FEBRUARY 1960

1'6

MODEL aircraft

featuring -

this superb free-flight

GLADIATOR

MODEL AIRCRAFT WINGS CLUB

A thrilling new club for young modellers—

full details and membership form inside

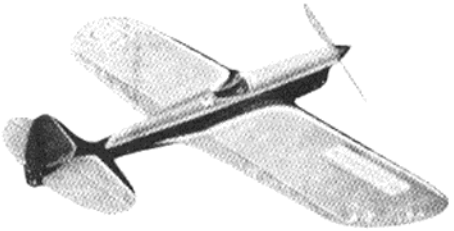
THESE KEILKRAFT KITS

ARE WINNERS!

Flt./Lt. M. F. Hawkins holding his Keilkraft SPECTRE, with which he won the Control Line Stunt Contest at the Tenth United Kingdom Royal Air Force Model Aircraft Championships—held at Debden Aerodrome, Essex, on the 26th and 27th Sept., 1959.

SPECTRE

The Spectre is a 41 in. span Stunt Model for engines from 2.5 to 3.5 c.c. A De Luxe kit containing die-cut parts for quick and easy building. **37/6**



—and just read these letters praising the Keilkraft CAPRICE!

12, Goodwood Crescent,
Singlewell,
Gravesend, Kent.

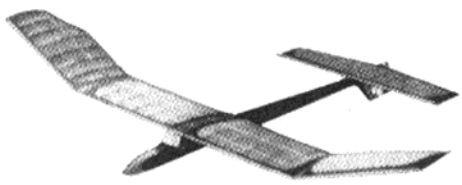
Dear Sirs,

I am writing to thank you for putting such a good kit on the market which is the KEILKRAFT CAPRICE which I would recommend to any future modellers.

This model had six off the line flights which regularly turned in flights over 3 minutes, on the sixth one it was timed for 27 minutes, before it was last seen disappearing into high clouds, from which the model has not yet been recovered. This performance can be verified by several members of the North Kent " Nomads."

Thanking you once again for this superb model.

Yours faithfully,
R. RENNELL.



CAPRICE

51 in. span contest glider. Kit contains all die-cut parts. **15/9**

72, Belsize Road,
Hemel Hempstead, Herts.

Dear Sirs,

I feel I must write to you and pass on this information. I have recently, after many years, started building model aircraft again, starting with your PIPER CUB, but this is not the model in question.

I purchased last Monday from " Henisons " of Hemel Hempstead your CAPRICE GLIDER, my first ever. After a week's work and many hours sleep lost, she was taken off the plan last night (Saturday), doped, and balanced and left till this afternoon. This being our club day for flying (Apsley Aero Model Club).

On arriving at our field she was assembled and launched on a straight glide for a distance of approx. 20 yards, no trimming or alteration being necessary at all. We then, at 2.55 p.m., launched her on the line. She was set with a one-minute D.T.

Three other club members set watches on her and at five to four clocked off. We followed by car for about six miles and lost sight through the twisting lanes. It was then going strong in the vicinity of St. Albans.

Although disappointed and a little sad, being first flight, I feel I must say my confidence and praise to you on the design and quality of your kits. Here's hoping for a speedy return of one said " CAPRICE," lost out of sight and still going this Sunday.

My thanks again for your first class kits.

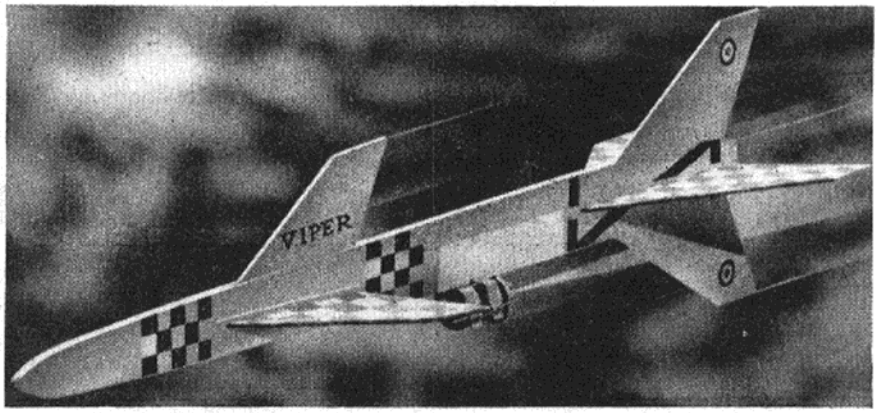
Yours sincerely,
BRIAN R. ENGLAND

If PERFORMANCE counts with you . . .

BUY KEILKRAFT

VIPER

Silhouette ground-to-air missile. Overall length 17 in. Span 5 in. Weight complete with empty motor $\frac{7}{8}$ oz. Building time $1\frac{1}{2}$ hrs. Kit contains: printed and pre-cut balsa parts, balsa strip, aluminium sheet, 50 c. motor and mounting clip, transfers, cement, hardwood motor mounting block, screws, noseweights, drawing and instruction sheet. Individually boxed. Retail selling price inc. P.T. **6/11.**



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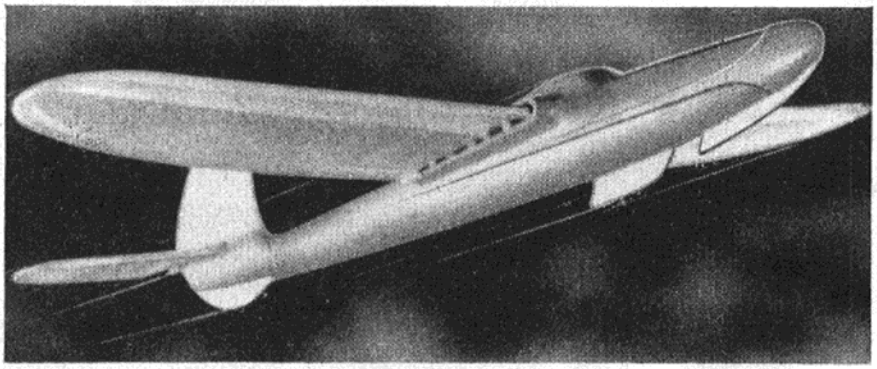
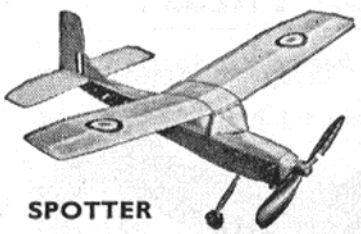


SWALLOW

Ready-to-Fly, 11 in. Span, Catapult glider.
Specification:
Injection moulded fuselage. Plastic wing and tailplane. Injection moulded catapult, complete with elastic launching band. Individually boxed. Retail selling price inc. P.T. **2/6.**

JASCO *Easy to BUILD-Easy to FLY!*

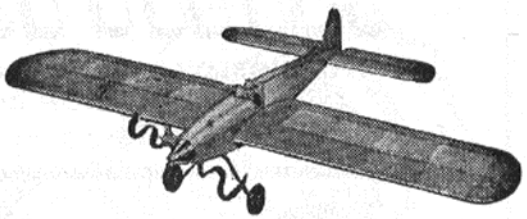


SPOTTER

SPOTTER Rubber model

An 18-inch rubber model complete with plastic prop and noseblock, plastic wheels cement, sandpaper, transfers, tissue and rubber motor. Quality balsa is used throughout and all parts are accurately printed. Suitably modified it is an ideal model for the Allbon "Bambi" diesel.

Price including tax **5/11**

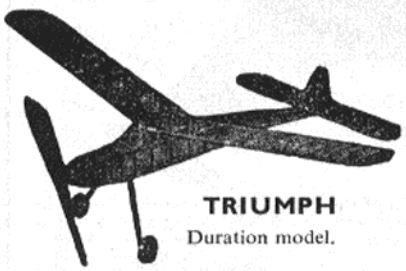


TRACER

TRACER Stunt control line model

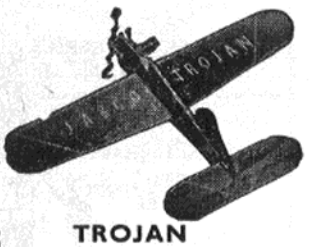
A 31½-inch span Stunt Model designed for beginners and experts alike. The kit is complete even to the cement and the finished model will go through the stunt schedule with ease. Suitable for 1.5 c.c. to 2.5 c.c. engines.

Price including tax **16/11**



TRIUMPH
Duration model.

TRIUMPH
A beginner's duration model kit containing selected balsa parts die cut for easy construction. Contains tissue, wheels, balsa propeller, transfers, all necessary small parts, except rubber motor for which 9 yards of 3/16″ × 1/30″ flat rubber is required. Wing span 33 inches. *Retail Price* **8/9**



TROJAN

TROJAN Control line model — A model suitable for a beginner who wishes to build his first model. An exceptionally strong model of a most pleasing appearance. Profile fuselage and solid sheet wings. Wheels, transfers and all small parts supplied. All parts pre-shaped. Wing span 18 inches. Suitable for engines 0.5 to 1.5 c.c. *Retail Price* **10/3**

JUNIOR AIRCRAFT SUPPLY CO. LTD.
129a EASTBANK STREET · SOUTHPORT

MODEL AIRCRAFT

FEBRUARY 1960

No. 224 VOLUME 19

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IN THIS ISSUE

The official Journal of the SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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Here and There

Electioneering !

TWO issues ago we stated that voting support from clubs for the S.M.A.E. election of officers had, in the past, been poor. This could hardly be said of the current election, for roughly twice the normal number of votes were cast.

No one will ever know exactly why this happened, but it is not unreasonable to assume that the election "manifesto" sent to all clubs, by Dave Posner, one of the candidates for the post of vice chairman, was in no small measure responsible. Dave was severely, and publicly, called to task for his "electioneering" which, it was claimed, gave him an unfair advantage over the other candidates.

This may or may not be so. In our opinion he should have received a vote of thanks for at last arousing some interest and discussion among clubs, although, in doing so, he pointed to the fact that the Society itself was at fault in not circularising details of the candidates with the ballot form.

Suffice to say that Mr. Posner was elected with a large majority, but, having scored a moral victory, took the first opportunity—at the Council meeting following the A.G.M.—to resign. His reason was that it had been put to him that by "electioneering," he had broken the "gentlemen's agreement" that no one candidate should seek more publicity than the others !

* * *

The only other vacancy requiring a vote was for the post of F.A.I. delegate and here Henry Nicholls scored an overwhelming victory with the largest percentage majority ever recorded.

Silence IS Golden—

Worth £10 to you !

ON March 4th the "Noise Abatement Bill" receives its second reading in the House of Commons. How will this affect model—particularly C/L—fliers? At the moment no one knows, but as one of the main reasons advanced for the curtailment of this type of flying in local parks, etc., has been noise, its affects may well be far reaching.

The obvious solution is for fliers to equip their motors with silencers. (The American term "muffler" is better, and, in fact, the use of these to muffle noise to a tolerable limit is obligatory when flying in certain of their Control-line Parks.) Their lack of use in this country is mainly due to the fact that the units so far seen, are bulky, heavy and, most important, materially restrict the performance of the motor.

We realise that a glo-motor in full song is music to a modeller—better than a Beethoven symphony or even Cliff Richard—but if C/L flying, in places where noise is a nuisance, is to continue on its present scale then steps must be taken.

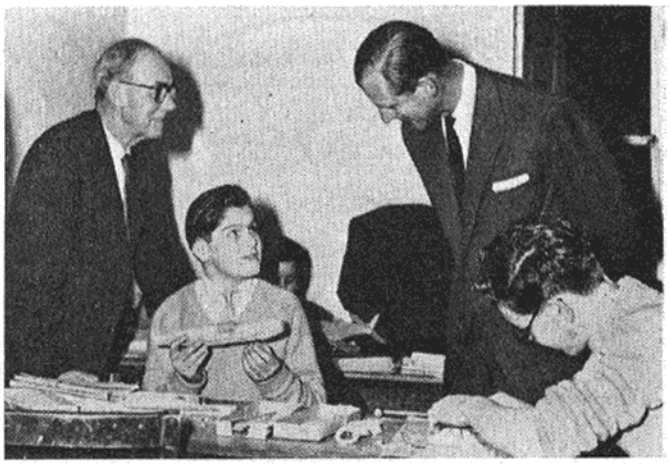
To this end MODEL AIRCRAFT is offering a cash prize of £10 to the reader who can produce the most efficient muffler to the following requirements. It must be light, compact, effectively reduce the exhaust noise while having the minimum effect on the output of the

engine, be readily adaptable to different types of motor and should be as simple as possible so as to be suitable for quantity production.

We realise that this is a pretty tall order, and we would emphasise that we are only interested in practical results, *not* theoretical designs. The £10 will be paid to the person who, in our opinion, produces the muffler which adequately fills our list of requirements, so let's have them, for we intend to put each to a practical test. The address is 19-20, Noel Street, London, W.1, and they should be securely packed in a box suitable for returning them when our tests have been completed.

A Royal Visitor

Modellers will be pleased to note the Royal interest shown in their activities by the Duke of Edinburgh, who is seen discussing model building with a member of the model aircraft class at Christ Church United Clubs, Kennington. Looking on is J. C. Smith, well known pre-war S.M.A.E. Comp. Sec.



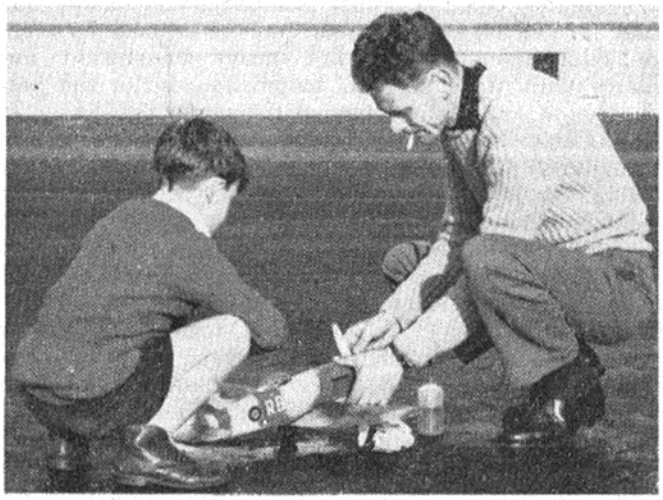
Looking at Models

YOUR local cinema will shortly be showing a film in the "Look at Life" series, dealing with models. There are many different types of model dealt with including aircraft, and it was in the filming of these latter sequences that we were asked to assist.

The photograph shows Norman Butcher, with very interested young spectator, preparing a scale C/L *Tempest* for a demonstration flight on the now deserted tarmac in front of the Control Tower of Croydon Airport. The model being the one flown to 3rd place in the Knokke Trophy at last year's Nationals by George Fletcher.

Incidentally, George appears in the film with a superb scale model of the tug *Vigilant* built by his father, Dr. T. Fletcher, some twenty years ago. This is the boat with which Dr. Fletcher won an award at the recent Doctors' Hobbies Exhibition, and it is powered with a twin cylinder, water-cooled engine, driving the prop through a reversing gearbox.

The day before the film was to be shot George discovered that one cylinder wall of the motor had rusted through and was leaking water. He overcame this by removing the head, connecting both H.T. leads to the remaining plug and running the motor as a "single." Very resourceful but we've an idea he will be busy with his lathe before he dare return the boat to dad!



Approved Contests

IN our correspondence columns last month, John O'Donnell drew attention to the unsatisfactory state of affairs that existed at two recent widely advertised rallies. John also pointed this out to the S.M.A.E. and the result has been immediate action.

Organisers of future rallies should inform the S.M.A.E. *in ample time* of their intentions, and if the Council consider that the area or club concerned have suitable facilities to run a *successful* meeting, then they will give it their sanction. This is an excellent move and should have the desired effect of guaranteeing that intending competitors will not travel, often hundreds of miles, to a meeting that is poorly run or has been cancelled at the last minute.

There is, of course, nothing to prevent people organising meetings and *not* applying to the S.M.A.E. for sanction, but as far as we are concerned *only* sanctioned meetings will be published in the M.A. Contest Calendar.

Doctors' Diversions

WE recently visited the annual Doctors' Hobbies Exhibition organised by Bengers Laboratories Ltd. From the literally hundreds of different exhibits, ranging from shrunken heads to home made wine, we were pleased to note that at least two doctors are aeromodellers. A C/L *Tempest* built from a Frog kit was entered by Dr. J. D. Carroll, while Dr. J. O'Conner had a selection of 24 plastic solids on show.

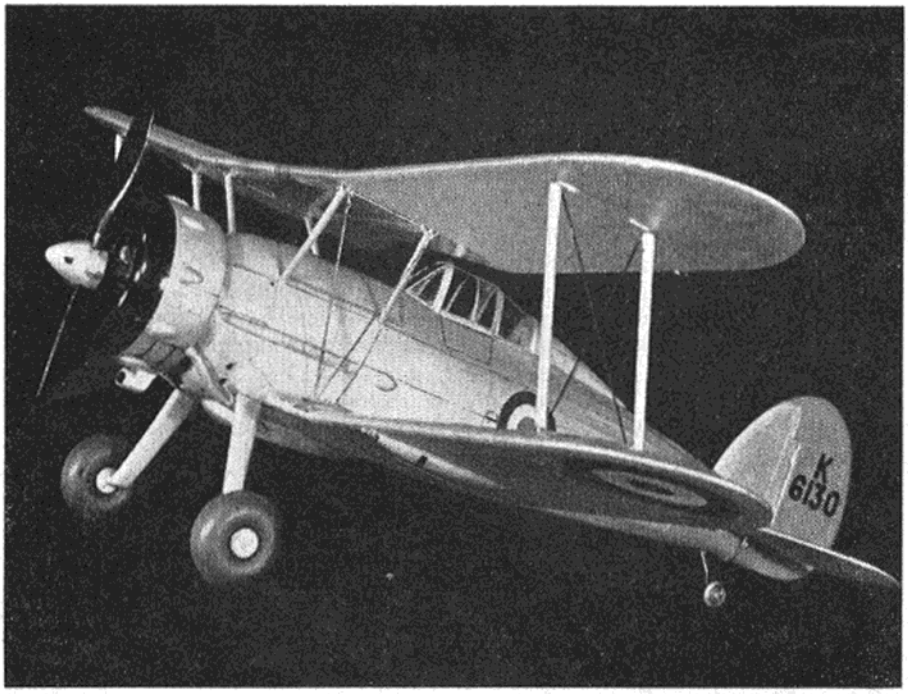
It is interesting to note that both these exhibitors hail from Ireland and makes us wonder whether all English medicos are earthbound in their leisure moments. Perhaps, however, they prefer to keep quiet about their interest, otherwise their surgery would be overflowing with local enthusiasts who would not only expect treatment for a cut finger, but instruction on how to operate the motor that had caused the damage, or even ask for ether on the N.H.!

In Retirement

Well known in the Trade, A. R. (Bert) Dean, father of that prolific modeller Bill Dean, has retired after 13 years' service as a traveller for Keil's, to take over a confectioners business. Bet he'll be selling kits before long!

An Apology

We apologise for the error in our S.M.A.E. Dinner Report where we stated that the prizes were presented by Mrs. L. C. Nash. In fact, this task was admirably carried out by the wife of the secretary of the S.B.A.C., Mrs. R. T. Hughes.



Build your own free-flight replica of this classic machine

Suitable for up to 1 c.c. motors

★

By GEOFFREY GANNON

GLOSTER GLADIATOR

AS the last fighter biplane to see service with the R.A.F., this aircraft has its own little corner in history and, in building and flying the model, we can recapture some of the atmosphere of its last days over Norway and Malta. The plans are very fully detailed, and, together with the cutaway drawing and these instructions, will enable anyone of average modelling experience to successfully complete the model.

Construction

Start by building the basic crutch on the plan and adding the top half-formers from F4 to F11a. On to these add the $\frac{1}{4} \times \frac{1}{8}$ in. hood-shoulders, F7a, $\frac{1}{8} \times \frac{1}{16}$ in. stringers and hood fairing block. While this portion is still on the plan it is advisable to build the tailplane, making sure that T6 is not cemented to the crutch. Unpin these parts from plan and add the lower formers from F5 to F11a and also the roughly carved tail block. The block components should be hollowed to give a wall thickness of about $\frac{1}{4}$ in.

The next stage of construction requires a little care, as the incidence settings of both wings depend upon its accuracy. Bend the cabane wires to accurate shape and join them with the tubing only at this stage. Stitch each strut to its correct former, and do the same with the undercarriage leg wire. Now add the rest of the formers as far forward as F1 using the crutch as a guide to make sure that they are in correct alignment. F2 and F1 should be assembled in one piece. The centre section ribs may now be added, plus the remaining wing platform wires and the top $\frac{1}{8}$ in. sq. stringers. Check the alignment of the wing centre-section very carefully.

Complete the lower centre-section by adding the leading edge and trailing edge straight through the fuselage, the trailing edge locaters, brown paper tubes and mm. ply facing ribs. Cut the engine bearers to the correct length and drill suitably spaced mounting holes for the engine to be used. Slide the bearers into place through F1 and F2 and add the $1 \times 1\frac{1}{2}$ in. block to F1 as shown on the plan. Slide C3 into position and cement it to the block and bearers. Carve roughly to shape from F1 to C3 leaving it $\frac{1}{16}$ in. oversize at F1.

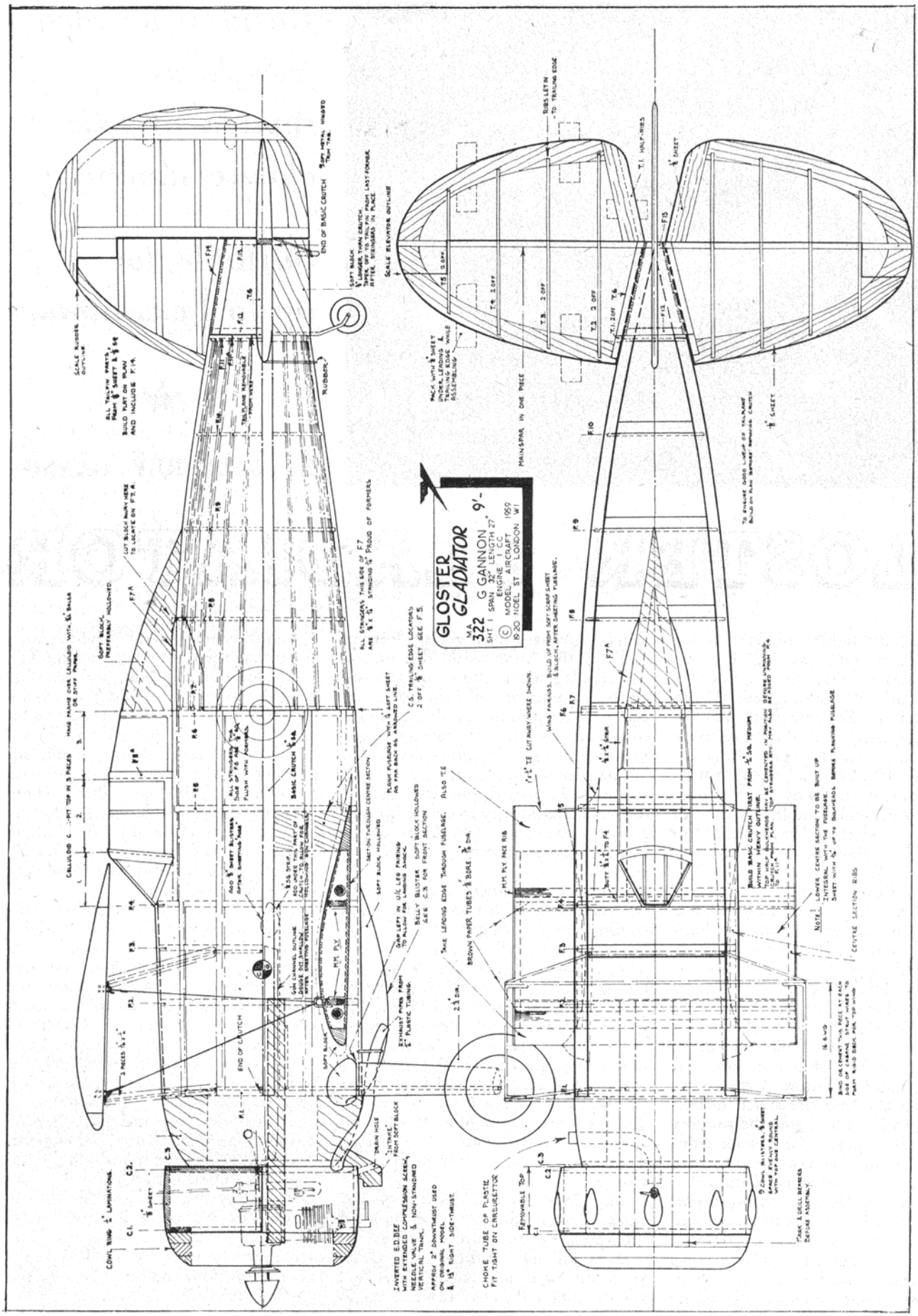
Top and bottom halves of the engine cowl should be completed separately on the plan, including the $\frac{1}{8}$ in. planking. Stitch half press-studs on each side. Laminate and roughly shape the cowl ring. Cement it to the lower half-cowl which is in turn cemented into position on C3. Snap on the top half and sand it roughly to shape, drilling the holes for the needle valve, compression screw, drain hole and exhaust tubes.

Add the rest of the $\frac{1}{8}$ in. sq. stringers to the fuselage and the wire loops to the stub spars. Plank where shown with $\frac{1}{16}$ in. soft sheet, including the centre-section stubs. The whole of the fuselage may now be finally sanded smooth, and the mm. ply facing ribs added.

The bottom lower wings are built in two halves and are fairly straightforward provided care is taken to give the $\frac{1}{8}$ in. dowels and root-ribs their correct angles and that the metal tubes for the interplane struts are correctly positioned. Check all the dowels for a good plug-in fit to the tubes and make the mm. ply face rib fit snugly against the mm. ply rib on the stub wings. Standard $1 \times \frac{1}{4}$ in. trailing edge and $\frac{3}{8}$ in. leading edge section may be used throughout.

Cut the top wing main spars, build the wings in two halves and then pin both halves either side of the centre-section on the plan. Support each tip at the correct dihedral, and complete the wing by building in the centre section, adding the gussets

Continued on page 35.



ABOVE IS A REPRODUCTION OF ONE OF A SET OF THREE FULLY DETAILED WORKING DRAWINGS, FULL SIZE COPIES OF WHICH ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, 9s., POST FREE

Continued from page 33.

and wire loops (paper fasteners) after removing from the plan. The fin/rudder is built flat on the plan and fitted into slots in F12 and F13 which are then planked with $\frac{1}{16}$ in. sheet. A small hole may be made in F12 to accommodate lead shot should the completed model balance nose heavy.

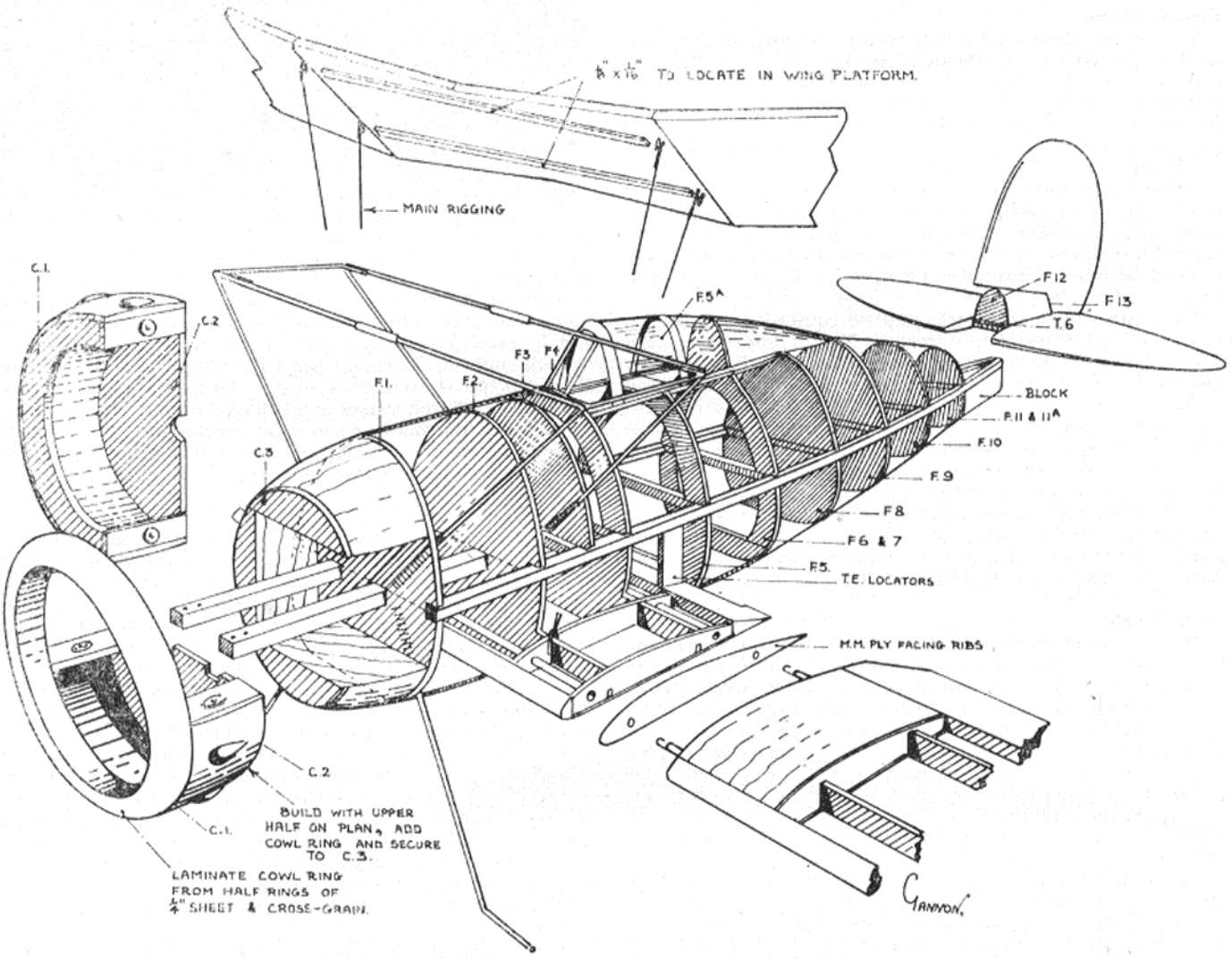
Fix the sheet fairings to the wire undercarriage legs, and add the cowl blisters and belly blister. Complete the cabane struts and interplane struts. Where milliners' elastic is used for rigging keep it nice and tight, and make the fixing hooks from paper clips. Add the celluloid hood and frame and cover the entire model with lightweight tissue, except for the underside of the lower wings where it pays to use heavyweight, as lightweight is easily punctured by the straw-like grass that is found on so many of our flying fields.

Model Aerodrome air wheels were used on the original model, but ply hub discs should be added to these for exact scale appearance. The original model was given a concours finish and weighed just under 17 oz., including prop and engine. A lighter model would result if less colour dope were to be used.

Flying

Balance the model on the c.g. and use lead ballast if it is nose heavy in preference to negative incidence on the tailplane. The latter method of trimming is inclined to increase the sinking speed more than the former. Should the model be tail heavy, then before adding any weights to the nose try a very small amount of positive incidence under the tailplane always remembering to test glide over long grass. Flying speed is fairly high so hand launch accordingly. For power tests (after a good smooth glide is obtained) it is preferable to try short take-off runs with the amount of downthrust shown on the plan, decreasing this by easy stages until the model just leaves the ground. Aim for a nice flat left-hand climb with just enough right-hand rudder tab for a wide right-hand glide circle. With the well-positioned undercarriage some pretty good landings are obtainable.

Stick to the 1 c.c. engine as a safe maximum capacity. I have tried a 1.5 out of curiosity, with a view to fitting stunt devices, but I was so alarmed by the rocket-like climb, that I abandoned this project. With a 1 c.c. engine the model will, under reasonable conditions, take a good bouncing, fall apart where it should and within two or three minutes be on its way back upstairs.



GLOSTER GLADIATOR
ASSEMBLY DRAWING

ONLY MAIN PARTS SHOWN.
STRINGERS OMITTED FOR CLARITY

TOPICAL TWISTS

by pylonius

Over-ruled

You happy-go-lucky modellers have heard by now something of what Aunty F.A.I. has cooked up for her wayward little chicks next season. Of course, she's too kindly an old body to give you all the grisly details at one go. So far you have only had a hint of the suffering in store, humanely conveyed in the Gosling report. From quite another little bird comes the full story; the stark facts of an amazing document which we dare you to read.

My interpretation might be just a little hazy. For one thing I can't pretend to be the gen boy on speed and other handle waving antics. In fact, I'm the bloke who thought Gadget Gibbs was a new type of toothbrush, but I can only do my clueless best.

Control-Line

First of all, there's some rule about whipping in the team race circle. It's a bit obscure, but I should have thought, resourceful as the engine whippers may be, such a crowded area would restrict their operations. However, I suppose it's possible for some light-fingered customer to infiltrate through the mass of officials and make his haul amid the general confusion.

There is, of course, the other sort of whipping, but I dismissed this after seeing a recent team race. How anyone could whip up any whipping enthusiasm while trying to control a rampant 100 m.p.h. monster with his head painfully wedged between a pair of gyrating knees I am at a loss to know.

Each timekeeper in future shall be equipped with a stop watch and lap counting tachometer. Now, I don't know what fearsome sort of machinery this latter gadget is, but from my experience of the average timekeeper it's as much as he can do to handle a stop watch. Where the watch is of the split hand type at least three are needed; the one with the highest official ranking having the casting vote. This means anything up to six extra bods to handle the lap counting instrument. By this time the area is getting somewhat crowded, and when you allow for the four blokes who trot round to see the piloting arms are in good straight order, the mechanics, the police dog patrol, and the usual flood of armbanded officials, there would hardly be room to swing a cat, let alone a model.

Free Flight

In view of the complexity of rules and restrictions attaching to this type of event, the council discussed the possibility of renaming it. However, owing to the various international interpretations of the term it was decided to defer the issue.

Free-flight finals will now be flown as eliminators. The eliminating process will begin in the small hours of the morning and continue on a systemised scramble basis until all but one of the victims, or rather competitors, are knocked out. At the end of the marathon it is hoped there will be at least one survivor to receive the pot, providing he is strong enough to carry it.

All claims for long distance walking records, made during the event, will be sympathetically received.

To suit the new conditions the Recovery Service will be extended. In addition to the usual first aid facilities there will be the provision of pep up pills, foot baths, artificial respiration, and all modern means of resuscitation. After the sixth fly-off bathchairs will be issued at the discretion of the judges.

Next year's competitors are strongly advised to participate in the current spate of marching stints as a necessary part of their training.

It is not yet known whether World Championships will be held yearly, two-yearly or five-yearly. Much will depend on whether anyone is prepared to run them, and also how long competitors take to recover from the previous endurance.

Formulae will remain every bit as complicated as before, with the usual grim grms and dim dcms to confuse the sporting British. Give these foreigners an inch. . . .

Personally, I don't see the point of this decimal system, anyway, as the modeller said, taking his 0.294 sq. in. Wakefield out of its matchbox.

Sheer In-comp-etence

Contest organisation has always been a fruitful subject for this off-beat column; engaging some of its wilder flights of fancy. But now, I feel utterly ashamed at the lack of imagination displayed when confronted with the glorious improbabilities of the real thing as currently applied. I can only take off my tattered titfer to the sheer inventive goonery of it all.

Even in one of its more delirious moods, this column could never have concocted anything so fantastic as the "Phantom Rally." Without doubt this is the practical joke par excellence. Just imagine the side-splitting hilarity of it as the travel-stained comp fanatics stop short at the tightly closed airfield gates. And what about that riotous cross talk act with the equally baffled guard commander? Such a giggle for the organising funsters as they lay snugly in their Sunday morning beds.

On a lesser level is the "do-it-yourself" rally. This provides the date, the airfield, the downwind forest, "no flying whilst aircraft are operating," and all the other familiar rally amenities, but the joke is there is no one there to run it. Not a sign of an official or anyone with the least clue.

After waiting around until about 4 p.m., which is the time even the best organised events usually get started, the competitors decide to hold their own scratch contest. Needless to say, under such unusually expert management, it turns out a complete success.

This is a fair enough joke, and one which, I think, has definite commercial possibilities. The "do-it-yourself" rally kit would become a must for any contest enthusiast. Among other things the kit might include a dummy stop watch, set at three minutes, flight cards, labels, lolly making outfit (refreshment and litter), a cardboard cut-out trophy, prize giving speech on plastic record, and a forged airfield pass.

With slight modification the kit could be used as an ideal club game for the winter evenings. All that would be needed is a slightly altered snakes and ladders board and a dice cup. Then, when the motor cycle gossip begins to flag, out could come the game for the club to enjoy a hectic hour of all the fun and excitement of the contest field.

Under the Counter

Our counter spy service reports something quite new in the kit line. A non-plastic model constructed of a revolutionary new material called Balsa. Exceptionally light, this wonder material can be cut with a razor blade. The kit also features a very simple but highly effective form of motive power. Strands of rubber strip are connected between hooks, and when wound turn the propeller. Cheap, economical and safe.

Our glow plug expert advises against going into the model shop and asking for a couple of U.2s. Comes under the heading of insulting behaviour, or something.

Reading of a model which suffered a rubber explosion in mid-air, we are now pleased to report that explodable rubber, as used by the British Wakefield team, can now be obtained from any good toy shop. This does not come within the province of the Dangerous Explosives Act (1066) and is available with full ignition mechanism, which, of course, does not come under the Small Arms Act.

Which just about winds the whole thing up.

* * *

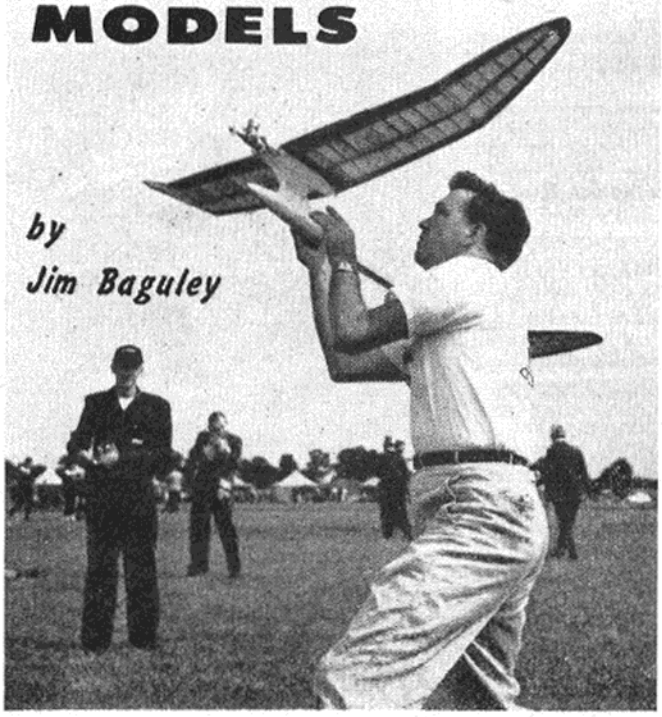
The combat antics of performing members of the Nuneaton club at recent barbecues have so enthralled the fry-up picnickers that they haven't been doing full justice to the grub.

Although I'm often critical of ill-chosen club names, I take off my hat to Nuneaton.

POWER DURATION MODELS

PART 3

by
Jim Baguley



One of the U.S.A. team members in the 1958 World Power Championships, Carl C. Perkins, carefully checks his timer as he prepares to launch his Oliver powered high thrust line model.

Model Size and Airfoils

These two considerations are closely allied. Whatever layout or airfoils are chosen the characteristics of wing and tailplane airfoils should be similar, as explained previously.

Many contradictory things have been said concerning airfoils. Some, with which people declare they could not even get a decent glide, are consistently hailed by others as being the " tops." Much of this is due to one's natural way of building and trimming a model, i.e. one will always tend to modify even when duplicating another person's design.

Examples of this are people who declare they are using " such and such " an airfoil, but on inspection it will prove to have a smaller, or larger, nose radius than the original, or the trailing edge inclination will be different, or maybe even his method of building will have produced distortion. The intention may have been to reproduce the original airfoil but the builder can easily, and quite unconsciously, alter it just by sanding the leading edge profile to a shape with which he is more familiar. Some airfoils will work with some layouts and loadings but not with others, which makes life rather awkward. Generalisations can be made, however —has anyone ever had an excellent glide from an 18 per cent. symmetrical tunt section on a F/F power model?

Model size is also quite a debatable point. Some say design for the climb, others for the glide, and yet others compromise, but why not try for both? A large, light, clean model with very low drag will obviously climb nearly as fast as a smaller model, and will probably be far easier to trim, as well as having an excellent glide.

A small, again light and clean model, but with airfoils of higher lift coefficient and consequently higher drag will also climb fast, and can have an excellent glide if designed carefully. Its advantage is that although it may take more trimming, and be more susceptible to warps, that important little extra height can be gained on the climb. Being relatively compact it will not be thrown around so much in bad weather conditions and therefore may actually be safer if a tolerant trimming method is used. I prefer this latter approach as it makes the models and their trimming far more interesting and a climb of respectable speed can be had from an inferior motor.

My past experience concerning airfoils can roughly be summed up—avoid " peculiar " airfoils—they may have peculiar habits. Stick to your own personal preference—you should know how to make it work. Avoid very sharp leading edges—you may experience pull out trouble. Avoid airfoils with the highest point of the upper camber very far forward—you may suffer breakaway and a non-existent glide. Avoid camber too far back—the resulting glide will probably be far from consistent. Avoid too highly cambered airfoils.

My own pet airfoil is a several times modified version of Kneeland's modification of a Goldberg section and bears hardly any resemblance to the original! It can be claimed that this airfoil (Fig. 9) has yet to show any vices, but many power fliers looking at it would probably say it is too thick.

As far as actual model weight affecting the glide is concerned, any model has a best gliding weight and will not necessarily have its best potential glide performance if it is built lighter. The climb is a different story, however, as extra weight will affect the rate of ascent. The solution would seem to be to put as much power into a model as can be handled, and at the same time keep the weight consistent with that needed for the best glide performance. The limitations being, safety of one's design and trim, and in being able to build down to the best glide weight which is usually very difficult. I often wonder if it is worthwhile trying to keep weight down. If one starts with a typical ball race 2.5, the engine, prop, timer, and tank system comes out at around 9 oz. which leaves only 7 oz. for the airframe!

Very thin, low-cambered airfoils, i.e. low lift, low drag, should only be used where the parasitic drag (fuselage, etc.) is kept to a minimum. Large light models should generally use these sections where the parasitic drag will be fairly low in relation to the airfoil drag.

Model Layout Types

This subject has already been dealt with in some cases, e.g. the Bethwaite type, because, in describing a particular

STATION	0	1·25	2·5	5	10	15	20	30	40	50	60	70	80	90	100
UPPER	·7	2·4	3·5	5	6·8	8	8·9	9·8	9·7	9	8	6·4	4·8	2·8	·8
LOWER	·7	0	0	·2	·6	1	1·6	2·1	2·5	2·6	2·6	2·3	1·6	·8	0

FIG.9

trim, the layout exclusively associated with that trim had also to be described. The high thrust line models have also been dealt with in preceding notes.

All of the pylon model types seem to lend themselves to the trims previously described for pylon models and the various types of pylon model are, in any case, only derived by the use of different proportions and airfoil sections.

FIG. 10. MULTISPAR CONSTRUCTION.

Some Examples of Designing Pylon Models for a Particular Flight Pattern. (The following should only be taken as general)

The near vertical climb with high rate of roll

Use of the following features will help to achieve this although the model produced may be unsuited for a different flight pattern.

(a) Very low aspect ratio to increase rate of roll.
(b) Fairly high polyhedral with panels of near equal length.
(c) Very large rear fin area.
(d) Pylon of normal height.
(e) Highly washed-out tips with wash-in/wash-out of inner wing panels.
(f) Reduced drag at tips, i.e. taper, etc.
(g) Very long moment arm.
(h) Large tailplane.
(i) Normal, low cambered sections.
(j) Balance of areas in slipstream above and below thrust-line as Norman Marcus suggests.
(k) Very little longitudinal dihedral.
(l) Tail tilt or auto rudder for glide turn.

The only possible snag with combining all these features, which are in any case not all necessary, to produce this climb pattern is that the pull out into the glide may well be poor, and spiral stability in the glide may be lacking.

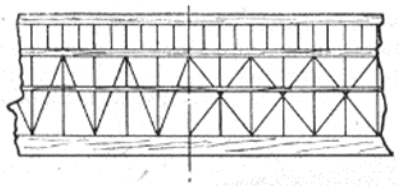


FIG. 12. GEODETIC & WARREN GIRDER + RIBLETS.

FIG. 13. TORSION BOX L.E. & T.E.

The near straight slowly rolling climb at high angle (three turns in 15 sec.)

(a) Moderate aspect ratio.
(b) Moderate polyhedral.
(c) Large rear fin area.
(d) Moderate moment arm.
(e) Slight wash-in on inner wing panel.
(f) High wing and tail incidence relative to thrust line.
(g) Glide turn by tail tilt or auto rudder.
(h) Other features normal.

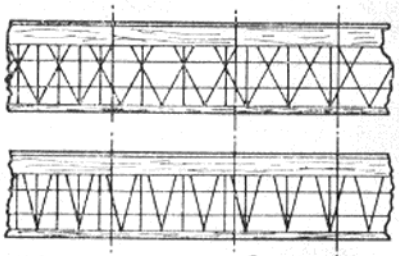


FIG. 11. GEODETIC & WARREN GIRDER CONSTRUCTIONS.

The foregoing is only intended to illustrate the way in which knowledge of certain effects can be used to design a model incorporating the desired characteristics, and does not mean that the trims cannot be attained in any other way.

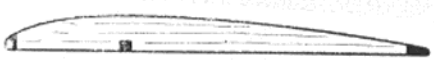
Structural Design Considerations

Wing requirements

(i) Torsional.
(ii) Adequate strength in bending (not necessarily rigidity).
(iii) Easy construction.
(iv) Easy repair.
(v) Resistance to crash impact.
(vi) Fuel and waterproof.
(vii) Required aerodynamic shape.

Sufficient torsional rigidity to prevent warping due to any reasonable load being imposed upon the structure is essential if a trim is to be kept. Permanent warps (i.e. those not induced by flight loads which occur only in flight) may be caused in several ways, for example. External loads applied for a limited time, or "unbalanced" and inadequate construction warped by covering tension.

Some form of constructional triangulation is usually necessary, especially with a thin wing section, if warping is to be prevented. Three forms of triangulation are (a) geodetic; (b) Warren girder; (c) cross braces, either in the form of part depth struts or full depth ribs. The complexity of the construction will depend upon how much effort the builder is prepared to put into it.



CENTRE OF SPANWISE BENDING RESISTANCE BELOW CENTRE OF COVERING TENSION BENDING - CAUSES BOW.

FIG. 14. UNBALANCED STRUCTURE.

CENTRE OF SPANWISE BENDING RESISTANCE NEAR CENTRE OF COVERING TENSION BENDING - PREVENTS BOW.

FIG. 15. NEARER BALANCED STRUCTURE.

J. O'Donnell is here seen launching a Eureka, a Norman Marcus design. The geodetic bracing of the wing and tail structure is clearly visible.

It is not usual to carry the diagonal ribs or riblets to the leading edge unless leading edge sheeting is used, for it is generally accepted that the first part of the airfoil, at least, should be relatively smooth. The diagonal ribs would, where sheeting is not used, normally extend as far forward as the front spar on the upper surface and riblets would be used ahead of the spar (see Figs. 10, 11, 12). It is a good thing if the triangulation ribs are at the surface for covering attachment, even if they do not extend to full depth.

While torsion box leading edges (see Fig. 13) possess great strength they are not advised if they are so rigid that they make the wing too resistant to bending. (This point will be amplified later.) A better arrangement is a number of spars equi-spaced, alternately top and bottom, as this will almost certainly provide a balanced structure.

To describe an unbalanced structure it is best to give an example, such as is shown in Fig. 14. This, it can be seen, will warp upwards if the tissue is at all tight and in doing so will almost certainly twist. The reason for the warping upwards is that the upper covering

surface tension has a greater moment about the constructional neutral axis than the lower covering surface tension. If, however, the spar is re-arranged as in Fig. 15, the moments of upper and lower covering surface tensions will be more nearly balanced, as the neutral axis of the construction will be moved upwards and will, in the ideal case, balance. The positioning of the spars across the chord will also have some bearing on the matter.

The reasons for having several spars are numerous; for example, smaller tissue panels (preventing twisting), more joins and shallower spars, less rigid in bending as ribs will also flex slightly, greater likelihood of achieving a balanced structure, better covering support, etc. If the wing section is of reasonable thickness the spars should be shallow but wide, rather than deep, as there will then be less chance of rib distortion. A great help in producing greater torsional rigidity has been found to be the addition of cement gussets on all joints.

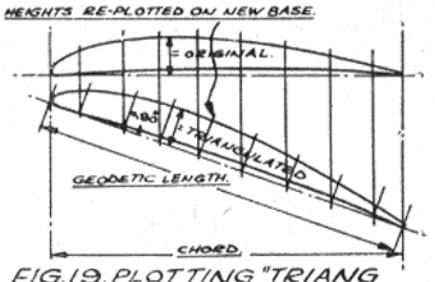


FIG. 19. PLOTTING "TRIANGULATED" RIBS.

The reason for not having a rigid wing structure in bending may be explained as follows. Imagine two wings, one having 3 units force per unit tip deflection and a maximum deflection to breaking of 10 units, the other having 1½ units force per unit tip deflection and a maximum deflection to breaking of 20 units; the first being the rigid wing, the second being the flexible wing. Both wings will obviously have a force at breaking of 30 units at the tip *but* while the energy absorbed by the first will be 300 force units × distance units, the energy absorbed by the second will be 600 force units × distance units. It can be seen that while the constructional weight of the first will be almost certainly greater, it will be unable to absorb more than half the energy.

This was brought home to me when wings started folding on power and on powered d/t. The reason was the use of torsion box leading edges which, although they took a large "dead weight," were unable to absorb the energy of a suddenly applied load. My later wings are much lighter and will withstand a d/t under power.

Strength of a wing in bending is also best "tapered off," as the bending moment imposed at a section will vary at least as the square of the distance of the section from the tip, even assuming even lift distribution which is not true.

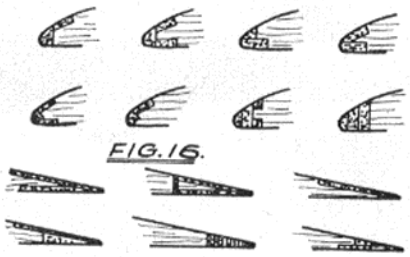


FIG. 16. BUILT UP L.E's & T.E's.

The tapering off should not be carried too far, however, as there are other stresses such as covering loads to be considered. Dihedral braces and bandage should always be used to strengthen the centre of a power model wing where there is a central dihedral break and the wing is in one piece.

If considerable complication is to be allowed in order to prevent twisting and keep weight down, there are no end of structures which can be used. One may even finish up with the classic case which uses built-up ribs with Warren girder inner construction, multi spars with Warren girder bracing running between them from upper to lower surface of the construction, and geodetic surface ribbing in each "panel"—or would you rather be a happy modeller? It is suggested that with a reasonable degree of care the simplest of constructions may suffice—once more we turn to George Fuller's models!

It should be remembered that any extreme complications will render field repairs impossible. Built-up leading and trailing edges of the type shown in Fig. 16 are worthwhile, as they are reasonably easy to execute, save weight, and are repairable with little trouble. Cap strips (Fig. 17) are worthwhile, as they enable a lighter rib to be used and give great covering support; they may also raise the covering above the spars. Built-up ribs as in Fig. 18 may be used and present a very quick construction, the only snag being that if the model hits a tree gliding downwind it usually

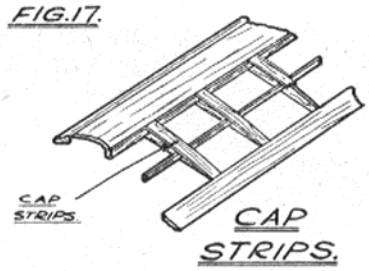


FIG. 17. CAP STRIPS.

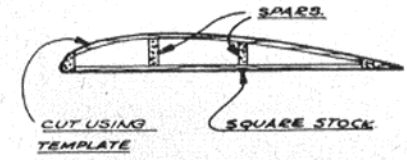


FIG. 18. BUILT UP RIBS.

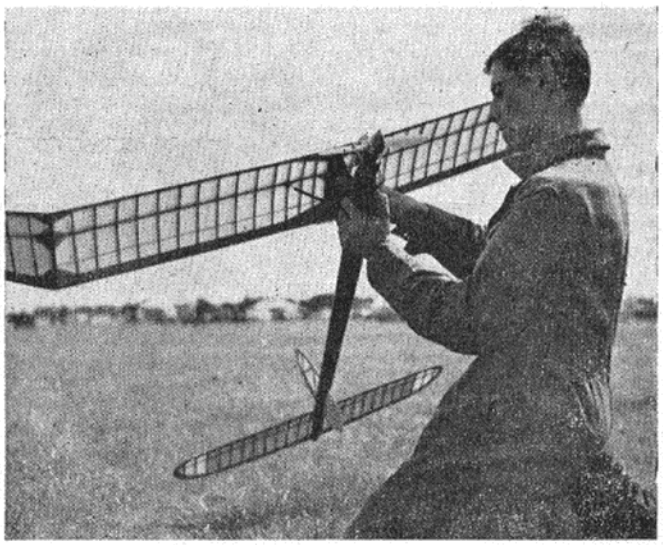
crumples chordwise if the ribs are of thin section, due to the short grain at the leading edge and trailing edge! An easy method of producing geodetic or triangulated ribs is shown in Fig. 19 which is self explanatory. Part ribs can also be produced in this way. This method is as precise as one's drawing!

A tapered or elliptical tip planform is useful constructionally, as it tends to reduce the likelihood of tip warping but is an added complication, the strongest outline being a laminated one. A two-piece wing is not advised due to the extra weight and greater likelihood of warping. Waterproofing and fuel-proofing is usually accomplished by using fuel-proofer, my personal preference being clear "Valspar."

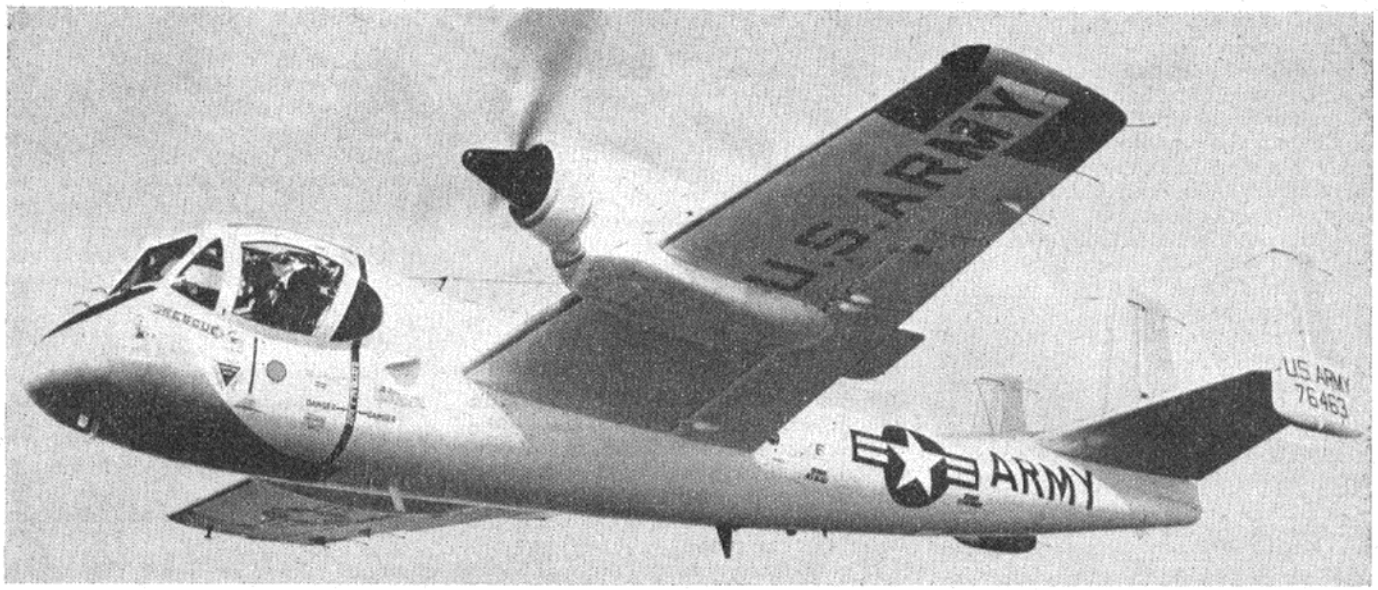
Tailplane

The tailplane is subject to virtually the same requirements as the wing. Its strength in bending need not be as great as that of the wing since it is lower stressed and is, in any case, frequently of lower aspect ratio. It should, of course, be kept light, for inertia and balancing considerations.

To be concluded next month.



Zdenek Malina, of Czechoslovakia, adjusts his engine timer prior to making a flight in the 1958 World Power Championships at Cranfield. The model is M.V.V.S. powered and employs simple structure and wing struts. Note also the sheet underfin



AVIATION NEWSPAGE

by J. W. R. Taylor

TWIN-INJUNED INJUN above is Grumman's new *YAO-1 Mohawk*, named after the most aggressive of the Iroquois tribes who used to scout for scalps around New York. The name is appropriate, because the *YAO-1* is also a New Yorker, from Long Island, but it is intended to do its scouting for the U.S. Army. The first prototype flew on April 13th last year, and eight more *YAO-1s*, plus 35 production *AO-1AFs* have been ordered to date.

Main requirements of the specification to which the aircraft was developed were a good all-round field of vision for the two-man crew and a combination of reasonably high level speed with the ability to operate from small and rough airstrips, if necessary off ice, snow and mud. To this end, it has widely-bulged cabin windows, much-flapped high-lift wings, optional wheel-skis, and two Lycoming T53-L-3 turboprops of 1,005 e.h.p. each. These give it a max. speed of 316 m.p.h. and enable it to take off to 50 ft. in under 220 yards. Stalling speed is 63 m.p.h.

The production *AO-1AF* will be able to carry a variety of stores such as camera pods, supply containers, flares, target markers or fuel tanks under its wings. Span is 42 ft., length 41 ft., loaded weight 12,800 lb.

* * *

BUILD-IT-YOURSELF HOOVERCRAFT (below) was designed and knocked together out of steel tube, covered with fabric, by U.S. scientist Walter A. Crowley. It is 16 ft. long by 10 ft. wide, weighs 550 lb. empty and uses a 12 h.p. engine for lift, plus a 6 h.p. engine for propulsion.

According to the official notes accompanying the picture, " the lift is provided by a cushion at ground level formed when air is ejected forcefully from slots around the outside bottom of the vehicle. Air jets from these slots strike the ground or water and form the cushion that lifts the car above the surface." Sounds simple enough !

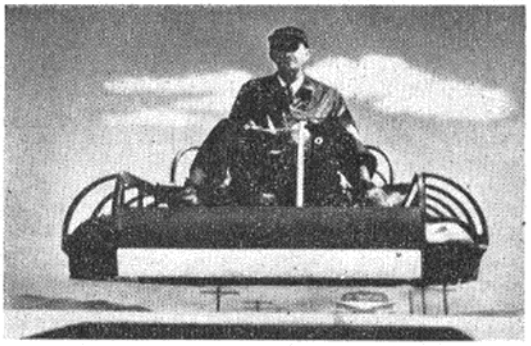
EAGLE-EYED ENTHUSIASTS will no doubt have spotted that Eagle Aviation have had to pander to popular preference for white-top cabins and dispense with their former distinctive red roofs. Just for the record, we have included a photo (below) of DC-6A *Eaglemaster* G-APON in its new Eagelivery.

* * *

ANOTHER VETERAN in the news is the rocket-propelled *Dakota* illustrated here. Racks for up to ten 1,000 lb. s.t. JATO bottles are fitted under its fuselage only two being used for its first test at Laverton R.A.A.F. base, Victoria. Even then, it was in the air and climbing steeply after a run of 100 yards.

Since then, the *Dak* has been flown to the far south, where it will spend 15 months with the R.A.A.F.'s 12-man Antarctic Flight. This explains the large snow-skis, red wingtips and underslung radome visible in the picture.

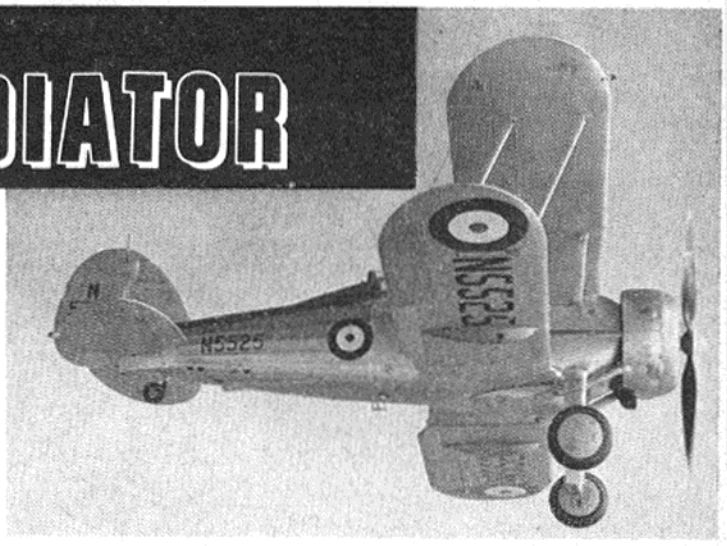
DC-6A Eaglemaster.



W. A. Crowley's Hovercraft.

Plane of the month

GLOSTER GLADIATOR



LAST and greatest of the long line of biplanes designed by H. P. Folland, the *Gladiator* was also the last biplane fighter to serve with the Royal Air Force and Fleet Air Arm. The prototype (K5200, first flown September, 1934) was evolved from the *Gauntlet* as a private venture under the Gloster designation *S.S.*37, but it met the requirements of official Specification F.7/30. As a result, when the other three aircraft designed to this Spec. proved unsuccessful, it was ordered into production for the R.A.F. in July, 1935.

The prototype was a single-bay biplane, with hydraulically-operated flaps on both upper and lower wings, a cantilever main undercarriage, spatted tailwheel, and Bristol Mercury engine in a *Gauntlet*-type cowling. Its basic structure was of steel tube and strip, with fabric covering over wooden formers, except for the front fuselage which was metal-covered. The pilot sat in an open cockpit, and had an armament of two Vickers and two Lewis machine-guns.

Design changes made in the production *Gladiator I*, under Spec. F.14/35, included the introduction of an enclosed cockpit and improved cowling ring, deletion of the tailwheel spat, use of a later 840 h.p. Mercury IX and the substitution of four Brownings for the original guns. The initial order for 23 was followed within two months by one for a further 186 aircraft, and the first squadrons to equip with *Gladiators* in 1936-37 were Nos. 3, 56 and 72, followed a little later by Nos. 33, 54, 65, 73, 80, 87, 263 and 247 and Auxiliary Squadrons Nos. 602, 603, 607 and 615.

The public was shown something of the manoeuvrability of the new fighter at the 1938 R.A.F. Display at Hendon, when three *Gladiators* performed aerobatics in tight vee formation with their wingtips chained together.

In the same year the Fleet Air Arm ordered a modified version as a carrier-borne fighter and Gloster modified 60 airframes into *Sea Gladiators*, with deck arrester hook, a dinghy slung externally between the main undercarriage legs and other mods. These were delivered to Nos. 801, 802, 804, 805, 813 and 885 Squadrons in 1939-40.

Foreign air forces also bought *Gladiators* and 216 of the total of 527 produced were exported during 1937-39 to Belgium (22), China (36), Finland (30), Greece (2), Iraq (15), Irish Free State (4), Latvia (26), Lithuania (14), Portugal (30), Norway (12) and Sweden (25).

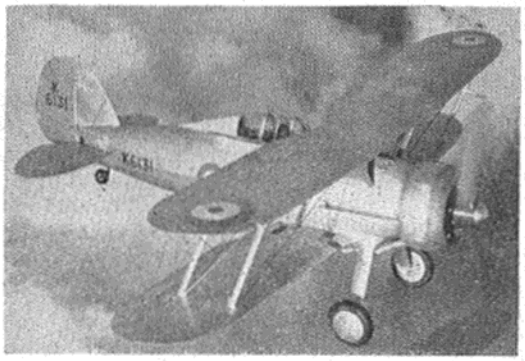
At the outbreak of war, a large number of *Gladiator IIs*, with Mercury VIIIA engines and three-blade Fairey-Reed fixed pitch metal propellers, to Spec. F.36/37, were in service with the R.A.F. They went to France as part of the Advanced Air Striking Force with Nos. 607 and 615 Squadrons, while a *Gladiator* of 603 Squadron scored one of the first air victories of the war by shooting down an He.111 over the Firth of Forth, much to the chagrin of the *Luftwaffe* pilot!

Gladiators achieved further glory in the Middle East and with No. 263 Squadron in its hopelessly gallant fight from the frozen Lake Lesja in Norway. Even more famous were the almost legendary *Sea Gladiators* "Faith," "Hope" and "Charity" which defended Malta alone against the might of the Italian Air Force for three months.

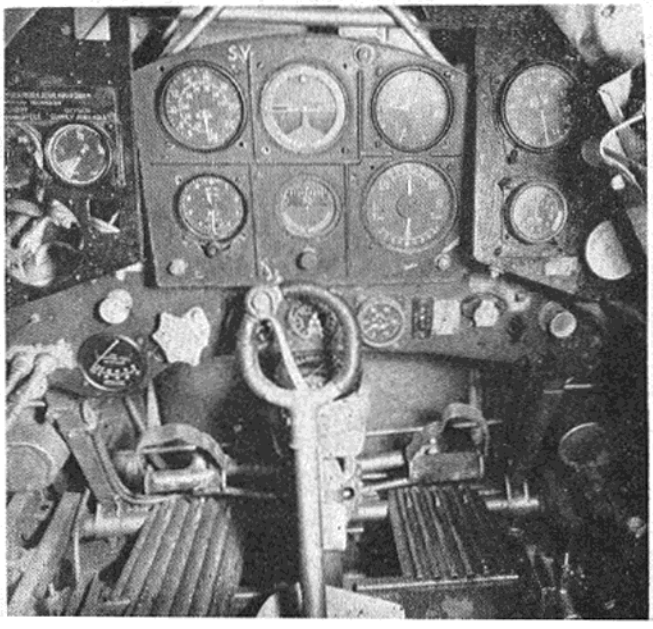
To catch the attacking *S.M.*79 bombers and Macchi 200 fighters, the *Gladiators* had to be flown at full boost with their throttles "right through the gate"—except that the gates had been removed to gain every ounce of available power. Inevitably this reduced the life of the Mercuries and the only available spares were Mercuries of a different kind with variable-pitch propellers, intended for *Blenheims*. Without further ado these were fitted, and there is a story that one *Gladiator* even ended up with *Swordfish* wings as a "Gladfish."

After the fighter had become obsolete, Gloster modified a number of airframes for meteorological flight duties with No. 521 Squadron and Nos. 1403, 1560, 1561 and 1562 Flights. These remained in service until 1944. Two of them, L8032 and N5903, were retained by Gloster until 1950, when they were acquired first by Air Service Training and then by Mr. V. Bellamy. He combined the airframe of L8032 with the engine and propeller from N5903 and flew the result with the civil registration of G-AMRK,

Data (*Gladiator I*): Span: 32 ft. 3 in.; length: 27 ft. 5 in.; height: 10 ft. 4 in.; wing area: 323 sq. ft.; weight, empty: 3,450 lb., loaded: 4,750 lb.; max. speed: 253 m.p.h.; climb to 15,000 ft.: 5.8 min.; service ceiling: 32,800 ft.; endurance: 2 hr.

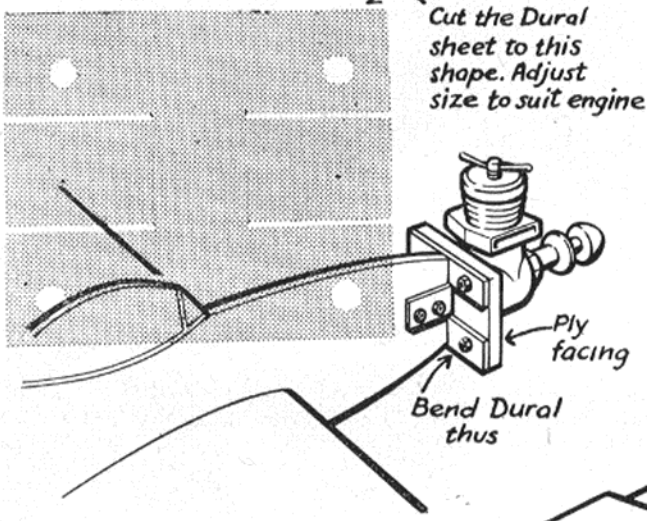


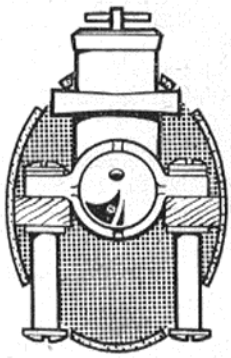
Top: Sea Gladiator, above: early production Gladiator, below: a Latvian machine, bottom: reconstructed Gladiator cockpit.



Readers hints and tips . . .

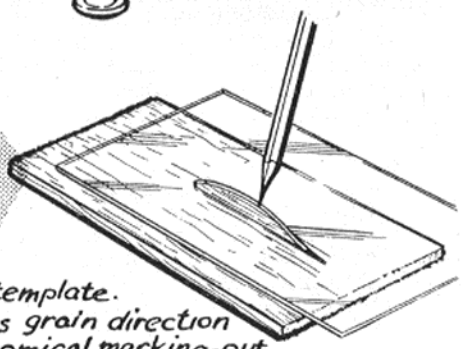
A simple and effective motor for profile models is sent to us by T. HENDERSON of WILLINGTON

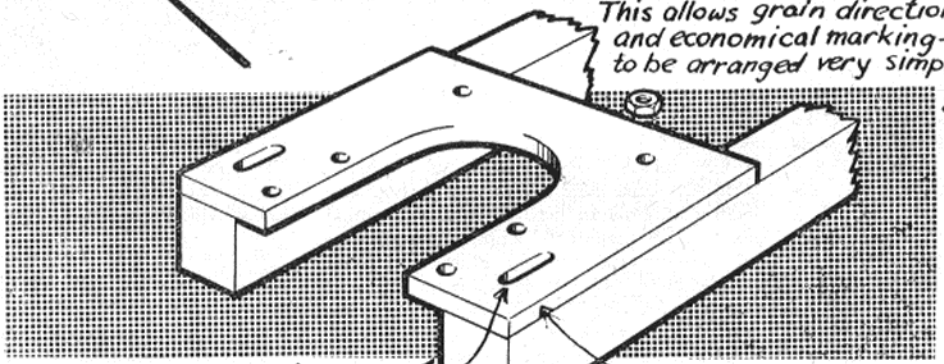




14-Year-old G. CRAIG of GREENFORD uses book-binding bolts to secure his engine within an inaccessible cowling.

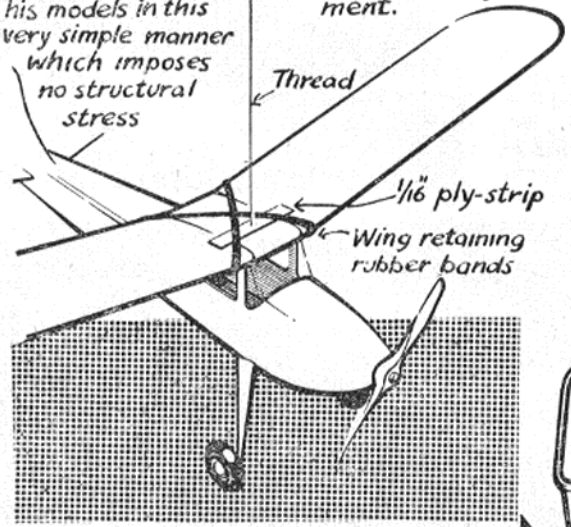
By placing an old sheet of acetate over the plan the parts can be scribed and broken out. Use the cut-out as a template. This allows grain direction and economical marking-out to be arranged very simply.—J. E. FAIRCHILD, PETERBOROUGH

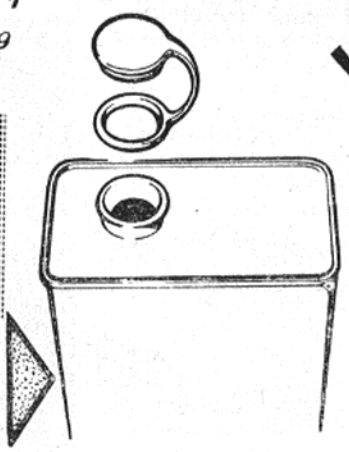




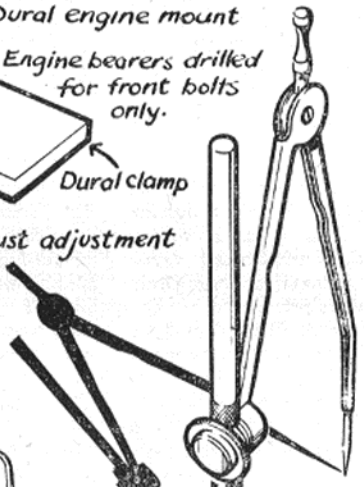
THIS INGENIOUS MOTOR MOUNT WINS THIS MONTH'S TOOL CHEST FOR M. HORTON OF BURTON-ON-TRENT

J. WALTON of LOWESTOFT accurately balances his models in this very simple manner which imposes no structural stress

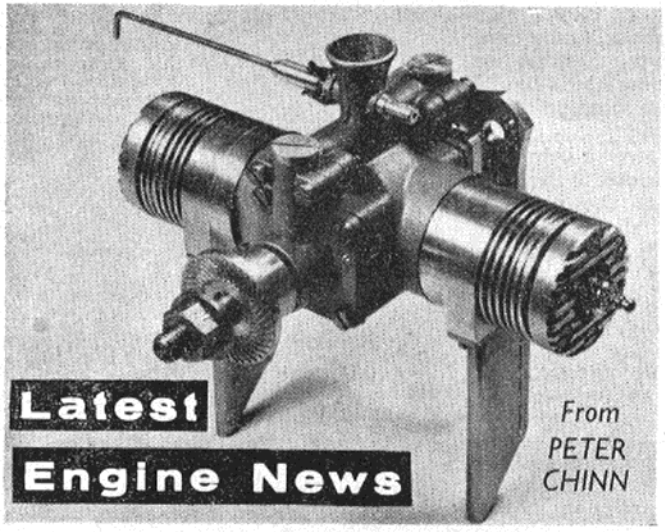




"Corona" mineral water plastic sealing caps are used by A. L. CRESSFORD of WORKSOP as an efficient captive fuel tank cap



M. A. JENKINS of BURBAGE shows how perfectly circular formers can be made by mounting a slim balsa knife in a pair of school type compasses.



Latest Engine News

From PETER CHINN

Left: A pre-production model of the D-C Tornado 5 c.c. flat twin glow engine. The production version will be available with a speed-control fitting on the intake manifold.

THE possibility of any really basic changes occurring in the design of miniature two-stroke cycle internal combustion engines, in the future, seems unlikely.

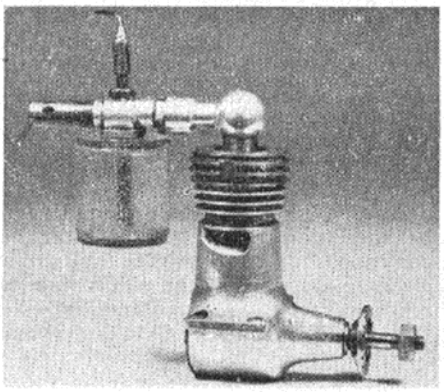
The simple two-stroke engine was invented by Dugald Clerk in 1881. Since that time, innumerable variations on Clerk's principle have been made. The most successful of these (from the point of view of their ability to compete with four-cycle motors) are to be found among (a) small engines, including models and (b)—at the other end of the scale—in highly complicated multi-cylinder air-scavenged or supercharged compression-ignition engines of the type designed for aircraft, marine and high performance commercial vehicle use. The chief disadvantage of the simple two-stroke is its lower volumetric efficiency resulting from charge loss and charge dilution. In (b) this is overcome at the expense of employing scavenging pumps and separate valves instead of piston-controlled ports to control the inlet and exhaust systems. In (a) it is merely tolerated: an increase in fuel consumption and/or loss of specific power output being more readily accepted than the expense of complication.

Over the years there have, however, been many attempts to find a middle road: a two-cycle engine that would offer some additional control over charging and scavenging but remain relatively uncomplicated. One solution offered was the double-piston engine—a British example being that used by the Trojan light delivery vans and cars of the between-wars years. Another and entirely different approach was the Schliha motor cycle engine.

This brings us back to models.

* * *

Some months ago we received an unusual engine from a reader, Mr. A. W. Humphrey of Northwood, Middlesex, together with some drawings and a copy of a patent application dated April, 1949. Unfortunately, none of the papers carries any reference to the name of the designer of the engine, but Mr. Humphrey told us that the engine had come into his possession via a friend and that he believed the name of the designer to be Jones. Whatever the history of the motor, however, it is a most interesting piece of work because it is, in all essentials, a Schliha type, but is a diesel instead of a spark ignition engine.

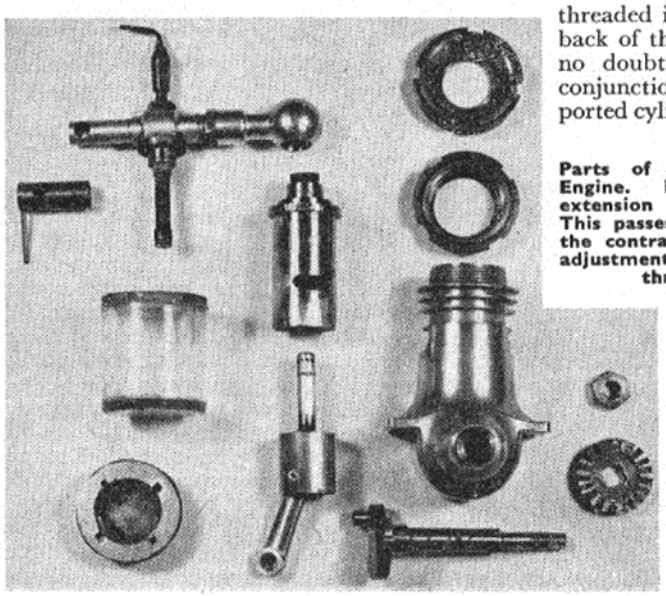


The "Jones" diesel Schliha type engine, showing the optional overhead induction system.

In the full-scale Schliha engine, the piston has a long tubular extension, of reduced diameter, centrally located above the crown. This extension, or sleeve-valve member, works in an extended part of the cylinder above the combustion chamber. The combustion chamber is thus of annular shape. Near the top of the sleeve valve (which is sealed) is a ring of small ports. At the top of the stroke these small ports are exposed to atmospheric pressure. At the bottom of the stroke, they open into the top of the combustion chamber.

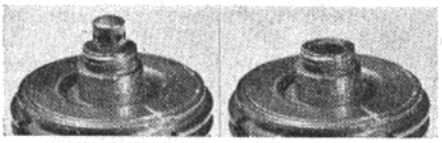
Operation is as follows. As the piston approaches TDC, a normal induction port opens in the cylinder below the piston skirt and crankcase depression draws in a fresh charge in the normal way. During the induction period, the sleeve ports also open, allowing fresh air to be drawn down the sleeve. The descending piston now compresses the mixture in the crankcase and exhaust gases begin to leave the cylinder as the exhaust ports are uncovered by the top of the piston. Shortly afterwards, the sleeve ports are uncovered as they descend into the top of the combustion chamber and the column of air, that has been trapped in the sleeve, followed by the new charge, now sweeps down the cylinder, expelling the remaining burnt gases through the exhaust ports.

In the "Jones" engine, the induction of separate scavenging air is not, apparently, provided for in the patent application, the emphasis being on the method of transfer and its value as a means of reducing charge loss and dilution. In practice, the engine, quite obviously, could be easily adapted to take in air only through the sleeve ports. As seen in our photographs, however, the engine is equipped with "overhead induction"—fuel mixture entering the engine via the sleeve valve only. This, apparently, is a modification of the original layout, since the carburettor unit can also be fitted into a threaded intake aperture at the back of the crankcase and was, no doubt, previously used in conjunction with a suitably ported cylinder liner. One of the drawings also shows a layout for an interesting 1.5 c.c. engine with shaft valve intake.



Parts of the "Jones" Schliha Engine. Note the sleeve valve extension on the piston crown. This passes through a bushing in the contra-piston. Compression adjustment is by means of a threaded ring.

Although it is not really apparent from the photographs, the engine is equipped with a contra-piston, this, in fact, forming



Close-up of "Jones" Schliha engine. At left, the piston is at TDC, and sleeve ports are open for induction. At right, piston is at BDC, and a secondary row of sleeve valve ports transfer the charge to the combustion chamber.

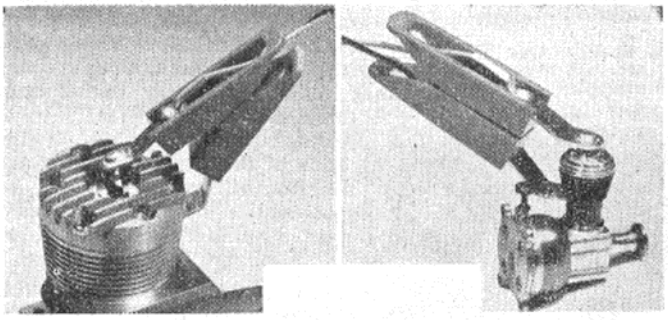
the extension in which the sleeve operates. Adjustment of the contra-piston is effected by turning the top cylinder fins. The engine has a bore of 0.680 in. and is of approximately 3.6 c.c. capacity. It weighs 9½ oz.

We gave the engine a brief test and were pleasantly surprised at its easy starting and even running. It is not, of course, a high speed motor, but it turned a 12 × 6 with ease and at useful revs. Due to the cooling effect of the sleeve intake, the cylinder head remained cool enough for the compression adjusting ring to be turned without discomfort.

The "Jones" is not a design which lends itself easily to the requirements of the modern miniature high performance two-cycle motor, (and it is scarcely "Latest" Engine News!), but it is a most interesting departure from the usual run of model engines and may well be the only successful Schliha type model diesel ever built.

* * *

For a long time there has been a need in Britain, for a good glowplug connector. At last, Davies-Charlton have come to the rescue with their "Quicklip." This is similar to the American "Kwik-Klip" and is of the clothes-peg type. In our experience—and having tried all types—this is the most practical



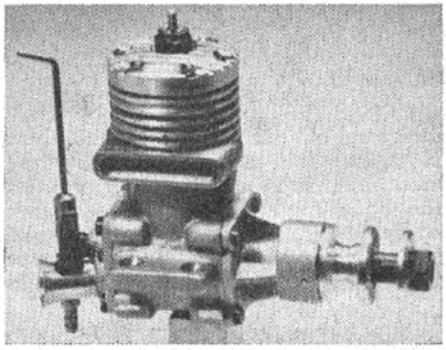
Davies-Charlton's "Quicklip" universal glowplug connector is suitable for all engines, big and small. (Cox Pee-Wee and Enya 60 shown.)

type of connector currently available. It may look a trifle clumsy, but it does the job positively and is applicable to a wide variety of engine sizes—just how wide a variety can be judged from our two photographs showing the D-C Quicklip attached to the largest and smallest glow engines currently available: the 0.33 c.c. Cox Pee-Wee and the 10 c.c. Enya 60.

* * *

Although the Czechoslovakian "state-sponsored" MVVS engines have, over the past year or so, been produced in limited numbers for sale (formerly they were made only for official Czech team use), they are still extremely rare and we were rather fortunate, therefore, to acquire, recently, a new latest-model MVVS racing 2.5 glow motor. Compared with earlier models, this engine has the backplate relocated to bring the intake to the bottom instead of the side, a position dictated by the need to provide better counterbalancing of the new cast-iron flywheel type valve rotor.

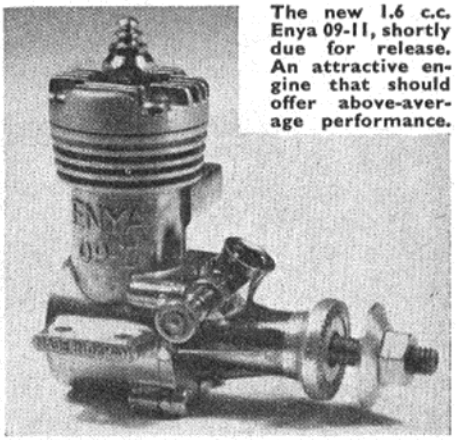
For this engine, MVVS (the Model Development Center at Brno) claim an output of 0.38 b.h.p. at 18,500 r.p.m. on a fuel consisting of 45 per cent. nitromethane, 20 per cent. nitrobenzene, 10 per cent. methanol and 25 per cent.



The current MVVS 2.5 c.c. racing glow engine. It has a ringed piston, twin ball-bearings and a counter-balancing disc valve. An output of no less than 0.38 b.h.p. at 18,500 r.p.m. is claimed for it.

castor-oil. Needless to say, this is a decidedly hot performance and it will be interesting to see whether it can be confirmed by tests on this particular example, or whether the official figures relate to specially selected engines. We shall publish further details in due course.

Also new from overseas, is the 1.6 c.c. Enya 09-II from Japan. This is an entirely new model and we are informed that it has a higher performance than the standard 09. This, if substantiated, should put the 09-II at the top of the 09 cu. in. class. The standard 09 has always been a particularly nice engine: extremely pleasant handling, very powerful and seemingly indestructible. [We know of one, that one of the fuel manufacturers uses in testing out new fuels, it has been flogged mercilessly at speeds exceeding 20,000 r.p.m. on everything up to 80 per cent. nitromethane (!) and still comes up for more.]

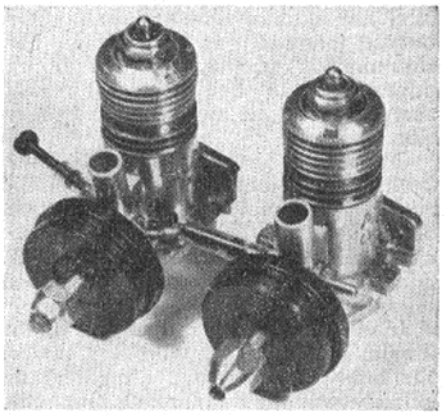


The new 1.6 c.c. Enya 09-II, shortly due for release. An attractive engine that should offer above-average performance.

Preliminary tests of Allen-Mercury's new Wen-Mac inspired 049 are encouraging. Our test sample is virtually fool-proof to start, using the integral "Rotomatic" starter. Anyone who has any doubts about a good starter-equipped glow 049—as opposed to a diesel—being the best choice for the ready-made power-model market, should try the AM 049. So far, we have only one criticism: the needle-valve. Like its American prototype, the AM uses a piece of fuel tubing over the needle and spraybar as a means of holding the needle setting but, on the AM, this was too slack a fit. The engine certainly does not lack the ability to rev. After a short running-in period, we had it up to 17,000 r.p.m., running crisply and evenly.

* * *

Thousands of enthusiasts visiting the recent National Models Exhibition took the opportunity of examining many of the motors that have been described in Latest Engine News pages, and which were among the 150 examples from my

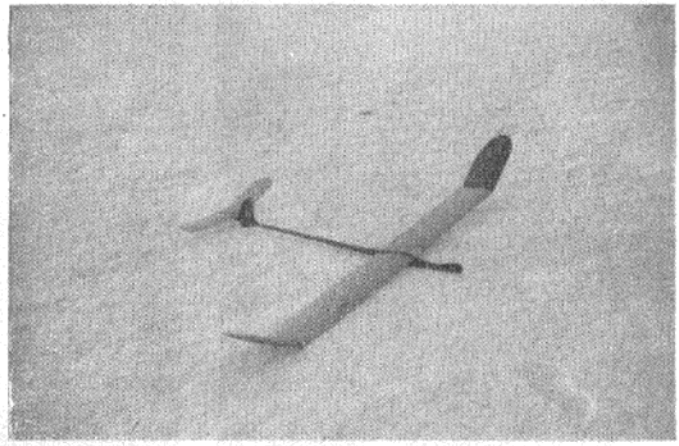


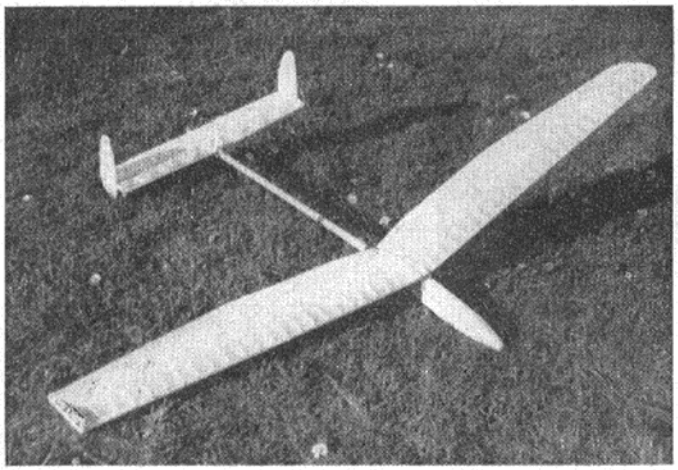
Allen-Mercury's new 049 (right) compared with the Wen-Mac Mk. III on which it is based. The enclosed, self-engaging starter unit is very effective.

collection shown on the MODEL AIRCRAFT stand. The comments about the collection were most pleasing—thanks a lot.

PHOTONEWS— *brings you a selection of readers' photographs*

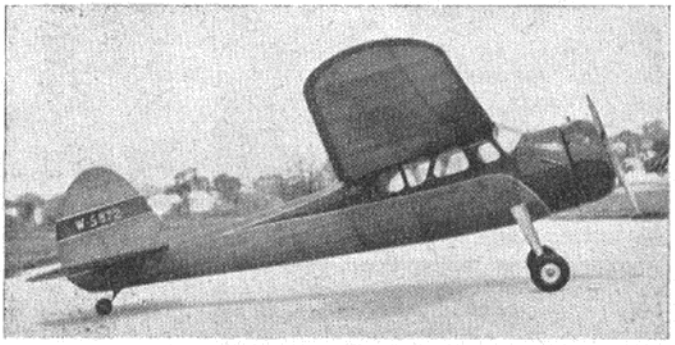
Eddie Black, who was in the 1959 *British A/2 team, sent us this photo of his Mk.* 7 Dreep *glider, set in seasonal surroundings. This series of models has proved very successful in various contests—span is* 76 *in. and that nose fin was fitted simply to make the rather sharp nose a little less lethal!* ▶

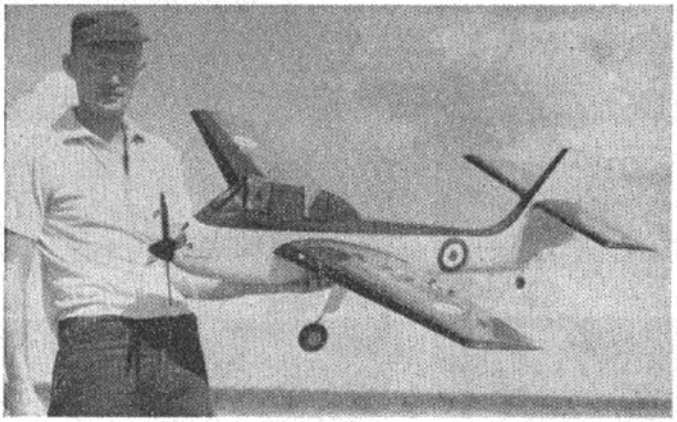




◀ *Also from Scotland, but in marked contrast to Eddie Black's winter background, we have this fine spring-like shot of a Skyleada* Albatross *beautifully built about a year ago by* 16*-year-old D. Fyfe of Peebles. The contrasting background shows off the model to good advantage—model photographers please note!*

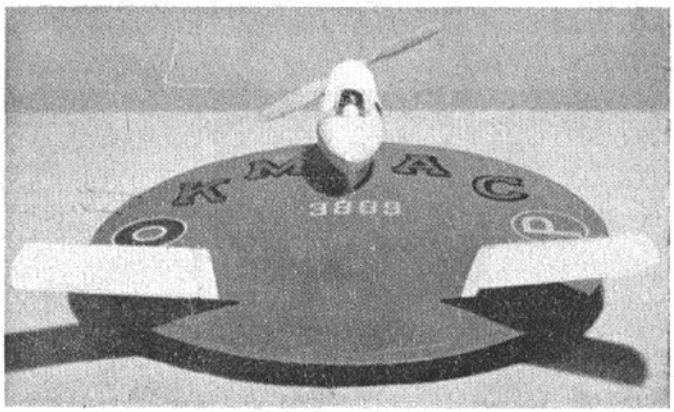
All the way from Australia comes this photo of a Mills 0.75 *powered Cessna* 195. *H. L. Jones adapted the original American rubber powered design very successfully as the realistic camera angle reveals. The model is covered with orange tissue and decorated with royal blue and white trim.* ▶



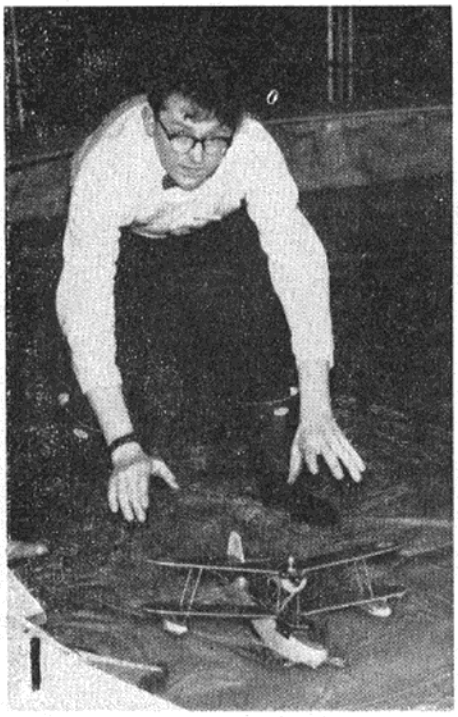


◀ *An excellent subject for F/F scale is the Short* Seamew. *American modeller Claude McCullough is here seen holding his beautiful Veco* 0.35 *powered radio controlled version. Claude scaled up this* 6 *lb. original from the MODEL AIRCRAFT* 1/72*nd solid plans.*

R. McLeod of Kirkcaldy built this novel C/L saucer. Powered with an E.D. Racer and "spanning" 15 *in. the saucer has an area of* 176 *sq. in. bringing it into line with the class "A" team racing rules. What is more, this racer can top* 70 *m.p.h., holding its own with many more orthodox designs.* ▶



National Models Ex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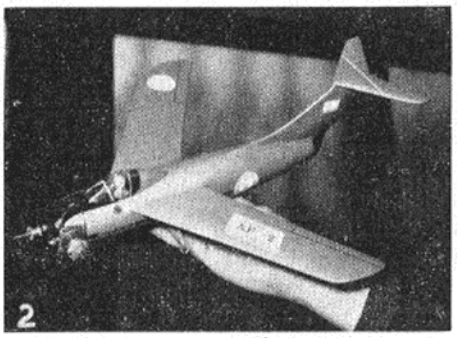
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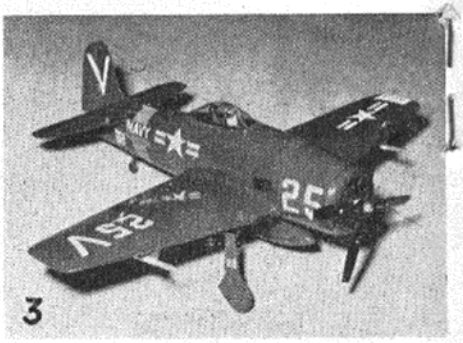
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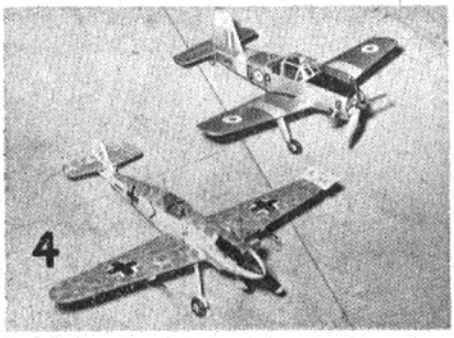
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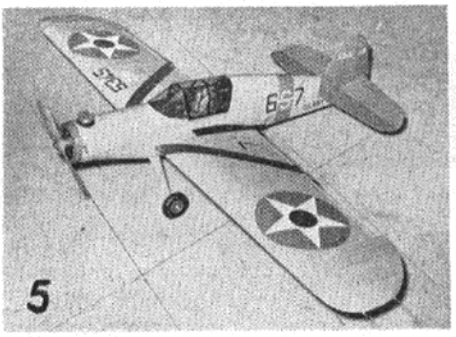
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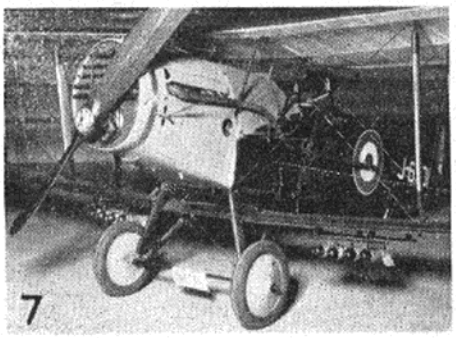
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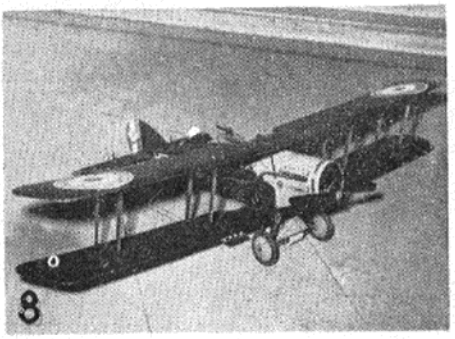
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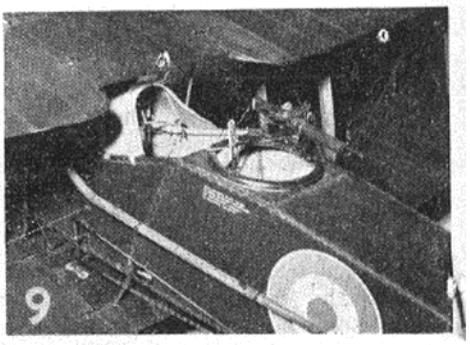
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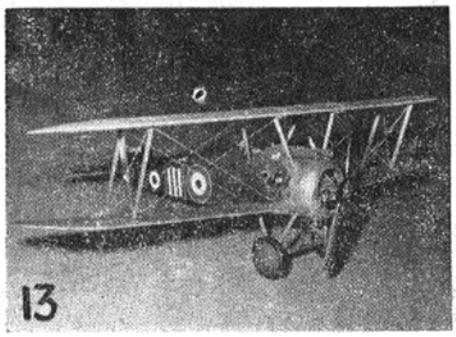
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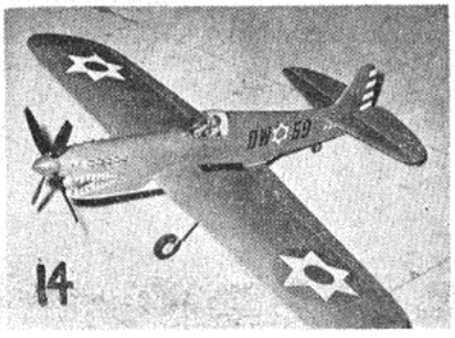
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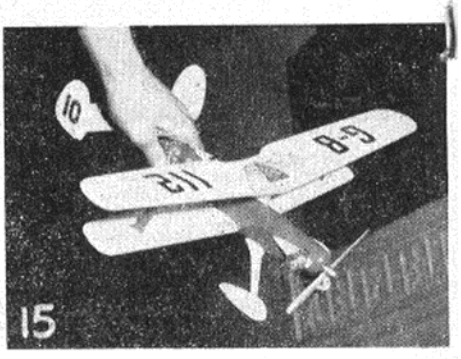
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hibition

TWO major changes have taken place since our last Exhibition was held at the New Horticultural Hall. The first is the title which now makes it more obvious that the event caters for models of all types. The other new feature is the date of the show which, being in the New Year, instead of August, permits those who are on holiday in the summer to visit us.

In the aircraft section alone there were nearly 100 entries, the standard of which reached an all-time high. Perhaps one reason for this is that the new Exhibition date does not clash with the flying season.

The competition judges (Messrs. Houlberg, Taylor, Gosling and Cosh) had a very difficult job to decide the eventual winners, as you may see from the accompanying selection of photographs of competition entries.

Caesar Milani's latest masterpiece, a 1/8th scale Bristol F2B won the Bristol Cup and was awarded a medal. This model was one of the finest we have seen and we will be giving further details of it in MODEL AIRCRAFT very shortly.

The 25 ft. sq. water tank from which a model *Sea Otter* and Ray Malmstrom's *Seamaid* flying boat operated on a 10 ft. line was a centre of attraction, and provided many thrills as the models skimmed over the water before becoming airborne. As a complete contrast, a freelance D.C. *Spitfire* powered hovercraft created much interest " flying " at an altitude of half an inch at about 10 m.p.h., around a circular track erected over the water tank.

Detailed results and a further selection of photographs will appear in next month's issue.

1. B. Gould of Kenton is here seen releasing a Dart-powered Sea Otter on the Exhibition water tank. It provided some extremely realistic flying.

2. A. Howland of Isleworth built this Frog 80 powered C/L " Pulqui."

3. Beautifully built Grumman " Bearcat " by A. C. Day of Birmingham.

4. The 1/24th scale C/L Me. Bf 109 is the work of P. A. Dunkerley of Altrincham and the Percival " Provost " to the same scale, was built by D. W. Gladwin, a junior from Pennywell.

5. In U.S. Navy markings this fully-flapped stunter by D. J. Day of Birmingham was most impressive.

6. N. Barker of Surbiton entered this beautifully finished 1/6th scale F/F " Cessna 172."

7, 8 & 9. The Bristol Cup-winning Bristol F2B by C. Milani was powered by a 10 c.c. Anderson Spitfire Spark ignition engine.

10. Finished in glossy red, this F/F Bristol " Racer " by C. G. Crowley of London was a real eye catcher.

11. An ambitious C/L " Viscount " by A. J. J. Symons of Epping displayed a wide variety of powerplants. It is being held here by E. Martinen of London.

12. Latest of Noel Falconer's " Gaisgeach " series is this Oliver-powered " Gaisgeach Foda " (long, or tall warrior).

13. A very realistic 1/8th scale Sopwith " Camel " by A. F. Clements of Maidenhead.

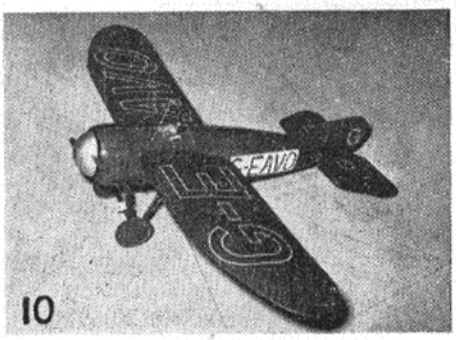
14. J. Wylie was obviously inspired by the " Tomahawk " when he produced this freelance stunter " Meanstreak."

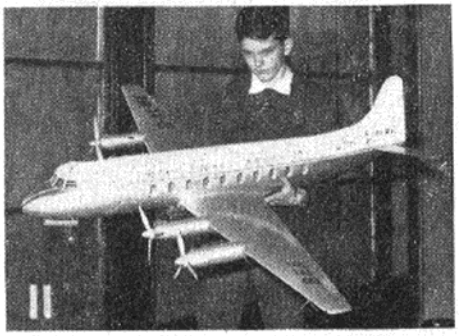
15. Another Wylie design is this diminutive F/F " Whippet."

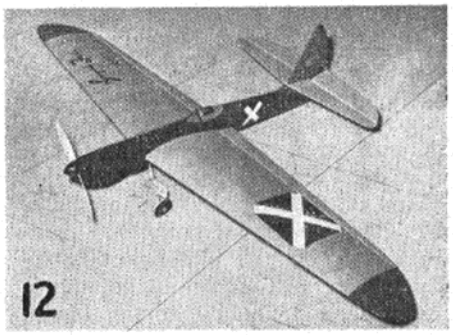
16. A very fully detailed 1/36th scale " Canberra " B. Mk2 in 61 Sqdn. markings by M. Freestone of Orwell.

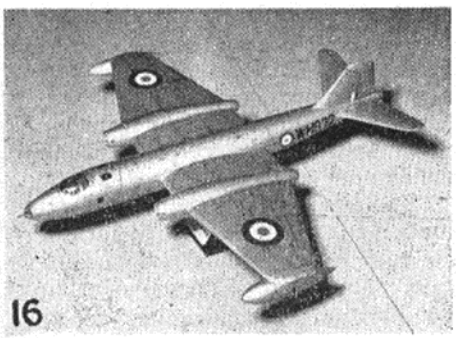
17. This fine F/F B.E.2.E was built by G. R. Quick of London.

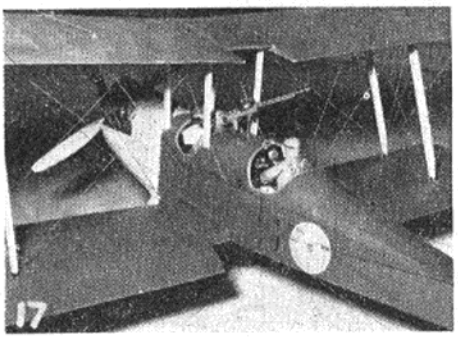
18. Doug McHard's diesel powered hovercraft which aroused much interest in the flying enclosure.

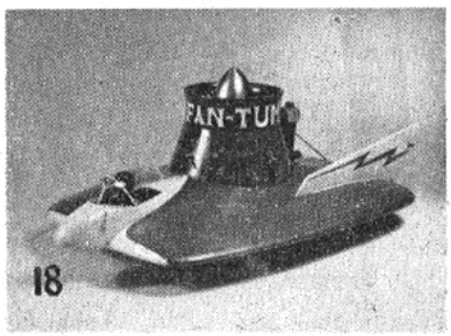


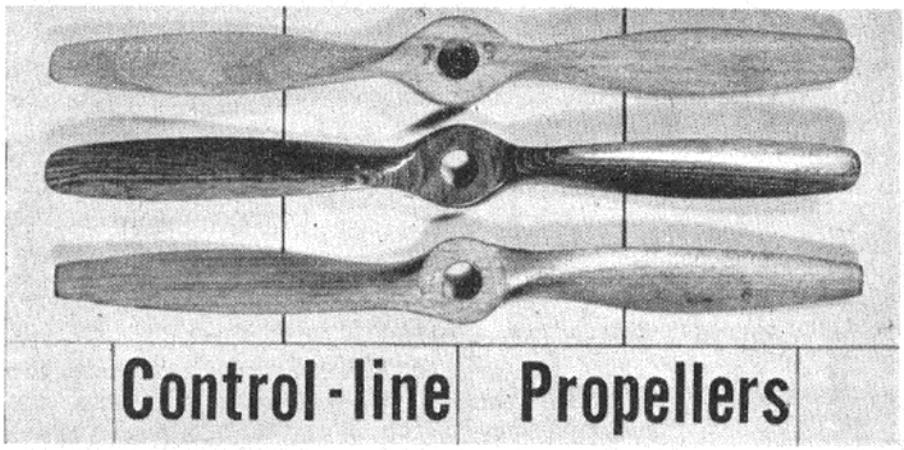












This photo compares one of the writer's props (centre) with a Stant (top) and a Tornado.

Control-line Propellers

Why not carve your own? asks KEVIN LINDSEY

MOST modellers design and build their own models, a few even make their own engines, but the C/L man who makes his own props is something of a rarity. Yet power props are not difficult to carve and they can be more efficient than commercial ones.

Using my own design props on a tuned Oliver-powered F.A.I. Team Racer, I get 95 m.p.h. for 34 laps, and my friend Dave Tyler also uses them to good effect with the same type of model. The same basic prop design has proved itself very efficient on a speed job, so might I then talk C/L enthusiasts into trying their own props?

First let us consider some points of prop design without being too technical. My props are designed basically to have a constant geometric pitch along the whole of the blade, although I do not claim to keep constant aerodynamic pitch. (The difference between geometric and aerodynamic pitch is shown in Fig. 1.)

The maximum camber position is moved progressively back from 30 per cent. at ½ in. from the hub to 45 per cent. at the tip. The prop blade airfoil section is a normal flat-bottomed type with the trailing edge as sharp as respect for fingers will permit. The leading edge is radiused to about 0.020 in. near the hub decreasing to 0.010 in. at the tip.

The blade tips of a 7 in. diameter T/R prop are moving at over 300 m.p.h. with an Oliver doing the work, so they must be kept thin to cut down drag. A good airfoil section must be carefully preserved as the tips are probably the most efficient part of the prop. The blade near the hub is also moving fast enough to be put to work, so a good airfoil section should be maintained from the tips to as near the hub as is possible, without unduly weakening the hub.

The front hub face, and some of the blade nearby, is cut away to put the revs up a bit and to make it easier to get the prop on the shaft. The front, rather than the back of the hub, is cut away because the prop is aligned by the rear hub face and 1 deg. inaccuracy in cutting away the rear hub face (à la Tornado) can mean that one blade has a pitch of 7 in. while the other has a pitch of 9 in.

The best materials for props are linen-reinforced Tufnol and the wood laminates such as Permali, Hydulignum, or Jabroc. Tufnol and the laminates are harder and stiffer than wood so they can be carved very thin, yet still retain sufficient strength. The only snag is that they are not very easy to work. The only really suitable "pure" wood that I have used is beech.

Very few tools are necessary for prop-making, especially if you are going to use beech, but if you can get a friend to bandsaw your blanks for you, it will make life much easier. The blank must accurately conform to the prop design and the centre hole must be drilled before any carving is started. A little tip here about the centre hole—it is not easy to drill the hole dead true so drill the hole as true as possible, to exactly the diameter of your motor shaft, then bell out the hole slightly at both ends with a cone rolled from sandpaper. This gives you a self-aligning

Continued on page 50

THE DISTINCTION BETWEEN CONVENTIONAL GEOMETRIC AND AERODYNAMIC PITCH.

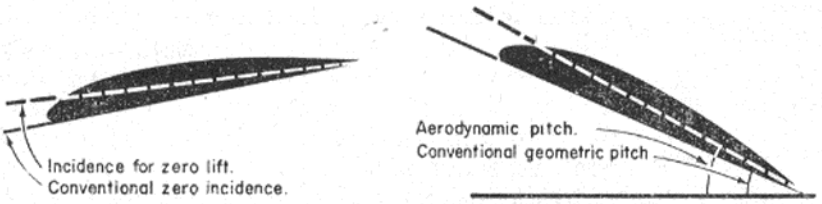


Fig. 1

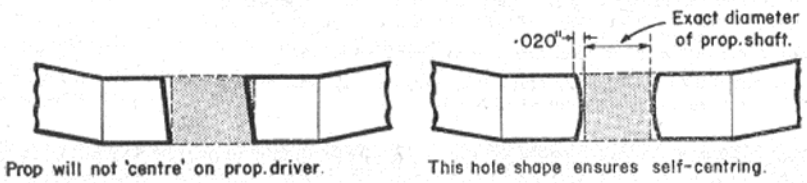


Fig. 2

7 in. F.A.I. TEAM RACE PROP (Blank from 1/2" x 3/4" x 7")

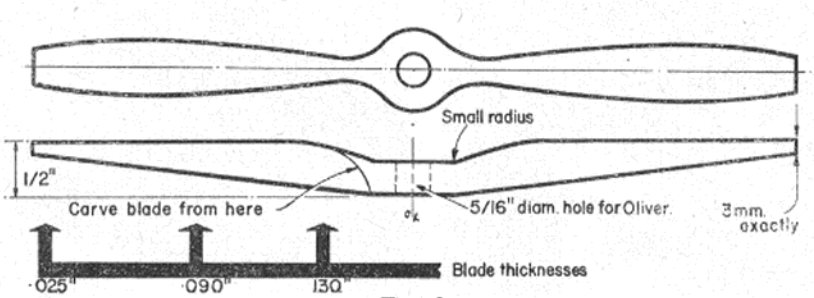


Fig. 3

Managed to improve your still-air times since last year? Yes? Then how about improving your model's visibility to match?

DAVID MILLER tells you how to select

COLOURS for CONTEST MODELS

★ ★ ★

EVERY time your model goes o.o.s. in a contest, the time scored depends not upon the performance of the model, but upon its visibility. So instead of scheming how to improve your still air time by another five seconds, take some time off to consider how to improve your model's chances of being seen by the timekeeper on a windy day.

Choice of Colour

Next time you are out on the flying field, have a look at a model about to go o.o.s. in the distance, and ask yourself what colour it is. If your answer is anything other than that it is a dark speck, then read no further. There's no hope for you. Against any but the darkest of skies, a model at a distance will show up black. It follows that for maximum visibility against the sky, the speck should be made as large and as dark as possible in order to contrast with the brighter sky.

Naturally, an all-black model is not a good proposition. Models are not the only things which show up black against the sky. Trees, hedges, hangars at a distance, all have the same habits. Once a model drops below the skyline, only the lighter parts of it will have a chance of showing up. A model, therefore, has to be a mixture of light and dark in order to show up against a background which is first bright and then dark.

From the point of view of contrast, black and white is probably the best choice, and, indeed, for a season or so I did use such a colour scheme on my models. Visibility against sky and dark backgrounds was all that could be desired (it is not now possible to say the best that could be obtained in view of the advent of fluorescent colours), but it took only a few occasions when the model got treed to make me realise that there is a third consideration which must affect one's choice of colours. A black and white model which gets treed just disappears, unless you are lucky enough to catch sight of a black mass which looks the wrong shape for a tree branch.

Some colour is needed which is fairly light in order to show up against a dark background, and also has enough colour to show up for retrieving purposes. The answer is easy—make a list of all the colours you have at your disposal, and then delete the unsuitable ones.

The colours will probably be found to be red; blue; green; brown; white; yellow; or mixtures of these.

Blue, green and brown are out for obvious reasons. White, by itself, has already been dismissed because of its lack of colour to make it stand out when the model is in a tree, but it can be mixed with the remaining colours in order to lighten them somewhat.

Let's try this: red and white make pink; yellow and white make yellow. One further combination remains, that of red and yellow, which makes orange.

That seems to be the choice. Yellow, pink or orange. Red can be added to this list if it is possible to obtain a red which is sufficiently bright. Most reds are rather dark and brown looking. But there's more to it yet. A friend of mine thought he had the answer with a red, yellow, orange, and black job—the back end being all yellow. He now knows better after the model flew slap into one of Chobham's black and yellow gorse bushes and buried itself in it up to the tail, thus hiding the red and orange parts! We had to go round all the gorse bushes nearby, trying to find the bit of one that did not prick.

No kidding though, the nature of the terrain over which you normally fly should have a considerable bearing on the choice of colours. There's no point making part of the model a nice yellow if you fly near cornfields, or an exotic pink if there is a large rose-grower's holding next to your flying field. If you fly where there are no trees (just send me the address) then you can get away with a black and white model which will give you maximum contrast under all conditions. If you fly near trees and get treed regularly, then a bright yellow is one of the best colours to use.

Select your colours by looking at the colour of the countryside where your model is likely to be flown, and then choose a contrasting colour. It is no use choosing a beautiful colour scheme which merely ensures that the model will be lost as soon as it touches down.

Disposition

Having selected the colours, the next problem is where to put which. There are only two firm rules and the rest is personal preference:

1. The proportions of light to dark colours should depend upon the performance of the model.
2. Large areas of colours are best—small patches of colour lose themselves much more easily than one big patch—ref. German lozenge camouflage.

To enlarge upon the first requirement—the point is this: if your model is a long motor run rubber job which never gets above 100 ft., then obviously a large proportion of it should be a light colour because the chances are that it will be flying against a dark background of trees and hedges more often than not. Alternatively, if your model climbs like a *Thor* with the wind up, then it is going to spend a major part of its life against a sky background, and it should consequently be a predominantly dark colour. Since this same model would probably have a brick-like glide to match, you would not worry overmuch about losing the few seconds it takes to sink from hedge height to ground.

With regard to the second requirement, it is naturally very much a matter of preference where the colours are disposed. As a guide, vertical surfaces and wing tips show up best at a distance—which colour you make them depends upon the sort of background the model will be flying against, at the distances where a colour scheme begins to matter. The underside of flying surfaces, and the portion of fuselage under the wings, never show up a light colour in flight and might as well be made dark.

My personal preference is for fairly fast climbing power models to be black from nose to tailplane and orange from there back. This has the advantage that if the model lands in a cornfield, the chances are that the bright end will remain sticking up out of the corn.

Practical Considerations

Having looked at the more theoretical side of colour schemes, it is time to turn to the practical side, and consider the finishes available.

Now it is unfortunate that the tissues at present on the market fail by a long way to achieve the brightness of colour desirable in order to ensure that the model will show up on the ground. Reds are more like dull browns, the yellow is too much of a pastel shade and all

colours are subject to fading. Worst of all, it is only possible to get orange in "hard" tissue, which is not widely used in contest models. To get the most out of a colour scheme, brighter colours are needed than those provided by tissue alone.

It is possible to intensify the colours by spraying another colour on top of the tissue, but this is bound to involve some weight penalty. However, the resulting colour is so improved that it is well worth trying, particularly on F.A.I. models, where weight is now of minor importance (unless, of course, you subscribe to the current stability craze of ultra-light wing tips, etc.).

A thin coat of colour dope, sprayed on top of tissue of the same colour, will brighten up the colours beyond all recognition, and the additional weight is no more than ½ oz. for an A/2 when the job is done properly. Use very thin dope (25 per cent. dope and 75 per cent. thinners) and do not attempt to get an opaque finish, or even to cover. Just a thin dusting coat will give you results far removed from the drab tissue efforts usually seen. The big disadvantage comes when it is necessary to patch such a finish. To produce a neat repair one has to spray on a coat of dope the same thickness as the original, which is, needless to say, somewhat difficult.

A rather better proposition is Mercury Aerolac. This thin dye-like finish is very light and the three colours available are all useful for our purpose. The black in particular is extremely intense and gives a nice matt finish—of which more anon. The yellow (on top of *white* tissue) is an acid sort of colour which is quite eye-catching, while mixed with red (a little red, and a lot of yellow) it makes a good orange. The orange is, however, rather prone to fading. Aerolac should definitely be sprayed on to get an even coverage, and the addition of some methylated spirit, as a thinner, assists this operation.

Where we turn for salvation, however, is to the recent fluorescent colours. Early experiments with such paints were not encouraging, and, perhaps, account for their relatively infrequent use, but the dyes have been improved since then and these colours are now worth every bit of the extra weight involved. To be able to pick out your model in rough country at a range of up to half a mile or so is, surely, of much more value than the 20 sec. still air time you lose with the extra weight?

It is possible to do just this with a good fluorescent colour. The unusual brightness makes it almost unnecessary to look for your model any more—it catches your eye instead. In improving the chances of recovery of the model, this finish will improve the contest flight times far more than the extra weight will drag them down.

The most suitable type of fluorescent paint so far discovered by the writer goes under the name of poster paint, but don't be put off by this because it smells like dope and behaves like dope and thins very well with Titanine thinners.

Called Fluorart, it comes in some really hideous shades. Even the lime green is a proposition, for there is certainly no colour quite like it in the English countryside. The paint is translucent, and, like other fluorescent finishes, should be applied over a white base, for otherwise any dark marks underneath will show through. Although the finish is waterproof in that it will not wash off, it tends to absorb any water lying on it with a consequent increase in weight, and it should, therefore, be proofed by a coat of fuel proofer or something similar. Doping over it produces a whitish powdery-looking surface which loses some of the intensity of the colour.

Having taken all this trouble over selection of a suitable colour scheme, for pity's sake do not throw away all the effort spent upon it by giving the result a glossy finish. By its very definition, a glossy finish will reflect back the light from its surroundings, and so, if the model is against a blue sky, it will reflect back a blue colour, and if it is in a tree, it will show up green. If you don't believe it, hold one of your models at arm's length in a gentle climbing attitude, so that it is pointing away from you. If there is any shine on the top of the wing at all, it will reflect back the colour of the sky rather than the colour of the finish.

A nice shiny model looks good and glistens in the sun, of course, but just count the number of times that you have seen your model, either in the air, or on the ground, by reason of its shine during the past season. Better still, approach the Club Mug (the one who does all the timekeeping, I mean) and ask him if he recalls ever having kept a model in sight by reason of its catching the sun as it circled. The occasions are few and far between.

A final word of warning; if you employ a matt black finish on any component, remember that this colour will absorb a great deal of heat. An anti-warp structure is, therefore, of paramount importance.

Control-line Propellers

Continued from page 48.

prop (see Fig. 2). The best knife I know of for prop carving is the Stanley No. 199 Trimming Knife which will carve even Tufnol.

Now the actual carving. Shape the back of each blade first and carve them as flat as possible, before finishing with medium grade sandpaper, then flourpaper. Next carve the front surface of the blade, finishing as before, then round the tips off slightly to help prevent tip-splitting. Check that both blades are identical for pitch, blade thickness, blade width and length—you will find a pair of callipers useful here. Now balance the prop on a knife-edge, correcting, if necessary, with a little careful sanding.

Now give the whole prop a coat of clear dope, rubbing smooth with flourpaper when dry. Repeat the process three times finishing finally with grade 400 wet or dry paper and metal polish. The airscrew is now ready to use.

The template drawings of an F.A.I. T/R prop (best on the Oliver) and an F.A.I. speed prop (2.5 c.c.) show how to lay out your templates which are then cut directly from $\frac{1}{16}$ in. ply or thin sheet dural.

Just a final thought for the theorist; by now some readers will be wondering why I haven't quoted any definite pitches for the prop designs given. The answer is that the geometric pitch of the T/R prop is about 7 in., but the aerodynamic pitch is nearer 8 in. Then comes the question of whether prop pitch increases or decreases in the air, so to talk of a prop with exactly 8 in. or 9 in. actual pitch is rather pointless! So forget "true" pitch, whatever the term may mean, and just regard pitch as a comparative measurement. My T/R prop design is, for example, roughly equivalent to a 7 × 8 in. Tornado.

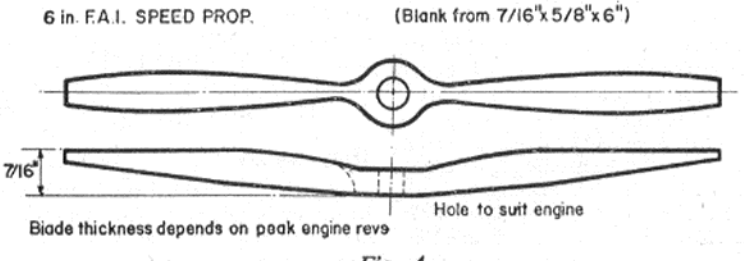
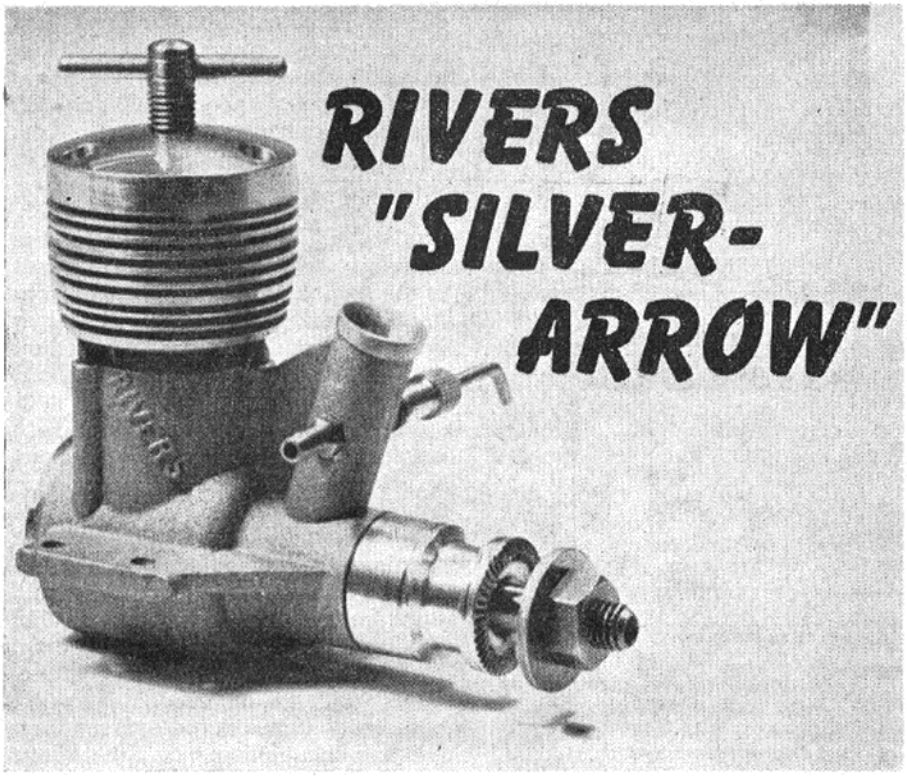


Fig. 4



3.49 c.c. DIESEL ENGINE

". . . it is, inherently, an exceptional engine . . ."

THE one big drawback to publishing test reports on brand new engines is that the reviewer has no means of telling how *representative* his particular example may be, by comparison with the bulk of production models to follow. Test samples usually come direct from the manufacturers just before their general release and, of course, readers expect to be provided with reports to coincide with the appearance of new engines in the model shops. Because of all this, there is always a risk of an engine being given a better pre-release report than is justified by the quality or performance of subsequent production models. Conversely, it is conceivable that a test sample might be substandard, although this is less probable, since, obviously, most manufacturers take the precaution of first checking test samples.

In the case of the new Rivers Silver-Arrow 3.5 c.c. diesel, which is the subject of this month's test, one may be tempted to question whether production versions can all be as good as our test engine, whose power output far surpassed that of any other 3.5 c.c. diesel produced to date. Yet everything about the Silver-Arrow does, in fact, suggest that it is, inherently, an exceptional engine, with handling and performance characteristics that lift it well above the general run of "large" diesels.

The general design of the Silver-Arrow follows that of the 2.5 c.c. Silver-Streak, introduced last year and featured in our November, 1959, Engine Test report, and it retains the smaller engine's "square" stroke/bore ratio. It is not, however, merely a bored and stroked version of the Silver-Streak: it is bigger all round and none of its components (apart from the needle-valve and prop drive assemblies) is interchangeable with that of the Silver-Streak.

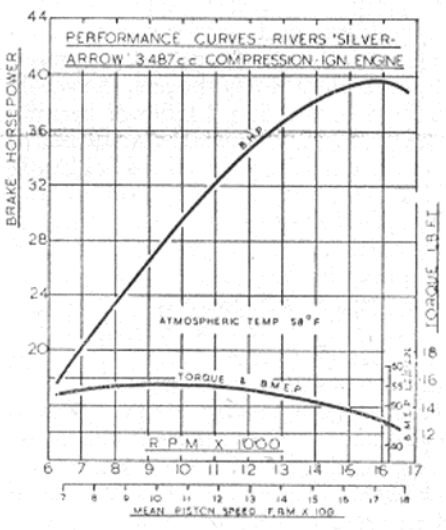
Not unexpectedly, the Silver-Arrow features the distinctive Rivers roller-bearing crankshaft. The shaft and bearing assembly is basically the same as that used in the Silver-Streak, but with increased crank throw, an enlarged valve port and larger bore induction passage. The induction period is increased by the best part of 20 degrees, opening at approximately 35 deg. after BDC and closing at approximately 45 deg. ATDC. The intake aperture through the bearing sleeve is also elongated, fore and aft, to cover the bigger valve port.

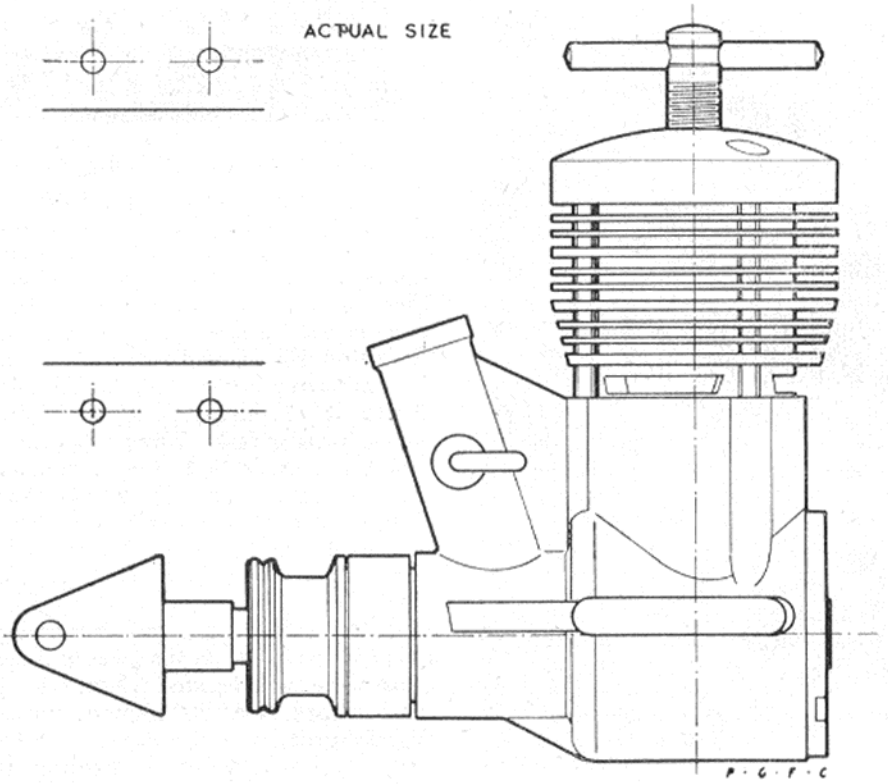
The radially ported cylinder has three exhaust and three transfer ports (compared with four of each on the Silver-Streak) and has somewhat differently shaped transfer flutes. The transfer ports also overlap the exhaust to a greater degree than in the standard Silver-Streak. As on the standard Silver-Streak the exhaust period is extremely long (actually about 165 degrees). The port timing throughout is, in fact, very much on the generous side. The cylinder liner has a very thick wall (0.090 in.) and is flanged at the exhaust belt where it is seated in a recess in the crankcase. The piston is unusual in that its wall is tapered internally towards the skirt, so that the greater mass of metal is located where piston temperature is at its highest, while slightly greater gudgeon-pin bearing area is provided where loading is heaviest.

The crankcase is notable for its very long carburettor intake. This has the needle-valve assembly installed in the orthodox straight-across manner instead of being swept back as on the Streak. The screw-in backplate has an internally threaded centre boss which is normally sealed by a brass plug. In place of this latter, a nipple can be fitted to provide pressurisation to a sealed fuel tank. Alternatively, Messrs. Rivers offer a simple crankcase-bleed plunger fitting, by which a measure of speed control can be obtained.

Specification

Type: Single-cylinder, air-cooled,





RIVERS 'SILVER-ARROW'

reverse-flow scavenged two-stroke cycle, compression ignition. Crankshaft rotary-valve induction with sub-piston supplementary air induction. Conical crown piston with matching contra-piston.

Bore: 0.647 in. Stroke: 0.647 in.

Swept Volume: 0.2127 cu. in. = 3.487 c.c.

Stroke/Bore Ratio: 1 : 1.

Weight: 7.1 oz.

General Structural Data

Gravity diecast aluminium alloy crankcase and main bearing housing. Counterbalanced crankshaft of E.N.33 steel with two 0.350 in. dia. journals running in roller type bearing assemblies, each consisting of seven 1.5 mm. dia. needle-rollers, separated by seven light alloy spacers, the whole being inserted in a hardened bearing sleeve, which is honed after fitting to crankcase. Fully machined DTD.363 alloy connecting rod. Ground and honed meehanite piston with pressed-in hardened steel gudgeon-pin and running in hardened steel cylinder liner, stress relieved and ground all over, with honed bore. Machined duralumin cylinder barrel and head unit encasing upper part of liner. Hollow compression screw. Entire cylinder assembly secured with three long head screws into crankcase lugs, clamping liner at exhaust flange between crankcase and cylinder barrel. Machined duralumin prop driver and crankcase backplate. Brass spraybar assembly, reversible for left or right-handed operation. Beam mounting lugs. Optional hexagon nut and washer or spinner-nut.

Test Engine Data

Running time prior to test: 4 hours.

Fuel used: Record Powerplus Diesel (castor base, 4 per cent. nitrate).

Performance

Prior to its being submitted for this report, our test engine was given approximately three hours of bench running by the manufacturers. We then gave the motor a further one hour on various props prior to the actual performance figures being taken. Some months earlier (as reported in the Latest Engine News columns) we had checked one of the four prototype Rivers 3.5s for the makers, who, subsequently, informed us that, having incorporated one or two small changes, they considered the performance of the production test engine to be superior to that of the prototype previously tested. Having regard to the outstanding performance of the prototype, this inferred a power output 15-20 per cent. higher than anything previously recorded for a 3.5 c.c. production diesel. In actual fact, the final peak b.h.p. figure of just under 0.40 b.h.p. at the quite phenomenal (for a 3.5 diesel) speed of 15,500-16,000 r.p.m., was 17 per cent. above the best figure previously recorded for a diesel of this size. The specific output that this represents, of approximately 114 b.h.p./litre, is, incidentally, the same as that recorded for our test of the 2.5 c.c. Silver-Streak. This, in itself, is an achievement, for it is generally conceded that diesels are not at their best in the above 2.5 c.c. sizes.

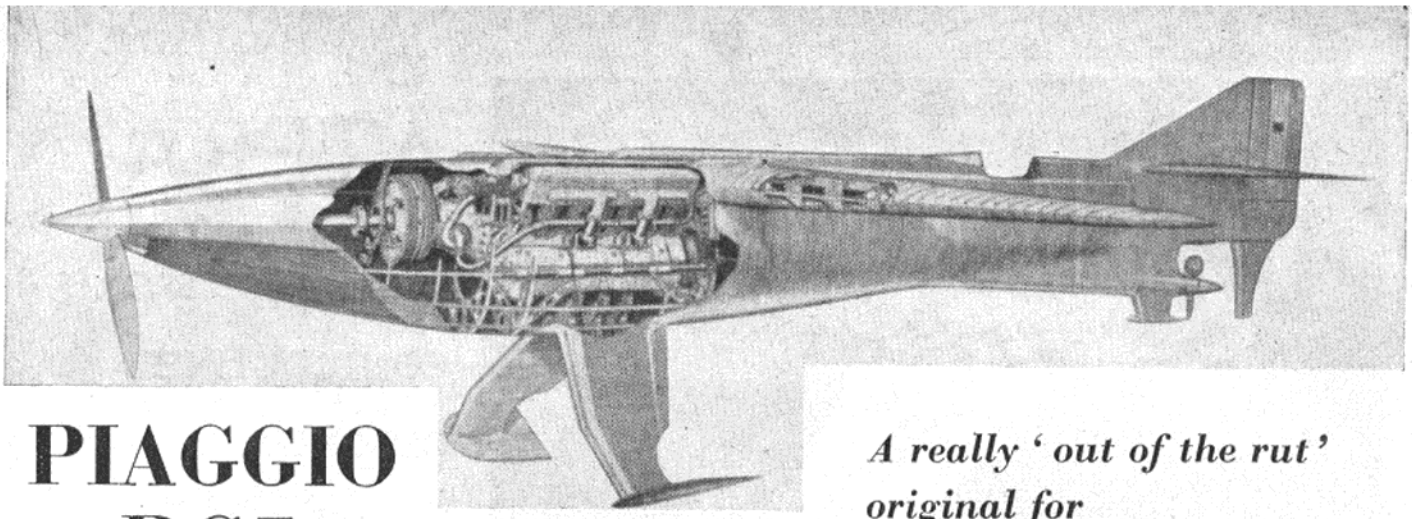
All this power was delivered with no deterioration in handling characteristics. The Silver-Arrow was, again, remarkable in this respect. It was, we would say, quite the easiest starting 3.5 diesel we have encountered in recent years. It would start from cold with a minimum of fuss and with finger choking only. Hot restarts were practically immediate and even on small light props of down to 8 in. dia., allowing speeds nearing the peak r.p.m., there was none of the viciousness invariably associated with the larger type diesel. A rather higher level of vibration was evident than with a good glow-plug engine of similar capacity (in this respect the production model seemed a little less smooth than the prototype), but the Arrow held indicated r.p.m. steadily and there was no tendency to misfire at the highest speeds, provided that a fuel of adequate nitrate content (3-4 per cent. is recommended) was used.

As one might expect, the Arrow gets fairly hot, but there was no tendency for the contra-piston to tighten in the bore and the compression adjustment remained easy to manipulate. There was the usual falling off of power after warming up under heavy loads, but this loss was reduced to a negligible amount at the peak r.p.m. Up to 12,000 r.p.m. (static) can be expected on a 9×6 prop, depending on type, increasing to 13,000 r.p.m. plus, on a 9 × 4. The engine owes its high performance mainly to its high peaking speed and if its performance is to be used, there is no point in loading it for speeds below 10,000-11,000 r.p.m. where it will have little to offer over other 3.5s.

The Arrow costs £6 5s. 8d., but, considering its all-round excellence, it is far from being expensive.

Power/Weight Ratio (as tested): 0.89 b.h.p./lb.

Specfiic Output (as tested) : 114 b.h.p./litre.



PIAGGIO PC7

A really 'out of the rut' original for solid enthusiasts

THE Piaggio PC7 was a unique single seater monoplane racing hydroplane, designed by Piaggio for the Italian Regia Aeronautica, as a possible entrant for the Schneider Trophy race.

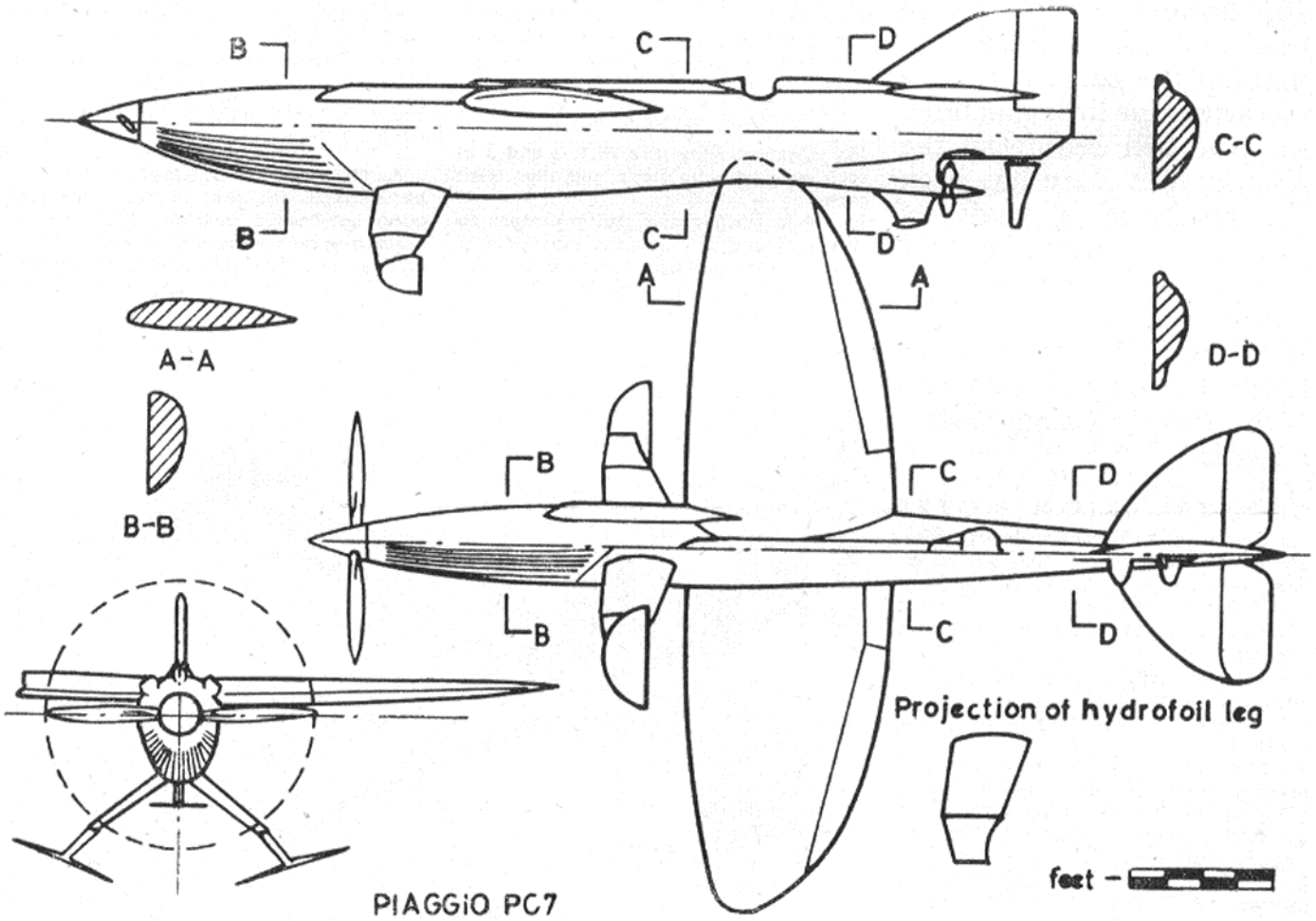
One of the many original features was the "undercarriage" which consisted of twin fixed hydrofoils, one mounted at the lower end of each main leg, and a third planing surface was mounted on a small strut under the rear of the fuselage. When at rest on the water the fuselage became a hull, almost three-quarters of it (up to the wing underside) being submerged—rather like the experimental Convair *Sea Dart*.

The theory of operation was that upon starting the engine, the clutch to the sea propeller, under the tail, was engaged and as forward speed increased, the machine rose out of the water on its hydrofoils. As soon as the machine was planing the airscrew drive was to be engaged, by means of a proportionate clutch, enabling the aircraft to achieve flying speed. Its maximum (estimated) speed was of 373 m.p.h. with a landing speed of 103 m.p.h., span was 22 ft., length 29 ft.

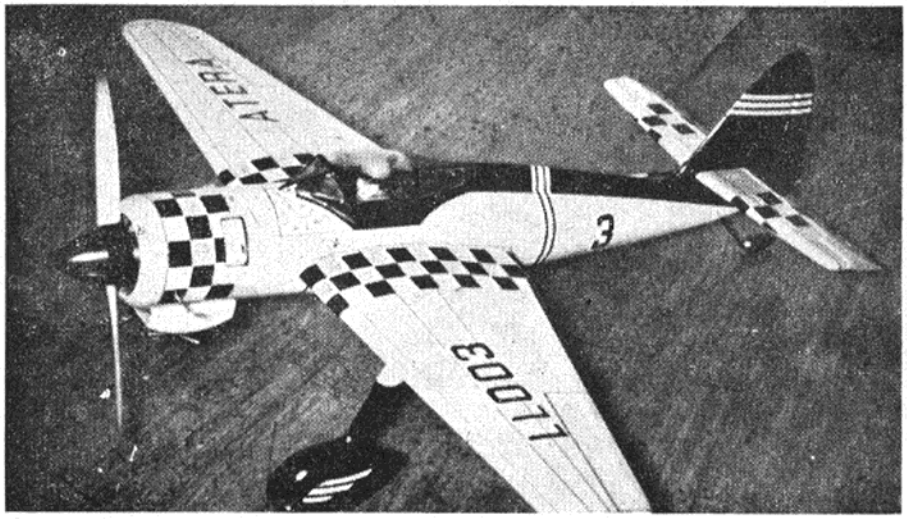
Though the machine never actually flew, it floated several times across Lake Garda piloted by De Molin of Schneider Trophy fame.

The project was finally abandoned as Piaggio were unable to deliver the completed and tested plane to the Regia Aeronautica in time for the Schneider Trophy.

It should be recalled that a very similar project, the Bristol X2, designed by Sir Dennistoun Burnley, had already been planned in England as early as 1912, and that a prototype had been built. This project was also abandoned before completion of conclusive tests.



PIAGGIO PC7



ATERA

A REALISTIC SPORTS CONTROL-LINER DESIGNED BY L. LAST

By using a suitable 1.5 c.c. engine this model can be flown as an eye-catching ½A team racer

THE fully detailed plan really needs very little additional information to enable anyone who has previously built a C/L model to successfully complete *Atera*. The following notes do, however, suggest the best building sequence to simplify the construction of this attractive little machine. As you will see from the photographs *Atera* has been the result of a study of pre-war Japanese fighter design, notably the type 95 which it closely resembles. It would look very effective finished in Japanese colours with the "Rising Sun" insignia.

CONSTRUCTION NOTES

1. Construct bell-crank assembly complete with push-rod and lead-out wires.
Note.—Loops on l.e. wires and on push-rod for control horn to be formed only after all construction of model is completed.
2. Bend u/c legs to shape and bind to wing spar formers (F.10, 11, 12 and 13).
3. Fit bell-crank assembly to wing spar formers.
4. Mark off fuselage former positions on fuselage keels F.1 and 2, and fit F.2 to wing spar/bell-crank assembly.
5. Add fuselage formers F.14 and top keel F.1, followed by F.15, 16 and 17.
6. Mark off engine bearer positions on formers F.6, 7 ,8 and 9, to suit type of engine to be installed and cut openings to suit.
7. Fix formers F.6, 7, 8 and 9 to F.2. Add both side keels F.3, engine bearers and tank table.
8. Fit engine, fuel tank and fuel tubing.
9. Add formers F.4 and F.5 keels to F.3, and then sheet fuselage, allowing approx. ⅛ in. clear around cylinder head.
10. Add tail-skid, cockpit spine and framing, fin, rudder, tailplane and elevator assembly, centre the control bell-crank, add elevator horn to push-rod, and then cement it in position on the starboard elevator.

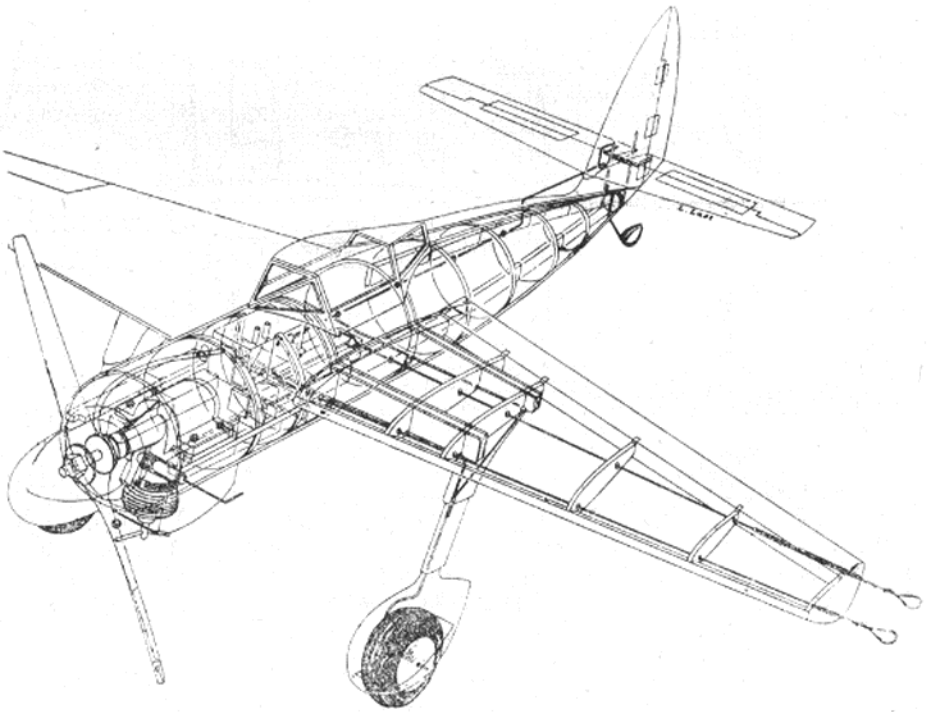
WINGS

11. Cement wing ribs W.1, 2 and 3 of each wing to wing spars, and align with care.
12. Add leading and trailing edges to ribs 1, 2 and 3. Cement ribs W.4, 5 and 6 into position, and when dry sheet wings. Add wing tips and form loops on lead-out wires.
13. Construct u/c spats and leg fairings and fix securely into position.
14. Construct air intake for engine cylinder head from sheet or block balsa, allowing ⅛ in. clearance around cylinder. Fix into position and add card air outlet gills to cowling.
15. Cover entire model with light-weight tissue and apply two coats of clear dope before colouring.

The original model was powered by a Frog 150 Mk. II. The colour scheme was black fuselage spine, fin and rudder and u/c spats, yellow fuselage, wings and tailplane, black and yellow checker-board as shown in the photos.

FLYING

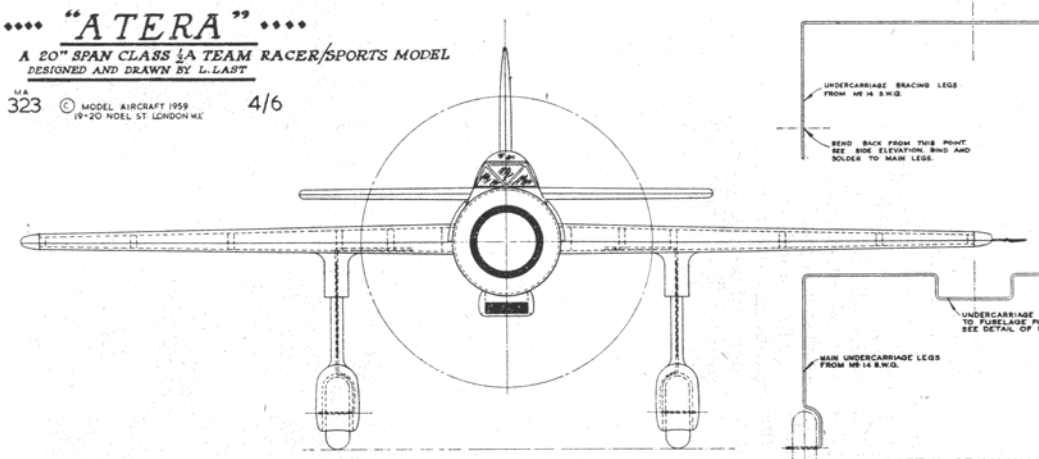
As the engine is enclosed and cannot be choked in the normal manner, open jet-needle approx. four turns, block one tank vent with finger and use fuel can to force fuel through to engine. This is usually sufficient priming to allow starting.



"ATERA"

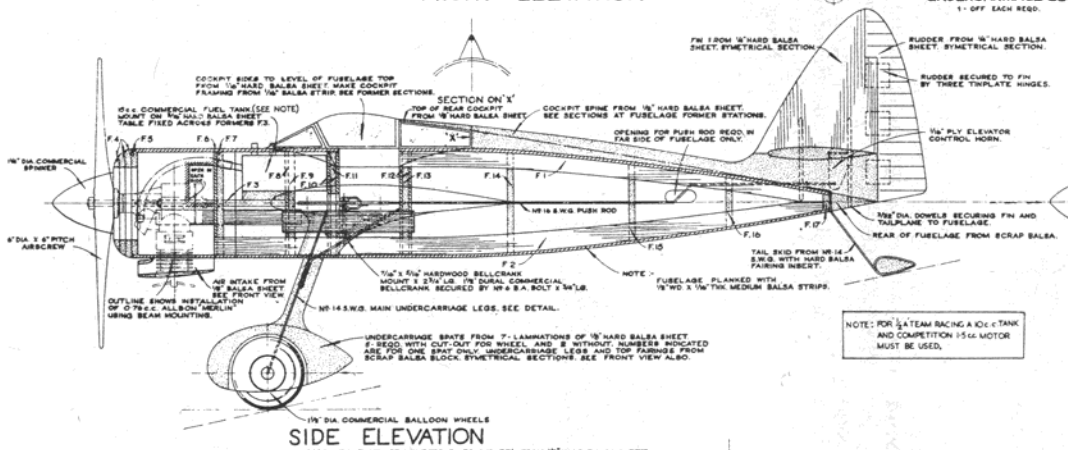
A 20" SPAN CLASS ¼A TEAM RACER/SPORTS MODEL
DESIGNED AND DRAWN BY L. LAST

MA 323 © MODEL AIRCRAFT 1959 19-20 NOEL ST. LONDON W.1 4/6



FRONT ELEVATION

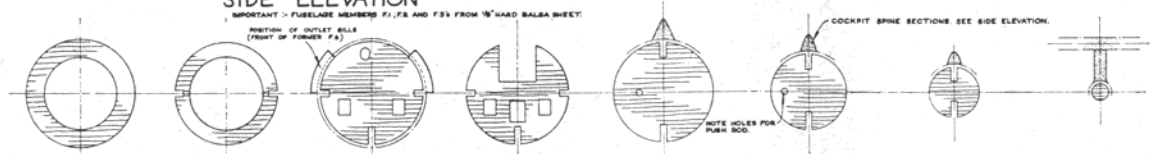
DETAIL OF MAIN 14 G. UNDERCARRIAGE LEGS
1 - OFF EACH REQD.



SIDE ELEVATION

NOTE: FOR ¼A TEAM RACING A 10 c.c. TANK AND COMPETITION 15 c.c. MOTOR MUST BE USED.

IMPORTANT :- FUSELAGE MEMBERS F.1, F.2 AND F.3 ½ FROM 1/8" HARD BALSA SHEET.



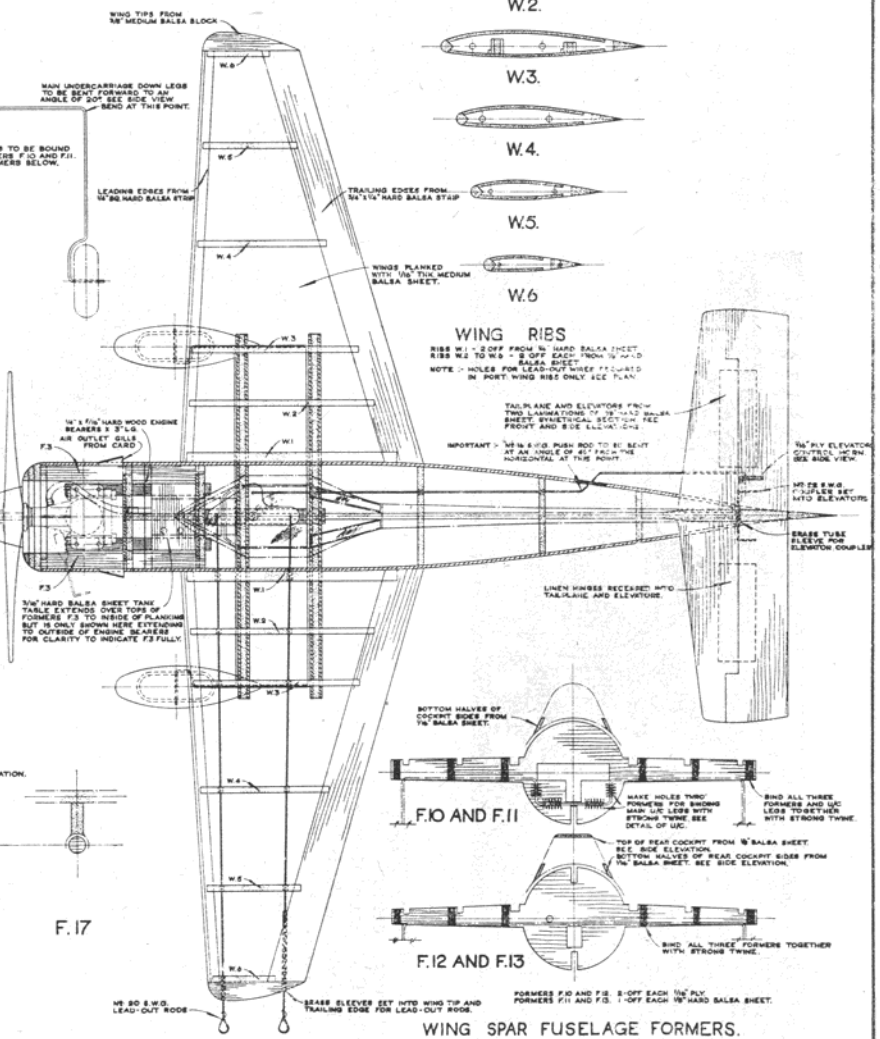
F.4 F.5 F.6 AND F.7 F.8 AND F.9 F.14 F.15 F.16 F.17

FUSELAGE FORMERS.

FORMERS F.4 - 7 - REQD. 1/8" HARD BALSA SHEET.
FORMERS F.5, 7, 9, & ALSO 14, 15, 16 AND 17 - 1 - OFF EACH 1/8" HARD BALSA SHEET.
FORMERS F.6 AND F.8 - 1 - OFF EACH 1/16" PLY.
SEE ALSO DETAILS OF WING SPAR FUSELAGE FORMERS F.10, 11, 12 AND 13 AT R.H. CORNER

WING RIBS

RIBS W.1 - 2 OFF FROM ¼" HARD BALSA SHEET.
RIBS W.2 TO W.6 - 8 OFF EACH FROM 1/16" HARD BALSA SHEET.
NOTE :- HOLES FOR LEAD-OUT WIRES TO BE MADE IN PORT WING RIBS ONLY. SEE PLAN.



PLAN

FORMERS F.10 AND F.12. 2 - OFF EACH 1/16" PLY.
FORMERS F.11 AND F.13. 1 - OFF EACH 1/8" HARD BALSA SHEET.

WING SPAR FUSELAGE FORMERS.

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, 4s. 6d., POST FREE

Builders of plastics will appreciate the new polystyrene cement which the Humber Oil Co. have recently made available. Known as **Britfix 77,** it is sold in ½ oz. tubes at 6d., and 1 oz. tubes at 1s. The larger tube comes with an excellent plastic "fine flow applicator" nozzle which enables the cement to be applied exactly where it is required, the user has complete control over the amount of adhesive reaching the job. This is a great advance over previous gadgets and is to be highly recommended. The cement itself is non-stringing and is one of the best we have used.

Incidentally, it has a somewhat unusual smell, which is quite distinctive and unlike any other plastic adhesive.

* * *

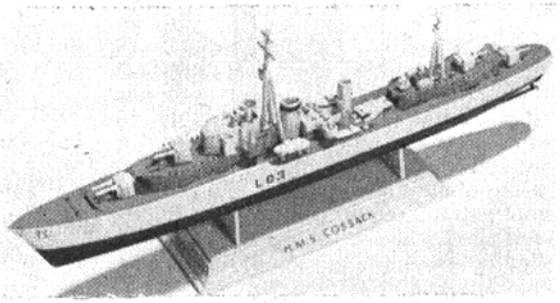
Another new adhesive, this time a contact cement, is Goodyear **Pliobond C.A.** Contact cements are being increasingly used by modellers to bond together large laminated areas, where balsa cement is, for obvious reasons, unsatisfactory. Pliobond C.A. remains permanently flexible, never becoming completely hard and brittle, and this property may well be usefully employed by enterprising modellers. A screw top tube of Pliobond C.A. costs 1s.

* * *

Although they are not aircraft, some of our readers will no doubt be interested to hear of the latest **Airfix** offering—a range of 1/500th scale plastic model warships. The first of these to be made available is H.M.S. *Cossack*, and it makes up into a most attractive, highly detailed model. We know that many of our readers are keen table-top photographers, and these ship models could well be used to produce a convincing naval set-up, perhaps in conjunction with the new Airfix *Sunderland*, mentioned in last month's "Over the Counter."

* * *

The latest **Performance** kit is a 32 in. span stunter with coupled flaps/elevators called the *Cirrus*. It is a good-looking cabin machine, featuring eliptical flying surfaces and an uncomplicated structure. Many parts are die cut and the high quality of the kit materials associated with this manufacturers' products is well maintained.



* * *

The Bristol/Ferranti *Bloodhound* ground-to-air missile forms the subject of the latest plastic kit to join the **Frog** Super Scale Model "M" series. Produced to a scale of 1/24th, this impressive model, complete with launcher and crew of four, is moulded in green and white plastic. It makes up into a most impressive and original model. The kit costs 12s. 6d.

* * *

Those who are reading our series of articles on power duration models, and who are looking for a suitable kit with which to make a start in this fascinating branch of the hobby, need look no further. **Keil Kraft** have produced just what you require with their new *Gaucho* kit for 1 to 1.5 c.c. engines, which we mentioned last month.

The extremely attractive and stoutly constructed box is chock-full of equally high quality materials. All wood parts are very nicely die-cut and the drawings provide full mounting instructions for four different engines. Price of this kit is 21s.

* * *

A tube of plastic wood is always a useful item to have in the workshop, and **Le Pages** have recently introduced an improved formula product which, at 1s. for a 1 oz. tube is well worth buying. Under size parts due to over enthusiastic carving can often be made good with a little plastic wood, saving not only time but the cost of replacement.

* * *

A new glow plug from K.L.G. is arousing a great deal of interest, particularly in view of the fact that the price is now only 5s. 11d. The new plug is known as the Miniglow "X" and is intended for use with a 1.5 volts battery (1.2 volts at plug terminal) at 3.5 amps. Both short and long reach plugs are available and they have already been extensively tested by modellers and engine manufacturers. A descriptive leaflet on these plugs is available from your local model shop.

* * *

As many modellers have discovered, there is now an acute shortage of nitromethane in Britain. This is due, firstly, to an embargo by the shipping companies on the transport of this highly potent additive from the United States and, secondly, to the fact that, when American commercial nitromethane became available in the U.K., British firms who had previously made laboratory nitromethane, ceased manufacture of this material.

This situation presented a serious problem to the manufacturers of **Record** fuels, whose glowplug fuels depend on nitromethane exclusively as an additive for increased power and flexibility. Numerous experiments were made with alternative materials, but these only served to emphasise a fact well-known to speed experts, namely, that there is no substitute for nitromethane for maximum all-round performance. Finally, an alternative source of supply for nitro was located but at considerably increased cost. As a result, the price of Record *Methanex* has had to be increased from 3s. to 3s. 6d. per ½-pint

(6s. for 1 pt.), while *Super-Nitrex* has gone up from 4s. 9d. to 6s. 6d. per ½-pint. The manufacturers state that the original prices will be restored as soon as American shipments of nitro begin again. This, however, seems unlikely to occur for several months, at least.

Meanwhile, to compensate the loss of a high-performance, medium price fuel, Record have introduced *Nitrex*-15 at 4s. 3d. per ½-pint. This contains 15 per cent. nitromethane and offers a performance approximately mid-way between Methanex and Super-Nitrex. The B.P. racing castor oil content is 25 per cent. *Nitrex*-15 is particularly well-suited to the new small glow engines and to larger types where extra performance and improved flexibility are desired after running in. Checked in an engine which had given 11,000 r.p.m. on standard methanol/castor fuel, Nitrex-15 raised this to 11,700 r.p.m., against 12,100 r.p.m. for Super-Nitrex.

Record's *Powerplus* Diesel fuel has recently undergone slight modification and now contains 4 per cent. amyl-nitrate. (Previously it had 2½ per cent., then 3 per cent.) Certain types of high-speed competition diesel demand these high cetane value fuels to maintain smooth, miss-free combustion (and, thus, maximum power) at speeds above 12,000 r.p.m. At the same time, since the compression ratio required for correct ignition timing is lower and less critical, the fuel can be easier on the engine than a standard type of fuel. Record *Powerplus* Diesel is approved by the makers of both Rivers and Oliver contest diesels and, in fact, is the fuel now used exclusively by Olivers for test purposes. It costs 3s. 6d. per ½-pint can.

Aviation Bookshelf

MANY of our readers have been eagerly awaiting the publication of William Green's **Famous Bombers of the Second World War.** This is, of course, a companion volume to the already well-known " Famous Fighters," by the same author.

The high standard set by his previous book is fully maintained in the present work, and, of course, Gert W. Heumann provides the magnificent tone drawings which are so valuable to modellers. Full colour details are included for each type described and many of the dozens of excellent photographs have never previously been published.

The 134 pages are just crammed with useful and interesting information and the complete development cycle of each aircraft is fully illustrated and described from prototype to late experimental variants. The bombers featured are the Heinkel H.E.111, Savoia Marchette *Sparviero*, Boeing B-17 *Fortress*, Junkers J.U.88, Consolidated *Liberator*, North American *Mitchell*, Martin *Marauder*, *Mosquito* and *Lancaster*.
(MACDONALD, 21s.)

* * *

Bristol Aircraft's Chief Test Pilot, Bill Pegg, will need no introduction to aviation enthusiasts, and when you have read his autobiography, **Sent Flying,** he will almost seem to be an old friend.

Bill Pegg takes us back to his early pre-flying days, through his training and service with the Royal Air Force during those stirring between-the-wars years which were so crammed with fascinating aircraft. We follow his eventful progress, up to the time when he becomes test pilot with Bristol's and read the first-hand story of the pioneering development and flight-testing of the *Brabazon* I.

There is a most exciting chapter devoted to that unfortunate *Britannia* crash-landing in the Severn Estuary, and we are given a graphic account of what it feels like to be at the controls of a blazing airliner, unable to either bale-out or land !

Fascinating fireside reading for those winter evenings, or while you are waiting for that dope to dry !
(MACDONALD, 21s.)

* * *

One of the best catalogue bargains available today is Gamages mammoth 1960 Catalogue. Covering not only model aircraft, but model trains, ships, cars, etc., it also has a section devoted exclusively to plastic models. For those who live in out of the way places where there is no local model shop, this 130-page, illustrated catalogue is a must, especially when it costs only 1s. (postage 6d.) from A. W. Gamage, Holborn, London, E.C.1.

LETTER to the Editor

DEAR SIR,—I wonder whether any of you mad-keen, acromodelling enthusiasts realise just what it's like to be the long-suffering, though admittedly interested, sister of one of your number ! I ought to. I am, or rather was one until the R.A.F. took my brother to far-off lands last year.

No more will I struggle to hold a vibrating, two-engined monster whilst he energetically, and with seeming disregard for his finger-ends, spins the prop. No more will I batter my way through icy winds to a faraway flying field, to stand, on arrival, a cold and slowly numbing witness of the historic maiden flight of his latest brain-child, sometimes to see it nose-dive seconds later, with a horrid crunch, into the ground, the tragedy dismissed by its perpetrator with only a philosophic shrug of the shoulders, whilst yours truly is promptly commissioned to grope in the long wet grass for a missing spinner or undercarriage wheel.

I miss the not-exactly-Devon-Violets fuel fumes rising from the cellar, the house shaking to its foundations under the unaccustomed strain of a running-in engine. The balsa-wood chippings that seemed to turn up in the oddest places, and most of all, the sight of Brother cycling away from the house on one of the Sunday afternoons when I didn't accompany him, with gaily decorated 'plane strapped to his back over his shabbiest and most fuel-stained jacket and oldest, baggiest flannels, he was all set for another few hours of trial and error, to return later with either a triumphant " mission completed " expression, or that determined " get-it-right-next-time-if-it-kills-me " look, indicating a saddle-bag brimming with sad remains and broken bits.

I miss the fun of rallies—halcyon June days spent in the open air, some fine, others not, but all very exciting. Ears buzzing and eyes popping after hours of listening, looking and ducking.

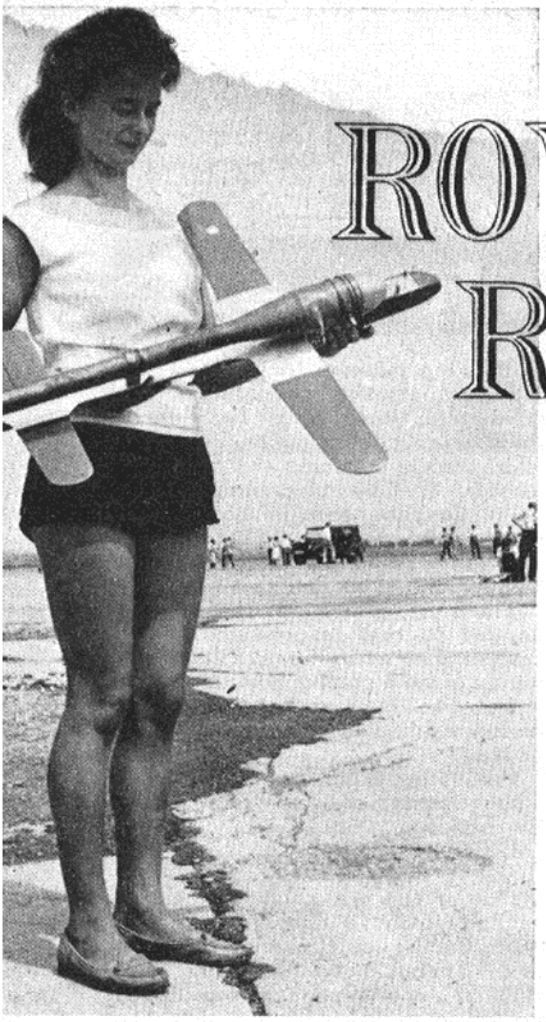
Not being too partial to freezing winds and arctic conditions generally, I could raise a grumble at some of it, but most of the time I thoroughly enjoyed being an aeromodeller's sister, confidante and general handyman. Though there were times when the language became a bit too technical even for me and flowed way over my head, but on such occasions a knowing expression and an occasional nod of agreement usually saved the day.

Yes, it was great fun while it lasted, but now what ? Whilst he's doing his nine years in the R.A.F. anything can happen, perhaps the interest will wane, perhaps not, perhaps we'll finish up with a mad motorist in the house instead of a mad aeromodeller, who knows ? Only time will tell.

Yours faithfully,
A. ELIZABETH MYERS
Willesden Green, N.W.2.

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

ROVING REPORT



Seen in the hands of his assistant, who is also a C/L flier herself, is Horst Diemer's German record holding pulse-jet. Model clocked 220 km./hr. (124.27 m.p.h.) at the 1959 German C/L Nats.

A NEW German slope-soaring R/C record has been set up by Wolfgang Soergel of Nuremberg, with the impressive time of 5 hours 3 minutes 11 seconds. This was a two hour improvement on the previous record, which was also established by Soergel and with the same model. The model was a semi-scale Scheibe *Bergfalke* sailplane of 7 ft 6 in. span. This is available in Germany as a "Hegi" kit, made by the famous Schuco firm.

The radio receiver and transmitter used by Soergel, was the recently introduced German "Mecatron" equipment. This is made by the Metz radio concern who, incidentally, are not unknown in Britain: they also make the well-known Mecablitz photoflash units. The Mecatron equipment is of up-to-date design featuring a fully transistorised and tropicalised receiver operating from a 6 volt battery. The transmitter incorporates a single valve and two transistors and also operates on a 6 volt (dry battery) supply, with the option of connection to a 6 or 12 volt car battery via special leads.

* * *

We have often wondered if and when the dope people would offer dopes in an aerosol can, ready for spraying. Such a product already exists in America (Pactra Aerogloss) and cellulose enamel is also available in aerosol cans in this country for retouching cars. Admittedly, it costs more to buy dope this way, but for anyone who does not already possess a spray outfit and who wants the added attraction of spraying, as against brushing, this would seem to be something worthwhile.

An alternative to the disposable aerosol can, has now been announced in America. This consists of a simple spraygun to which separate containers of paint and "propellant gas" are attached. When the gas runs out, one simply attaches another cartridge and the screw-on paint container can be refilled any number of times and with any type of paint—provided it is thinned to spraying consistency, of course.

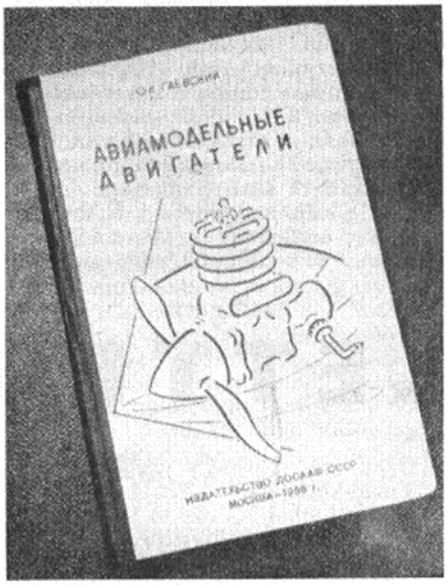
Few modellers enjoy the luxury of a compressor-driven spray outfit, but it is worth mentioning here that a very good job can be done with a car foot-pump and a simple spraygun of the "Celspray" type. This, in our experience, is far better than the type of gun which works off a vacuum cleaner. This latter, operating at low pressure, give a relatively "coarse" spray, unless the dope is thinned to a very watery consistency, so that a great number of coats, not to mention vast quantities of thinners, are required before an adequate depth of colour is built up.

Wolfgang Soergel (above) and the model with which he recently set a new German R/C slope soaring record of over 5 hours.

Fibreglass fishing-rod sections are the latest wear in A-2 and free-flight power in California: they make wonderful fuselages. Non-angling modellers note; take a look at these remarkable rods when next near an angler's shop. However, we can offer no advice on how to persuade the shopkeeper to sell you part of a rod.

* * *

All too rarely do we manage to obtain model publications from Russia, but recently we were fortunate enough to receive a copy of a new book (published last year) on model engines by the well-known Russian model writer and engine designer, O. K. Gajevsky. This, published by the official "DOSAAF" organisation which is responsible for model matters in Russia, runs to over 250 pages and is certainly one of the most comprehensive books on the subject ever issued, anywhere. By British and American standards, the quality of the paper is rather poor and the half-tone illustrations suffer as a result, but the text is well laid out and the line drawings are numerous and well executed.



From Russia comes this new book by engine designer O. K. Gajevsky. It includes data on western, as well as Russian, motors.

The book briefly covers the fundamentals of two-cycle engine design and then devotes the next 70 pages to descriptions, illustrations and drawings of a score of engines of various nationalities. Half of these are Russian (mostly MK and MB designs) and the remainder includes four from the U.S.A. (K & B 15, Dooling 29, McCoy Series 20 and Bungay 600), three from Italy (Super-Tigre G.22, G.20 and G.19) and one each from the U.K. (E.D. 2.46), West Germany (Webra Mach-1), East Germany (Zeiss Aktivist) and Czechoslovakia (MVVS 2.5/1955). About 40

pages are included on engine construction, followed by a long section on tanks and fuel systems and chapters on operation, installation, performance-testing, tuning and props. The book concludes with working constructional drawings on six engines including, rather surprisingly, the E.D. 2.46, K & B 15 and Webra Mach-1.

Some interesting performance curves for various engines are given in the book and most of them seem to be on the generous side. The 1.48 c.c. MK-16k diesel is shown as developing over 0.20 b.h.p. at 15,000 r.p.m., the 2.47 c.c. MB-09KS glow engine is credited with 0.375 b.h.p. at between 18,000 and 19,000 r.p.m., the 4.96 c.c. MKS-10L is given 0.70 b.h.p. at the same speed and the 9.96 c.c. MKS-05P is alleged to give 1.5 b.h.p. at just over 14,000 r.p.m.—a decidedly improbable figure having regard to the general design of the engine which is a plain bearing, shaft induction motor reminiscent of the early post-war period. Fuels quoted are conventional, with no more than 20 per cent. nitromethane for glow mixtures. Figures for foreign engines include 0.27 at 14,700 for the E.D. 2.46, 0.31 at 16,000 for the Webra Mach-1, 0.75 at 17,500 for the Dooling 29, and 1.5-1.75 b.h.p. at unspecified r.p.m. for the Bungay 600.

* * *

Judging by the speeds that are being reached by R/C racers in the U.S. (particularly California), the record established a few months ago, by Jean-Pierre Gobeaux of Belgium, is not likely to survive for very long. The Gobeaux model clocked 145 km.hr. (a fraction over 90 m.p.h.) but speeds of over 100 m.p.h. have already been recorded (unofficially) in the U.S. Some of the bigger American R/C clubs have quite impressive records of their own. In the East Bay R/C Club of Oakland, California, for example, Bob Heise holds the club speed record at 79.9 m.p.h. and the club distance record at 22 miles.

Talking of potent R/C jobs, we see that the U.S. Civil Aeronautics Administration has put its foot down regarding one modeller's idea of what an R/C model should be. This is a 16 ft. span model weighing 300 lbs. and powered by a 27 h.p. target drone engine! Complete with cine camera and parachute—it is reported to have taken four years to build—and to be capable of 150 m.p.h. The CAA have grounded it.

* * *

The photographs of the impressive looking C/L Lockheed *Lightning* were sent to us by A. L. Aarts of the Haarlem Model Club, Holland. Mr. Aarts tells us that the model was built by P. Groos and won first prize in the scale event at the Dutch National contest last September. It spans 4 ft. weighs 42 oz. and is equipped with working oleo-leg type undercarriage struts which are said to give very smooth landing and taxying characteristics. It is powered by two E.D 2.46's driving 9 × 6 props and has a level flight speed of approximately 60 m.p.h.

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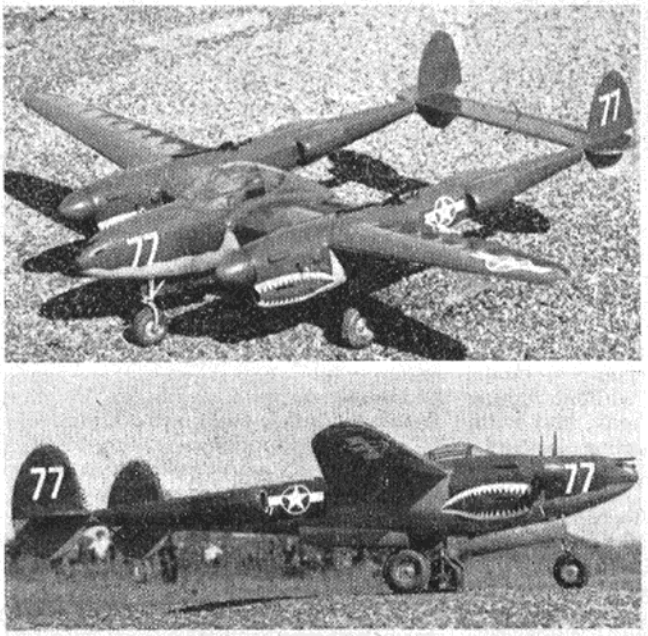
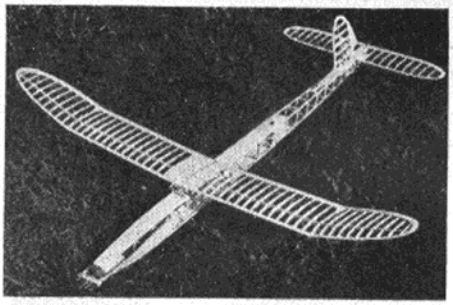
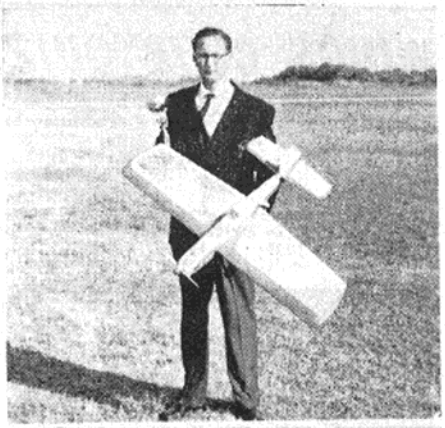


Above: prizewinning Lockheed P.38 Lightning control-liner built by P. Groos, of Haarlem, Holland. Powered by twin E.D. 2.46 diesels.



Left: Radoslav Cizek's latest version of his 1959 Wakefield winning design, XL-59. This new version has a Benedek wing section in place of the NACA 6409 previously used.



Right: Luciano Megalhaes, after winning the stunt event at the first model contest to be held in Portugese East Africa. Model is an original design powered by an Eta 29.

Right: John Maloney, well-known American importer of O.S., Oliver, Super-tigre, etc., with two nice R/C jobs. The de Bolt Cruiser has O.S.II 29RC and was built, by Chas. Greetham. The Smog Hog, built by J.M., has Max-III 35 RC. Both use Controlaire 8-channel receivers with O.S. relays and reed banks.

Left: Milan Drazek, Czech combat champion for 1959 and co-holder of the team race title with Jiri Trnka, releases Trnka's McCoy 35 powered stunt model on a practice flight.

YOUR OWN . . .

MODEL AIRCRAFT WINGS CLUB

. . . PAGES

EVERY expert was originally a beginner. This is true of aircraft modelling as of other subje ts. Once upon a time (and it may not have been long ago) our local R/C wizard was graduating from paper gliders to his first lop-sided static model.

We al have to begin. It is one of the great attractions of the model aircraft hobby that the junior schoolboy can easily build or buy something that will satisfy him at once. He can make his own model from scratch with simple materials and such commonplace tools as a penknife and razor blade. He can buy a ready-made plastic model or a kit from his pocket money. In short, he has only to make the decision. Having made it, he becomes a model aircraftman right away, without waiting for Christmas or a birthday, and without the need of cultivating a special skill before he really does anything.

Older modellers have the intelligence to respect his first efforts, not only because they remember their own pioneering days but also because they know that the future of the hobby will be determined largely by the continuing enthusiasm of the young. While it is true that many aircraft modellers enter the movement as adults—some while they are operating full-size machines—it is also a matter of commonsense that the movement must perpetually gain in strength when it holds the interest of the juniors. Even those who drop out, or are pressed out by examinations and other duties as they grow older, will continue to help the hobby—by giving it their goodwill.

At the beginning of this New Year thousands of schoolboys are discovering the fun of assembling and flying little aircraft together with the pleasure of learning more and more about the technique and history of aviation. They deserve to be encouraged and helped in every way.

For that purpose, the MODEL AIRCRAFT Wings Club has been formed. It seeks:

To assist beginners in the building and flying of their models by constructional articles in these pages

To promote National and International fellowship between young model enthusiasts by publishing here a monthly list of pen-friends

To publish news and ideas as the members submit them

To arrange competitions with attractive prizes for Wingmen. (The first competition is the Quiz on this page, and to the senders of the first 25 correct solutions opened we will give a copy of Peter Chinn's invaluable book for beginners, "All About Model Aircraft." This is normally worth 6s. od., but these will be special copies personally autographed by Mr. Chinn.)

To encourage the building of suitable models by offering the plans at special rates

To advance the prosperity and prestige of the movement by impressing upon all beginners the importance of *care*—care for their own safety and the safety of others, and care for the convenience of all.

From this point, I am calling all schoolboys. . . .

Every month MODEL AIRCRAFT will rope off this section as special territory; it belongs to you, the modellers from 10 to 16. Here we shall meet as friends, to talk over our problems and ideas, to exchange news, and to keep in comradely touch as fellow-members of a world-wide movement.

You will see on the opposite page the first of our monthly constructional features for Wingmen. While the small F/F scale models are not recommended for absolute beginners, we are writing of them this month because many of you will have been given this kind of kit for Christmas. What you read on the opposite page should help you to surmount the normal difficulties—those difficulties which often deter the beginner and sometimes destroy his interest for ever.

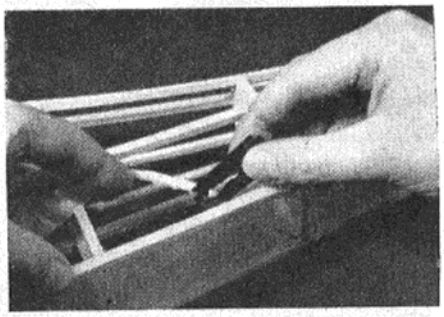
Continued on opposite page

WINGS CLUB QUIZ

Win an autographed copy of Peter Chinn's "All About Model Aircraft," the ideal book for beginners. A copy will be awarded to the senders of the first 25 correct solutions opened. Send your answers on a postcard to the address on opposite page.

1. Fill in the manufacturers' trade names of the following well-known kits:
(*a*) " ..... Cardinal " ; (*b*) " ..... Monarch "; (*c*) " ..... Junior 60 ";

2. Diesel model engines were first seen on the market in Britain in:
(*a*) 1936; (*b*) 1939; (*c*) 1946; (*d*) 1949.



3. Here, a fuselage is being covered with silk. There are several kinds of silk covering, but one of the materials listed below is actually a tissue paper. Which is it ?
(*a*) Japanese silk; (*b*) Chinese silk; (*c*) Silkspan; (*d*) Oiled silk.

4. What do the following abbreviations stand for ?
(*a*) R/C; (*b*) r.p.m.; (*c*) C/L; (*d*) S.M.A.E.

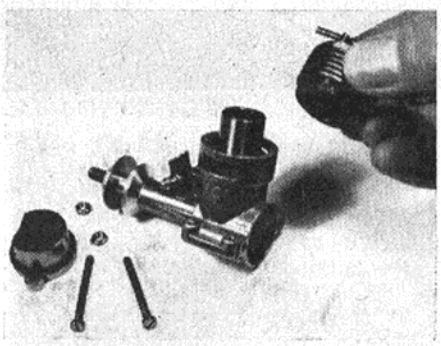
5. On the tips of this flying-wing glider are horizontal control surfaces. They are known as:
(*a*) Ailerons; (*b*) Elevators; (*c*) Flaps; (*d*) Elevons.

6. Balsa construction, which originated in America, was adopted in Britain during the:
(*a*) Early 1920's; (*b*) Late 1920's; (*c*) Early 1930's; (*d*) Late 1930's.

7. The present absolute world duration record for model aircraft is 8 hr. 34 min., achieved with a radio-controlled model glider. It is held by:
(*a*) Great Britain; (*b*) U.S.A.; (*c*) New Zealand; (*d*) U.S.S.R.

8. The King of the Belgians Cup event is a contest for:
(*a*) Gliders; (*b*) Radio-control models; (*c*) Control-line models; (*d*) Rubber models.

9. Which of the following well-known model engines is fitted with a ball-bearing crankshaft:
(*a*) A-M 35; (*b*) A-M 25; (*c*) Frog 80; (*d*) E.D. 2.46.



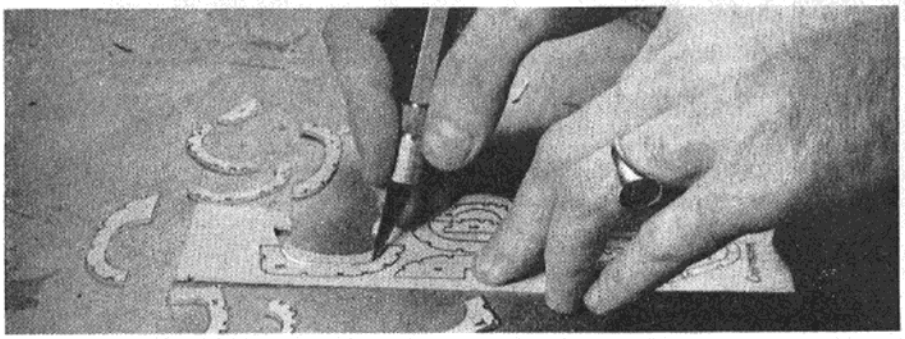
10. This popular British engine is a :
(*a*) Frog 150; (*b*) Allbon Merlin; (*c*) Allbon Spitfire II; (*d*) Allbon Sabre.

11. In relation to what model items do the following dimensions obviously relate:
(*a*) 1/16 x 3 x 36 in.; (*b*) 9 x 6 in.; (*c*) 2.49 c.c.; (*d*) 0.550 x 0.625 in.

12. The wood most commonly used for commercially made power model propellers is:
(*a*) Beech; (*b*) Ash; (*c*) Oak; (*d*) Mahogany.

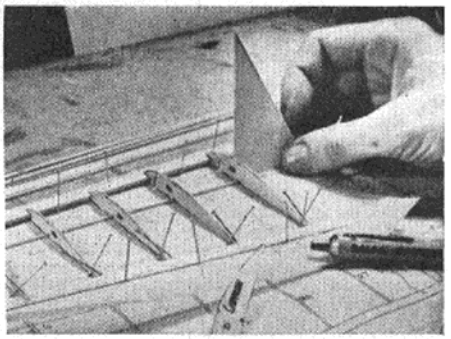
ON THE WINGS CLUB WORKBENCH — Flying Scale Kits

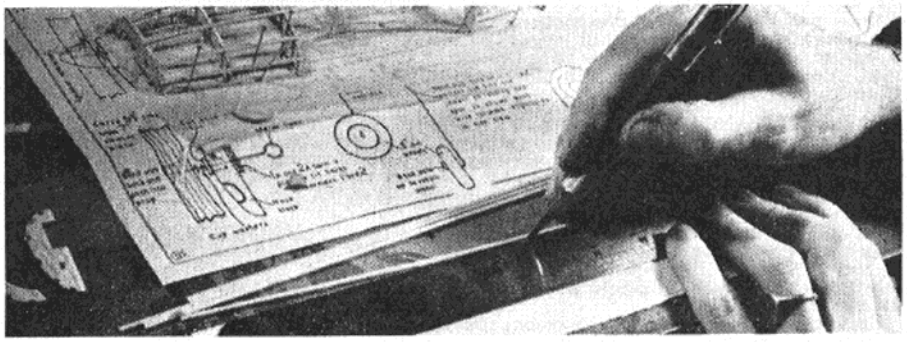
Did you receive a flying scale kit for a Christmas present ? These photographs of a *Chipmunk* we are building augment the instructions included in the kit, and will help you to successfully complete any similar design.



First job is to cut out the printed parts. These split easily, so use a very sharp knife and always cut the inner curves first.

Cover the plan with greaseproof paper before you start building. Check for squareness before cement dries. Always place pins *either side* of wood strips.

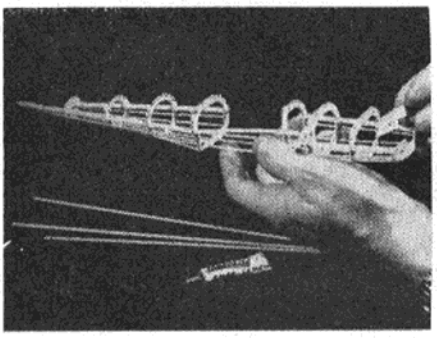


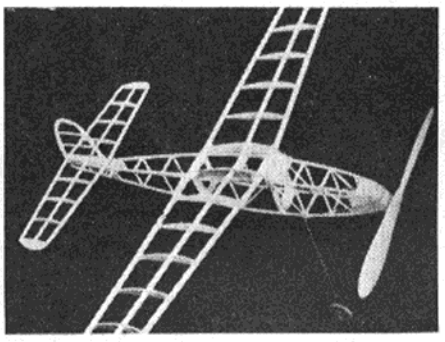


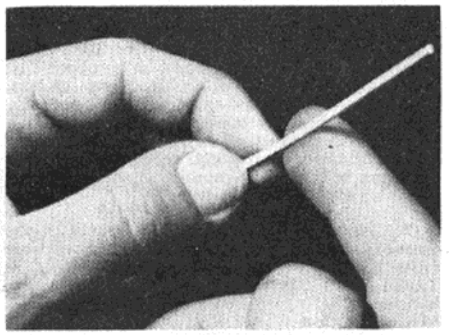
Separate the stripwood with a straight edge and sharp cutter. Note method of fuselage construction in background.

Where there is a sharp bend, notch the strip with your thumbnail.

Only one fuselage side is built on the plan, the other side is completed as shown here.







Next month we will show you how to cover your model. We will be using this machine, which is a type ideally suited for youngsters who want a model to *fly*.

Future articles will give the Wingman and Wingman-to-be the kind of advice and guidance that he needs for success. Please tell us if you find any point obscure.

We want to hear from you. If you send us a letter, news item or a suggestion and it is published we will pay you 5s. od., or if we include a photograph you have sent, 10s. od.

To join, you have only to fill in the coupon right and post it to us as the directions say. The badge which you will receive is a beautiful thing and you will be proud to wear it, the two transfers will enhance the appearance of your model, while your membership card, which contains the Club rules, will be a useful introduction to other members. Begin the New Year well as a Pioneer Wingman—one of the first in this great New Club organised by the leading magazine of the movement!

ALAN WINTERTON.

Dear Alan Winterton,

I would like to become a pioneer member of the Model Aircraft Wings Club. With this coupon I enclose a postal order for 1/- to help cover the cost of the badge and membership book.

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(Underline christian name normally used)

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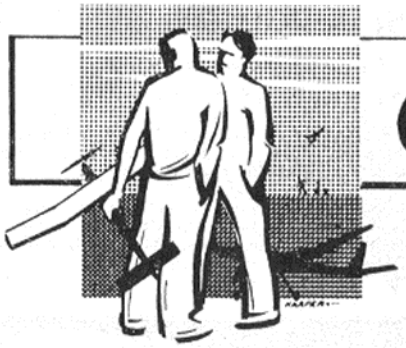


CLUB NEWS

S.W. R/C M.F.S.

The annual general meeting of the South Western R/C Model Flying Society, which draws its members from all over Devon, Cornwall and Somerset, was recently held at Paignton. The secretary, Harry Stillings, was unfortunately unable to be present owing to his detention in hospital after an operation and G. Lynn (Plymouth) was elected chairman in succession to H. O'Heffernan (Salcombe).

The subscription to the society has been standardised at 5s. per annum and new members are welcome. It is proposed to hold R/C rallies each month, commencing April, the first being at Winkleigh, N. Devon. The May venue is tentatively fixed at Davidstowe, Cornwall. If this is not suitable, it will be held at Winkleigh as will be the June meeting. July, September and October meetings will be held at the new site near Totnes, Devon, whilst the August venue will be the Devon Rally at Woodbury Common, near Exeter.

Enquiries for membership should be made to Hon. Secretary: H. STILLINGS, 5, Woolsery Grove, Whipton, Exeter, Devon.

WEST BROMWICH M.A.C.

In order to retain interest over the winter months we are organising our own competitions. Indoor contests are priority; chuck gliders, microfilm and round-the-pole are popular. Several members are building small indoor team racers for motors of up to 0.8 c.c. The results should be quite interesting, especially now that there are so many glo-motors on the market.

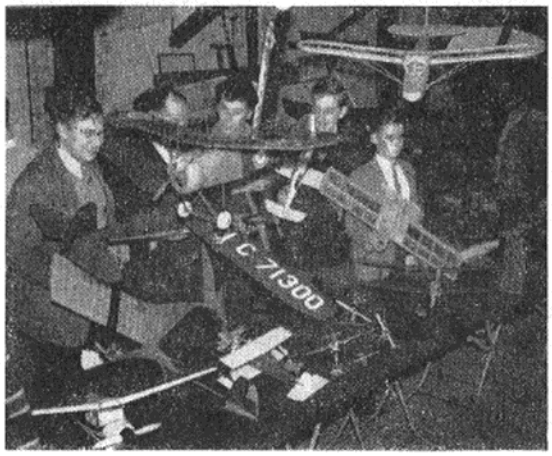
NORTH KENT NOMADS

Our club prizegiving and dinner held at the Grove Tavern was well attended, and we were most disappointed that our president, Col. Taplin, was unable to attend, but we were honoured with the presence of the local J.P., Mr. Liddington, and his wife, who kindly presented the prizes.

We congratulate Charlie Dance on the efforts he is putting in to attempt a world distance record for a radio controlled flight. He is being ably assisted by Wally Skeels.

OUTLAWS (CANNOCK) M.A.C.

The second annual dinner was held recently and was again very successful, some 50 members, friends and guests from five neighbouring clubs attending. Trophies for the year's champions were awarded as follows:— combat, J. Burke; stunt, E. Burke; glider, R. Lockley.



A selection of members and models at a recent exhibition held by the Northwood M.A.C. This was highly successful, there being some 75 models displayed in their club room, to an interested gathering of mums, dads and other visitors.

CRYSTAL PALACE M.A.C.

The recent recruiting campaign has brought forth such an influx of new members that we have had to open negotiations with the local council for larger accommodation. The club had a large entry in the National Models Exhibition in all classes while many scale models are now taking shape.

Our winter programme contains plastic kit contests for juniors and an A/1 cup. Indoor flying will start as soon as our new premises are obtained. Flying takes place with monotonous regularity every weekend at Epsom (R/C and F/F) and Mitcham (C/L).

DARTFORD M.F.C.

We have been very inactive over the past year, but, now that membership is rising slowly we hope to attend most of the forthcoming rallies. Modellers in the area, whatever their interests or experience, are invited to join this reorganised club. Meetings every Friday, 7.30 to 10 p.m., at the Rose and Crown, West Hill.

EAST LANCASHIRE M.A.C.

All that can be said of our recent rally is that conditions were so bad that we had to postpone the meeting until February 28th.

Details for February 28th at Walton Spire, Nelson:—

All F/F classes 3 min. max., three flights. Chuck glider entries on the day, best out of six flights. R/C, S.M.A.E. combat (see S.M.A.E. rule book); "½A" combat max. engine capacity 2 c.c., line length 40 ft.

Entry fees for the postponed December 6th meeting will be held over and returned to contestants who cannot attend on the new date. Pre-entries 1s. 6d. and 1s. to L. Clarkin, 19, Fair View Road, Burnley.

WHARFEDALE & D.A.

We are at present engaged in design and construction of next season's T/R and F/F entries. Many new ideas are under development, including delta and flying wing team racers. With the weight of the new models around 16-18 oz. the performance should be better than last year.

A new club room of greater volume and unlimited curfew hours has been secured for our use. Members and visitors will be welcomed in the Salem School Rooms, Burley-in-Wharfedale, nr. Ilkley (behind the Queens Hotel) on the first Friday of each month.

CROYDON & D.M.A.C.

The first of the breed-improving F.A.I. contests that Croydon are running this winter was the Nordic A/2 event held recently at Chobham. Twenty stalwarts braved the fog and rain to put up some quite fair times.

John Blount, of Croydon, came out at the top flying a *Nebula* for a total of 10 : 03 for five flights, closely followed by Messrs. North and Wisher. The amount of lift was slight, but the first ten people all scored over nine minutes; this presumably proves something.

The Springpark Club kindly donated a cup for the event; for this and to people who helped with timekeeping, many thanks.

After talking to a few moist and cold random samples, we've decided to hold a Wakefield contest on January 31st, again at Chobham. Five 3's, bring your own timekeepers, 2s. 6d. entry, winner takes the lot. So far no pot is forthcoming.

EXMOUTH & D.M.A.C.

Six members went to the ex-R.A.F. station at Blake Hill Farm to take part in the Keil Trophy, Farrow Shield and Area events.

Most successful member was Alan Parker, who placed 5th in the Keil and 13th in the Farrow. He also took 1st in the Area power and rubber events. In the Keil and Area power event Alan flew a *Eureka* with a 12-year-old Arden up front! Also using *Eurekas* were Chris Strachan, who placed 3rd in the Area event, and Den Baudet who was sixth. Flying in the Area rubber event was chairman "Pop" Baudet who could only manage 5th place.

S.M.A.E. NORTHERN AREA

The weather conditions for The E. C. Muxlow Memorial Trophy were almost perfect, very little wind, sunny periods and all competitors enjoyed a good contest. The results were as follows:—

1. S. Broadey ..	Thornaby Pathfinders	13 : 29
2. G. L. Roberts	Lincoln	13 : 00
3. C. P. Miller	Baildon	12 : 16

Also flown off on the same day was the final of the Northern area's inter-club knock-out competition in which Sheffield "A" beat Tees-side "A" by 25 : 51 to 23 : 48.

ANGLIA M.F.C.

Interest is now centred on R.T.P. flying with a number of members experimenting with electrically driven scale jobs; these look very realistic taking off, due to engine control being possible by using a variable resistance from the mains.

Since the chairman, Eric Minall, put up a prize for the best time of the winter season, many rubber models are being built, particularly by the juniors who seem more intent than the seniors on getting their hands on the prize!

HAYES M.A.C.

At the final of the L.D.I.C.C. contest, Croydon did not put in their last two flights because they could only do 2 × 3 min. = 6, when they needed 8 min. to win. The gliders opened up what would have been a tight finish and the unlucky 0 : 37 of Partridge decided the contest.

RESULTS

Croydon

Glider	D. Partridge ..	4 : 39
Power	K. Smith ..	5 : 29
Rubber	J. North	5 : 28
		15 : 36

Hayes

Rubber	N. Cliff	9 : 00
Power	L. Barr	8 : 15
Glider	J. Baguley ..	6 : 08
		23 : 23

NOVOCASTRIA M.A.C.

We finished the flying season with a narrow margin win for the North-Eastern area cup, with 28 pts. to Stanley Club's 27 pts. The club champion over the past year is Fred Harvey, who, at our social, seemed to have nothing better to do than run backwards and forwards collecting pots!

CHANGE OF SECRETARY

CRYSTAL PALACE M.A.C. C. Brewer, 144, Church Road, Upper Norwood, S.E.19.

NEWCASTLE A.M. A. R. Darby, 119, Ennerdale Road, Walkerdene, Newcastle-on-Tyne, 6.

SOUTH BRISTOL M.A.C. D. A. Wilson, Woodlands Cottage, Wrington, Somerset.

ABINGDON & D.M.A.C. R. B. Winter, 5, Gravel Lane, Drayton, Abingdon, Berks.

HESWELL M.A.C. G. K. Mutch, 16, Briar Drive, Heswell, Cheshire.

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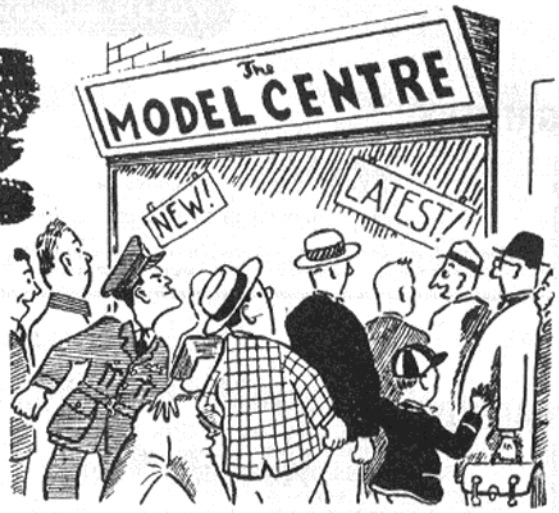

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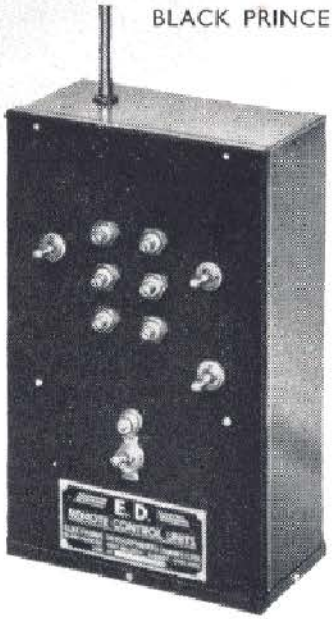

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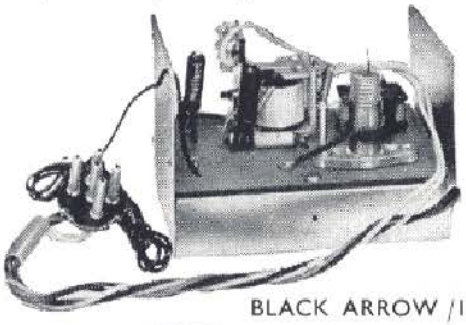

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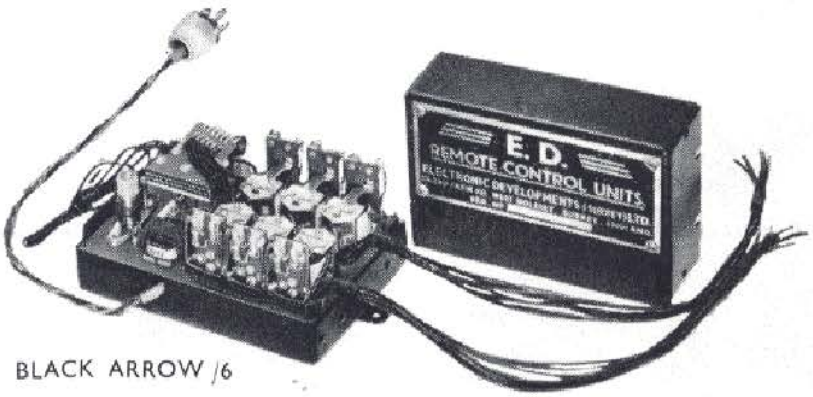

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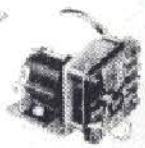

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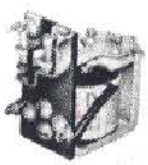

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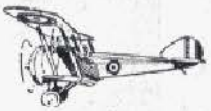
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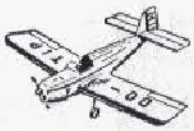
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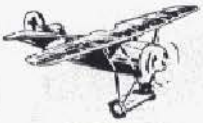
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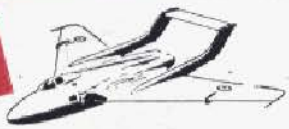
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