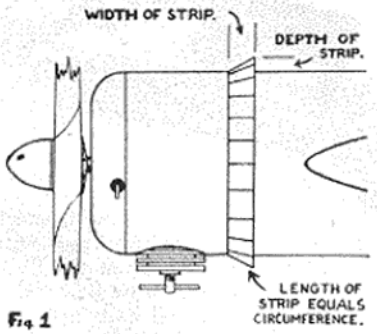


Fig. 1

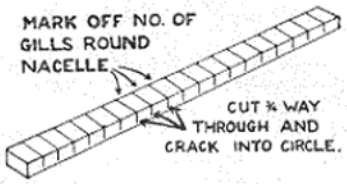


Fig. 2.

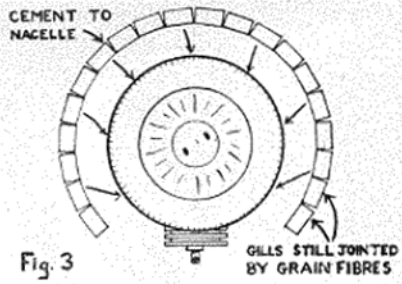


Fig. 3

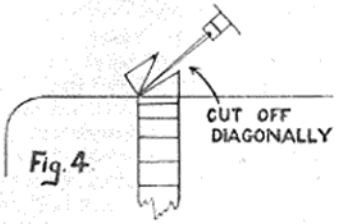


Fig. 4

Have fun with a

HELI-KITE

WITHOUT power a helicopter is readily capable of making a reasonably slow glide descent. If tethered, in a strong enough wind, it can even maintain height due to the amount of rotor lift developed by autorotation. Actually, under neither of these conditions is it acting as a helicopter—the rotors are working on pure *autogiro* principles.

Using these principles it is possible to make a towline autogiro which can be launched like any other towline glider—although when released its descent path will be almost vertical, but with a relatively low rate of descent. Alternatively, by not releasing it from the line at the top of the climb, such a model can be flown like a kite and maintain its height at the top of a line in any wind strong enough to support a conventional kite. Kite flying may be something which model aircraft enthusiasts look down on—but flying an autogiro kite is really lots of fun, and quite tricky.

With an autogiro kite (or glider for tow-launching; or a powered model for C/L flying), getting the rotor right is only half the problem. The other half is getting *directional* stability.

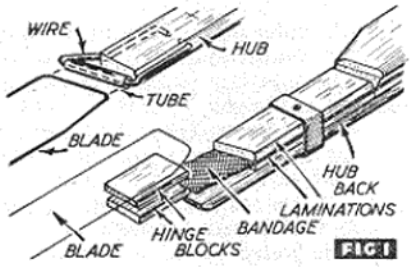


FIG 1

That is, the model must weathercock into wind all the time and recover rapidly if upset by a gust.

A recently published American plan for a "gyro" towline glider utilises fixed rotors, trimming out the inherent roll by adjusting the (fixed) blade incidence settings. Our personal experience, however, has been that fixed rotors are most unsatisfactory and in view of the relative simplicity of making a flapping rotor hinge, not worth considering.

The most basic form of model rotor "skew" hinge was developed for the Jetex commercial helicopters and is difficult to better. The usual wire and tube form can, however, be replaced by a bandage strip sandwiched between balsa to make it even simpler. Both types are shown in Fig. 1. If made carefully with a close initial fit the bandage hinge is extremely flexible and has a long life. The main requirements are to incorporate the required skew angle and chamfer the balsa parts above the bandage strip to allow for upward flapping movement.

The rotor design shown in Fig. 2 has proved quite satisfactory on various models. It is important to reduce the bearing friction to an absolute minimum. On a large rotor it is worth while to incorporate a proper ball bearing in the hub. On smaller sizes, at least a thrust washer should be used above the hub bearing. Excess friction will tend to spin the fuselage and make directional stability more difficult to achieve. In fact, if there is too much friction here you will never get the model to "weathercock" properly.

For satisfactory results the rest of the design should then follow the layout shown in Fig. 3. The rotor needs to be mounted fairly high on a rigid spindle (e.g., 14 or 12 S.W.G. wire). A tailplane is essential with an area at least 50 per cent. of the (total) rotor blade area. Taking the axis of the rotor as vertical, the tailplane incidence *must* be at a generous negative angle.

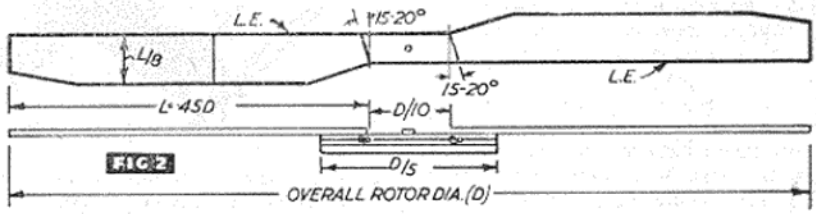


FIG 2

Forward stabilising winglets spread well out from the fuselage and inclined sharply upwards are also essential. These should be mounted as far forward as possible and again given a generous negative incidence. It is an advantage to make this incidence setting variable so that it can be adjusted for trimming. From the practical point of view, too, a knock-off form of mounting is highly desirable, for if the model does slide off to one side it will be these winglets

Continued on page 104

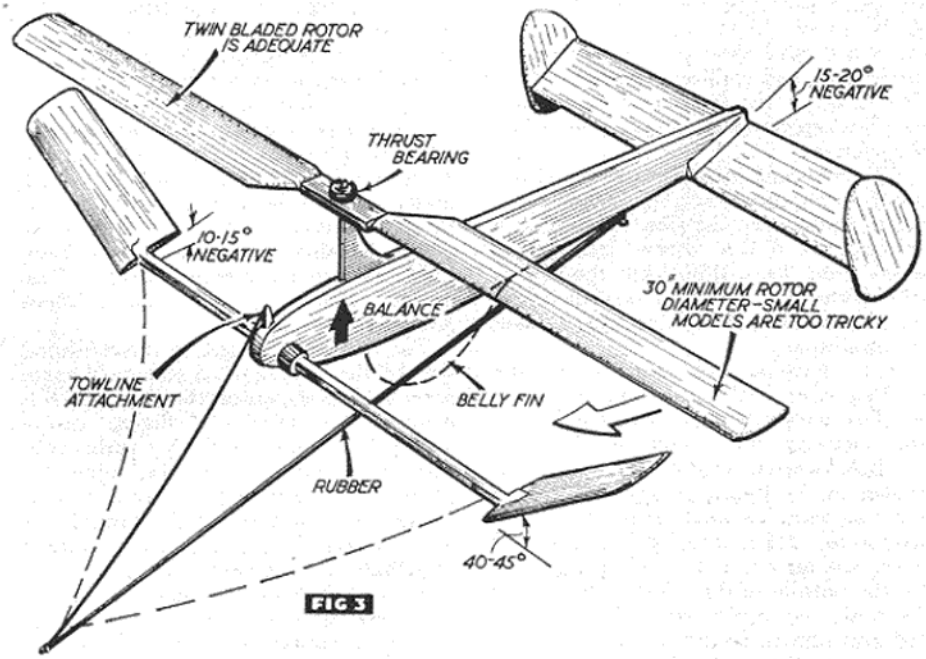
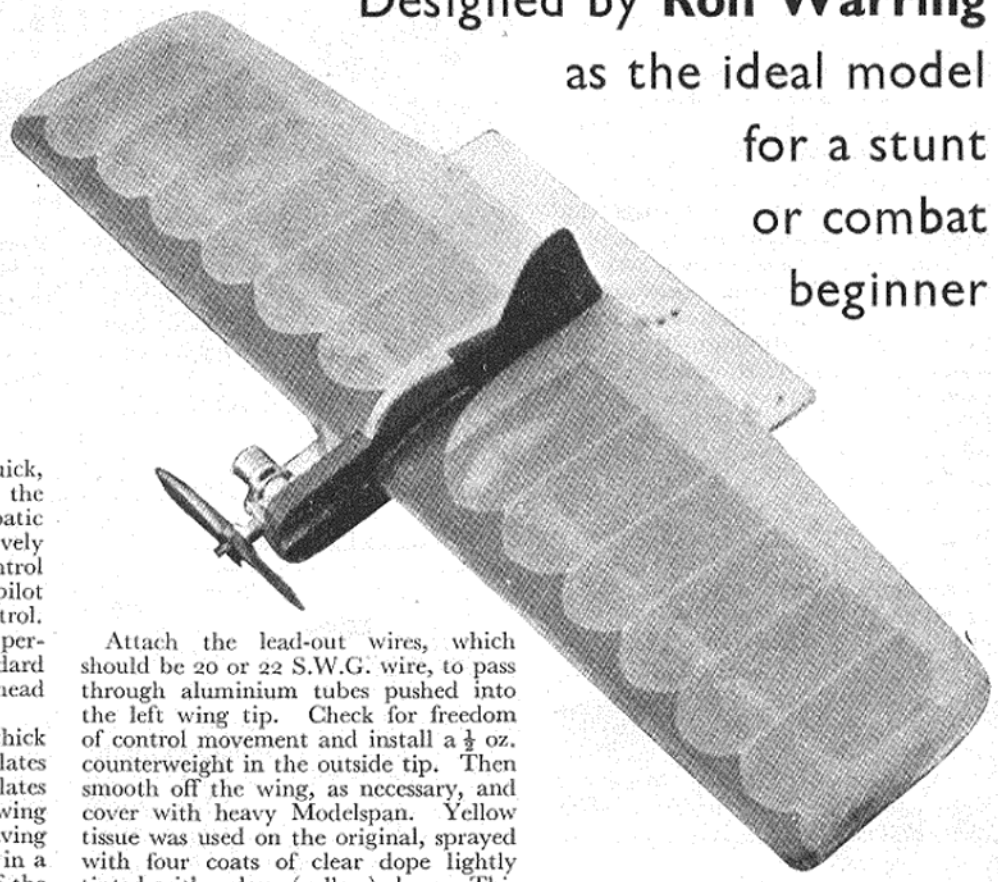


FIG 3

FLIP

Designed by **Ron Warring** as the ideal model for a stunt or combat beginner



THIS model was designed for quick, rugged construction, but at the same time it had to be fully aerobatic on 0.8 c.c. motors. It is a very lively model with instant response to control movement, but is easy enough to pilot once you have learnt not to over-control. On 25 ft. lines it is capable of performing the whole range of standard manoeuvres, including tight overhead circles and eights.

Toughness is ensured by using a thick balsa profile fuselage with ply plates each side at the nose. These plates extend well back beyond the wing leading edge, the extra strength saving the fuselage from breaking off short in a crash landing under full power. If the fuselage does break, it will do so at the end of the ply plates, which leaves ample area for cementing back so that it is as strong as before.

The wing is built by cutting a set of ribs as shown on the plan, pinning down the mainspar (medium light balsa) and assembling the ribs on the spar. Leading and trailing edges are slotted and cemented in place to complete the assembly. Remove from the plan when set and cover the centre section with $\frac{1}{16}$ in. sheet. Add the tip blocks and carve and sand to section when shaping the leading and trailing edges to section. The latter is cut from $\frac{1}{4}$ in. sheet and may be shaped to section before assembly, if preferred.

The bellcrank (2 in. between lead-out wires) is mounted on a $\frac{1}{16}$ in. ply plate cut to fit between the ribs. Mount on a countersunk 6 B.A. screw, pulling the screw head down flush with the underside of the ply, and then cement in the wing with the pivot point located over the mainspar.

The elevators are attached to the trailing edge with thread hinges, sewn in place with the aid of a needle. Bend the elevator horn and secure with 10 B.A. screws, washers and nuts, as shown in the detail sketch. The push rod can than be bent from 16 S.W.G. wire to fit. Before locating in the control horn, cut an extra strip of $\frac{1}{16}$ in. sheet for the bottom of the wing, slot to allow for push rod movement, slip over the rod and cement to the wing.

Attach the lead-out wires, which should be 20 or 22 S.W.G. wire, to pass through aluminium tubes pushed into the left wing tip. Check for freedom of control movement and install a $\frac{1}{2}$ oz. counterweight in the outside tip. Then smooth off the wing, as necessary, and cover with heavy Modelspan. Yellow tissue was used on the original, sprayed with four coats of clear dope lightly tinted with colour (yellow) dope. This gives a much denser and permanent colour without adding much extra weight.

The fuselage is simply a profile shape cut from $\frac{3}{8}$ in. thick balsa sheet. Cut an extra rib for marking out and checking the cut-out. The fuselage should slip easily over the finished, covered wing and is cemented permanently to the centre. The ply plates are cemented on later and should be clamped in position until thoroughly set. The cut-out in the ply plates (and fuselage) should be checked for fit against the motor to be used, the shape on the plan being used with a D-C Merlin.

The engine is mounted "sidewinder," with the cylinder pointing to the outside of the circle. A washer should be used under the lugs at the front bolt position to give a certain amount of right side-thrust, which will be helpful in keeping the lines taut in overhead flight. The engine should be mounted without downthrust or upthrust.

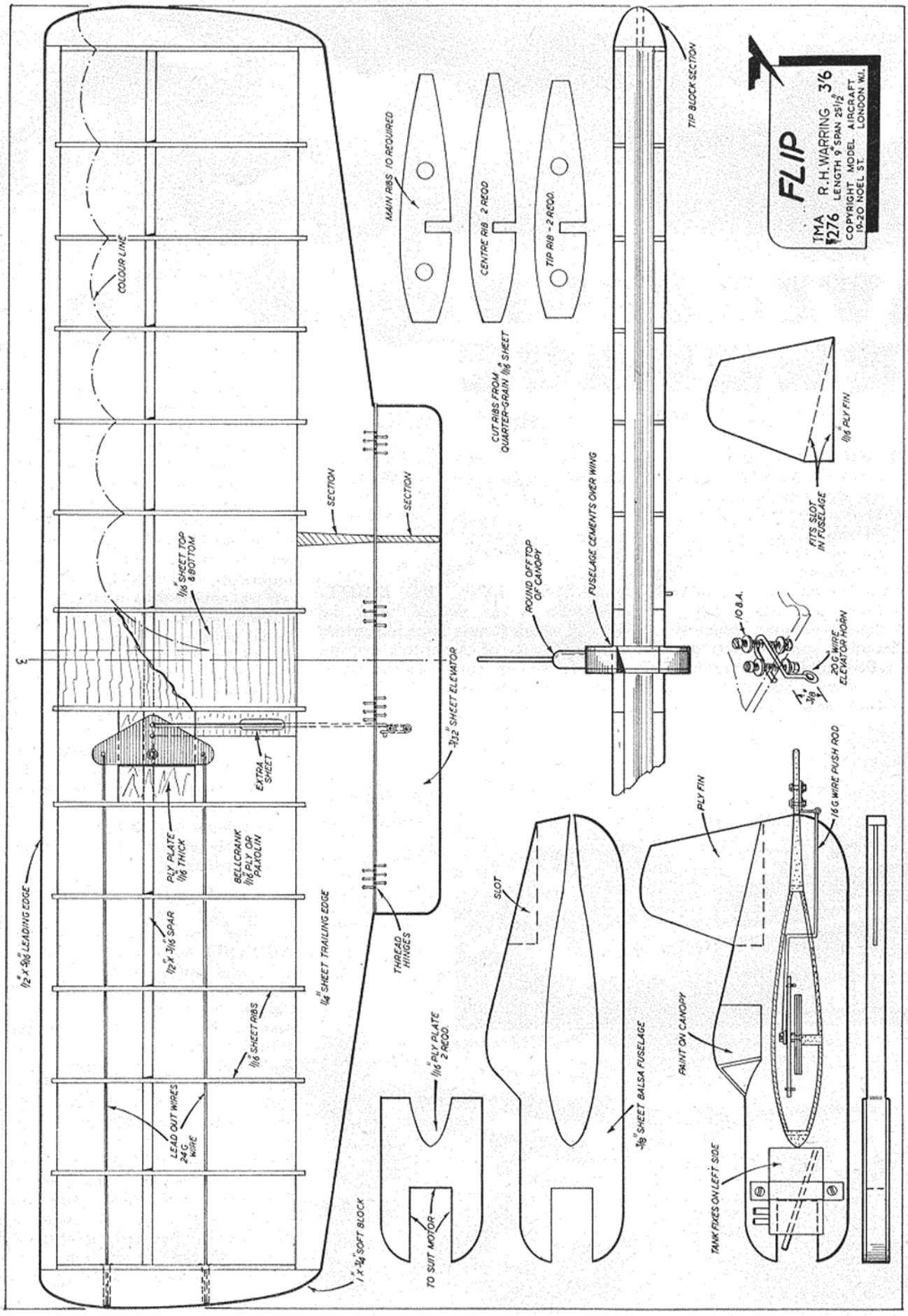
The tank is mounted on the left-hand side of the fuselage. A standard team racer tank is shown on the plan which is suitable for aerobatic flight, except inverted. On the original a team racer tank was used with the feed pipe displaced to the centre of the tank so that prolonged inverted flight could be attempted as long as the tank was more than half full. A wedge tank is not so easy to fit, but can be mounted on the right side below the engine level.

A point about the engine controls. The needle valve will be bent in landing, if pointed downwards. It is best to reverse the spraybar so that the needle comes out at the top, even if this means that it is swept forward near the propeller disc. Cut off short and then you will be able to adjust it without nipping your fingers. If you really know your engine you will find it easy enough to leave the needle valve alone and start by finger choking and using the compression screw.

The fuel line should be as short as possible between the tank and engine as this makes for easier starting. Since, too, each landing is a "belly landing," keep the fuel line clear of the bottom of the fuselage.

The flying speed of *Flip* may surprise you. It is a very "clean" model with little drag and with the motor revving fast and a 6 × 5 or 7 × 4 propeller will approach 60 m.p.h. For ordinary stunt work it is an advantage to slow the model down somewhat, runnning on a slightly rich mixture and driving, say, a cut-down 8 × 4 plastic propeller. It does not need full motor power for loops, etc.

For best results, too, keep the model as light as possible. The original weighed just 3 oz. (less motor and tank) when new—although it now checks out at $3\frac{1}{2}$ oz. due to oil accumulation, etc. This latter figure is about a maximum for a really first class performance. And for combat work, you need just that, to get the edge over the other fellow.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, 3s. 6d., POST FREE

AVIATION NEWSPAGE

by J. W. R. Taylor

NEW PHOTOGRAPH of the Hispano HA-100-E1 *Triana* two-seat trainer (above) is the first to show one of these machines equipped to production standards. Intended to replace the old HS-42 and HA-43 advanced trainers, the *Triana* was designed under the direction of Willi Messerschmitt and has a 755 h.p. ENMA Beta B-4 engine, which gives it a maximum speed of 276 m.p.h. Range is 820 miles at 237 m.p.h.

The machine illustrated is fully equipped for weapons training, with two fixed 12.7 mm. machine-guns and underwing racks for four 8 kg. rockets. It spans 34 ft. 1 in., is 29 ft. 5 in. long and has a loaded weight of 6,459 lb.

* * *

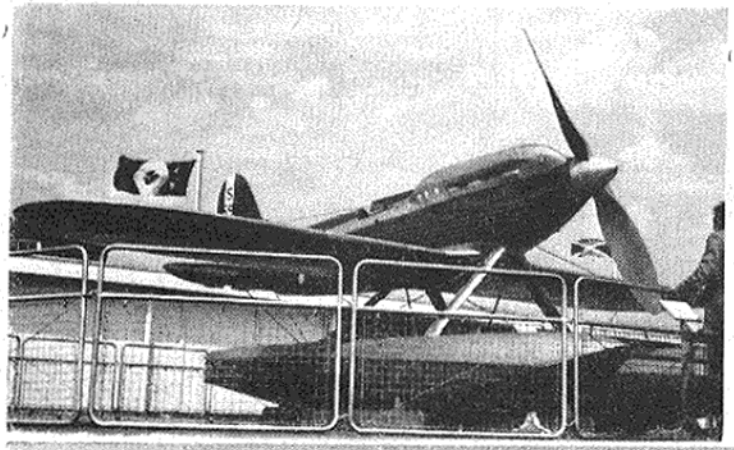
LATEST LINE IN LIGHT-PLANES is the *Skylane*, with the help of which Cessna hope to capture 50 per cent. of America's private aircraft sales in 1958. Described as "the complete airplane for the complete pilot," it has the same basic all-metal airframe as the well-established Cessna 182.

Priced at $16,850 (around £6,000), it has a Lear or Narco single-unit radio for VHF communications, omni-range navigation and instrument landing, directional and horizontal gyros, sensitive altimeter, clock, outside air temperature gauge, rate of climb and turn-and-bank indicators, and fibreglass spats on all wheels, which add 3 m.p.h. to the cruising speed. Other features are tinted glass in all windows to reduce glare, sun visors and a navigation light flasher.

Smartly-upholstered inside and with a choice of more than 500 three-colour external paint-schemes, the four-seat *Skylane* has full dual controls. Power plant is the 230 h.p. Continental o-470-L, which gives a top speed of 168 m.p.h. and range of 667 miles at 158 m.p.h. Span is 36 ft., length 26 ft. and loaded weight 2,650 lb.

* * *

Fine sight on the roof of the passenger buildings **AT LONDON AIRPORT** nowadays is the graceful blue and silver Supermarine S.6B seaplane (S1596) in which Flt. Lt. George Stainforth became the first man to set up an "over-400 m.p.h." World Speed Record on September 29th, 1931, with an average of 407.5 m.p.h. Powered by a Rolls-Royce "R" engine, specially boosted to 2,600 h.p., this S.6B is similar to S1595 in which Flt. Lt. John Boothman won the Schneider Trophy outright for Britain in the same year. Together with the Alcock and Brown memorial—and the *Viscounts* and *Britannias* on the parking aprons—it forms an inspiring reminder of the achievements of British designers and pilots.



Left: Rather out of its natural element is the Supermarine S.6B, now perched on the roof of the passenger buildings at London Airport. Below: The Cessna Skylane—typical of a class of aircraft at which the Americans excel

AVIATION NEWSPAGE

Plane of the month

The North American F-107A

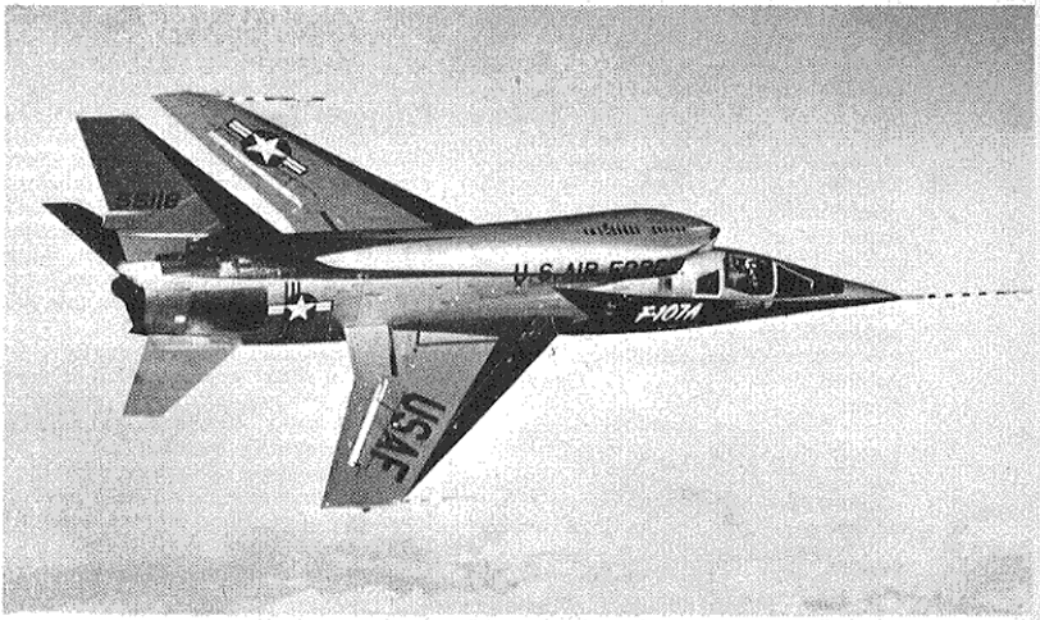
Although it started out as the F-100B version of the *Super Sabre*, the F-107A rapidly accumulated so many unusual features that it earned its new designation, and became a promising competitor to the Republic F-105 *Thunderchief* for an important U.S.A.F. fighter-bomber contract. Design work began on May 1st, 1955, and North American received a limited production order for nine, of which three were completed before the Air Force decided in favour of the *Thunderchief*.

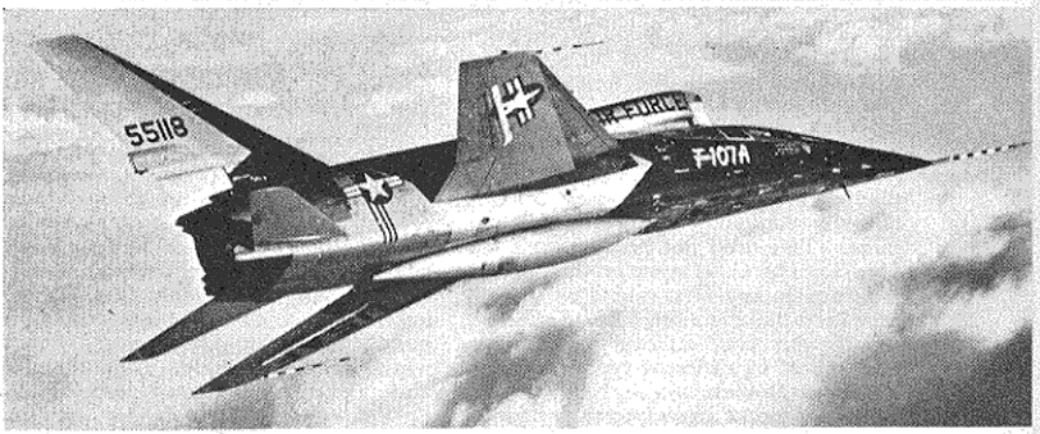
The first F-107A flew on September 10th, 1956 (less than 18 months from start of design) at Edwards Air Force Base, and had the misfortune to suffer a parachute brake failure on landing, with the result that it ended up in a ditch, minus nosewheel. Later, it more than made up for this setback by proving outstandingly successful, with a top speed above Mach 2.1 (1,400 m.p.h.).

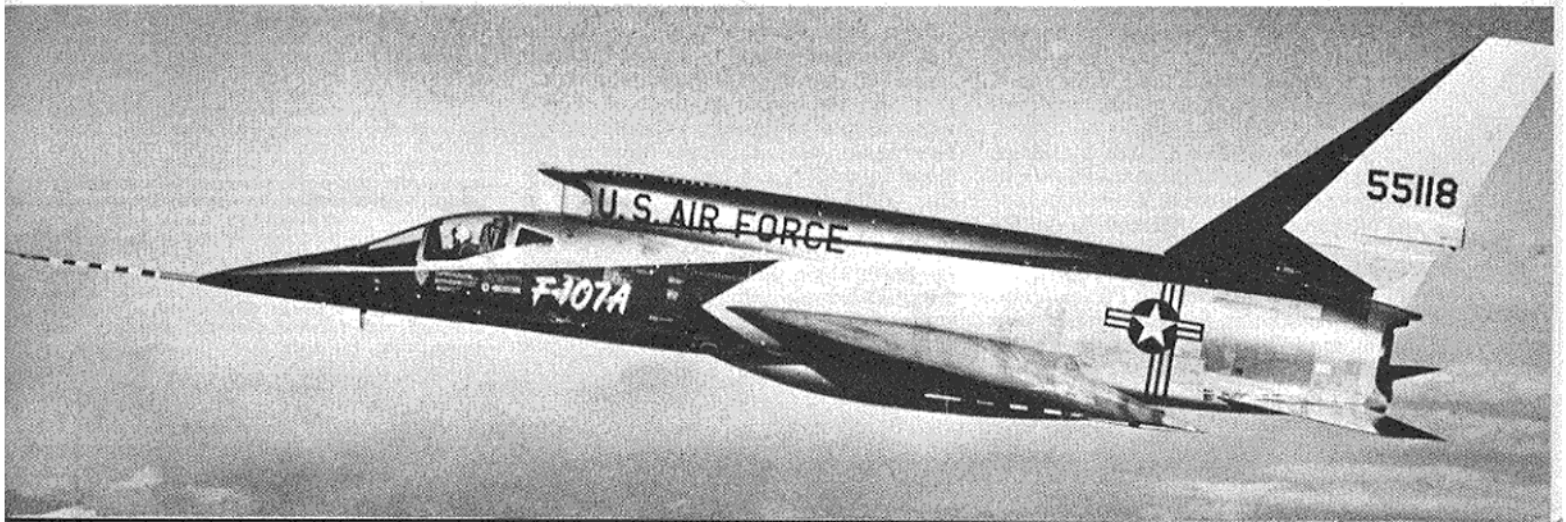
About the only feature that the needle-nosed F-107A has in common with the F-100 is its 45 deg. swept wing. The fuselage is area-ruled, and an interesting fact is that the under-belly tank fits into a recess in the bottom of the fuselage to maintain the area-ruling.

Colour scheme of the F-107A is basically natural metal, with bright orange flashes under the nose and cockpit, along the sides of the air intake and on the leading-edges of the fin and wings.

Span: 36 ft. 7 in. Length: 60 ft. 10 in. Height: 19 ft. 8 in.







LETTERS

Practise patience?

DEAR SIR,—I was rather surprised to read that the S.M.A.E. had adopted the A.M.A. stunt schedule, as I feel that this will result in a decrease in entries for the Gold Trophy this year.

The reason for this is simple—the average modeller hasn't the patience (that is all it requires) to practise for two or three hours each week until the necessary standard has been reached. Also it will mean throwing away last year's models as the A.M.A. rules require a new approach to stunt design.

Yes, I'm a pessimist at the moment, because I envisage twelve months of hard practising ahead, before I even approach the required standard.

Yours faithfully,

Ashford, G. OSWELL.
Kent.

Idea for plastics

DEAR SIR,—In your January issue you printed two letters from readers both of which call for a reply.

Concerning that from C. McCall, I am a modeller of some 30 years' experience, and for some considerable time I have run the "solid" section of a club. To us, plastics kits have been a great help, as members who spend many hours making models find relief in being able to build another model for their collection, with little trouble.

The common belief is that when a plastic kit is built, it becomes just one of many thousands, all more or less the same. This need not be. When a kit for a Sopwith *Camel* came on the market, I turned to my files, and that kit has now been built as a *Swallow*. Similarly, the Hawker *Hart* kit can be made up into any of 64 different types (my *Hart* is now a *Demon*).

Many types of aircraft were developed into other types, and of course between the wars, parts of one type of aircraft were used by another firm to build an aircraft of their own. It is this type of "original" aircraft that can be built from kits.

The searching for details, markings, etc., provides me with many hours of enjoyment, and results in 'planes that are out of the usual rut. After all, a *Spitfire* can be put on floats, and a *Lysander* have two rudders, and a gun turret.

The letter from Mrs. Fisher complained of articles on real aircraft in a model magazine, and stated that solid builders should buy books or periodicals that deal with full size aircraft. May I point out that "solids" are very popular these days, and as they are, after all, models, where else but in a model journal should we expect to find articles and plans, etc., applicable to them?

Yours faithfully,

Emsworth, F. HONEY.
Hants.

Ducted fan job?

DEAR SIR,—After examining your 1/72 scale drawings of the S.R.53 (MODEL AIRCRAFT, December), I considered it would make an excellent subject for a ducted fan project, while the addition of a Jetex motor in the lower exhaust would give the model a take off, characteristic of this aircraft.

The fuselage itself is perfect for housing a diesel engine and if it were designed around a 0.5 c.c. engine it would, I think, be extremely popular among flying scale enthusiasts.

As I myself have neither the experience nor the drawing instruments I have to hand my suggestions over to you and hope something comes of them.

Yours faithfully,

Andover, G. KRINGS.
Hants.

Knowing the ingenuity of our readers, we have no doubt that such a project has already been contemplated—we would be interested to hear the results.—Ed.

Critical comment

SIR,—Having been an ardent reader of your most excellent magazine since its first issue, I have two points which I would like to take the liberty to raise.

(1) In the January issue, Mrs. Fisher's letter complained of the ever-increasing quantities of full-size aircraft "gen" which is being included in your magazine. I feel that I must agree wholeheartedly with Mrs. Fisher on this matter. I think the January issue of MODEL AIRCRAFT, which included no less than eight pages of full-size aircraft "gen" (nearly one quarter of its volume), was not helping to keep up the good name of your magazine. I do appreciate, however, that a large number of "modellers"(?) are building the plastic kits which are now on the market in very large numbers, and these builders may require photos., etc., to help them to finish their aircraft accurately. As Mrs. Fisher so rightly says, there are many full-size aircraft magazines available to help them to do this. So please may I suggest a little *less* full-size aircraft "info" and many more model articles?

(2) In the January issue the plans of the *Mosquito* and details of the variants were very interesting, but may I take David Ogilvy to task over some of his views in the above article which I consider were not exactly in good taste. He seems to consider that the "old-time" *Mosquito* pilots were heroes to be able to cope with such an aircraft and all its vices. He even went as far as to state that the modern jet-only trained pilot would certainly break a *Mosquito* on his first solo (without having previous dual), even before leaving the ground. Surely the piston-era pilots would do likewise if suddenly put into a *Hunter* or *Javelin*? If they did not "bend" it on take off, they would certainly have difficulty coping with "over-the-hedge" airspeeds of 140 knots or more on landing. No, David, please give credit where it is due; a "Mossie" pilot was quite a normal human being, and *not* a superman. I would like to point out also that *any* jet pilot would be able to cope with a *Mosquito* and its vices after a very short spell of dual instruction. Incidentally, having had quite a few hours flying *Mosquitos*, and also respecting the ability of the modern jet-only trained pilot more than you apparently do, I found your article on the handling of the the "Mossie" quite a "line-shoot."

Yours faithfully,

R.A.F. Marham, E. A. J. CROOKS,
Norfolk. Flight Lieutenant.

In fairness to D.F.O. we asked him for his comments on Flt./Lt. Crooks' letter, and they are as follows:—

I am very pleased indeed to provide a reply to F/Lt. Crooks, for if he cares to read the article again he will find that his facts are wrong.

He accuses me of considering *Mosquito* pilots "supermen" and "heroes" yet how does that tie-up with paragraph 4, which reads "intensive fast-twin conversion courses were introduced to make it [the *Mosquito*] just another *machine for the many*"?

However, regarding *any* pilot flying a Mossie, again I must disagree. Any *average* pilot would be happy and competent on the type, but well I remember many students on *Mosquito* courses being suspended through inability to cope, but who were transferred to *Meteors* and managed from then onwards without undue incident!

His second accusation, that of my having no respect for jet-trained pilots, is also out of order, for paragraph 2 on page 21 opens "Not that we are condemning or belittling the service pilot of today, for his skill on the operating side, dealing with high fuel consumptions or letting down from great heights in bad weather with only a few minutes' endurance, calls for considerable coolness and a sense of responsibility that only a flying man really understands."

Nevertheless, my own experience of endeavouring to convert jet pilots to basic piston types leaves me with many pitiful memories, and in particular I remember one pilot currently flying on a *Meteor* squadron who, after eight hours' dual on a *Magister*, gave up the attempt and asked me to taxy the machine back for him. Admittedly, this was an exceptional case of lack of adaptability, but on an average I find that a fighter pilot needs about four hours' dual before being safe for solo on an *Auster* or even a *Chipmunk*!

Finally, F./Lt. Crooks lays himself open to severe criticism in all instructional circles when he states that a piston pilot would experience difficulty with "over-the-hedge" speeds of 140 knots or so, for apart from the wider turning

circle involved, airspeed in itself has no effect whatsoever on the problem of the approach. As any pilot who has flown more than a few types soon discovers, and as any pupil has drummed into him when converting to a high-speed aeroplane, it is the feel that counts, and a machine that feels right on finals is right; it matters little whether it is a *Meteor* (or for that matter, a *Mosquito*) at 115 knots or an *Auster* at one-third that speed, except that the person flying the slower aeroplane will have a drift problem in cross-wind conditions, whereas this is virtually absent with fast aircraft. I have not flown a *Hunter*, but I can hardly imagine an added 25 knots making any appreciable difference!

We cannot lose the main point; potent piston aircraft need handling rather than operating skill, and jet types need operating rather than handling technique, and the two are very different problems. Personally, I prefer an aeroplane that needs handling rather than operating, for I like flying!

Incidentally, I note that your scale plans of the PR34 mention 200-gallon underwing drop tanks. Although these were tried, they were found to overload the structure and upset the handling, and they were banned after a short time in service. Squadron machines normally used 100-gallon tanks, and it is interesting to note that a few had these replaced by similarly-shaped fairings to house forward-facing cameras in place of fuel. I have not seen this mentioned in print, but I used them several times, and in case a modeller wishes to make a *Mosquito* with a difference, one such 34 was RG178, which had special internal wiring for the purpose. These fairings looked exactly the same as the tanks, except that the leading edges were transparent and optically-flat.

Yours faithfully,
D. F. OGILVY.

Scale team racing

DEAR SIR,—I have read with great interest the article on "Scale Team Racing" in the January issue of M.A.

I think that this is a good idea, probably just what the movement needs to put a little new life into it.

However, I have a few suggestions to make regarding rules. A scale of 1 in. to 1 ft. would give more scope instead of a wing area rule.

Tank size, engine size and line length for Class A racing is all right, but there should be two sections, (1) for World War I aircraft, and (2) for World War II aircraft.

I hope that this proposed branch of T/R catches on, as it should be good fun.

Yours faithfully,
Halifax, A. R. BARRON.
Yorks.

Developing ideas

DEAR SIR,—I thank Mr. Hunter for his interest in my article and am glad that anyway it caused him some amusement. It is a pity, however, that he did not read the article more carefully before rushing into print with his facetious and supercilious remarks on what is a serious matter to thinking people; it is quite obvious that he did not grasp or understand my meaning. I may have been to blame for not making it clearer, or perhaps he was misled by the title but for this I was not to blame; my title for the article was "Model Making, Yesterday and Today."

Nowhere in the article did I accuse *model makers* of a lack of originality; what I did say was that far too many of the *models* made today lack originality, and I tried to encourage and urge model makers to devote more of their time to models to try out and develop their own ideas. Many of these ideas are now being wasted because too much time is given to the beautiful models used merely for amusement or sport. By all means have these models as well; any form of model making is a most useful hobby because it exercises the mind and improves craftsmanship, but recently the numbers of each seem to have got out of proportion, to the detriment of the development of new ideas.

I did not say that model makers lacked inventiveness; in fact, in regretting the decline of experimental models I definitely stated this could "not be due to lack of inventive power." I also pointed out that "most model makers have the gift of looking ahead, they develop the power to improvise and are continually forming new ideas, and this capability should not be wasted." From time to time I have come across really first class ideas of model makers which they have failed to develop because too much of their time has been taken up with other models, or because the ideas have seemed too unorthodox and they feared they would be scoffed at. Every really new idea is unorthodox, and unless new ideas are tried out there cannot be progress.

It is true that I have been connected with the aircraft industry since the early days, but I am not "still living in the atmosphere of oiled-silk and bamboo." During the First World War I was responsible for the production of 120 service machines per week and for the organisation and administration of the factory where they were made. In the Second World War I acted as production manager to a firm which, during that time, produced over 8,000 service aircraft of their own design, as well as a very large number of big gliders used on D-Day, so I am quite conversant with aircraft factory procedure and the type of models they make, but they are not the kind of models I refer to.

What is needed today is for more and more model makers to make more and more working models and devices to try out and develop more and more of their own original and often valuable ideas, which might otherwise be lost.

Yours faithfully,
Portsmouth, DONALD STEVENSON.
Hants.

This correspondence is now closed—Ed.

This month's winning letter

DEAR SIR,—Surely Mrs. Fisher (MODEL AIRCRAFT, January) must realise how valuable the articles on full size aircraft, published in MODEL AIRCRAFT, are to the scale model builder.

I build scale aircraft and have had to make several trips to the Imperial War Museum to collect data for scale, W.W.I and intermediate period aircraft. The gen contained in your articles on the subject has saved me a lot of time and expense, so I am sure this must also be the case for many other scale fans, and I would like to thank MODEL AIRCRAFT on their behalf, as well as my own, for the fine articles on this subject.

To specialise in one particular branch of our hobby is all right, but why should one branch want to see articles for other branches removed?

Also, does Mrs. Fisher realise that all scale fans are not "Solid Modellers," but like myself, prefer to see their creations flying, either C/L or F/F or even R/C?

As to the suggestion that we should buy periodicals that concern full size aircraft only, I should say that the great majority of us already do this, as well as buying MODEL AIRCRAFT. I will stick my neck out and say that the majority of these magazines are only concerned with the more up-to-date aircraft, i.e. post W.W.II, and we need model mags that can supply us with other information as it is not practical for all scale fans to visit reference libraries and the museums, etc., much as they might like to.

Yours faithfully,
Witley, MICHAEL P. LOWMAN.
Surrey.

Achieve that LIFE-SIZE LOOK!

Ever wanted to build an exhibition-class model? Famous scale modeller P. M. H. LEWIS here shows you how!

SURPRISINGLY few solid-scale enthusiasts branch out and attempt to make their creations even more realistic by constructing, as far as is practicable, the original framework of the aircraft which they have chosen to copy in miniature. The reason, perhaps, is that the task is thought to be difficult and tedious. In fact it is by no means as formidable as it appears. On the contrary, anyone attempting this form of construction is likely to be agreeably surprised, both at the speed with which the framework can take shape and at the ease of working.

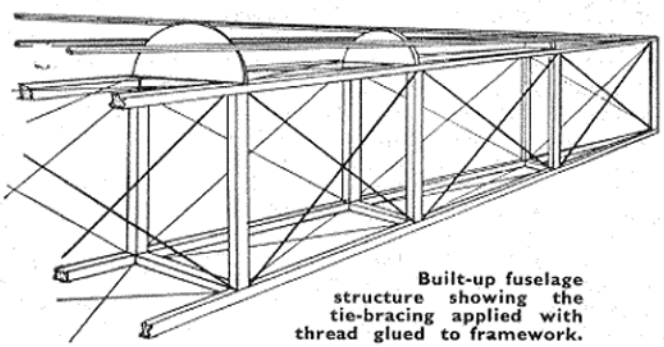
Undoubted advantages of the built-up system are the elimination of the comparatively heavy work of cutting and carving from the solid wood, and the more realistic appearance of the framework beneath the covering. Against these, possibly, may be set the greater vulnerability and also the extra time spent in research for the interior framework and in its incorporation on the plan.

It is not suggested that metal- or plywood-covered modern types of aircraft should be treated in this way. In their case, the smooth skin is simulated best by the polished wood surface. The built-up form does, however, come into its own for the old fabric-covered machines and has a particular fascination for the modeller as the framework evolves. If one has some experience of making flying models, no trouble should be found in using built-up construction, as the model is made on parallel lines, the main difference being a reduction in overall dimensions and, correspondingly, in those of the materials used.

This brings us to the question of size: 1/18th scale is perhaps the best, as it enlarges by the multiple of 4 from a 1/72nd plan; plenty of detail can be incorporated; the materials are easily handled; and the finished job is of reasonable size.

The following is a quick guide for giving the size of a model in inches from the aircraft's actual dimensions in feet. For 1/144th scale (1/12 in. to the foot) divide by 12; for 1/72nd (1/6 in. : 1 ft.) divide by 6; for 1/48th (¼ in. : 1 ft.) divide by 4; for 1/36th (1/3 in. : 1 ft.) divide by 3; for 1/24th (½ in. : 1 ft.) divide by 2 and for 1/18th (2/3 in. : 1 ft.) divide by 1½.

For the purpose of this article, let us assume that a single-engined biplane is being constructed to 1/18th scale, and that the Gloster *Grebe*, of 29 ft. span and 19 ft. 6 in. length, has been chosen. The model's upper wing will therefore measure 19 1/3 in. across and the overall length will be 13 in. Full



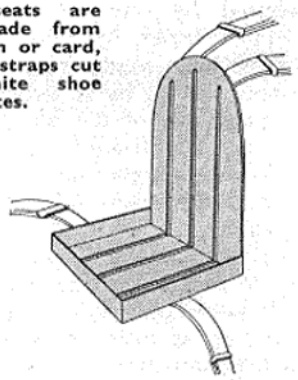
Built-up fuselage structure showing the tie-bracing applied with thread glued to framework.

working drawings are now prepared and the article "Scale It Up" in the February, 1957, issue of MODEL AIRCRAFT may be of some help in doing this.

The methods used in building the *Grebe* will apply to many other aircraft of similar construction, and when the plans are ready the materials may be selected. Some modellers may prefer to use hard balsa, which is quite suitable, but a much stronger model results by using the same materials—spruce and plywood—as employed in the original—small sections of spruce and 1 mm. plywood are really no harder to work with than balsa.

Materials necessary will include the following: strip spruce, birch and balsa from 1/32 in. square upwards and in various sections, sheet balsa and 1 mm. to $\frac{1}{8}$ in. plywood, block balsa or hardwood, spring steel wire from 24 S.W.G. to 10 S.W.G., brass and copper tubing, wood dowelling, various thicknesses of card, 30 S.W.G. aluminium sheet, and other materials mentioned with the making of the items which they are employed to represent.

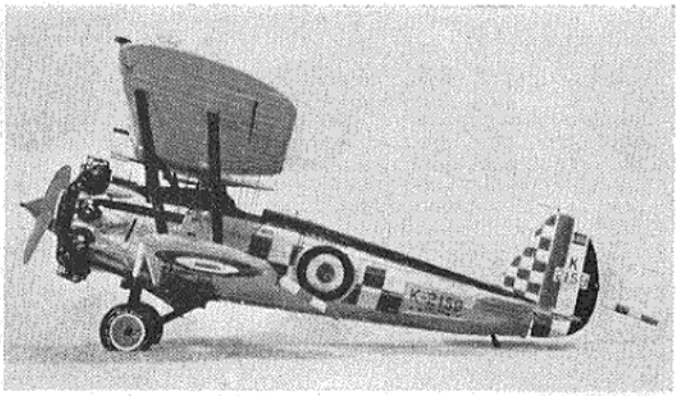
Let's take the fuselage first. Construction used for the *Grebe* follows that



Pilot's seats are easily made from aluminium or card, with the straps cut from white shoe laces.

of the full-size machine and consists of longerons, separated by uprights and cross braces. Take two lengths of $\frac{1}{16}$ in. square spruce and fix them in position, with glass-headed pins spaced on each side, as upper and lower longerons, cut to the correct length and then glue the uprights into place. When the first frame is complete, another is made directly on top of it to ensure that they are identical. They are now removed from the plan and separated with a razor blade as far as the sternposts, which are glued together permanently.

To guarantee a square framework, cut one or two cardboard formers with the corners cut away to accommodate the longerons. These are clipped into place temporarily and rubber bands press the side frames against them until they are removed. The cross braces are glued in position, working from the rear to the front. When the structure is completely dry, the temporary formers are removed. The wire tie-bracing is applied by gluing the thread in place in some portions, such as the cockpit and engine bays, and then to cut it



The two photos on this page show the writer's Gloster "Grebe" (below) and "Bulldog" (right) constructed from spruce and plywood is described in this article. A Gloster "Gamecock" also "built-up," is shown in the heading photo.

away with the razor blade where it is not required. Formers cut from 1 mm. plywood are glued in position to form the upper and lower decking and the sides, to which light stringers are then added.

The engine bulkhead is filled in with sheet, in company with those parts of the decking and forepart of the fuselage covered with plywood on the actual aircraft. Other inspection panels are represented with card cut to shape. The sheet fill-ins are pinned down or held in place with rubber bands until set. They are then trimmed with a razor blade or sharp knife and the structure is sandpapered to a smooth finish.

At this stage it is advisable to cover the fuselage. Jap silk may be used, or heavy grade Modelspan. If silk is chosen, it should be applied damp over as large an area as possible without creasing and almond paste is the best adhesive. Dry tissue should be applied lengthwise in strips with the same paste. The edges are trimmed with scissors and razor blade and smoothed down, the tissue covering being water-sprayed to tighten it. When quite dry, several coats of clear dope should be applied, with a very light rubbing down between each. The interior may now be painted a pale shade of green. If a leather padding is required around the edge of the cockpit, this is simulated very well by splitting some rubber valve tubing or neoprene lengthwise and cementing it in place round the opening.

Where the engine is enclosed by metal panels, they are cut to shape from 30 G. aluminium sheet and curved so that they follow the contours of the fuselage. Rivet holes and other orifices are made with an awl. Louvres are cut with a knife and bent outwards and air intake scoops may be formed in the same way.

When the panels have been shaped, they will be found to have abrasions which must be removed with emery paper followed by steel wool applied with a circular movement. When the deeper scratches have been eliminated, polishing is commenced with metal polish applied with a rag until the metal is bright. The panels are fitted to the fuselage by bonding with rubber solution, and flat-headed pins are pressed into their correct holes to simulate rivets. To ensure that the panels are firmly bonded, it is advisable to spread the rubber solution on both the metal and fuselage and to allow each to dry separately. A second coat is then applied and the panels are placed in position when the solution is tacky.

(To be continued)

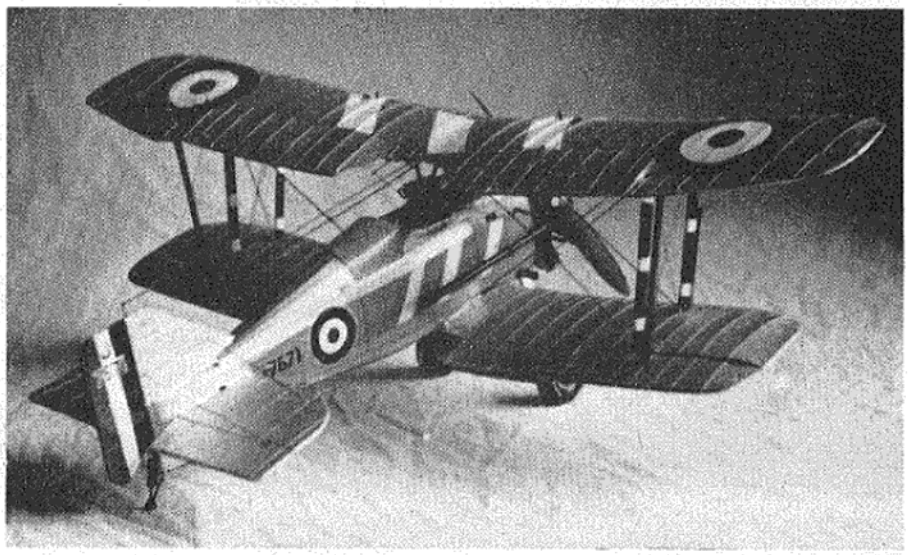
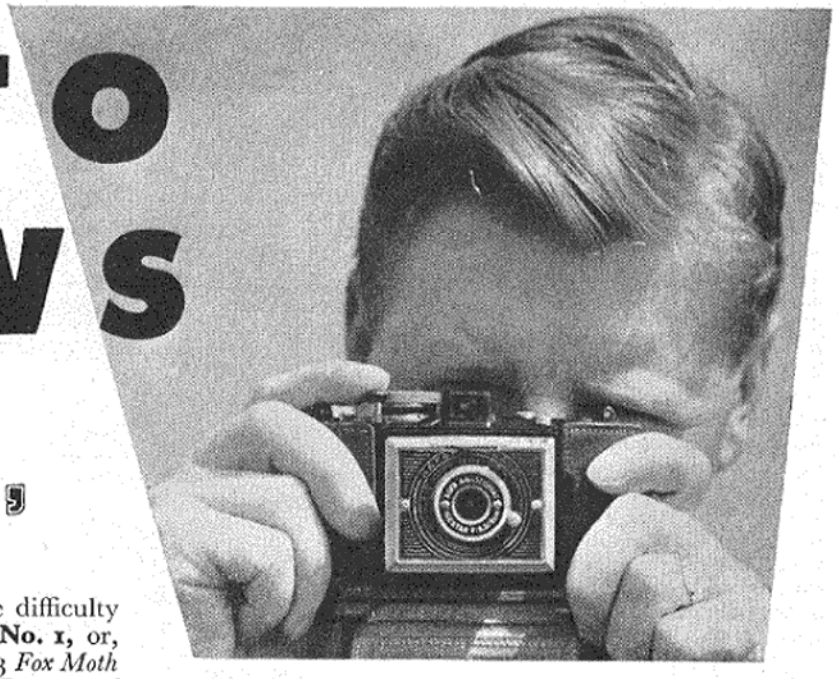


PHOTO NEWS

'The pick of the pics'



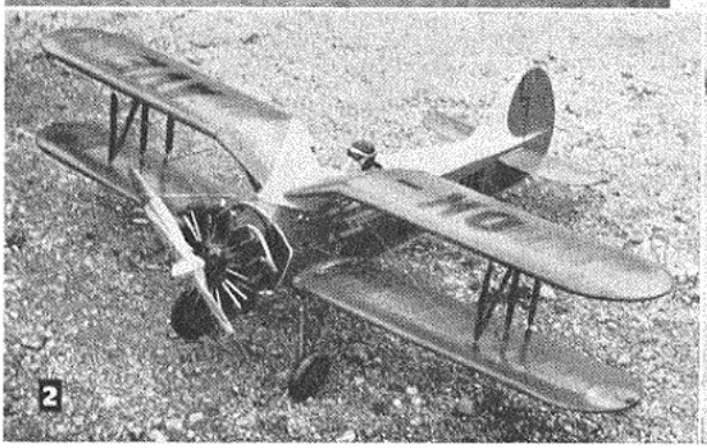
VISITORS to Southport should have little difficulty in recognising the aeroplane in photo **No. 1,** or, rather, they would recognise the original D.H.83 *Fox Moth* that inspired this fine model, built by B. Barton of Doncaster. It is to the popular 1 in. to 1 ft. scale, and the colour scheme is as per the original. Power is supplied by a Mills 0.75 c.c., and the model performed well enough to win the E. J. Riding Memorial Trophy in 1956.

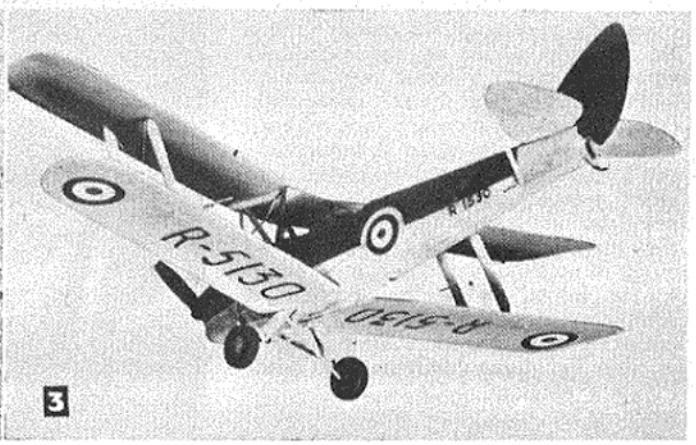
The interesting C/L biplane in photo **No. 2** is a scale model of the *Avia* 722, an aircraft flown between the wars by the well-known Czech military pilot F. Nora. The model was built by G. Rue, while the photograph was taken by the Czech speed flier Milan Vydra.

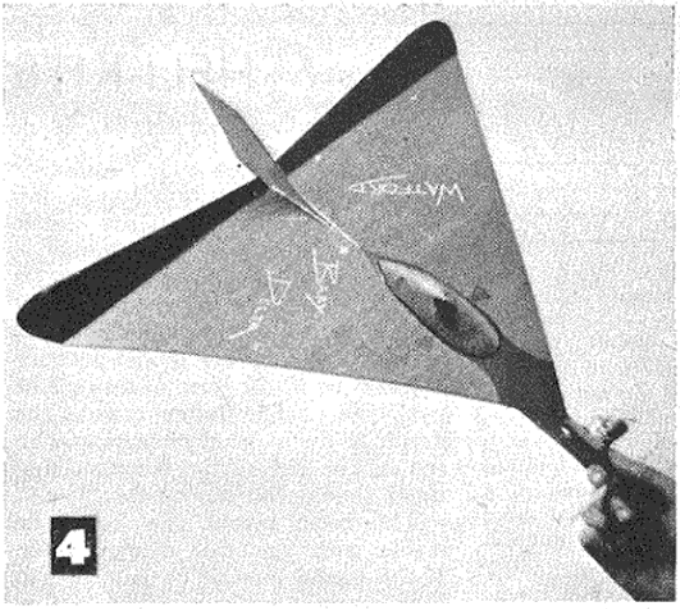
We have always known that most modellers have a soft spot for the *Tiger Moth*, but even we were amazed at the tremendous interest aroused by our feature on this aircraft in the March, 1957, MODEL AIRCRAFT. Of the many fine models that have been made from the plans in that issue, this one (photo **No. 3**) by L. Brock is truly outstanding. With the exception of the wheels, struts and propeller, the construction is entirely from balsa, and is finished dark green/dark earth upper surfaces, trainer yellow undersides. The photo was taken by F. Huthwaite with a " vintage " plate camera.

It is almost impossible to visit any flying meeting without seeing a variety of saucers, deltas, and similar wings performing. Their popularity is easy to understand, for they are easy and cheap to build, simple to fly, and, being usually of all-sheet construction, are about the most robust sports designs available. The example shown in photo **No. 4** is the work of John Taylor of Watford, who also designed the popular *Sorcerer*, which appeared in the April, 1956, MODEL AIRCRAFT. Powered with an E.D. 0.46, this latest model is called *Baby Delta*, and has a smooth, if somewhat fast, flight pattern.

Readers who are interested in stunt flying will, of course, recognise the aircraft in our next photo (**No. 5**) as the popular *Stunt Queen*. This one was built by Ian







Thomas of Ealing, is finished dark blue and yellow, and powered with a B.B. Amco, which gives it an airspeed of some 55 m.p.h. G. E. Grey took the photo, and Miss Mary Bamford was obligingly on hand to assist with the pose.

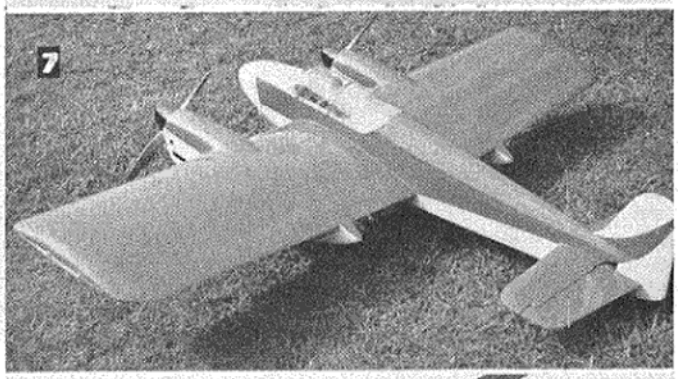
Another popular M.A. plan design is shown in photo **No. 6.** It is B. I. Fry's original *Wendy* (plan No. 199). The model is spray finished in green and brown matt camouflage colours, which give it a realistic semi-scale appearance; this is added to by the cabin detail which includes full interior upholstery, etc. Needless to say it flies well, powered in this case by an Allbon Merlin.

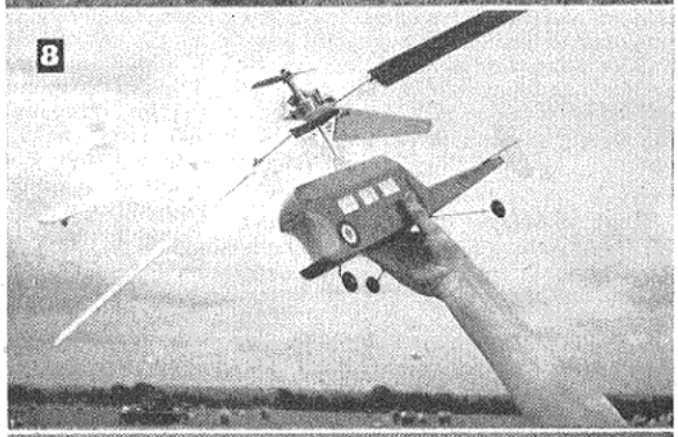
Another semi-scale model, but this time C/L, is shown in our next photo (**No. 7**). Called the *Venture*, it was built by C. Hollowood for the Northern Models Exhibition, where it gained first prize in its class. Of 42 in. span, the wing is that of a Mercury *Monarch*, sheet covered and flaps removed, but the rest is original. With an all up weight of 3 lb. the two A.M.25s give it an airspeed of between 50 and 60 m.p.h. The photo was taken by Clifford Kendall.

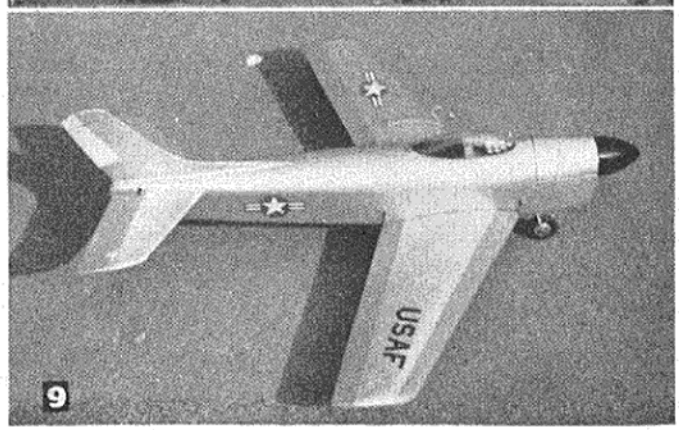
It has often surprised us that in spite of their full-size popularity, helicopters have never really caught on with modellers. Surely, with all the ingenuity that exists, the technical difficulties cannot be too great; indeed, these models should be the type to appeal to those who want to build something that is challenging and different. To provide inspiration photo **No. 8** shows a successful design built and flown—with a 1.5 c.c. engine—by Colin Read of Newport Pagnall.

Our last photo this month (**No. 9**) was sent in by P. Green of Gloucester, and shows his semi-scale C/L F86D *Sabre*. For ease of transport it features a detachable wing, and, in spite of rugged, almost all-sheet construction, has an impressive turn of speed with an Allbon Merlin, while the tricycle undercarriage gives excellent take-off and landing stability.

Would you like your model to appear in Photonews? We are always pleased to receive photographs and news of readers' models—old or new. Just send us a print, not smaller than postcard size, together with full details of the model and relevant photographic gen. A word of warning: we cannot use photos that are out of focus, fuzzy or taken against a confusing background. A reproduction fee is paid for all photographs that are published.







American Column

SIZE appears to have been the keynote of the 1957 U.S. Nationals. It was, say the experts, too big. Too many people, too many entries (over 1,500) and too much to try to cope with in seven short days of model flying. . . . If that seems hard to believe, imagine, for a start, over 300 R/C entries.

* * *

As for the photo of the Convair B.36, we still can't make up our minds whether this is a leg-pull or is meant to be taken seriously . . . As we said, size was the keynote of the Nats, so why not a BIG C/L model?

A/1c Don Belote, at Orlando Air Force Base in Florida, sent us the picture. According to his information, the model is 1/6th full-size, which would make it 38 ft. 4 in. span and 27 ft. long . . . "It has," he says, "six Whizzer motorbike engines and four Dyna-Jets. . . . It's supposed to have been flown but I have no idea what they used for lines (or an anchor!) and how in heck they get those ten engines going at one time—especially the Dyna-Jets—is beyond me."

* * *

Keith Hoover, of the long-established Chicago Aeronuts, has been experimenting with ultra-high-thrustline F/F models and the unusual and interesting result is seen in our second photo. The model has a thin wing section (7 per cent.) with a sharp entry and flat undersurface. The wing is also swept forward 5 deg.

Construction features a geodetic tailplane and Warren truss wing. The latter is silk covered, but would have been better planked, says the designer.

The "droop snoot" forward end is of no special significance—it is merely there as a prop saver. Keith tells us that the model exhibits none of the usual looping tendencies. He did not give the make and type of motor he is using, but, studying the picture closely and with the aid of a magnifying glass, it looks to us like an Arden 0.099—which, in a normal pylon model of similar size, would give quite a lively performance.

* * *

From time to time, over the past two or three years, rumours have been heard from California of a 0.15 cu. in. (i.e. 2.5 c.c. or International class) engine by L. M. Cox, makers of the famed Thermal-Hopper engine. Having regard to this company's reputation in the ½-A class engine field, everyone has expected that, if and when a Cox 0.15 appeared, it would most likely prove to be another world beater.

We therefore enquired of Leroy M. Cox, president of the L. M. Cox Manufacturing Co. Inc., what the position is in regard to his company's entry into this highly competitive international class.

In reply, Mr. Cox told us that, for the present, the Cox 15 will not go into production. It is true, he went on to say, that they have developed a 2.5 c.c. glow engine that has outperformed every similar sized engine against which it has been tested—including diesels—but the current demand for other products is such that all present available facilities are taken up.

The Cox concern is, of course, one of the most active in the U.S. model industry. At the present time they are producing no less than 4,000 high quality baby engines per day! In addition, vast numbers of powered ready-made plastic models (some with self-starters) are turned out for the toy industry.

Have Fun with a HELI-KITE

Continued from page 93

which take the shock of "landing." The rotors, strangely enough, are seldom damaged if stoutly made initially with a good strong hinge.

The remaining requirement is plenty of side area—in the right places. Tail fin area should approximate to ordinary F/F model practice and can be in the form of a single or twin fins. The latter enable the depth of fin to be decreased and so reduce the risk of the rotor striking them should the mount flex.

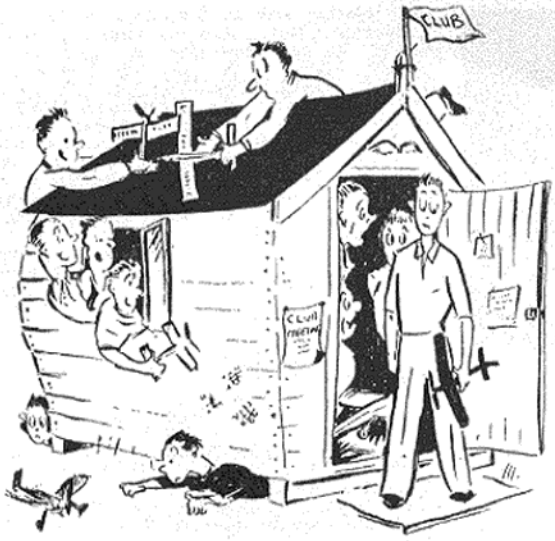
The basic layout can be made stable with just this configuration. If the model cannot be trimmed to keep straight without rolling off to one side, check first that the tail surfaces are not flexing and causing the trouble. If these appear satisfactory, than a "belly" fin will effect a cure, finding the best position by trial and error.

Balance point is not all that critical but is best on or slightly in front of the rotor axis. This will demand a fairly generous nose weight, for the fuselage forebody is normally kept short.

A really stable model will fly quite satisfactorily as a kite with a single line attached to the nose of the fuselage, the best point of attachment being quite high. A second tether line back to the fuselage, using $\frac{1}{16}$ in. square rubber ($\frac{1}{8}$ in. strip on large models), may improve stability, the best point of attachment for this rubber being found by experiment. If the model does not respond satisfactorily, then bridle lines to the winglet spar will help. These will not, however, cure a turn.

For tow-launching as a glider a number of hook positions should be tried until one is found which gives satisfactory results. These, again, need to be high, and fastening on the side of the fuselage near the top edge will be best. It is very doubtful if you will get the model to tow consistently with hooks on the bottom of the fuselage.

Flying, whether as a kite or tow launching, is just like launching a towline glider, except that the rotors must first be rotating strongly in the *right* direction. To ensure this it is usually best to set them spinning by hand and then hold the model into wind in the best attitude to keep them autorotating strongly.



Club News

NORWICH M.A.C.

Our American members attended one of our flying meetings on St. Faith's Aerodrome and it proved to be an eventful afternoon. One of them flew a F/F cum C/L model of a Piper *Cruiser*. Using a U-Reely handle, he flew on short lines and then gradually lengthened them, making everyone run for cover.

WANSTEAD C/L RALLY

The wind and rain kept a large number of modellers away but quite a few hardy types turned up.

The Flats soon churned up into mud and the "½A" and "A" racers had a wallowing time. Fisher of Peckham took the "½A" prize and Allen of Enfield won the "A" class.

There were only two entries in the stunt and three in the "B" racing. Gordon Oswell of Ashford won both these events.

The combat was the best attended event and as this started late to allow late arrivers to enter, it was dark before it had finished and in the draw for the winner, B. Austin of The Dope Pedlars was the lucky one.

Prizes were sent on to the winners by post as the tin containing all the club's cash—including entry fees—was taken from the main control desk.

We hope the weather will be kinder to future rallies.

BAILDON M.F.C.

The club held its first annual general meeting recently, and officers for the coming season were elected—or, to be more precise, in most cases re-elected!—the only important change being in the post of competition secretary, where Bill Lakeland replaces Gerry Tideswell.

Two days later, we attended the Colne M.A.C.'s winter rally in cold, but otherwise ideal, weather conditions, and had a most successful outing, Arthur Collinson's Thimbledrome-powered *Thermal Hopper* taking first prize in open power with 11 : 36 and Silvio and Brian Eggleston following up in second and third places respectively; while in the glider event, Frank McNulty came in third and added further laurels to those already won by our power boys. All praise, too, by the way, to the Colne club for organising a very enjoyable meeting.

SIDCUP A.S.

A model of "Sputnik I" complete with radio and aerials and an authentic tape recording of the "bleep-bleep" was shown at a "Fayre" at Eltham Congregational Church. This model, made by R. Alchorn, was the highlight of our part of the display which included representations from all branches of aeromodelling, including R/C and several hundred plastics.

BLACKHEATH M.F.C.

The club recently held its annual general meeting and cup presentation, in which H. Sharp (Fred) took most of the pots away. The old committee were re-elected, and Mr. Baines, our treasurer, was re-elected for the 24th year in succession. (Good going.)

The Bill White Cup will be flown off later in the season, about October; the precise date has yet to be fixed. We are hoping for better weather, and thus a larger entry.

New members are always welcome to the fold. For further details contact: P. Crossley, 11, Broadfield Road, Catford, S.E.6.

ENFIELD & D.M.A.C.

The class "A" T/R boys got away to a good start to the season, by winning the class "A" event at the Wanstead rally, although it might have been more appropriate had the models had floats instead of wheels for getting off the mud.

Indoors, one evening was livened up recently by a "paper dart" comp. Members were each given a standard sheet of paper, and told to get working for a comp. in 20 min. time. Considering the restricted confines of our club hall, some quite good performances were put up too; in fact, in the "longest distance in a straight line" event we had to open the doors at each end and fly straight through! And with no "ballast" allowed this time (last time someone used a pair of pliers as ballast, which, while the "model"

CONTEST CALENDAR

Feb.	22/23rd	INDOOR NATS., Corn Exchange, Manchester. Microfilm, Tissue, Chuck Glider.
,,	23rd	Southern Area Rally, Beaulieu Aerodrome. Rubber, Power, Glider, Radio, T/R ½A, "A" and "B."
Mar.	2nd	A.R.C.C. Meeting, Chalgrove Aerodrome, Berks. R/C Single and Multi.
,,	16th	GAMAGE CUP. U/R Rubber. De-centralised. C.M.A. CUP. U/R Glider. De-centralised.
April	6th	PILCHER CUP. U/R Glider. Area. LADY SHELLEY CUP. Tailless, Rubber, Glider, Power. Area. WOMEN'S CUP. U/R. Rubber, Glider. Area. JETEX CUP.
,,	20th	Surbiton Gala. U/R Rubber, Glider, Power. Chobham Common.
,,	27th	*KEIL TROPHY. Team Power. Area. K.M.A.A. CUP. U/R Glider. Area.
May	25/26th	**BRITISH NATIONALS** THURSTON CUP. U/R Glider. SHORT CUP. 2.5 c.c. PAA-Load. GOLD TROPHY. C/L Stunt.
,,	25th	S.M.A.E. TROPHY. R/C Multi-Control. (Full R/C schedule, course and aerobatic flying.) DAVIES TROPHY. T/R Class "A." SPEED. Classes 1, 2, and 3. SIR JOHN SHELLEY CUP. U/R Power.
		COMBAT. (1st Round.) MODEL AIRCRAFT TROPHY. U/R Rubber.
,,	26th	SUPER SCALE TROPHY. F/F Scale. KNOCKE TROPHY. C/L Scale. RIPMAX TROPHY. R/C. Rudder Control. (Course flying manoeuvres 1-6 inclusive and No. 20.) DAVIES TROPHY. T/R Class "B." SPEED. Classes 1, 2, and 3. COMBAT. (2nd Round and Final.)
June	7/8th	POWER & RUBBER WORLD CHAMPIONSHIP CLASSES (First Trials). Centralised.
,,	15th	Godalming M.A.C. Rally. Team Racing. "A" and "B." Combat.
,,	22nd	INTERNATIONAL CLASS C/L TRIALS. T/R, Speed, and Aerobatic. (All to F.A.I. Specifications.) Centralised.
,,	29th	Scottish P.A.A. Festival. R.N.A.S. Abbotsinch.
,,	29th	Northern Heights Gala. Halton.
July	5/6th	POWER & RUBBER WORLD CHAMPIONSHIP CLASSES. (Second Trials.) Centralised.
,,	20th	AREA CHAMPIONSHIPS. Centralised. INTERNATIONAL CLASS R/C TRIALS. Centralised.
Aug.	3/5th	WORLD CHAMPIONSHIPS POWER & RUBBER. Cranfield.
,,	23rd	U.K. CHALLENGE MATCH.
,,	24th	**SCOTTISH GALA** CATON TROPHY. U/R RUBBER. U/R GLIDER. U/R POWER. TAPLIN TROPHY. R/C. Rudder Control, Stunt. (Simplified schedule.) TEAM RACING. "A" and "B."
,,	24th	South Midland Area Rally. Cranfield.
Sept.	7th	**NORTHERN GALA** U/R RUBBER. U/R GLIDER. U/R POWER. AEROMODELLER R/C TROPHY. R/C Multi-Control. (Full R/C schedule, course and aerobatic flying.) TEAM RACING. "A" and "B." P.A.A. LOAD. (International Class.)
,,	21st	GUTTERIDGE TROPHY. Wakefield. Area. *MODEL ENGINEER CUP. Team Glider. Area. HALFAX TROPHY. U/R Power. Area.
,,	28th	TEAM RACING. "½A," "A," and "B." Area.
Oct.	12th	*FARROW SHIELD. Team Rubber. Area. S.M.A.E. CUP. A/2 Glider. Area.
,,	26th	HAMLEY TROPHY. U/R Power. De-centralised. FROG JUNIOR CUP. U/R Rubber, Glider. De-centralised.

*Plugge Cup events.
All S.M.A.E. competitions in capitals.

went a long way, when it reached the hardboard wall at one end of the hall it went straight through !). Spot landing also produced some fun, one chap landing right over the spot, from quite a distance, too.

We wonder whether it is a coincidence or not, that all the top placers are still at school!

HAYES M.A.C.

Several members braved the wind and the rain to decide the club C/L championship. B. Greenaway and D. Balch won "½A" and "A" team races respectively, and K. Fuller succeeded in making the sole flight in class "B." These three will hold the cups presented recently by K. Lindsey, and will be considered champions for 1957, with another competition for 1958 expected to be held later, when (and if) the better weather comes along. Combat went with a swing, but was typically inconclusive with two members still battling away doggedly after dark.

ASHFORD M.A.C.

We endured a rather wet day at the Wanstead rally. However, it was worth it, for Gordon Oswell won stunt and "B" team race.

Apologies to West Essex for the mess we made of their lines—poor Norman Finch.

On a bad flying day one always sees the *same* keen flyers. If you're keen you'll be there at any price.

An increase in membership is always a good sign, but now we have our first radio bod.

Meet us at Victoria Park, Ashford, Kent, on Sunday mornings—and bring a model.

LEICESTER M.A.C.

The final attempt to hold the club R/C contest was successful. When I say *successful* I mean it was held and was very well attended but *not* by competitors. The winner was G. Franklin with 29 points out of a possible 100 and M. N. King was 2nd with 8 points, the model thereafter being o.o.c. and soon o.o.s. These were the only ones who recorded any times and collected any points out of the four entries. Now I ask you. We get three good *placings* in the R/C Internationals last year, but only two *flying* entries in our own contest.

However, it appears that R/C flying this year should be more lively as in addition to the seven regulars present there seems to be another five members at least who are contemplating trying R/C.

Let us hope that this year's contest (which should be held earlier by the way) will attract 12 entries, that they will all *fly*, and that they all have *much* less radio and engine trouble.

WIGAN M.A.C.

Our end of season comp. had a very close finish for top senior between S. Wood and B. Talbot. Members flying in all F/F events nominate two events before the comp. for top senior trophy. The eventual winner of the comp. was B. Talbot, with M. Hosker top junior.

Wigan's model shops presented two large cups, one for senior and one junior. Both silver cups were for the best competitive member throughout the full season. The senior trophy, "The J. J. Bradburn Trophy," was won by B. Talbot. The junior trophy, "Jack Carrington Trophy," was won by F. Anderton. Mr. Bradburn also gave vouchers for all winners. Mr. Carrington supplied small trophies for first places. We extend our grateful thanks to both shops for the wonderful co-operation.

The club was highly praised for their stall at the Wigan arts and crafts exhibition which drew a lot of attention and also brought some new members into the club which is now settled in their rented club room every Friday night. The club would also like to thank all those concerned in making their stall at the exhibition a success, not forgetting the handful who turned up early Sunday morning to dismantle same.

S.M.A.E. NATIONALS FILM

Feb.	21st	Plymouth M.F.C.
Mar.	3rd	Stratford-on-Avon M.A.C.
,,	10th	Enfield & D.M.A.C.
,,	14th	Wakefield M.F.C.
,,	20th	N. Lincs. M.A.C.
April	2nd	De Havilland (Hatfield) M.A.C.
,,	17th	Dagenham M.F.C.
,,	23rd	Glasgow Barnstormers.
May	3rd	Glevum Gloucester M.A.C.
,,	8th	Lincoln & D.M.A.S.
,,	14th	Hoddesdon M.F.C.

An attractive stand at a local exhibition. See Wigan report for details.

LIVERPOOL & D.M.A.S.

The above club was formed through the amalgamation of members from the Crosby M.A.C., the Merseyside M.A.S. and the Wavertree M.F.C., with a view to providing one strong competition club. Full details from the secretary—see under new clubs.

HUCKNALL & D.M.A.C.

The main interest of this new club is in C/L flying, but we are hoping to be able to provide F/F space before the contest season begins.

The club is affiliated to the S.M.A.E. (Midland Area) and new members are welcome. Full details from the secretary—see under new clubs.

EVESHAM & D.M.A.C.

This club has now been re-formed and meetings will be held every second Thursday of the month at Wallace House, High Street, Evesham. Prospective members welcome.

FARNBOROUGH M.A.C.

Junior M. Brown was the cause of much activity from the police in the Chobham area recently, when, following an o.o.s. flight in the Christmas club comp., his Alag-powered *Landrail* pylon job was found by a woman who informed the police that "A plane from Farnborough had come down on her land"—prompt arrival of squad cars !

Duncan Sibbick was awarded the annual club contest cup at the last club meeting, largely due to the performance of his *Helicanth* power models. Mk. I and III are currently flying and IV is on the way. (Mk. II is in storage due to lack of motors !)

Honour of fastest climb must go to Alan Leeson's *Saint III* (straight-dihedralled wing and works-tuned Oliver), which can do 3 min. from a 10 sec. motor run.

STRATFORD-ON-AVON M.A.C.

The club is showing "The Nationals 1957," on Monday, March 3rd, at Central Chambers Clubroom, S.-on-A., probably at 7.45 p.m. Details to be settled in the near future.

SOUTHPORT M.A.C.

A combat event, which attracted eight entries, took place in the club grounds recently. During the event much prangery occurred, to the delight of the more bloodthirsty spectators. Darkness prevented a final, and Geoff Major and Doug Barber took a joint first place.

SURBITON M.A.C.

Not much flying is taking place at the moment due to the cold weather. On a recent visit to Chobham it was found that the swamps had turned into solid ice.

Much activity is going on at the moment with F.A.I. models. All the power boys are doing over 3 min. on 15 sec., every time. In Wakefield the less said the better.

Surbiton supplied all the London area champions last season, these being: Power, D. Posner; Rubber, R. Burwood; Glider, A. Wisher.

We are holding a gala at Chobham Common on April 20th for all U/R F/F events. Four flights of 3 min., weather permitting, and Surbiton will not be flying in these events.

All enquiries regarding this gala should be sent, together with an S.A.E., to A. Wisher, 5, Bancroft Court, Lansdowne Green, London, S.W.8.

CHELTENHAM M.A.C.

Flying apathy in the Cheltenham M.A.C., always a problem at this time of year, should be cured now that Brockworth (Gloster Aircraft) aerodrome is permanently available to us. A fresh campaign to secure new members is to be launched, and all interested are asked to write to the secretary at 5, High Street, Cheltenham, for further details.

The club also intends this year to bring the Model Aircraft Carrier once more into the focus of the national eye. With all members lending their support, this project should prove to be a star attraction at several rallies this year.

NEW CLUB REQUIRED

All those interested in restarting the Tunbridge Wells M.A.C., please contact: J. Whitaker, 4, Court Road, Tunbridge Wells. 'Phone: 21088.

NEW CLUBS

EVESHAM & D.M.A.C. D. Grove, 121, Kings Road, Evesham, Worcs.

HUCKNALL & D.M.A.C. P. Watson, 25, Rockwood Crescent, Beauvale Estate, Hucknall, Notts.

LIVERPOOL & D.M.A.S. D. G. Thomas, 2, Wortley Road, Fazakerley, Liverpool, 10.

CHANGE OF SECRETARY

GLASGOW BARNSTORMERS. R. Forrest, 15, Avons Park Street, Glasgow.

FARNBOROUGH M.A.C. M. S. Young, 10, Lye Copse Avenue, Hawley Estate, Farnborough, Hants.

STRATFORD-ON-AVON M.A.C. P. Bartlett, 3, Glebe Road, Stratford-on-Avon, Warwickshire.

KLOUDET

Continued from page 78

third of a turn on the vernier at a time. However, if the elevons are lowered to a position to where they are in line with the washout angle of the tip, then they will be too low for proper flight under power. The cure for a stall in this condition is more ballast in the nose.

When you have obtained a nice flat and straight glide, raise the RIGHT elevon (looking from rear) about a third of a turn of the vernier. This should give just a shade of turn to the right. Remember a flying wing will turn toward the higher elevon. When you have reached this condition of trim, you can start on the power flights. Use low power to start with and gradually work up full power. Under full power conditions, if the model rears up into a stall, cure this with ballast in the nose and retrim for glide with the elevons.

The original model, under full power conditions, climbs at an angle of 60 deg. and completes about three-quarters of a circuit on the way up—to the right. When the power cuts out, it drops into a glide to the right. We have found the right power-right glide flight best for contest conditions. The model will not spin in to either the left or the right, but if adjusted for a left climb it will not gain height as quickly as with a right turn. Time and patience taken in trimming and adjusting is rewarded by "in-the-groove-flights" which will be the envy of those who see it perform.

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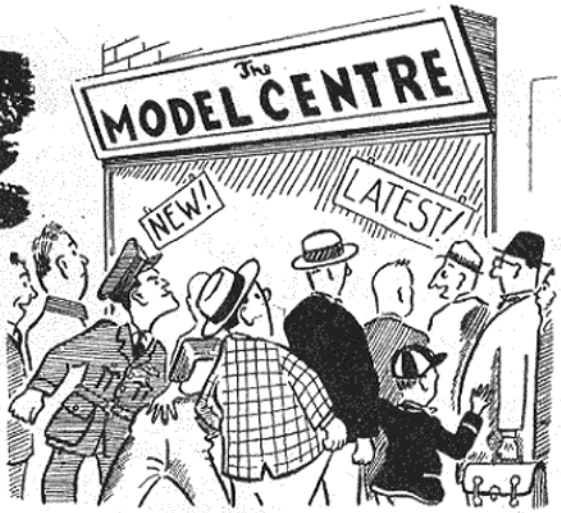

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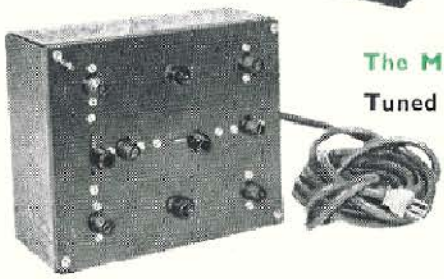

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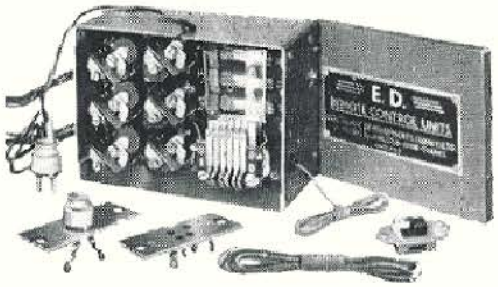

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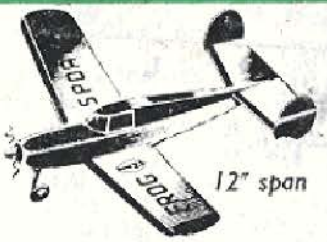

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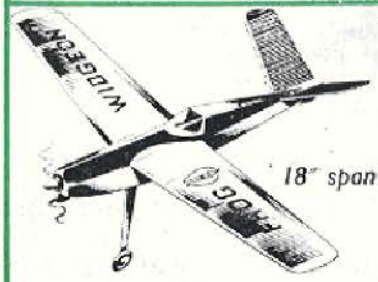

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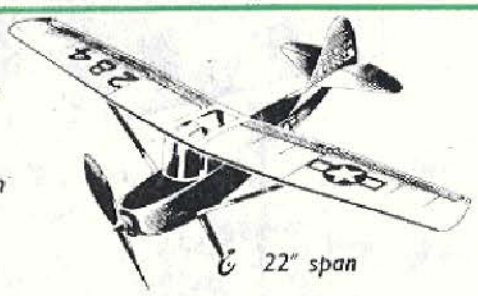

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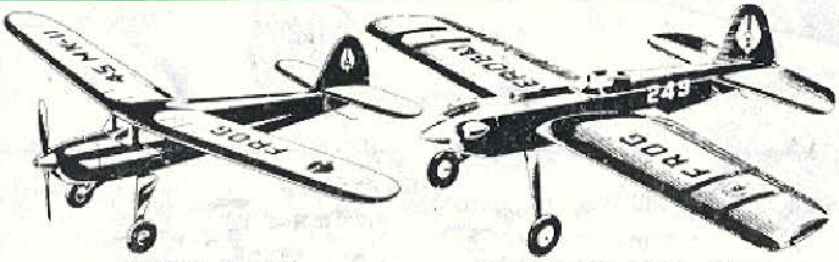

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"80" DIESEL
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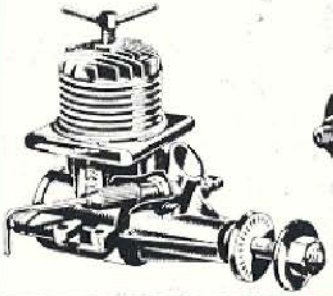

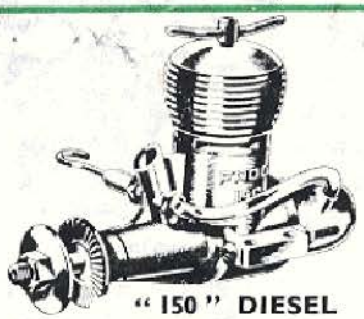

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