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FEBRUARY
1957

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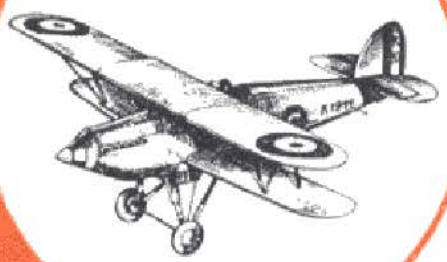
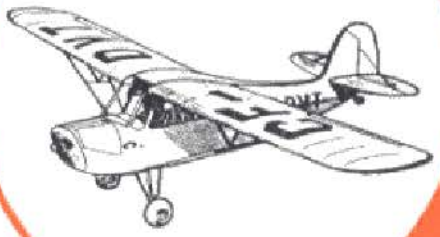


20" HAWKER FURY

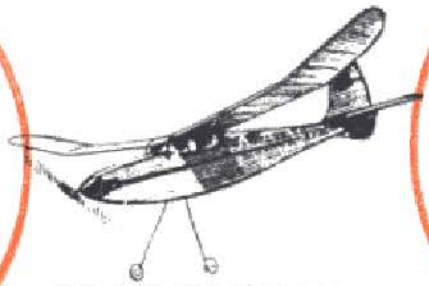


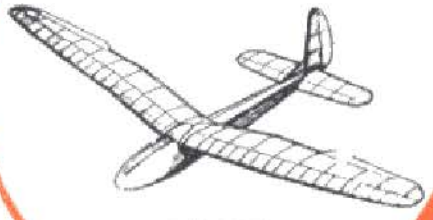
24" PIPER SUPER CRUISER

24" CESSNA BIRD DOG

20" TIGER MOTH

24" SHORT SEAMEW





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At Hacienda " El Paraiso " Esmeraldas, Ecuador, South America.
Tuesday, October 30th. 1956

I am dictating this whilst my friend and agent Gustavo Landers ty pes it direct unto his machine. We are sitting upstairs in his house looking out across the esmeraldas river which here is about 600 yards wide.

As I sit here it is hard to believe that we are almost e exactly on the Equator. It is the dry season and you therefore expect to be sweltering in the sun. Not a bit of it. I have seen it but only occasionally. Mostly it is cloudy very often with a breeze and unless you are taking up an almost vertical hill really quite cool.

Why is it cool? Because of the famous Humboldt current which at this time of the year comes close to the coast of Ecuador. If you have read the Kontiki book you all remember something about it. It is a stream of icy cold water wich comes up from the Antartic in a very strong flowing stream. I am told that in some spots on the Peruvian coast the sand is so hot that you can't stand on it and the sea so cold that you can't swim in it.

It is because of the clouds that hang over Ecuador during the dry season that you get the best Balsawood. In northern climes you get a distinct winter and summer growth in trees and if this accurred with Balsawood you would have wood with hard and soft layers. The only point about it is that the dry season here is neither winter nor summer. It just doesn't rain, at least it does not rain much.

As I sit here a Balsawood raft floats swiftly down the stream. There go some logs for the mills we buy from down at the coast and there also go Bananas for its Balsa which provides the means of transport.

Quite francly it is all just as unlike an Englishman's picture of the tropics as you could imagine. In this part of the country it is hilly as against beeing mountainous and between the hills there are quite flat valleys with green pastures and fat cattle.

On the table is a bottle of "Cluny's Scotch Whisky". Down below is a paraffin refrigerator for the soda. Other amenities (I had to spell that for Gustavo) are to hand, his company is excellent and perhaps I stay here. Yes?

J. V. Paterson

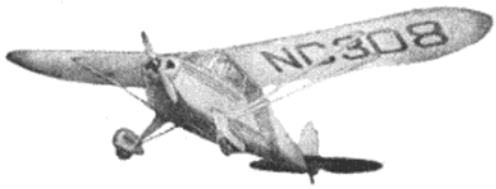
Flying Scale

Flying Scale Power models are getting more popular every year and experienced modellers appreciate the "full-size" appearance and excellent performance of these well established Mercury models. They have won contests throughout the world and have the distinction of being the finest in their class. Every model is true to scale and is most realistic in flight. Complete plans and building and flying instructions are included with every kit, as well as precut and printed SOLARBO Balsa of outstanding quality.

AERONCA SEDAN

The most popular model in the range and a firm favourite with those who want a scale model for Radio Control. A truly fine flier. 65 in. span. For diesels 1.5-2.5 c.c.s.

MONOCOUPE 64" & 40"



Of simple construction yet a true scale model, this machine is an old favourite. The large 64 in. version is ideal for Radio Control with diesels of 1.5-2.5 c.c.s. The 40 in. model takes any good 0.5-.75 c.c. motor.

STINSON VOYAGER

A most attractive model with delightful lines. The prototype machine is one of the most handsome of present-day light aircraft. With a diesel of 0.5 to 0.75 c.c.s. this machine has a lively but stable performance and is quite easy to build and trim. 42 in. span.

TIGER MOTH

One of the world's most famous aircraft, this machine needs no introduction. More pilots have been trained on Tigers than on any other type of aircraft. A grand model of a fine old timer. 33 in. span for diesels 0.5 to 0.75 c.c.s.

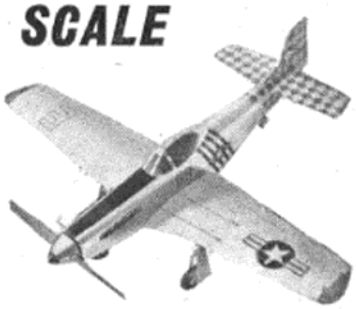
CHRISLEA SKYJEEP

The distinctive lines of this popular light aircraft make the model as interesting to build as it is enjoyable to fly. A really handsome flier, it has a most stable flight characteristic when powered by a 0.5 to 0.75 c.c. diesel. 45 in. span.

ASK TO SEE THESE KITS AT YOUR LOCAL MERCURY STOCKIST

CONTROL-LINE FLYING SCALE

P.51 MUSTANG



The first of a new Mercury range under development. This pre-fabricated kit with its fully formed solid balsa wings must be seen to be appreciated. With a 2.5 c.c. diesel such as the A.M.25, the Mustang can be flown in Class "A" Team racing or as a sports model. Span: 23½ in. O/A Length: 20 in. Flying speed: 65-80 m.p.h., depending on motor fitted. Super quality SOLARBO Balsa throughout. 32/6

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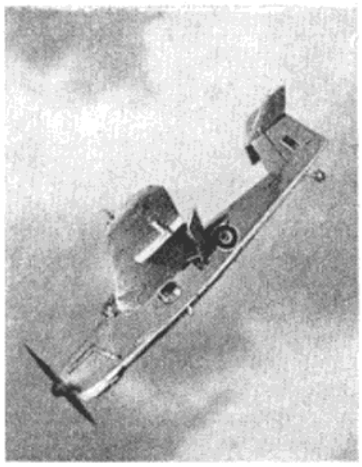
FEBRUARY 1957 No. 188. VOL. 16

Contents

Cover Story

The Fairey *Barracuda* was not one of the most graceful aircraft of World War II, but it was certainly one of the most functional. The big Youngman flaps under the wing assisted deck landings and gave the necessary retard action when dive bombing.

Designed as a replacement for the *Swordfish* and *Albacore* biplanes, the *Barracuda* faced criticism when it first entered service, but later proved its worth when, on April 3rd, 1944, two forces of *Barracudas* attacked and severely damaged the German battleship *Tirpitz* in Alten Fiord, Norway.



THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

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Letters TO THE EDITOR

The Designer Replies

DEAR SIR,—Although I am always a bit reluctant about writing to the Press, I feel that the remarks of two of your correspondents in the January issue do call for a reply, even at the risk of releasing a hornets' nest around my head.

I grant your contributors that the Miles 5 c.c. diesel engine is heavy by glo motor standards, but it is significant that out of quite a few attempts on both sides of the duck pond to produce large diesels, the Miles is one of the few that are still in current circulation. Their application is, of course, quite varied and apart from being used to power model tractors, etc., some have actually been used in model aircraft.

Regarding the Miles "35" your correspondents appear to base their statements on assumption rather than on facts, when they assume that because the same crankcase diecasting is used for both engines, the "35" must be in a similar weight bracket to the diesel. This, of course, is not so. In actual fact the weight comes out considerably less, 8 oz. to be exact, but still, no doubt, a bit heavy by American standards. Their excellent diecasting technique gives castings of almost eggshell thickness, but surely this weight (8 oz.) would be acceptable, at least to the less fortunate enthusiast who is unable to obtain a suitable foreign product. Neither have I any recollection of any two-figure price being quoted for this engine.

On the subject of weight, does an ounce or so one way or the other really matter? If it does, is it because some of the glo motors have power curves like the peak of Everest, and that if the r.p.m. drops a bit at the top of a loop they slide down their power curves like the boy who forgot to hold on the the banisters? I wouldn't know about the nail at the bottom.

But, seriously, please do not think I am anti-glo; quite the contrary, I like glo motors, and am not altogether unconversant with their design and use, although I think we should take our hats off to the chemists who gave us nitromethane. The "35" under fire is designed as a glo motor and will not appear as a diesel and in no way resembles a woeful diesel conversion.

In conclusion let me take this opportunity of congratulating the members of the MODEL AIRCRAFT staff for producing such an excellent journal, especially the "M.A." engine tests.

Yours faithfully,

Ewell, Surrey. B. C. MILES.

(*Letters continued on page* 44)

Here and There

COMMENTS ON CURRENT TOPICS

THE WORLD CHAMPIONSHIPS

ONCE again the F.A.I. Model Commission has made a decision which has been received with disapproval by most British contest fliers. Since the surprise announcement that the World Championship events were to be paired and held bi-annually, we have received a large number of letters from MODEL AIRCRAFT readers protesting against this decision.

In the first place, we would like to make it quite clear that the S.M.A.E. Council has a clear conscience in this matter; it proved that it was aware of the opinions of British contest fliers by instructing its delegate to the Paris F.A.I. meeting not to vote for any proposal altering the existing arrangements. If the council had known that this so-called compromise proposal was going to be discussed, we are certain that our delegate would have been instructed to strongly oppose it, even though this might not have affected the ultimate result.

We must also bear in mind that the decision was carried constitutionally by a two-thirds majority and that we have now no alternative but to accept it—for 1957 at least.

We are told that the reason for the change is that some countries are finding it difficult to support four World Championship events because of the expense involved. If this had been so, surely it would have been reflected in the support given to the championships? However, the following entry table, showing the number of teams entered in the Championships since they were started, proves conclusively that there were sound reasons for leaving well alone—but that seems to be the last thing that some members of the Model Commission want to do!

We have a shrewd suspicion that this resolution was passed because some of the delegates on the Model Commission who hold (seemingly) permanent jobs with their national aero clubs, felt that it was a heaven-sent opportunity to halve their responsibilities to the contest fliers in their countries and they grasped it with both hands! Certainly these people will only have to worry about supporting two championships each year in future, but what of the contest fliers in their countries—were their views sought? Judging from conversations which we had with many members of foreign teams this year, we doubt it very much indeed. In fairness, it must be admitted that in some cases there is no organisation in existence which, like the S.M.A.E., enables the model fliers to air their views and the delegates to the Model Commission apparently have full authority to decide what is best for model fliers in their countries—if they don't like it, that is just too bad!

	Rubber	Glider	Power	Speed
1952	18	12	9	10
1953	17	16	13	4
1954	9	18	9	8
1955	18	21	21	7
1956	18	19	16	11

We believe that the decision to drop two of the events each year was made without proper consideration of the adverse effect which it is bound to have on the development of world championship model design.

It is to be hoped that this decision will be reversed before it has had time to do irreparable harm to the future appeal of world championship events.

Quiz Results

HERE'S what you've all been waiting for—the name of the TWO GUINEA CASH QUIZ WINNER: J. Roderick of Rotherham, Yorks was the lucky first "all correct" to be opened—congratulations.

For those who wish to see where they went wrong here are the full results. 1(a) a tailless aircraft. 2(d) Junkers Ju 52. 3(a) Sweden. 4(a) Russia. 5(b) R/C exponent. 6(d) Czechoslovakia. 7(c) 50 metres. 8(d) Mills 0.75. 9(b) Norway. 10(c) Bucker Jungmeister.

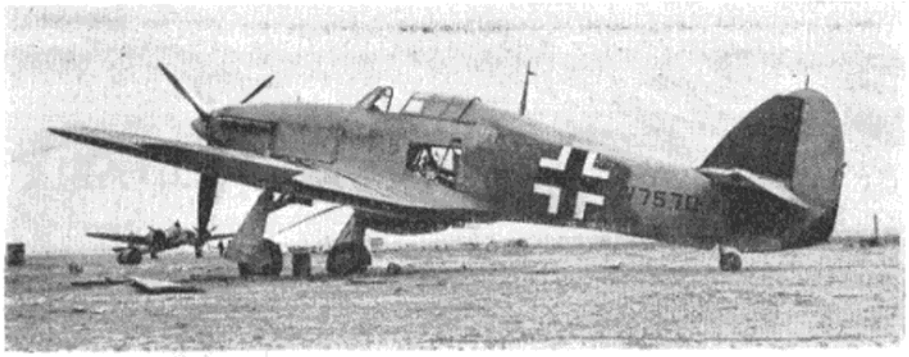
SMAE Dinner

BREVITY with a good dash of humour marked the after-dinner speeches at the S.M.A.E.'s Annual Dinner and Prizegiving, held at the Horse Shoe Hotel, in London, on December 6th, and contributed much to an evening that marked the end of the Society's activities for 1956.

After the members and guests had wined and dined, Mr. M. Imray of the R.Ae.C., in proposing the health of the Society, matched the mood of the assembled company when he praised the international achievements of Gt. Britain's contest fliers and wished that private fliers of full size machines were as keen.

Mr. E. F. H. Cosh, replying in light hearted vein on behalf of the Society, justified the existence of the Council and—possibly thinking of his own forty odd years—emphatically denied that its members were a lot of old fogeys!

Mr. D. A. Gordon proposed the toast of "Ladies and Guests" and welcomed the guest of honour, Mr. R. T. Hughes, secretary of the Society of British Aircraft Construc-



Imperial War Museum photograph

←——THINGS ARE SELDOM . . . WHAT THEY SEEM

for the answer to this poser see Jerry Hurribus item

tors. He also acknowledged the assistance—over £1,000 in the past—given by the S.B.A.C., and thanked the Society and the R.Ae.C. for their continued support.

In reply, Mr. Hughes maintained the humorous note prevailing in the previous speeches, and ably recounted some amusing incidents connected with test pilots who had also been keen modellers.

The prize-giving proceeded at a rapid pace, the cups and trophies being graciously presented by Mrs. Hughes. An adjournment to the bar was necessary while the dining room was "modded" to take the keen dancers and those who favoured more strenuous exercise with glass and bottle.

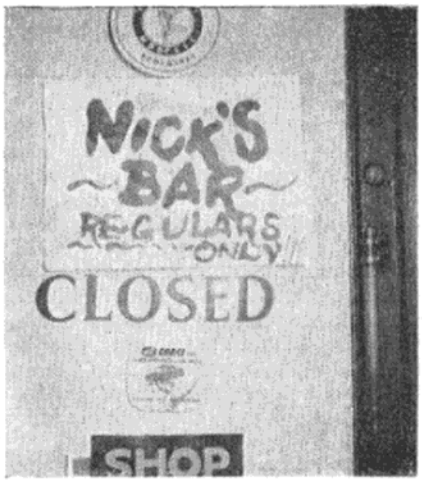
A highlight of the evening was a Rock 'n' Roll demonstration by Mr. Alex Houlberg and Mrs. E. F. H. Cosh; our tame cameraman did attempt to record this event for posterity, but when the film was developed it was obvious that even the camera succumbed to the gyrations induced by the music.

Jerry Hurribus

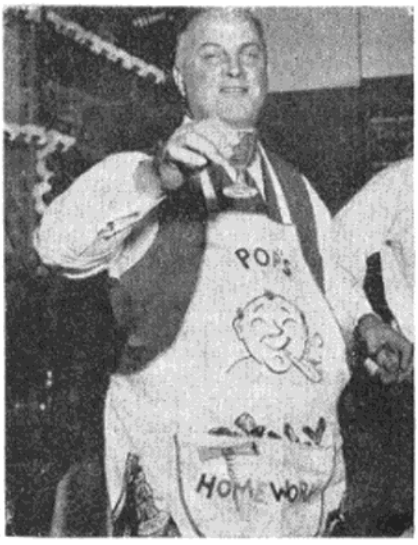
AT first we thought we were seeing things—that humped back, the rounded fin and rudder and the rest of the familiar lines that all make up into a famous *British* warplane, the Hawker *Hurricane*; but those German crosses! Actually the explanation is quite simple, it's a photograph of a captured recaptured *Hurricane*! This particular shot was taken by a British photographer when the Allies overran a German airfield during World War II. Among other interesting items, they found this *Hurricane* which the Germans had secured and made airworthy. Note the Bristol *Blenheim* in the background.

Ten Years in The Trade

"So We'll Throw a Party" said HENRY J. NICHOLLS . . . . . *and 308 can become a bar*

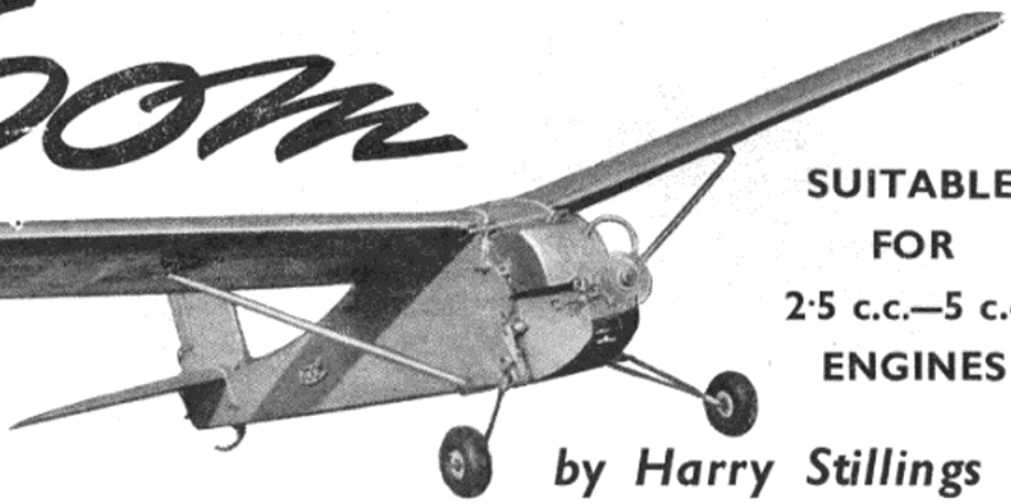


Cheers said the Colonel



The boy's a winner Eddie Keil concluded

Zoom



AN ALL WEATHER RADIO CONTROL STUNT MODEL

SUITABLE FOR 2·5 c.c.—5 c.c. ENGINES

by Harry Stillings

ZOOM is the culmination of steady progress from one design to the next in the search for a compact, fast-flying, all-weather R/C model. It embodies several unique features, all of which have been thoroughly proved by practical experience. It is rugged and easily-built, although it is NOT intended as a beginner's radio model—the speed of flight and rapid response do not give a novice enough time to think, but any radio flyer who has had some experience will find this model a fascinating machine to fly. Even so, it is strongly recommended that one starts with the reduced-throw crank until the model is thoroughly trimmed and practice in controlling it has been obtained.

Zoom flies at nearly twice the speed of the average R/C model, and in diving turns the speed builds up to 40 m.p.h. and more. Almost any stunt can be accomplished, with practice, and I have even flown inverted for several seconds (unfortunately, I can't remember exactly how I did it!).

It will penetrate quite strong winds, yet gain altitude at the same time, and will zoom up to regain quickly all height lost in a stunt, so that it can be quite safely thrown about without having huge reserves of altitude. The glide, although fast, is quite flat, and with response not greatly less than under power, spot-landings are commonplace.

A most exhilarating trick is to "dive-bomb" the transmitter to within 10 ft. of the ground, by holding on for half a turn from low height (by which time the model is diving towards you at speed) when, by giving opposite rudder, it will zoom up into an equally fast climbing turn. Let go as soon as the model reaches a 45 deg. bank, when it will quickly level off, and the manoeuvre can be repeated from the opposite side.

This must not be attempted until you have complete confidence in the model and your own control, and NEVER, repeat NEVER, immediately above any spectators. If, through any radio failure, the rudder *should* stick on, serious injury could be caused. At all times you should remember that under power *Zoom* is very fast, and nearly 4½ lb. travelling at speed, can, wrongly applied, become very much a "mis-guided" missile.

The combination needed to achieve these results is that of an over-powered model with a high wing-loading (all-up weight is 4 lb. 6 oz.), and a large rudder having a fairly wide movement. The tendency to power-stall is overcome with built-in downthrust (see plan)—also, according to motor and prop used, 2-4 deg. right thrust will be needed. Because of the above factors, *Zoom* needs a special launching technique.

You must walk back about 20 yd. from the transmitter, run as fast as you can, and "shoot" the model forward at speed, making sure that when it leaves your hand it is straight and level. Then get to the button as quickly as possible. In dead calm or light-breeze conditions it may be necessary to launch from an elevated position so that the model has a margin of height in which to "drop" before reaching full flying speed, when, of course, wing-lift takes it safely upward.

It is quite useless to trot a few steps and shove the model into the air as you would a sports model—it will just fly straight into the ground. Nor must packing be added to get it airborne, because once its normal fast flying speed is attained, such packing would create a bad stall.

The launching technique may take a little time to perfect, but once you've got the knack it will present no difficulties. If you have level tarmac available, *Zoom* will take off in 30-40 ft., but you must be "at-the-ready" on the button to correct any tendency to turn off straight before it unsticks.

Much thought has been given to achieving a high degree of "knock-off-ability," and in the event of a heavy impact all parts are free to move or knock off without damage. This has proved itself several times in the months that *Zoom* has been flying, when I have tried to stunt just that little bit too near the deck!

Care must be taken throughout to ensure accurate construction, as even small errors can cause trouble with a fast-flying model of this nature.

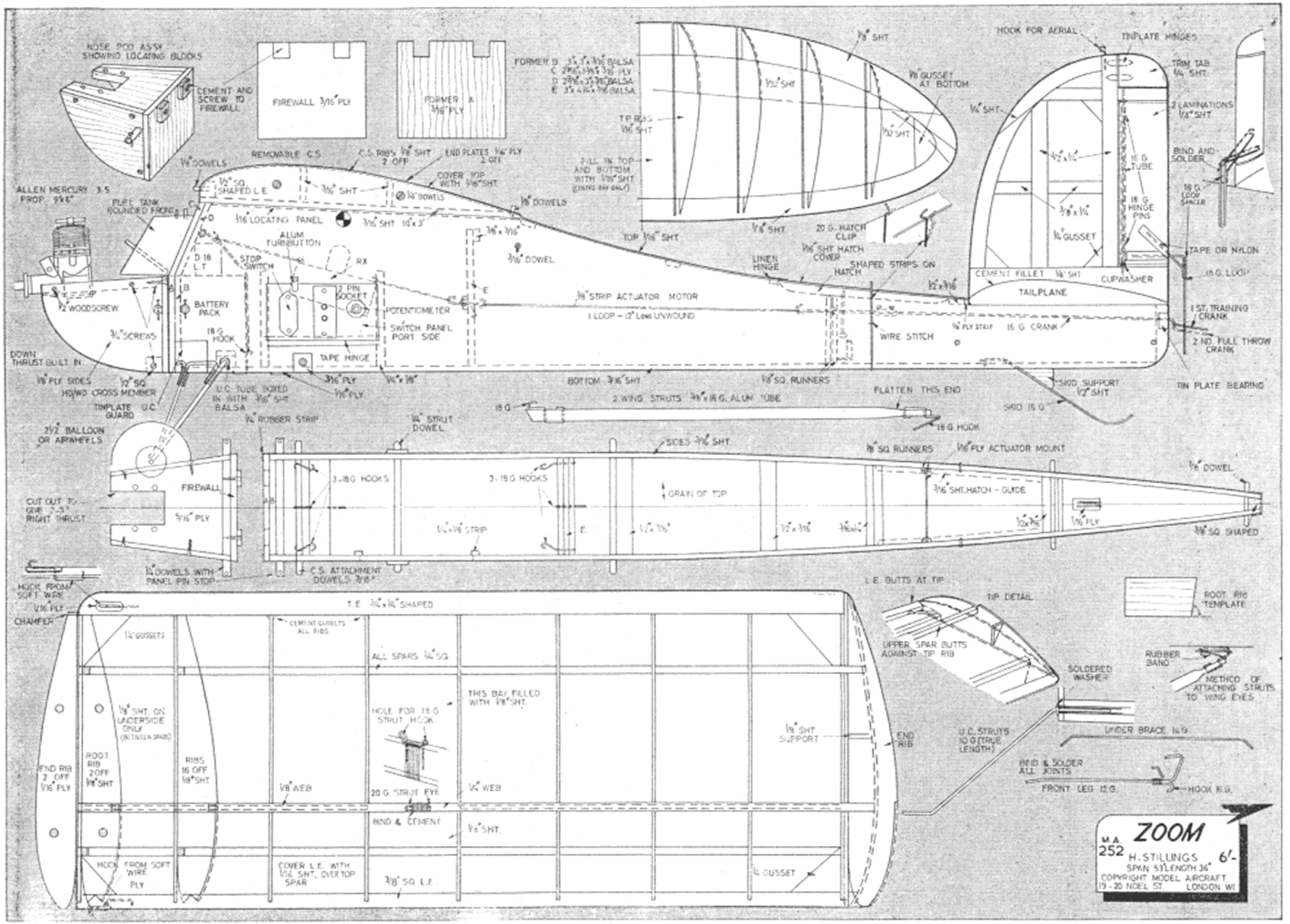
Fuselage

Start by cutting out the two sides from medium-hard $\frac{3}{16}$ in. balsa. If possible use 4 in. wide stock, butt-jointing sufficient extra sheet at the cabin end before cutting out. Next cut out the fuselage bottom from 3 in. wide sheet (also $\frac{3}{16}$ in.) and cement the two sides to this, from front to rear of cabin only. Ensure accuracy by also cementing in place the $\frac{3}{16}$ in. balsa bulkheads B and D, and the $\frac{3}{16}$ in. balsa former E. Place to one side to harden thoroughly. Whilst waiting, the wing and centre-section ribs can be cut out, using a $\frac{1}{16}$ in. ply template cut exactly as root rib. Do not cut out ply end-plates yet—these are added after the centre section and wings are completed. The two tip-ribs must be cut separately.

Assuming that the fuselage is now quite hard, cement the remainder of the sides to the bottom, add the cross-pieces at top, and the tail-post from $\frac{1}{2}$ in. sq., shaped as shown. Pin and rubber-band in place, and again set aside to harden. When the fuselage is quite hard, cut out the switch-panel hatch (port side only), adding the $\frac{1}{4} \times \frac{1}{8}$ in. combined strengtheners-door-stops in side as shown. Add the $\frac{3}{16} \times \frac{3}{8}$ in. cross-pieces at rear top of former E, and at the hook position. Add rear RX hooks, and actuator motor hook, taking through the lower cross-piece and bending the points over into same. Cement well, then add the $\frac{3}{16}$ in. ply bulkheads A and C.

Cut out a tinplate strip $5\frac{3}{8} \times 1$ in. plus saw-tooth cut at ends to embed into fuselage side, and fix in position below and at lower sides of fuselage—this acts as undercarriage guard. Add all dowels, fixing front RX and battery-pack hooks on to front C/S dowel before cementing in place. Note that the engine-pod retaining dowel (which also takes the undercarriage bands) is drilled at the tip and a panel-pin inserted to prevent the bands from slipping off when oily.

(*Continued on page* 40)



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

Add lower battery-pack hook, strut dowel and ply plates. Insert undercarriage tube and box in with $\frac{3}{16}$ in. sheet using plenty of cement ; note that the top strip must be cross-grained for strength. Note also that ordinary copper or aluminium tube is useless for an undercarriage bearing, whereas tinplate rolled up and soldered is tremendously strong. Add $\frac{1}{16}$ in. ply striking-plate for undercarriage cross-brace under the fuselage.

Mount the actuator on $\frac{1}{16}$ in. ply, and cement the $\frac{1}{8}$ in. sq. runners in place (note that actuator is not at right-angles to the bottom, but at a slight angle). The actuator is thus easily removable on the field, but is kept in position in flight by runners cemented to the underside of the hatch. Add $\frac{3}{16}$ in. × $\frac{1}{8}$ in. ply end-strip forward of tailplane. Make up tail-skid from 16 g. wire and fit as shown, not forgetting the $\frac{1}{16}$ in. ply plate reinforcement of the fuselage floor.

Drill tail-post considerably oversize, and add tinplate crank bearing drilled slightly oversize. Bind and solder all undercarriage parts except cross-brace, insert in tube, then add cross-brace making sure that the legs are lined up true. Now add $\frac{1}{16}$ in. balsa top sheeting, and cut out $\frac{1}{16}$ in. hatch cover which extends over the fuselage sides. Hinge with tape or nylon. Add $\frac{3}{16}$ in. runner/guides to bottom of hatch cover.

Make actuator catch in the form of a saddle which goes round and under the fuselage. This "snaps" shut and ensures that the actuator mount cannot move in flight. Note that the upper half of the legs is free to spring open and close. Add strip of $\frac{1}{4}$ in. flat rubber on either side of bulkhead A with Bostik or similar adhesive—these act as vibration insulators.

The nose-pod is made entirely of ply, pre-cemented and screwed with countersunk wood-screws (drawings are self-explanatory). Note that the dowel is drilled at the tips and panel-pins inserted. Also note the built-in down-thrust and angle of the engine cut-out to allow for right-thrust.

Wings

Make up the centre-section as per plan. Note that the dowels must not protrude more than $\frac{3}{8}$ in., otherwise the "knock-off" qualities are impaired. A $\frac{1}{16}$ in. balsa sheet panel is cemented to the underside to make an easy fit in the cabin top.

The wings are quite straightforward, the only point to note being that the root-rib must be set at the angle shown. Make sure that the strut hook and eye are in the exact position shown on the plan, and that the aluminium tube struts are made to exact length, including hooks—these points decide the accuracy of the dihedral each side. A small ply plate for the front wing hook is recessed into the lower face of the L/E. Use medium-soft iron wire for hooks (packing case wire is ideal) as piano-wire causes damage when being bent in position. Be especially careful that all dowel holes (centre-section and both wings) line up exactly, as accuracy here decides correct incidence.

The construction of the fin, rudder and tailplane is orthodox, but ensure that the rudder is absolutely free—it must instantly drop by its own weight when the fin is held on its side. Cement the fin centrally on the tailplane and run a generous cement fillet down either side.

Cover the entire machine with heavyweight Modelspan and apply at least three coats of dope, adding colour afterwards as desired. Fuel-proof entire model. Flying surfaces must be completely warp-free.

Assembly

Hold the centre-section firmly in place with strong bands from dowel-to-dowel diagonally. Two strong bands front and rear across the fuselage hold the wings in position, and three strong bands stretched tight under the fuselage hold the struts. These are held in place on the wings with one small band passed over and over. Undercarriage is held in place with bands stretched from hooks over engine-pod dowels in fuselage. Engine-pod should have two bands each side, in case one breaks. Note that only castor-base fuel should be used, as this does not affect bands, whereas mineral oil quickly rots them.

Cement $\frac{1}{8}$ in. sheet to the underside of the tail as a key once the correct position is determined by test flights. The trim-tab is then used to correct minor deviations at later stages. Note that wing dowel-holes must be slightly enlarged to an easy "knock-off" fit on centre-section dowels.

Flying

Test-glide model, fully equipped, over suitable "featherbed," such as long grass, fern, heather, etc., using running launch but keeping slightly nose-down. If there is any trace of a stall, pack leading edge of tailplane with $\frac{1}{16}$ in. balsa until the stall disappears. Now try power-on flight, using reduced throw crank (this is important). Watch neutral flight on power and glide. Correct glide first by moving tailplane assembly ; when correct, adjust power-on neutral with side-thrust only.

With full-throw crank, the model will start a spiral dive after a $\frac{1}{4}$-turn, so for direction control use short signals, blipping through unwanted positions. One spiral is sufficient for loops, giving opposite rudder and releasing as soon as the model is slightly nose-up, otherwise it will develop into a wing-over ; or this can be done, until model is upside down, then releasing when it will loop straight from resulting dive. To roll off top, give another signal when model is nearly at top of loop. Slow roll is done from a cross-wind wing-over, giving opposite rudder when wing-tip is pointing straight down, then releasing as soon as model starts to roll.

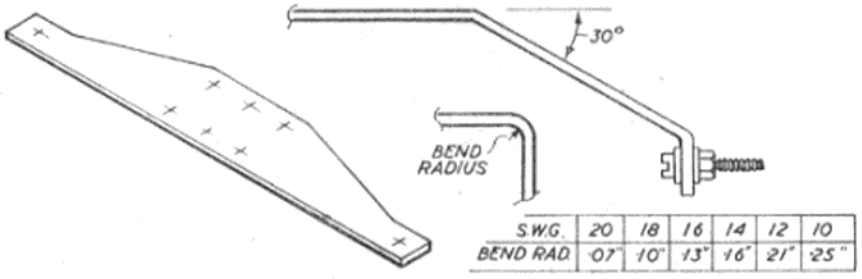
Cantilever Undercarriages

SHEET metal undercarriages are neat, scale-like, and quite robust when properly anchored to the fuselage. They must, however, be made from dural (or Alclad, which is aluminium coated dural). Aluminium sheet just is not strong enough and lacks 'spring.'

The standard shape for laying out such an undercarriage is shown in the sketch. A width of 1½ in. at the middle is sufficient for models up to about 2 lb. weight, but increase for larger models. The first bend should be 30 degrees minimum and the bottom bend never more than 60 degrees. Minimum bend radii for different thicknesses of dural are summarised in the table. Dural must not be bent more sharply than this, otherwise it will fracture.

Dural will have to be softened in any case before it can be bent. Having cut the undercarriage to shape, rub on a coating of ordinary household soap. Grasp the metal in a pair of tongs or pliers and hold in a gas flame. Move gently over the flame to give even heating and continue until the soap definitely discolours to a brownish-black skin. This is the correct softening temperature for the metal so remove and quench in cold water.

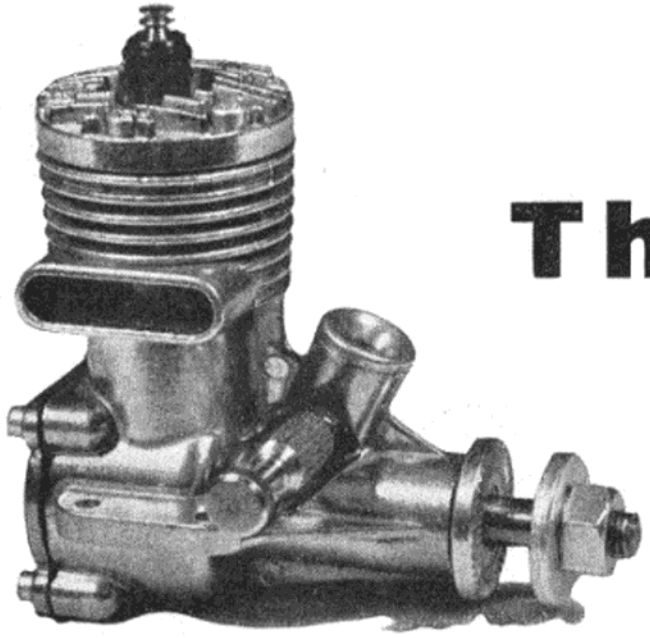
The dural will now be quite soft, rather like aluminium, and can be bent with ease. It will reharden to its original strength within a matter of 24 hours or so.



S.W.G.	20	18	16	14	12	10
BEND RAD.	·07"	10"	13"	16"	21"	25"

THE SMAE ANNUAL DINNER, DANCE and PRIZEGIVING

(1) Mr. R. T. Hughes, Secretary of the S.B.A.C., proposed the toast to the Society
Anne Germaine and Peter Pilsworth listen appreciatively to an after dinner
(3) After she had presented the prizes, Mrs. Hughes was herself presented with a
of chocolates by Women's Cup winner Mrs. Betty Moulton. (4) An informal grou
the dance floor, Mr. R. T. Hughes, Mrs. Hughes, Group Captain Saw, Mrs. Saw
Mr. A. F. Houlberg. (5) " Sally " Salloway, Harry Barker and Syd Taylor were obvi
enjoying the fun as (6) Gadget Gibbs and his Girl Friend " rocked and rolled," th
(7) Bob Gosling and Dave Posner had more serious things to discuss (F.A.I. ?) whil
amateur Fred Carter and professional George Fletcher (Frog engine designer)
obviously talking shop.



MA ENGINE TESTS

The VECO 19

An American 3·27 c.c. Glowplug Engine

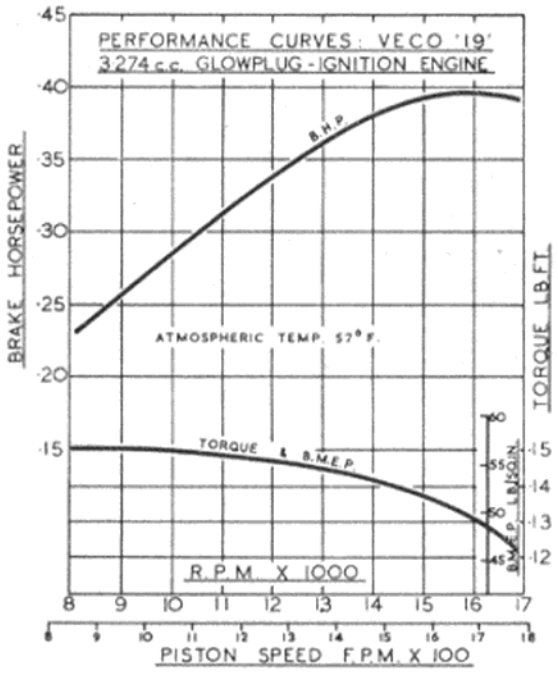
"a pleasing motor on all counts"

ONE of the most remarkable features of the modern medium capacity American model aircraft engine is not merely its power output —that is virtually taken for granted —but the way in which this is combined with exceptional handling qualities.

The 3.27 c.c. Veco 19 engine, made by the Henry Engineering Company of Burbank, California, is an outstanding example of this happy achievement and it took five seconds to start up our test engine from cold for the very first time. No priming is necessary ; one simply chokes the intake for two or three turns and, provided that the needle-valve setting is roughly correct, the motor bursts into life within a couple of flicks of the prop.

When we first described the Veco 19 in the July 1956 issue, we mentioned that we had found the piston clearance to be much closer than that encountered on other glowplug engines of similar type and commented that this could be expected to result, *inter alia*, in better starting, a theory which seems to be supported in some measure by our present test findings.

The reduced piston clearance has been made possible by the makers' attention to cylinder design, which has aimed at achieving uniform expansion of piston and cylinder. This, by eliminating the risk of seizure under the most severe conditions, has allowed the piston to be more closely fitted to the bore, thereby improving compression seal. Those who complain that most glowplug engines have a soggy feel, as compared with a diesel, will delight in the hearty "plop" of the Veco as it is flicked over compression.



The construction of the engine is fairly typical of current American design. It is extremely robust and is obviously intended to give long and hard service with maximum crash resistance. It has a shaft journal 0.406 in. (3/32 in.) in diameter, running in a 1¼ in. long bushed main bearing. This bearing is of sintered iron, an excellent material for the purpose, and has a small oilway running its entire length.

The body of the engine is a superior example of modern pressure die-casting as applied to model engine construction and embraces the entire cylinder barrel, with exhaust duct and smooth, carefully radiused transfer passage, as well as the crankcase, main bearing housing and carburettor body. The casting is tumbled to a bright finish and receives a minimum of machining operations. Contrary to two other reports on the engine, the cylinder liner of our test sample was a close sliding fit in the main casting.

The cylinder liner follows current design concepts, having a fairly generous wall thickness of nearly $\frac{1}{16}$ in. and, located and locked in position by a flanged top, is relieved of radial or axial compression. The cylinder head is channelled to fit this flange and six head screws are arranged around the outer edge. The head gasket, being closely confined in this channel and not pierced by the head screws, is virtually "blow-out proof."

The piston is notable for its light weight, and the lower part of the skirt below the gudgeon pin bosses is slightly reduced in diameter to minimise friction. For this same reason, the cylinder bore below the ports is opened out. A tubular gudgeon pin with brass end pads is used. The fit of both the small and big-end bearings is first class.

Externally the Veco 19 is of neat and attractive appearance. It is for beam mounting but can also be adapted to radial mounting by means of the crankcase backplate lugs.

Specification

Type : Single-cylinder, air-cooled, loop-scavenged two-cycle, glowplug ignition. Shaft type rotary valve induction. No sub-piston supplementary air induction. Baffle piston with ignition plug offset to exhaust side.

Swept Volume : 0.1998 cu. in. (3.274 c.c.).

Bore : 0.634 in. Stroke : 0.633 in.

Compression Ratio : 8 : 1.

Stroke/Bore Ratio : 1 : 1.

Weight : 5.6 oz.

General Structural Data

One-piece crankcase, cylinder barrel and main bearing of pressure diecast aluminium alloy. Cylinder liner and main bearing of sintered iron. " Stressproof " steel crankshaft with integral crescent counterbalance and rectangular induction port. Duralumin floating big-end bush. Mechanite lightweight lapped piston with tubular gudgeon-pin. Pressure diecast aluminium alloy finned cylinder head attached with six Phillips screws. Pressure diecast aluminium alloy rear cover attached with four Phillips head screws. Steel propeller drive washer. Reversible brass spraybar type needle-valve assembly. Detachable aluminium venturi insert fitted as standard. Beam mounting.

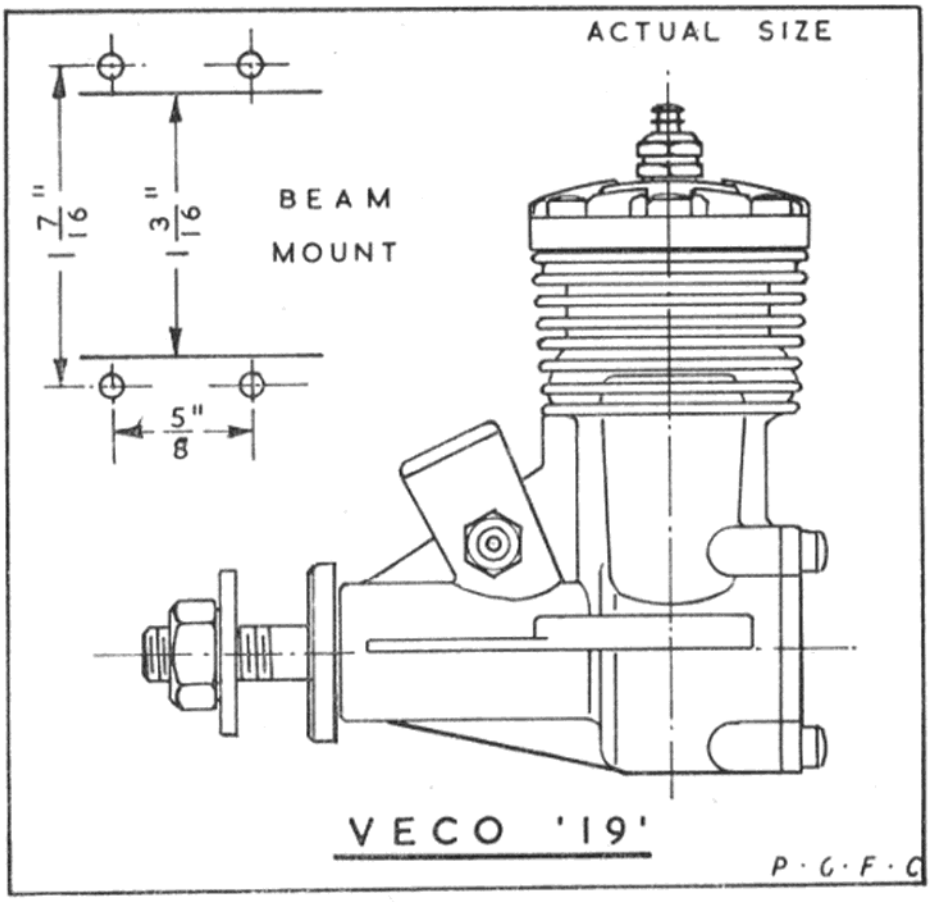
Test Engine Data

Running time prior to test : 2½ hours.

Fuel used : 70 per cent. methanol, 30 per cent. castor-oil for preliminary running ; 50 per cent. methanol, 25 per cent. castor-oil, 25 per cent. nitromethane for dynamometer test.

Ignition plug used : Anderson-Veco as fitted.

Venturi insert retained for all tests.



Performance

Starting, as we have said, is exceptional. The engine is easy to adjust, the needle-valve response being just right. Instant hand starting was obtained under all propeller loads permitting speeds up to the peak r.p.m. Running is smooth and even at all speeds.

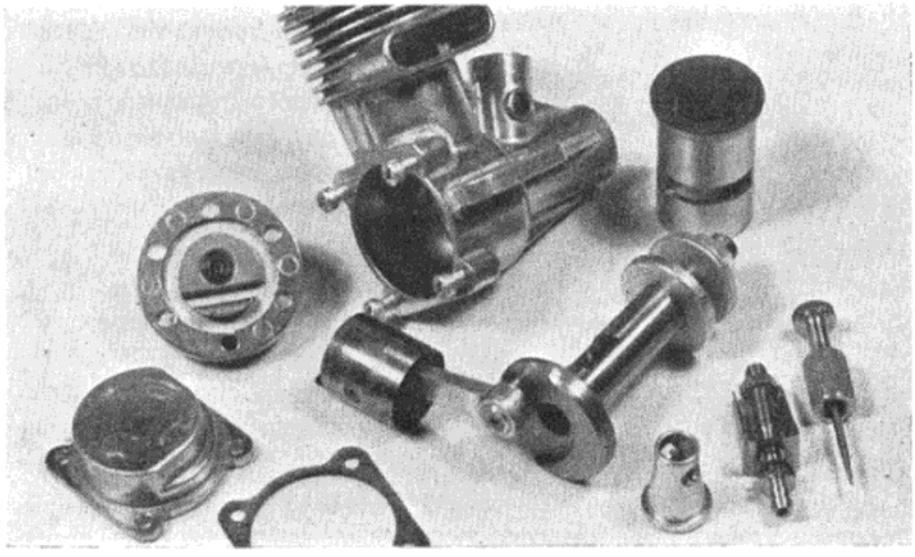
The makers' leaflet states that Veco engines are partially run-in at the factory and suggests the engine be installed direct in a model without bench running, with, however, the proviso that a rich mixture setting should be used for the first hour.

On our dynamometer test, the Veco proved to have a somewhat higher peaking speed than we had anticipated. The lowest speed at which torque was checked was 8,000 r.p.m. where a figure of 0.15 lb./ft. (29 oz./in.) was recorded. But from this point onwards, torque declined quite slowly, with the result that the peak horsepower was realised at between 15,500 and 16,000 r.p.m., where the actual b.h.p. was a fraction under 0.40. This, of course, is really excellent. Nevertheless, with the venturi choke removed and a higher nitromethane content fuel, following some further running, it may well be possible to exceed these figures.

To sum up, this is a pleasing motor on all counts : well made, strong, easy to handle and very powerful.

Power/Weight Ratio (as tested) : 1.14 b.h.p./lb.

Specific Output (as tested) : 122 b.h.p./litre.



Letters

Continued from page 35

WORLD CHAMPIONSHIPS

Contest Fliers Protest to M.A.

WHAT do the chaps who fly in world championships and other top contests think of the F.A.I.'s latest decision? Are they for or against? Have they alternative suggestions to make? These and many more questions spring to mind. Among the many letters we have received from M.A. readers were a number from this country's leading model fliers, and their views are quoted below in extracts from their letters.

Opening barrage for the modellers comes from Pete Wright, who says :—

. . . I presume that the main reason for the new rule is economy. If this is the reason surely it would be more practical to hold an all-in meeting every three or four years. This would give the various countries time to raise the necessary cash and, just as important, would give the competitors much more time to get together into a team. I think that the Czechoslovakian speed and glider teams' performance in Italy proves my last point.

Veteran power flier Silvio Lanfranchi had some harsh words to say on the subject, from which we quote here:—

. . . in all democratic institutions it is surely the voice of the many that should be heard, but nothing of the sort has happened ; we are faced with a fait accompli.

All the competition fliers of many nationalities with whom I have discussed these problems were in favour of retaining the status quo, so then why does not the F.A.I. consult us about what we want ? Is it because we do not know what is good for us ?

Did the F.A.I. consider the probable decline in competition flying that will result from this new rule ? It is a fact that all the modellers that I know are not contemplating a building programme for 1957 because of this bi-annual rule. The great fillip that an annual contest for world honour gives to an individual and the movement as a whole could not have been taken into account.

It is because interest will diminish considerably in competition flying if World Championships are held bi-annually, that I offer the strongest opposition and consider that every effort should be made to revert to annual events.

Another power flier and friend of Silvio, Arthur Collinson, writes:—

. . . I think that the bi-annual rule will lead to a drop in interest in World Champs and F.A.I. flying altogether.

I will miss the F.A.I. power contest and the chance to go to the World Champs and meet old friends and I am very disappointed about the two-yearly arrangements, although I am much more concerned should the new power rules be passed. At present, I can fly in open comps. with my model and still have a good chance to do well, but not with the new rules.

Speed man Ray Gibbs's thoughts on the issue are summed up in the following extract from his letter:—

. . . I have never questioned the F.A.I.'s reasons for past alterations in international rules and organisation even when they have been stupid, but now I am convinced that they have no consideration for model flying generally or internationally.

. . . we should . . . withdraw from all future F.A.I. contests.

Mike Gaster, Dave Posner and Vic Jays, well known model fliers all, shared similar views and sent a joint letter in which they said:—

. . . it would appear that the F.A.I. Model Commission does not necessarily represent the modellers of the member nations and this supposition is confirmed by our discussions with modellers from many nations at Cranfield. Those most concerned with F.A.I. rules had, it appeared, not been consulted as to what rule changes they felt were necessary but were being told what was good for them.

The continual changes in the international rules strangle development, and the final decision to hold Championships every alternate year threatens to finally kill interest in these events. The possible decline in interest in the Wakefield Cup, previously the premier world event, should be stopped by withdrawing the cup from the control of the F.A.I. and running the event annually as in the past, when it enjoyed tremendous prestige value and popularity. It is unfortunate that we have no control over the Power Cup, but it is suggested that a trophy be provided and a power event run in conjunction with the Wakefield Cup meeting.

Most modellers, while completely condemning the F.A.I. changes, had alternative suggestions to make, and 1956 A.2 team member Fred Boxall wrote:—

. . . surely it would be much better still to hold each event annually, and if any particular country, or countries, cannot afford to send their team, or teams, they could send their models to be proxy flown. Then again, the keenest of the keen might prefer to pay some, if not all, of their own expenses if chosen for a team, rather than send their models solo.

There has been, on the other hand, some very successful proxy flying during recent years. Some models, I'm sure, have been handled as well as ever their owners could have done !

Phil Read struck a gloomy note with:—

. . . two-yearly events will just about ruin Wakefield models. Not many people build them now because with only the eliminators, plus if you are lucky, the trials and a slight chance of the finals to fly in, they do not give very good return for time spent on them. They do not stand much chance in open events with only 80 grams of rubber, so with only one Wakefield contest this year (Gutteridge) no one but a crank would build one. I think most Wakefield fliers will give them up and go over to open rubber models and they are not likely to start from scratch all over again in 1958.

If the power rules are changed as proposed, the same remarks will apply.

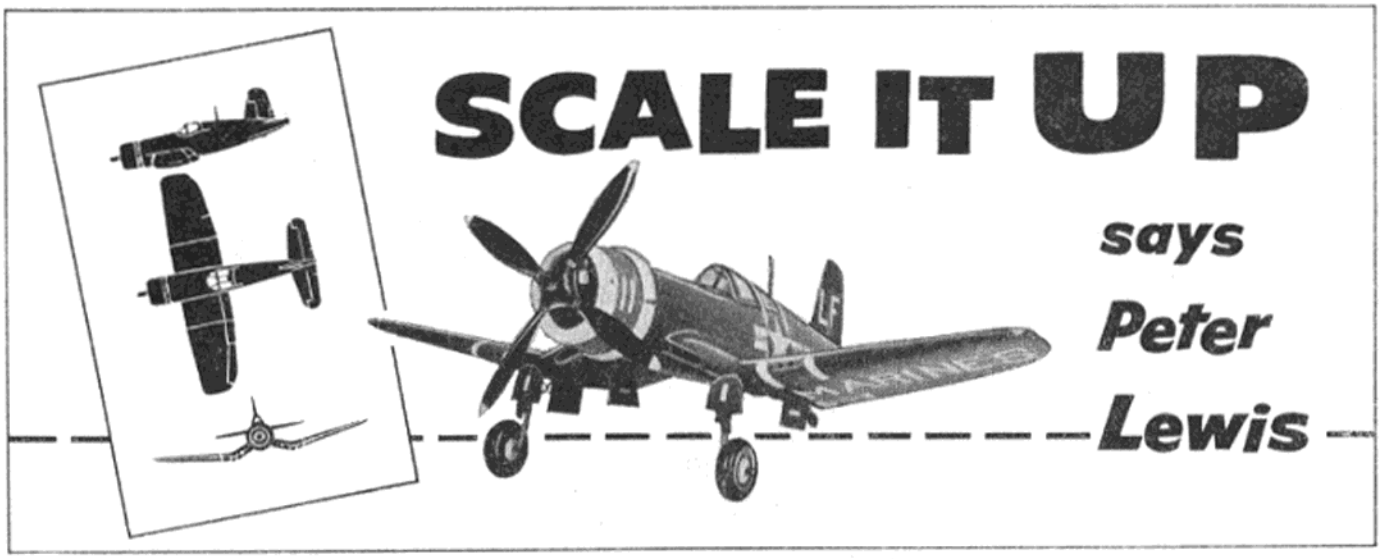
More letters on page 63.

FREE X-acto Knife Chest

GEOF LEFEVER wins this month's X-acto Knife Chest for the letter of the month. We regret that shortage of space made it impossible to publish his letter in full.

One of these handsome X-acto Knife Chests is presented FREE each month to the writer who, in our opinion, sends us the most interesting, amusing or controversial letter for publication

There are absolutely no restrictions—and, remember, a letter of 50 words will stand just as much chance as one of 500. In fact, we like them short and snappy. So let's hear from you.



SCALE IT UP

says Peter Lewis

HOW many times have you looked at a scale drawing of a free-lance model and thought "I'd like to build it"? And how often has the design been that of a full-size aircraft of which you would like to make a non-flying or flying replica? Plans or silhouettes are drawn and printed, together with relevant details, for your use, and it is quite a simple matter to redraw them to suit your own purpose.

What you Need

Before considering the ways and means of scaling up, let's gather together the necessary implements. The basic requirements are simple and consist firstly of a drawing board of adequate size or you may prefer to use a smooth table-top, but the board has the advantage that it can be turned about without trouble. For ease and accuracy in drawing, large sheets of graph paper with $\frac{1}{8}$ in. squares are undoubtedly the best proposition.

The drawing instruments required are the usual rulers, set squares, French curves, dividers, compasses, protractor, pencils and a soft rubber. A useful addition is a length of $\frac{1}{8}$ in. square spruce or hard balsa which is pinned down for ruling the longer curves. If you feel that a reverse view of any part is needed, just lay sheets of single-sided carbon paper, surface upwards, below the graph paper to cover the required areas. Now we can get to work scaling-up.

How to do it

(*A*) *From free-lance designs.* Magazine drawings of existing models usually have the essential dimensions indicated, otherwise a scale strip is given. From the latter, we make our own scale ruler by taking a length of stiff card and marking the divisions on it direct to a sufficient length to cover the greatest measurement, e.g. the wing span or fuselage length, that we need to take. Mark the inches and the sub-divisions so that, by laying the cardboard ruler on any part, its real length can be read at once. This is then transferred to the drawing by using the full-size ruler for measurement. Curved parts, such as wing-tips and fuselage sections, are often shown superimposed on squares of indicated size.

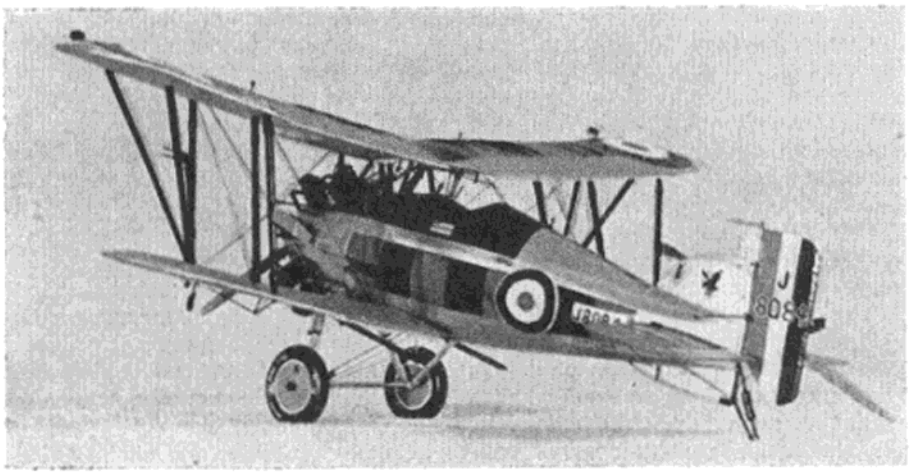
Three views—side elevation, plan and front elevation—are normally needed and this type of drawing is simply a direct copy enlarged from the printed miniature.

The side elevation is easiest to begin with and the thrust line is pencilled on, leaving sufficient surrounding space for the rest of the outline. Using the scale ruler, read off the full-size total length and mark it on the thrust-line. Do the same at each of the upright stations on the fuselage and connect each one of them to fill in the outline. Longerons, uprights, formers and engine bearers follow to sizes as indicated either on the drawing or in the accompanying text.

When the side view has been transferred in its entirety, the plan view is similarly treated until it is complete.

The front elevation is used mainly to show undercarriage track, dihedral angle and strut locations and, in most cases, can be dispensed with as a full-size drawing.

(*B*) *From plans of full-size aircraft.* Scale plans are frequently published in journals, books and in plan services. Some are in the convenient 1/72 size, but many are smaller or appear as spotters' silhouettes. Particular satisfaction can be gained when the official drawings are first published and, by working from



The author's 1/18 scale Gloster "Gamecock." Photographs and a silhouette helped authenticity here.

them, one can be the first to produce a model of the new machine. To make use of these drawings, several methods may be employed.

If an epidiascope is available, they may be projected to the desired size onto the paper and drawn in. Again, if the equipment is at hand, photography may be used. After copying, the negative is placed in the enlarger and projected to any size onto drawing paper for tracing. Alternatively, a normal enlargement may be made if the paper size is adequate. If you intend to make a fairly large working plan from a small silhouette or drawing, it is a good idea to make a photographic enlargement to a convenient size, so that it may then be drawn up to the required measurements by increasing by an easy multiple of a round figure, using the dividers.

For non-flying replicas, the degree of enlargement will, of course, depend upon the size of the model required, compatible with the amount of detail which you wish to incorporate with the scale that has been chosen. On the other hand, the enlarging multiple for a powered flying model will be based upon several factors. These include the performance expected from the available power unit for either F/F or C/L. It is generally desirable in a scale model to conceal the engine within the cowling as far as possible, while retaining easy access to the controls and adequate cooling. The engine outline is first drawn and the rest of the model filled in to the size chosen to accommodate the power unit

The side elevation is based on the datum-line which is drawn through the thrust-line. After the agreed length of the model is set on the datum-line, the salient vertical depths of the fuselage are marked at the relevant points. These may be—from nose to tail—the rear of the spinner or airscrew hub, radial or in-line engine cowling, front and rear of cabin or cockpit, leading edges of fin and tailplane and the rudder-post. Any significant changes in the fuselage profile should also be noted at this stage.

When all of the necessary verticals are on the paper, connect them up with the ruler and the curves, using the wooden strip if needed to give a smooth outline. Once this is finished, leading and trailing edges of the wings and tail unit follow, with their chord lines set at the correct angle of incidence.

The undercarriage is incorporated with skid or tailwheel, if the latter is fitted. If the landing-gear is of the non-retracting type, you will have to decide whether to show it in compression when the machine is on the ground, or extended as it would be in flight. The two positions are often indicated on plans.

The plan view, built up around the centre-line, is tackled by projecting vertically from the elevation, either above or below it, according to the available space. Mark off the same positions on the plan view as those on the elevation and any additional features of importance that show. An underside view may be felt to be useful as well as that from above. To save extra drawing or tracing, it can be adapted from a carbon reversal underneath the sheet of drawing paper.

When the outline of the plan is ready, the front elevation is taken, as was the plan view from the elevation, by projecting vertically. Note that, owing to dihedral angle, there will be a difference in span length in the front view from that of the plan if the latter has been drawn out flat for modelling with the dihedral to be incorporated by steaming or any other method later. Due allowance must be made for this point when adapting plans of full-size aircraft for modelling as, otherwise, the model's final wing span will be shorter than it should be.

When you have the number of outline views that you require, there comes the interesting work of filling in the details. Returning to the side elevation, there are the cowling panels to show and the engine details that are visible. If the engine is a radial, a separate drawing is advisable for the absorbing business of constructing the miniature power unit. A little searching through back numbers of special engine issues of the periodicals or the year books will usually reward you with the engine drawing that you need. Descriptions published at the time of the introduction of the unit are a useful source of information.

Undercarriage details follow next, together with wing and tail bracing struts and wires. When the side elevation has sufficient detail in it for your satisfaction, the same procedure is followed with the plan view and here the flying-surface ribs and aileron, flap and elevator outlines are put down.

As large a selection of photographs as possible is a great asset as it will enable you to add quite a lot of interesting detail which will not be on the original plan or silhouette. Cockpit details add immeasureably to the model and here again it is usually possible to find a detailed drawing or photograph from which to work.

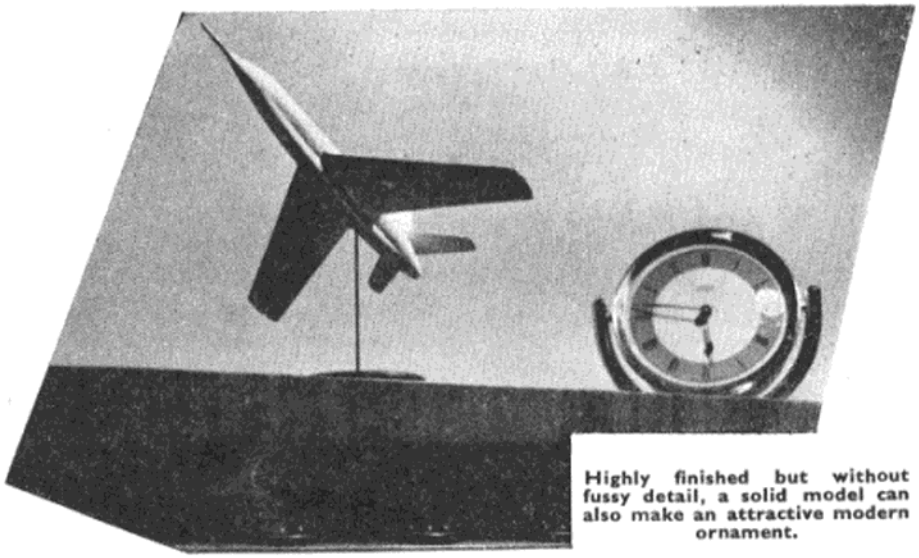
A really super scale job of the Grumman "Bearcat." Plan for this was scaled up from a silhouette by the author, as described in this article. (M.A. Plan 214.)

Another useful point to remember while preparing the plans is that of including the civil or military markings, colour divisions, camouflage, etc., so that they may be transferred direct to the model's surfaces when the time comes. Photographs are invaluable for this, as also are personal notes of the aircraft concerned for the precise colouring.

Scale sailplanes are treated in the same way by redrawing to the desired size for the intended performance or to comply with contest rules.

So why not use those plans ? There are scores from which to choose and limitless scope in the scale field to put interesting and original types on display or into the air.

Solid Scale Models



Highly finished but without fussy detail, a solid model can also make an attractive modern ornament.

The NEW M.A. BEGINNERS' COURSE PART XII

WHEN people take up aeromodelling, they generally do so for two reasons. Either they have a keen interest in full-size aeronautics, which leads them to want to own models of their favourite aircraft, or they make models mainly for the enjoyment of building and/or flying them.

There are, of course, a few model builders who have little or no interest in full-size aviation, but, generally speaking, not even the keenest exponent of the " functional " type model is oblivious to the fascination of an accurate and well-finished scale model.

Our purpose in this chapter, therefore, is to discuss the non-flying scale model : the " solid " or " display " model.

So far as the model industry is concerned, the solid model is one of its earliest products. Long before flying model kits came on the market, enthusiasts were buying hardwood kits of World War I favourites : Sopwith *Camels*, Fokkers, S.E.5a's and the like. When balsa-wood flying model kits came along in the mid-nineteen-thirties, many model builders turned to flying-scale models and to other more functional types, but the " solid " has never lost its appeal to a hard core of keen modellers and was particularly popular during the war years. Recently, solids have been making a strong come-back assisted by the new moulded plastic kits.

In Great Britain and the United States there are now hundreds of different kits and plans available for solid models. The kits are mainly in three types : those of balsa construction, to which a few diecast metal or moulded plastic parts such as propellers, wheels, etc., are added ; those in which a harder wood is substituted for balsa ; and those employing ready-made plastic mouldings throughout, which are joined with special cements.

Most modern balsa kits have all components partly pre-shaped. That is to say, the wing and tail surfaces are ready cut to the correct planform, while the fuselage block is also cut to the outline shape in plan and side elevation. Except when symmetrical circular-section

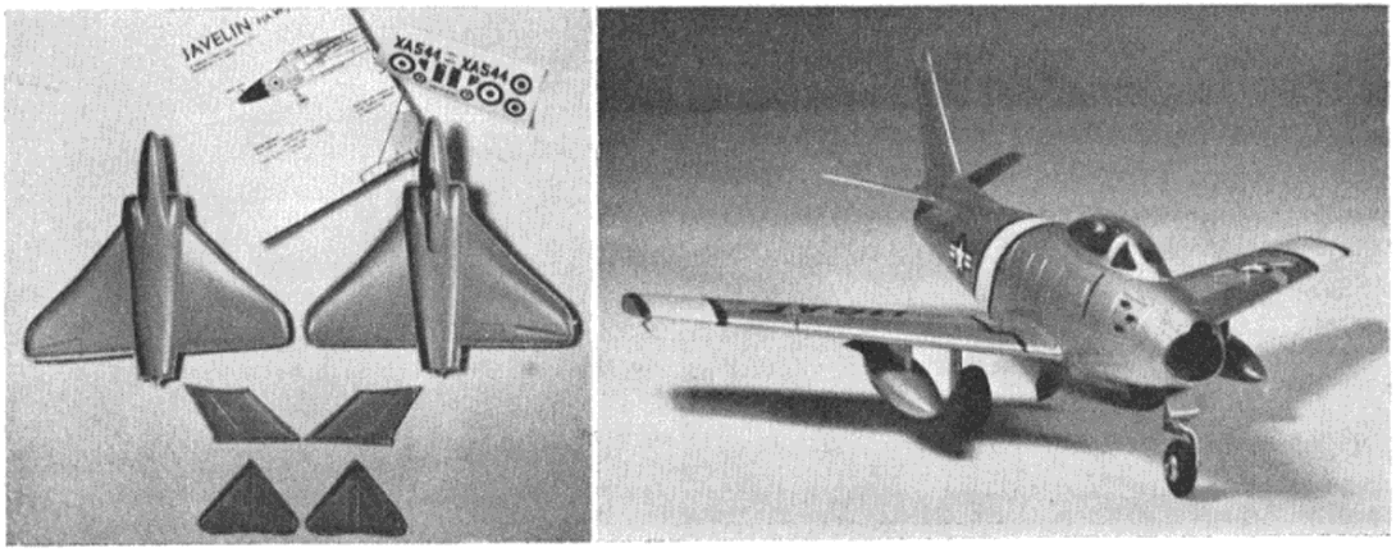


Fig. 2. Alternative to the popular 1/72 scale are the 1/144 scale Wimco Hollow kits (left), easy to make from moulded polystyrene parts. Allowing a more detailed treatment (right) is a hardwood 1/48 scale F-86F " Sabre."

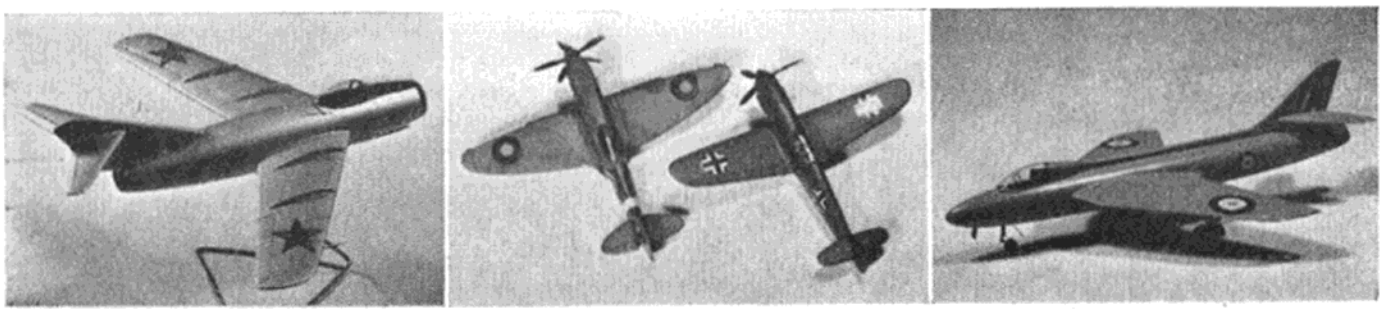


Fig. 3. Where it is desired to assemble a collection of models to the same scale, 1/72 is a convenient size. Many kits and plans are to this scale. Shown, left to right, are four models built from Veron kits: "Mig 15," "Spitfire XIV," "Me.109G" and "Hunter."

fuselages or nacelles are features of the prototype (in which cases these may be supplied turned to shape), it is necessary, however, for the modeller to shape all parts to the correct cross section.

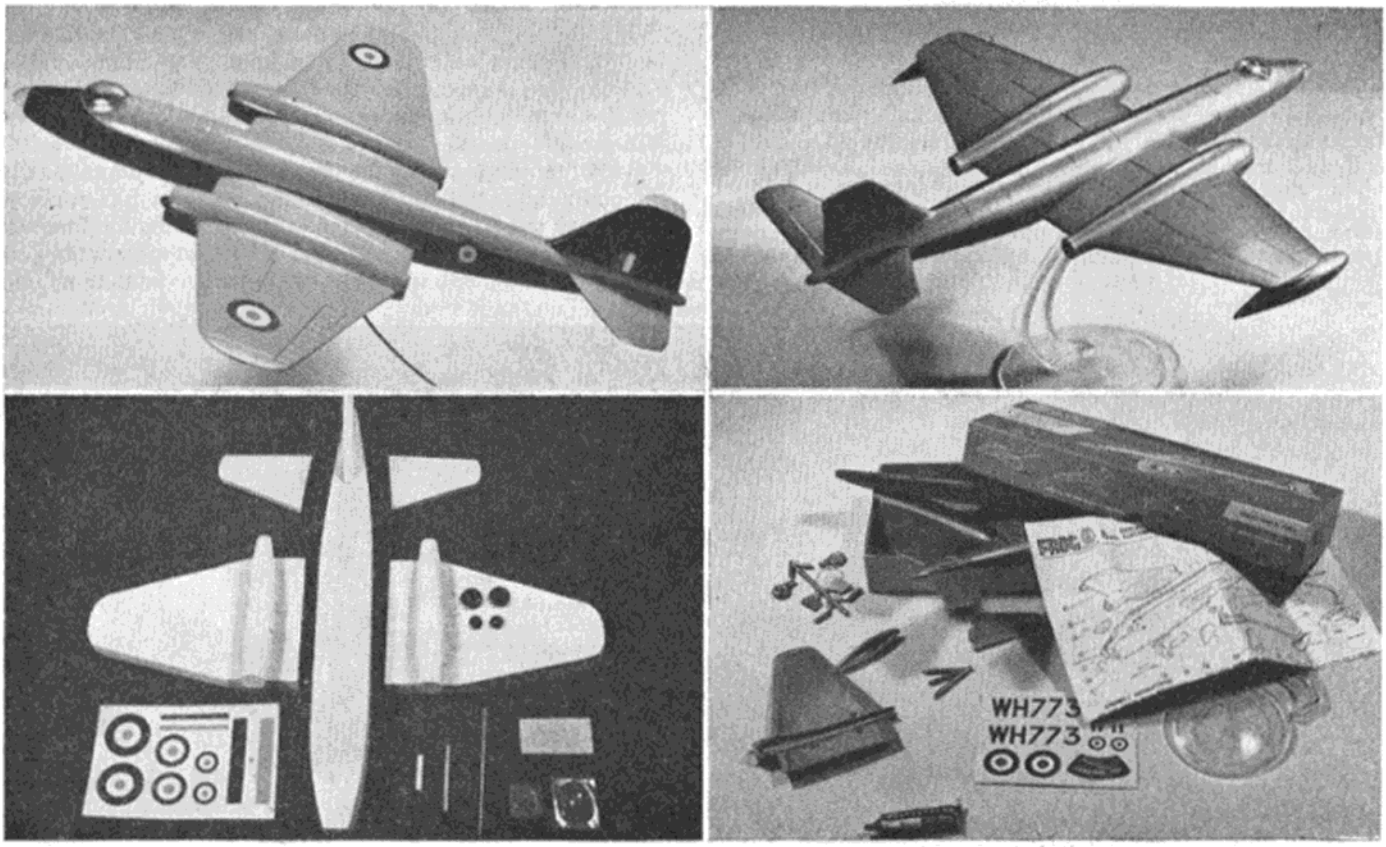
One of the advantages of balsa is that it can be carved and sanded to shape very easily due to the softness of the wood, but this also means that the model will require very thorough grain filling treatment and also that the finished product will be somewhat less resistant to dents and chips than one made from a harder wood. Most of the better solid kit manufacturers are careful, therefore, to choose only a relatively hard grade of balsa, which remains easy to work but produces a durable model.

This is taken a stage further by those kits in which an alternative to balsa, often obeche, is employed. Professional model makers also favour more serviceable woods such as basswood and pine, and examples of their art are to be seen in the many models made for the airline companies, travel agencies, etc.

Moulded plastic kits, which have been gaining immense popularity, first in the United States and now in Britain, have been criticised by some serious model builders as being too easy to make and demanding little or no skill. In fact, while much of the more difficult part of solid modelling is eliminated in these kits, the plastic model nevertheless will, in its finished appearance, repay the attention of the skilled and careful modeller, just as with any other model.

The material used for the parts of these models is usually high impact polystyrene and two methods of manufacture are employed. In the first of these, the parts are pressed shells of polystyrene sheet. This is the form of construction used in the Wimco "Hollows" kits manufactured by Sebel Products Ltd., the pressings being made from flexible 0.025-in. styrene sheet throughout. The second method (as seen on the Sebel Vickers *Viscount*, the Frog series, and many American kits) employs injection mouldings of polystyrene. This allows much more detail and an accurate and simple means of interlocking assembly. It is, of course, somewhat more

Fig. 4. The solid enthusiast has a choice of conventional wood construction or the new moulded plastics. Left is a Veron "Canberra" kit and the model built from it (balsa). Right is the Frog "Canberra" (moulded polystyrene).



expensive, but even so, prices are only a little more than those of traditional wooden solid kits. Some of these models, too, are moulded in a metallic grey polystyrene having almost the appearance of aluminium and, where appropriate, can be left in this very effective natural finish instead of being painted.

A large proportion of non-flying scale models both wooden and plastic are made to a scale of 1 in. = 6 ft., i.e. 1/72 of full size. The choice of a scale depends largely on whether you intend to make a collection of models to the same scale and on the sort of aircraft you propose to include in this.

For example, if you wish to assemble a collection to illustrate the history of the single-seater fighter, you might well choose a scale of 1/48. A *Hunter* will then have a span of 8.4 in., a Bristol *Bulldog* will span 8.5 in., a *Spitfire* 9.2 in., a *Sabre* 9.3 in., and a *Hurricane* 10 in. Such sizes will allow reasonable attention to detailed fittings and markings without making the model look too fussy. If, however, you should want to extend the collection to include bombers to the same scale, this would mean a *Lancaster* of 25.5 in. span, a *Valiant* of 28.5 in. and a 35 in. *Superfortress*, and thus a good deal more bulk than the average collector can cope with for display purposes. In this case it would be better to adopt a 1/72 or smaller scale.

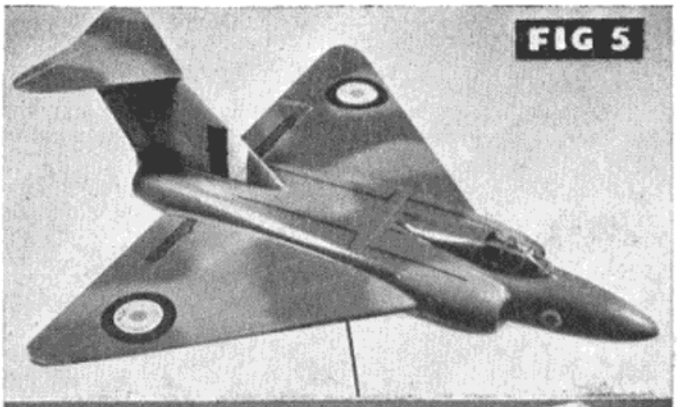
At the present time, by far the largest number of different prototypes of which solid kits are available are those represented by the ordinary balsa kits and it is appropriate, therefore, to deal with these first.

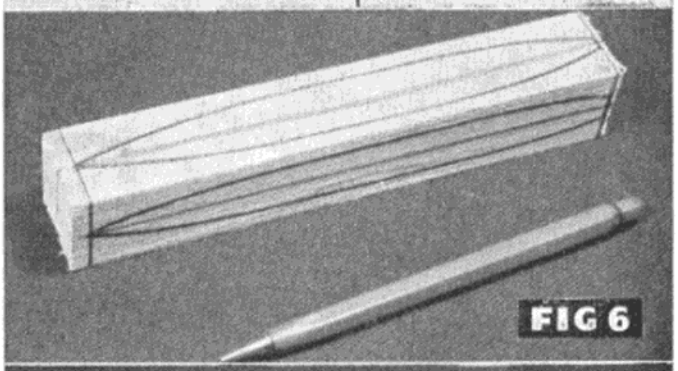
Generally speaking, the beginner will be well advised to seek the advice of a reputable model shop when choosing his first kit. A few of the solid kits on the market are not of the best quality, sometimes having roughly cut parts and inaccurate plans, and since a good kit may cost no more, it is obviously best to avoid the inferior ones.

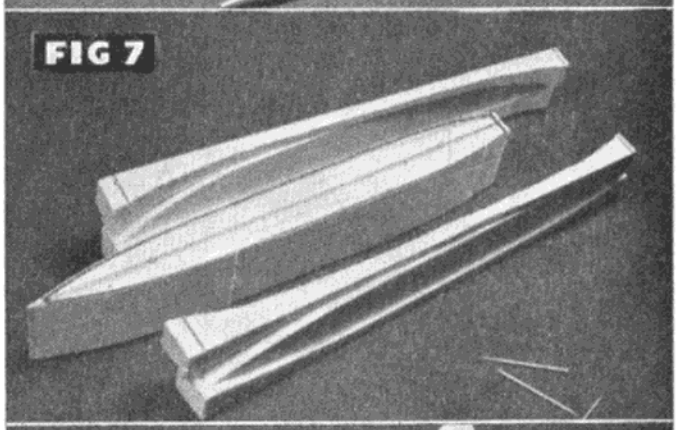
Most wood solids follow the same general design, with wings and tail butt jointed to the fuselage or fitted in a cut-out in the fuselage. In a few cases, such as in the Keilkraft kits, accuracy of assembly is somewhat simplified by the inclusion of a "jig-spar"—a short stub spar joining the wing panels at the correct dihedral angle (if any) and aligning them with the fuselage.

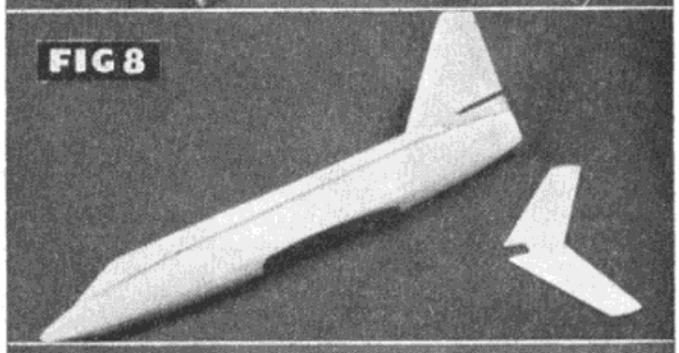
The raw beginner will certainly be well advised to start with a model of simple lines and a minimum of detail. Some types of modern single-engine jet fighters are a suitable choice here, and the Veron MIG-15 comes to mind as a good example.

The practised modeller, on the other hand, may elect to make a model direct from a scale plan, rather than from a kit. Accuracy in marking out the blanks is the keynote here. Taking the fuselage first, this should have the centre-lines marked, followed by top and side outline shapes. (Fig. 6.) The preferred method of then shaping the blank is to use a power jig-saw or fret machine, which will ensure a truly vertical cut, but a coping saw or fretsaw, if used with care, is satisfactory. When the two sides of the blank have been cut to shape, the two offcuts are pinned back in place to restore the blank to its original shape. It can then be turned over and the top and









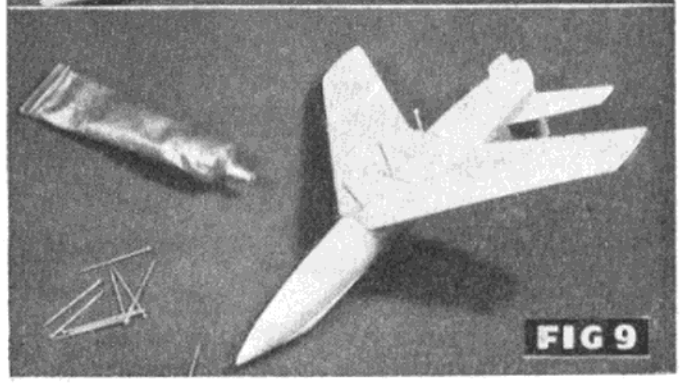


Fig. 5 (top). Another fine Veron kit model, the Gloster "Javelin." Figs. 6-9. Steps in the construction of a simple solid model. 6—Marking out the top and side fuselage outlines. 7—The fuselage outline can be sawn to shape, as shown, or carved. 8—The fuselage carved and sanded to correct sections and interlocking tail surfaces added. 9—The wing is fitted into the fuselage taking care to align it properly.

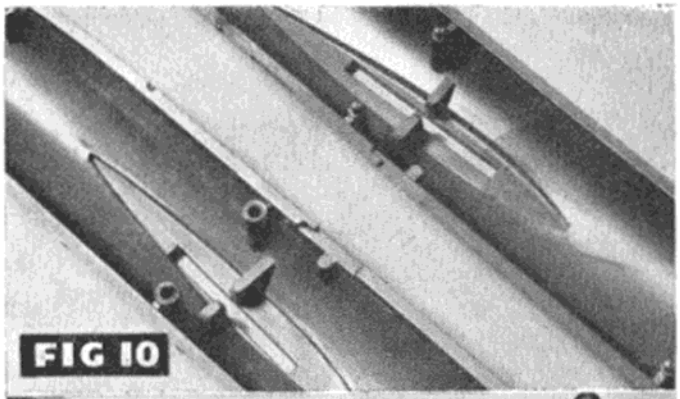


FIG 10

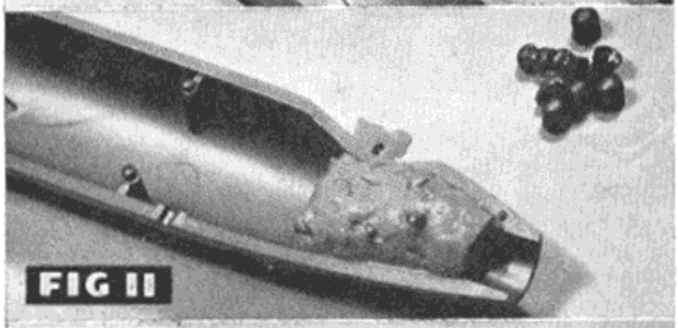


FIG 11

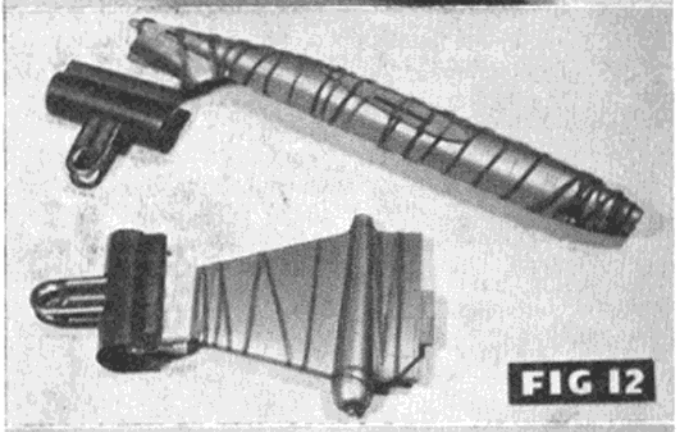


FIG 12

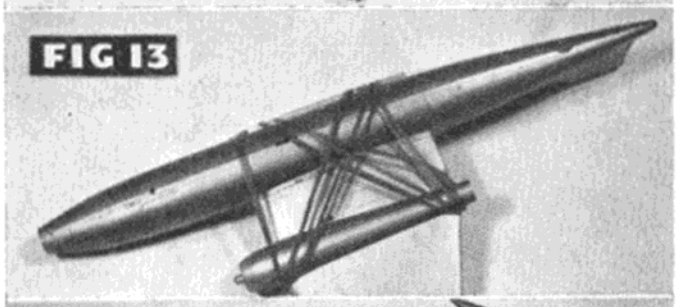


FIG 13

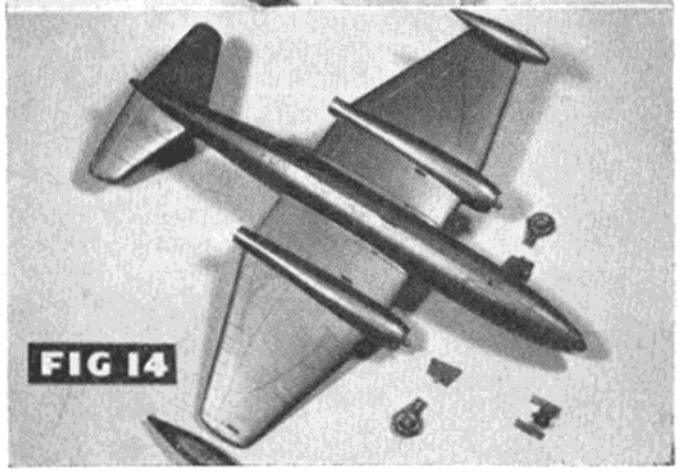


FIG 14

bottom lines sawn keeping outside the line (Fig. 7.)

Where suitable tools for sawing to shape are not available, the blank may, of course, be carved, in which case it is necessary to trace the outlines on both top and bottom surfaces of the block and to then trace the side view shape on both sides of the semi-finished blank. Whichever method is used, the initial shaping should be to the *outside* of the marked lines and the blank finished to size with a sanding block.

Obtaining the correct cross-sectional shape of the fuselage, as well as the aerofoil sections, is facilitated with suitable templates. Most plans show the cross-section at various points and card templates are cut to fit these.

Accuracy and a good finish are the hallmarks of a good solid model, not an excess of detail. When you are satisfied that your model is accurate, give it a coat of clear dope, followed by a coat of sanding sealer. This, by giving the model a matt, one-colour finish all over, will show up any slight imperfections. Rub down smooth with very fine sandpaper and then give another coat of sanding sealer and rub down again when dry. Repeat this process two or three times. Use the sanding sealer properly thinned and keep rubbing down.

When the grain is no longer visible, the colour coats can be applied. The same procedure is adopted of thin coats followed by rubbing down. Use ordinary coloured cellulose model dope, thinned up to 50 per cent. and rub down with silicon-carbide No. 400 wet-or-dry paper. This can be purchased from a garage and is the same as that used by coachbuilders to obtain a high finish on cars. It must not be used " dry," but should be dipped in water and lubricated with a smear of soap.

After several coats, the resultant finish will be beautifully smooth and even, and to achieve a final shine the last coat can be burnished by rubbing with a light application of " Brasso " metal polish and a soft cloth.

In Figs. 10-14, we show the construction of a typical moulded polystyrene model, in this case the 1/72 scale Frog *Canberra* PR.7. The excellent surface of the parts, which even includes rivet lines, is noteworthy, as, also, is the manner in which all parts fit accurately together.

Cellulose cements and lacquers must not be used with styrene and for these kits special polystyrene cements are marketed. These cements have the effect of bonding the components by partially dissolving the surface of the adjoining faces. For this reason considerably more care must be exercised in cementing polystyrene than normal wood models.

For example, if too much cement is used, this will be squeezed out of the joints and efforts to remove the surplus will almost certainly result in damage to the surface of the model.

The answer is to use cement only very sparingly and to hold parts together under pressure until they are properly bonded together. It is advisable to carefully check the fit of all parts before cementing together as it is almost impossible to separate and re-cement a joint satisfactorily. Final cleaning up can be done with a metal scraper or the edge of a piece of glass.

Figs. 10-14. The assembly of a typical polystyrene plastic model. 10—Half-shells are aligned and locked together by simple plug and socket fitting. 11—Where ballast is required for balance, lead shot can be held in place by embedding in plasticine or putty. 12—Use cement sparingly and hold parts together under pressure with strip rubber or suitable clips. 13—Clean up wing roots for close fit and lash with rubber while cement dries. 14—Tailplane, wing tanks, etc., complete the assembly. Undercarriage may be omitted if the model is to be mounted on stand.

Topical Twists

by PYLONIUS

WITH SKETCHES BY **ALI**

Eric's Folly

Beyond a distance of some twenty feet one scale model looks much like another. All the finer details, like the moustache on pilot George's girl friend, are apt to become a trifle obscure. The essential element of realism, however, comes in the crash. Some modellers strive after the spectacular by aiming at complete disintegration. Others, less ambitious, are content with a buckled undercarriage and collapsed wings.

These thoughts occurred to me upon reading that Mr. Fearnley has lately been flying a pylon model. But don't run away with the idea that this was any ordinary pylon model. Far from it. It was, in fact, a full size scale model of a pylon model.

Over the years, our Eric has exhausted the whole range of single engined monoplanes in the full size world, most of them being too old fashioned anyway to look like the real thing any more. And since model jet planes are too functional to look like the real thing either, the only alternative was to turn his scale attentions to model planes.

Perhaps other scale enthusiasts might wish to use this alibi.

Going to Town

When the country modeller flies his job out of the 'drome, it inevitably lands in the most inaccessible branches of the tallest tree on the landscape. But he is not dismayed. Sooner or later along comes the tree climbing urchin, which agile youth disappears upward faster than a pylon. For his death defying escapade he is handsomely rewarded with a grudging three-penny bit and a thundering good hiding for coming home in such a filthy state.

The town modeller is not so fortunate. When his model lands with a shattering plonk on the outhouse of the suburban villa, retrieving operations are not left to the agility of small boys, but come under the direct command of the man of the house. A shrill clamour of female domiciles arouses him from his bed. After a short wait of an hour or so, during which time the black tom from next door has demolished a succulent portion of the left wing, the master emerges in all his dignity, holding up a broomstick in one hand and his trousers in the other. After poking vigorously at the model for a few minutes and succeeding in mangling the right wing, he calls imperiously for the steps. Perched precariously on the top he wields the broomstick to devastating effect, the miserable modeller below collecting the various pieces as they float down.

With a glint of victory in his eye the master beams down on the wreckage strewn modeller. "Lucky it landed here," he booms jovially, "If some of those kids had got hold of it . . ."

Snappy Number

Happily, the camera pest is a thing of the past. No longer are our flying fields overrun by wild hordes of snap-hungry ex-modellers. From recent reports it would appear that the only cameras now in evidence are discreetly tucked away in the bellies of aerial photography models, but as no one has yet produced an aerial picture, this can hardly be considered a serious threat to camera-shy modellers.

Modellers taking up photography nowadays do so only as a sideline to their flying activities. The early results of their amateur efforts are of somewhat dubious merit; the neighbours next door fondly regarding a framed portrait of a tubby team racer, which they consider to be a striking likeness of their rather large eared baby. But models are now seldom photographed on their lonesome; the modern trend is to pose them in the tender embrace of the local glamour girl. This is particularly effective where the lucky model is not quite up to the best concours standard—no one is likely to pay too much attention to it.

For the bachelor modeller there is a further advantage in choosing a glamorous background for his model snaps. When he casually flicks a snap over to a friend with the comment, "My new streamlined job," the friend will look at him with a new found respect, and remain in a state of puzzled envy until it ultimately occurs to him that if old so-and-so really did have such a smashing girl friend, he wouldn't be messing about with model planes.

Married modellers are, of course, advised to stick to more commonplace backgrounds, like the wife.

A Bracing Sport

Back in the days when aeromodelling was still in its shirt sleeves and braces, or less energetic stage, we British didn't mind the odd bit of outdoor exercise, but sensibly we had our limits. We even went to the strenuous extreme of getting out of bed on Sunday morning, much to the dismay of the neighbours, who would tap their heads significantly at such eccentric behaviour. Incidentally, getting out of bed on Sunday morning is now considered quite normal practice, except by your own clubmates.

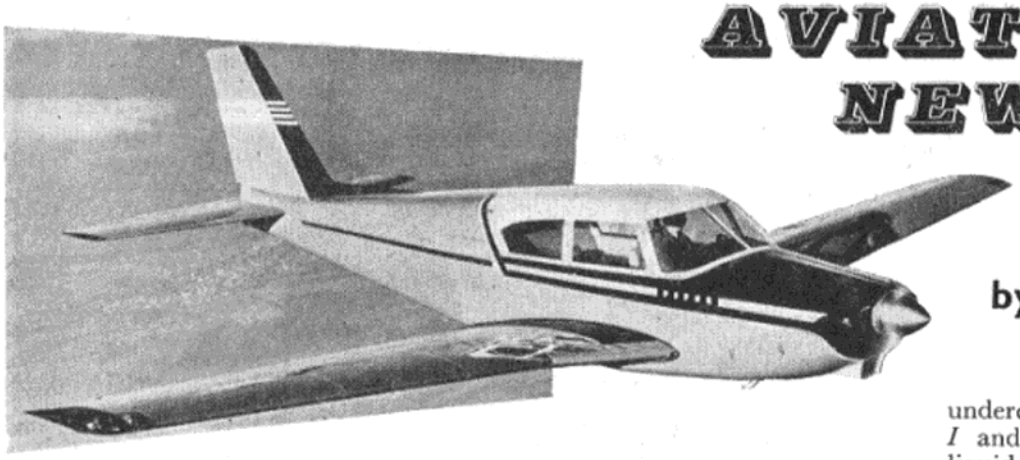
We might have jumped over the odd hedge on occasion, depending on the agility of the pursuing bull, but we drew a firm line at prancing across the flying field backward, clutching at an invisible piece of string. Such undignified capering was not only ruinous to best Sunday braces, but an emergency length of glider line often proved an insecure substitute, particularly on Sunday.

Our American friends, too, displayed a similar reluctance towards the backward gallop. This, however, had nothing to do with any inherited strain of British reserve—it was just that they kept tripping over their shirts.

When braces went out of fashion, being only retained as standard uniform for our visiting teams abroad, we went in for glider flying in a big way. True, our backwardness in going backward had made us backward, but we prepared for action by taking our pre-war glider fleet out of mothballs. However, it soon became evident that we had made a serious tactical error—we should have thrown away the gliders and kept the mothballs. Compared with the sleek foreign designs, our models, both in looks and performance were reminiscent of the time Granny knocked the aspidestra off the window ledge. But we soon learned; if the foreign jobs were long and sticky, ours became longer and stickier; if the foreign jobs were poddy and ribby, ours became poddier and ribbier. Before long our gliders were so advanced in design that they would do a max just from the heat produced by the D/T fuse.

But, alas, you know what model flying is. Just when we in the modelling world are congratulating ourselves on a great aerodynamic advance, along comes a ten-year-old job, which proceeds to fly all the scientific wonders into the ground. This time the vintage job looked suspiciously like one of our pre-war aspidestra specials. The moral being that there is nothing like going backwards.

AVIATION NEWSPAGE



by J. W. R. Taylor

INJUN WITH A DIFFERENCE is the new Piper PA-24 *Comanche* above, which is named after a famous tribe of Wyoming redskins and departs completely from the company's traditional high-wing-fixed-undercart configuration. Just the job to keep Piper in the number one position among lightplane builders, it features all-metal construction, a laminar-flow wing, swept fin and one-piece all-moving tailplane-elevator unit of the type used on supersonic fighters.

Production deliveries of the four-seat *Comanche* are due to start in April, with a 180 h.p. Lycoming engine of the kind fitted in the prototypes. With 50 gal. of fuel, this version has an endurance of five hours with a useful load of 1,100 lb. A second version with 250 h.p. Lycoming and 1,200 lb. load is scheduled for delivery next December.

* * *

Rumours that **NO MORE FIGHTERS** are to be ordered for the Royal Air Force beyond the English Electric P.1 and Saunders-Roe SR.53 series are given weight by the announcement that Fairey's have not yet received a contract for their projected fighter developments of the record-breaking Delta 2 research aircraft, which is probably the most controllable supersonic airframe ever built.

Tired of waiting for a decision on recently-issued specifications, Hawker's have decided to build their Mach 2-3 fighter project as a private venture, although the cost of development will run to several million pounds. No details are available, but it is significant that the *Hurricane* also started out as a P.V. some 23 years ago, at a time when the R.A.F. was still biplane-minded despite reports of a monoplane *Luftwaffe* taking shape in Hitler's Germany.

* * *

FRENCH FASHIONS IN FIGHTERS are following the *Starfighter* formula of achieving high performance by a combination of minimum airframe and maximum power and bright ideas. Typical is the area-rule wasp-waisted Dassault *Mirage III* (below, right) which made its first flight on November 18th last. Developed from the twin-Viper *Mirage I*, it has a single 9,900 lb. thrust afterburning SNECMA Atar G turbojet with side intakes, to thrust it to a designed Mach 1.5+. No mention is made of an SEPR auxiliary liquid-rocket motor of the type specified for the *Mirage I*, and a reference to greatly extended range probably implies that the rocket has been dropped in favour of more jet-fuel.

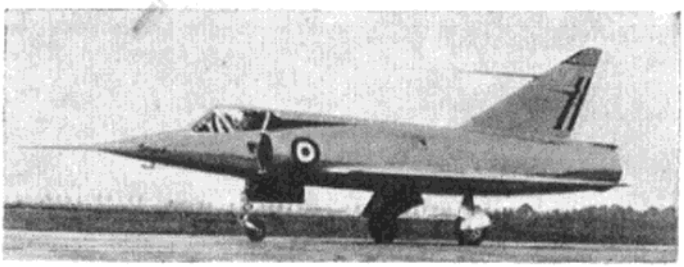
Second new interceptor is the Ouest-Aviation (ex-SNCASO) 9050 *Trident II* (below) which has a longer undercarriage than the earlier *Trident I* and an 11,000 lb. thrust SEPR liquid-fuel rocket with only two barrels instead of three. Flown to date with two 1,640 lb. Dassault-built Viper auxiliary turbojets on its wing-tips, but stressed for 2,420 lb. Turbomeca Gabizos, it offers a startling set of performance figures, with a climb to 50,000 ft. from a standing start in 2½ min., a ceiling "limited only by the pilot's vulnerability at extreme altitude," an eventual top speed of Mach 2, and ability to take off and land in under 550 yards, with a touch-down speed of only 100 knots.

Missile-type controls are fitted, with three all-moving one-piece tail surfaces to provide control in bank, pitch and yaw. There are no ailerons, but full-span high-lift flaps are provided on the straight stubby wings. Metal honeycomb is used extensively throughout the airframe to give a loaded weight of only 11,355 lb. Wing span is 22 ft. 6 in., length 42 ft. 6 in. and wing area 155 sq. ft. Armament, like that of the *Mirage*, will be a single guided missile, mounted under the fuselage.

* * *

BEER LIFTS have been in the news in several parts of the world lately, but the best story has come from Wyndham in N.W. Australia, where the locals chartered an Air Beef freighter to fly in supplies when the barrels ran dry on the eve of the annual race meeting. For old-timers it brought back painful memories of

Left: The "Trident" II. Right: The Dassault "Mirage" III.



when the publican died some years ago and was buried with due respect, only to be dug up again when the thirsty mourners discovered that the key of the bar was in his pocket.

* * *

According to *American Aviation*, the U.S.A.F. is placing less and less reliance on speed and altitude for protection of its strategic bombers. The B-52 is slower than the B-47 and at its over-target altitude of 50,000 ft. could be jumped from above by the latest *Migs*. Main defensive emphasis is placed on electronic countermeasures and other means of foiling interceptors and missiles, including remotely-controlled launchers for North American *Nasty* 1.5 in. spin-stabilised rockets.

* * *

The **BROKEN BACK MODIFICATION** to the tailboom of the Sikorsky S-55 series, to give greater clearance between main and tail rotor blades when landing in gusty

conditions or autorotation, can be seen on the Royal Navy's latest *Whirlwind* H.A.R. Mk.5 aircraft (above). In addition to the 3½ degree droop on the boom, there is a new wide-chord tail rotor pylon and a spring-loaded tailskid, and the small stabilisers have been repositioned parallel to the ground.

* * *

Regulus II is the name of Chance-Vought's new supersonic surface-to-surface missile.

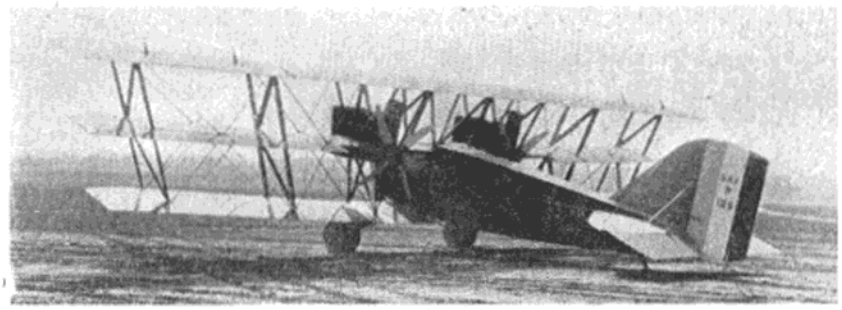
* * *

CONVAIR WITH KNOBS ON (right) is a C-131B with two Solar T41 gas-turbines slung on pylons under its inner wings to supply electrical power beyond the capacity of the aircraft's own system. Equipped with either a.c. or d.c. generators, the baby turbines have a power output that would be sufficient to meet the needs of 60 average homes and enable the C-131B to be used for the flight-testing of unusually large electronic systems.

* * *

MORE FLYING BOATS . . . but not for Britain. Only the U.S. Navy seems to retain its faith in water-based aircraft and has ordered more than £36 million worth of 600 m.p.h. four-jet *Seamaster* mine-laying and reconnaissance flying boats from Martin, who are also working on the design of a nuclear-powered 'boat, probably based on the *Seamaster*. Nor is that all, because it has been reported that Martin are developing a new anti-submarine and rescue flying boat for the U.S. Navy, designated P7M and powered by four piston-engines.

FROM THE PAST . . . . . No. 9



The Gax Triplane

The three-seat **Gax Triplane** of 1920 was Boeing's answer to General Billy Mitchell's plea for a rough, tough low level bomber, its designation signifying Ground Attack EXperimental. It had lashings of everything, particularly wings, struts and armour plate, and the crew were seated in shoulder-high bathtubs of armour containing rotating slots through which they were supposed to view the ground.

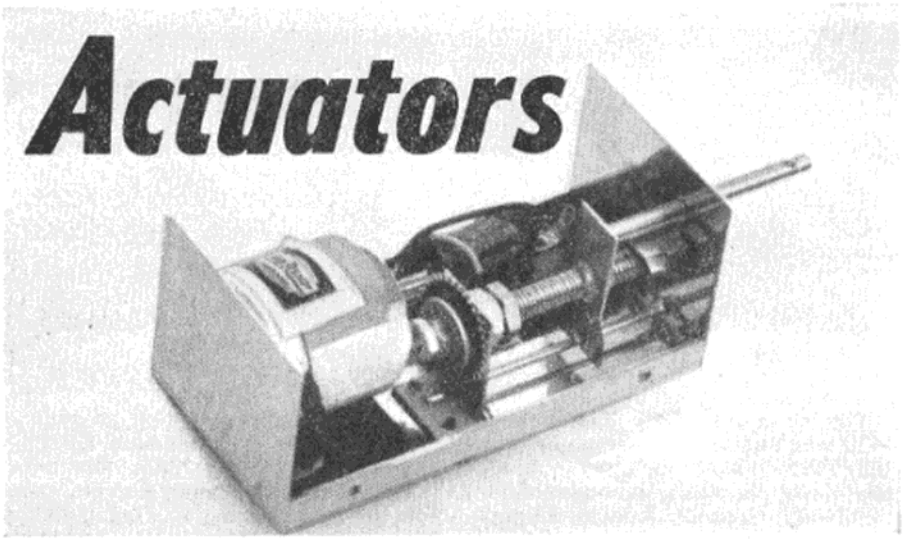
To reduce vulnerability to ground fire, ribbon-type radiators were placed above the armoured nacelles for the two 400 h.p. Liberty 12 engines ; but they showed a regrettable tendency to overheat, and burst when the first of two prototype GAX's was 300 ft. above the ground on its first take-off. After the radiators had been modified, the bomber was demonstrated to General Mitchell in a flat-out fly-past at nought feet with its 20 mm. cannon and eight machine-guns all firing.

It was so impressive that an order was placed for 20 production GA-1's with 435 h.p. Liberty 12A's ; but this was later reduced to ten aircraft, the first of which flew at Fort Lewis, Washington, in May 1921. Landing after 15 min., the pilot was so deafened by the noise that it was some minutes before he could hear the question " How does she fly ? " His reply was " How can you attack the ground with an aeroplane you can't see out of, and that's too unwieldy to manoeuvre close to the ground ? "

After that—according to Boeing publicity chief Harold Mansfield, who has just published a superb history of the company entitled *Vision*—Army officers enforced discipline by telling young pilots : " Watch your step or you'll be ordered to fly the GA-1." Span : 65 ft. 6 in. Length : 33 ft. 7 in. Loaded weight : 9,740 lb. Max. speed: 105 m.p.h.

Radio Control Notes on . . . .

Actuators



To meet the ever-increasing interest in radio control we have undertaken a comprehensive series of tests of standard commercial equipment which we shall present in condensed form, together with a description of basic techniques appropriate to different stages of the complete radio control link.

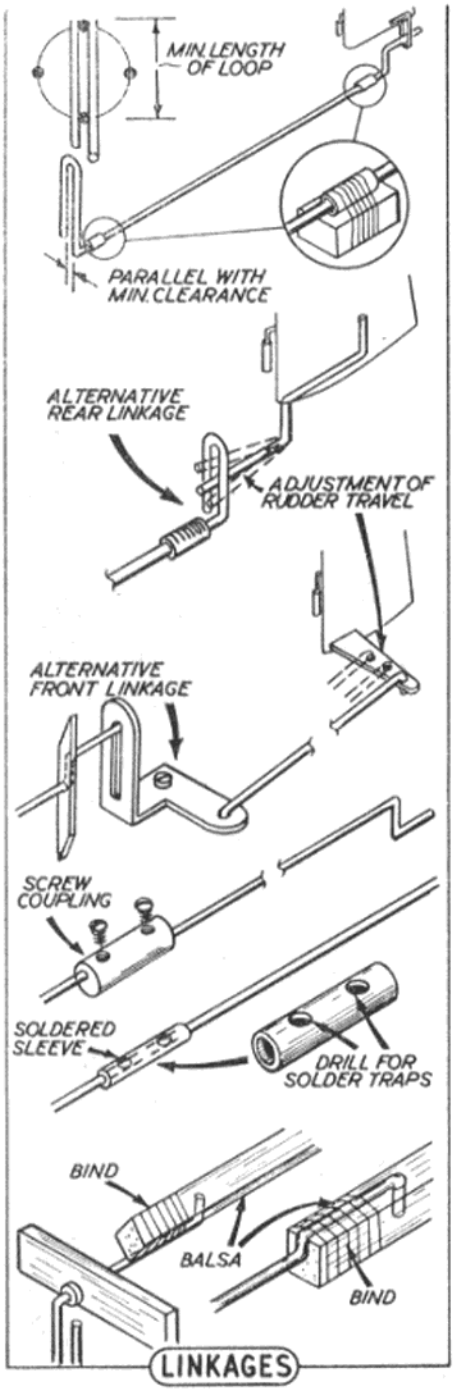
SURPRISINGLY few actuators are currently produced in this country, which is largely an unsatisfying position since this is one of the most vital components in the complete control system. The actuator, too, is quite often the weakest link in the complete chain, being susceptible to both mechanical and electrical failure.

The simplest forms of actuator are of the escapement type, with servo power provided by a rubber motor. A majority of such escapements (and all the current British commercial types) are self-neutralising, implying that a control position is held on by a change in signal and released, automatically, to return to neutral by reverting to the standing signal. To hold a control position, therefore, the actuator coil must remain energised, thus drawing current from the actuator battery during this period. A method of minimising the " hold on " current is to employ two coils in series, one of high resistance and one of low resistance. For pulling in the armature initially to release the escapement, current flows through the low resistance coil only (the high resistance coil being shorted out). Movement of the armature towards the pole effectively switches in the high resistance coil in series by means of a wiping contact. Thus the initial current demand of around 1 amp required for " pull in " is reduced to a matter of some 100 milliamps " holding " current.

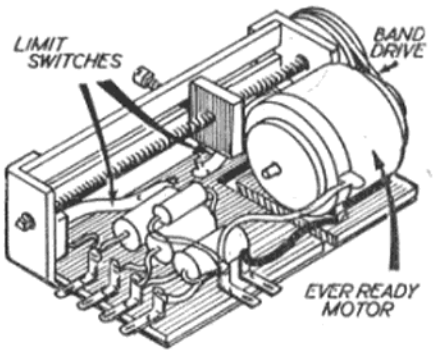
A common fault with electromagnetic escapements is lack of current *at the coil*. Using marginal size batteries and with long, thin leads to the actuator, P.D. drop in the leads may be a matter of 1 volt or more. Unless very carefully designed, made and adjusted, few escapement type actuators, are reliable on less than 4.5 battery volts.

Common causes of an escapement skipping are : excessive play in the escapement spindle ; servo motor too strong, or wound too tightly ; incorrect clearances between escapement arm and pawls ; incorrect angles on escapement arm or pawls. Causes of an escapement sticking include lack of battery power ; escapement spindle pulled out of line ; incorrect contact angles ; armature return spring too weak ; excessive friction in the control linkage ; servo motor run down or too weak.

The control linkage is an important feature of actuator operation and should be as light and free as possible. A wire link rod is normally employed between actuator and the actual control horn or actuating arm. Play in the system should be reduced to a minimum, without evidence of binding. Where a long length of link rod is necessary (e.g. when the actuator is mounted amidships) it is generally best to use a light, rigid balsa rod with wire end fittings to minimise inertia and resonant effects. A long wire, for example, may tend to vibrate in resonance with engine vibration. The actual power normally transmitted via the rod is very small and 20 S.W.G. wire end fittings are usually adequate.



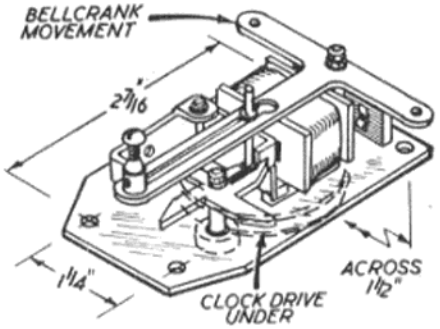
Radio Control Data — Actuators



Ripmax Steering Unit

Primarily a unit for marine models, this is a motor-driven unit employing a lead-screw driven by pulleys and a rubber band. Designed for use with multi-channel or single-channel receivers (the latter when used in conjunction with a matching control box). Limit switches are included, stopping the motor at the full "on" positions, but intermediate control positions may be produced by "inching." This unit will shortly be rendered obsolescent by a revised design.

Operating current: nominally 0.1 amp per volt supply; two (4.5 volt) batteries required; weight $3\frac{3}{8}$ oz.



E-D Clockwork Escapement

Main application of this actuator would appear to be for boats, although its bulk and weight could be accommodated on large model aircraft. Control movement is effected by strings or push rods from each end of the bellcrank bar. The clockwork mechanism (replacing rubber motor power) is located under the base plate driving the escapement through a single reduction gear. Fully wound, this mechanism gives 100 operating movements. Torque, fully wound, is 2.25 inch-ounces, dropping to 0.5 inch-ounce towards the end of the wind. A two-arm escapement is provided as an alternative to give self-neutralising action, if required (recommended when used on aircraft).

Data

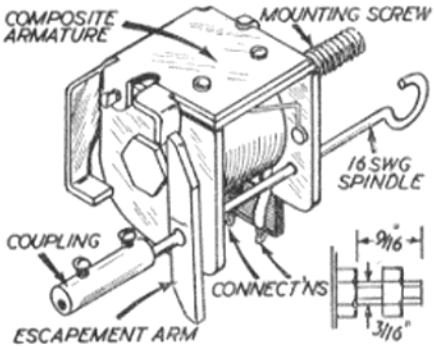
Weight 3 oz.; coil resistance 13 ohms; operating current (4.5 volts) 0.35 amps.

E-D Compact Escapement

This is a miniaturised escapement with a single coil designed for 3 to 6 volt operation. A minimum of 4.5 volts would appear necessary for consistency. Mounting is by means of a single $\frac{3}{16}$ in. diameter screw thread protruding from the rubber hook end. The unit then beds down against a large nut which should face a hard, rigid panel for positive location. The armature movement is somewhat unusual in that the end cheeks form the pole pieces with the armature pivoted above them. Reworking of the pawl angles and increase in armature spring pressure improved our specimen.

Data

Coil resistance 12 ohms; current consumption (4.5 volts) 0.375 amps; weight $\frac{15}{16}$ oz.

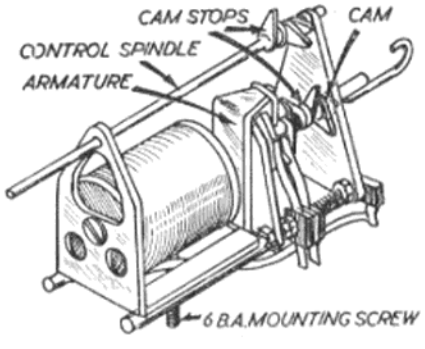


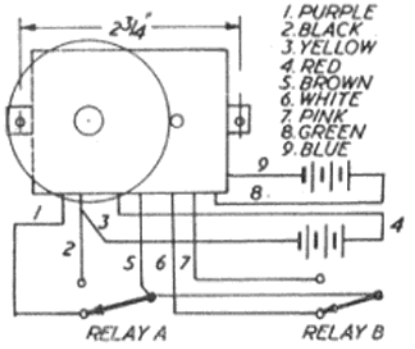
Rudevator

Now obsolete, this was an American device manufactured in limited numbers in this country under licence. Suitable for use with a single channel receiver, the arrangement of cam stops gave selective control positions, the control surface itself being an angled flap or tab mounted on the control spindle. This surface windmilled in "neutral" position and could be stopped to give "up" and "down" elevator or left and right rudder equivalents. Two-speed motor switching was also taken off the star wheel.

Data

Coil resistance 9 ohms; operating current (4.5 volts) 0.5 amps; weight 1 oz.



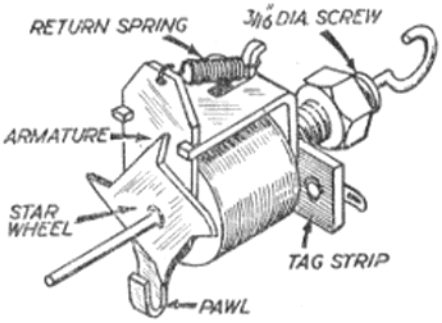


E-D Power Driven S/C Actuator

This is a motor driven actuator powered by the Ever-Ready electric motor operating on 3 or 4.5 volts. It is intended for use with multi-channel equipment via two relays. Self-centring action is given by cam switching, limit switches restricting rotation of the motor to give 90 deg. control wheel movement on relay change-over. No less than nine leads have to be wired into the circuit, as shown in the diagram. Most suitable for boats (e.g. operating rudder and giving selective control).

Data

Weight 4 oz. (including wires); motor resistance (nominal, stalled) 2.9 ohms; current consumption—varies with load; may be taken as 0.1 amp per volt.



Typhoon Escapement

This is a Dutch production, imported into this country by H. J. Nicholls Ltd. Basically it is a copy of the Aerotrol (American) unit. An outstanding feature is the excellent magnetic circuit given by mounting the coil on what is, essentially, a large diameter bush with the armature suspended, relay style, on an L-shaped bracket clamped to one end of the coil. The escapement is in the form of a star wheel with angled points. The single screw mounting necessitates packing to the thickness of the first nut for rigid mounting. Operation was not consistent on less than 6 volts.

Data

Weight 1 oz.; coil resistance 9 ohms; operating current (6 volts) 0.66 amps.

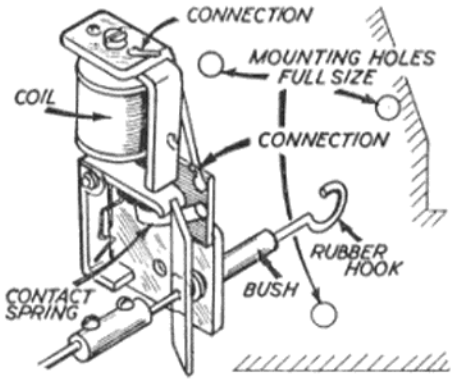
(*Continued on next page*)

E-D Standard Escapement

This is a robust design with a conventional two-arm escapement designed to operate on 4.5 volts. The coil has low and high resistance windings in series, the high resistance coil being shorted out in the "neutral" position by a light phosphor bronze spring contacting the escapement arm. Return (shorting) circuit is via the spindle bush and frame, which is a possible high resistance source unless scrupulously clean or lubricated with contact oil. This actuator is very susceptible to being mounted with the spindle out of line with the rubber motor, causing sticking.

Data

Coil resistance 12 ohms (high resistance 30 ohms); current consumption (4.5 volts) 0.375 amps (0.15 amps hold in); weight $\frac{3}{4}$ oz.; servo motor $\frac{1}{8}$ in. flat strip to double knots.

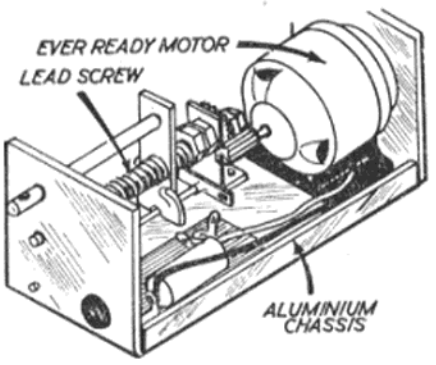


Ripmax Servo Unit

This is another power driven unit designed primarily for marine use. Two 3 volt batteries are used to drive the motor (in alternate directions). The motor is run continuously and disconnects from the control link at each end of the travel by means of a slipping clutch. Control is effected via two relays (in a multi-channel circuit) or via the Ripmax control box when used with a single-channel receiver. The Ever-Ready motor needs a minimum of 1 mfd condenser and 47 ohm resistor for arc suppression.

Data

Weight $3\frac{1}{4}$ oz.; operating current (3 volts) 0.3 amps.



An M.A. *QUICKIE* ENGINE REPORT

on the

FROG 50 $\frac{1}{2}$ c.c. diesel

THE $\frac{1}{2}$ c.c. Frog 50 is the cheapest model engine currently manufactured in Great Britain. It is also the most compact and just about the lightest of the $\frac{1}{2}$ c.c. models at present available. The Mk. II model was introduced just over a year ago and supersedes the original 50 which first appeared on the market three years earlier. The Mk. I was dealt with in the M.A. Engine Tests series in August, 1952.

The Mk. II 50 can be distinguished from the earlier model by its somewhat longer fuel tank and by the needle-valve unit which is now raked back. The cylinder barrel is of a slightly different shape and a thicker compression lever is used. Internally, the cylinder porting has been revised and the three transfer channels are now on the outside of the liner, with inclined ports into the cylinder, instead of on the inner wall as previously used.

Type

Single-cylinder, air-cooled, two-stroke cycle, compression-ignition. Shaft type rotary valve induction. Reverse-flow scavenged cylinder using three radial exhaust ports and three (external) transfer grooves with inclined ports into cylinder between and halfway below exhaust ports. Flat crown piston.

Dimensions

Bore: 0.343 in. Stroke: 0.330 in. Swept Volume: 0.499 c.c. (0.0305 cu. in.). Height to top of cylinder: 1.5 in. Length, rear face of prop to backplate: 1.5 in. Propshaft diameter: $\frac{1}{8}$ in. Weight: 1.2 oz.

General data

Aluminium alloy diecast crankcase and main bearing housing. Hardened steel cylinder liner screwed into crankcase. Mechanite piston and contra-piston, ground and lapped. Forged RR.56 alloy connecting-rod. Silver-steel gudgeon-pin pressed into piston. Hardened steel full-disc crankshaft with $\frac{3}{16}$ in. dia. journal running in bushed main bearing. Deep section diecast alloy rear cover. Machined alloy cylinder barrel. Inclined spraybar type needle-valve. Beam or radial mounting.

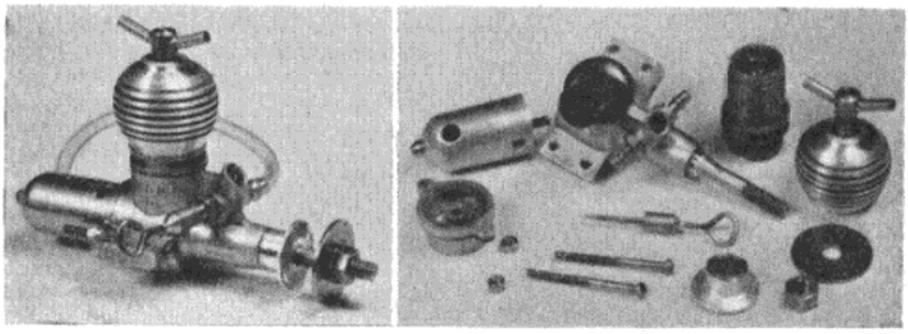
Performance

Practically all $\frac{1}{2}$ c.c. class diesels are a little trickier to start than some of their bigger brothers and the 50 is no exception. It is not, perhaps, the engine we would recommend as the best for a beginner, although the knack of handling it will improve with further acquaintance.

On a standard Frog 6 in. × 4 in. propeller, the engine will reach 10,000 r.p.m. and this prop is well suited to the engine for most applications. The engine will hold an even speed and does not suffer the severe power loss with warming up that is common to many diesels.

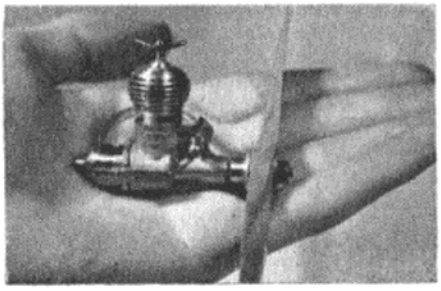
In contrast to our findings on the Mk. I, the contra-piston was found to be an excellent fit and easy to adjust by means of the new, heavier compression lever.

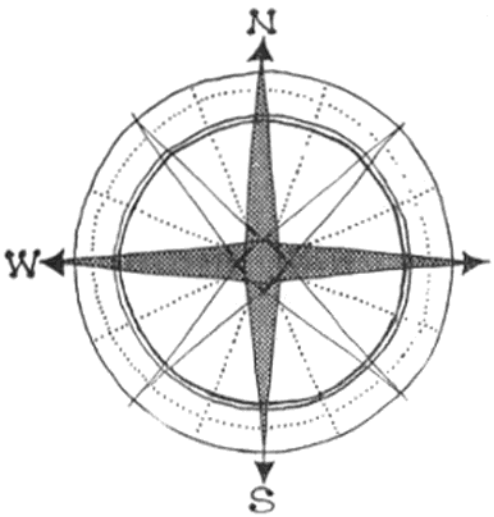
The maximum output is of the order of 0.04 b.h.p. or a little over at around 12,500 r.p.m.—i.e. about the same as that recorded for the Mk. I. The engine is well made throughout and represents very good value.



Compare the Mk. II above with the Mk. I below to see the few external changes.

The diminutive proportions of the 50 are well shown in this photo.

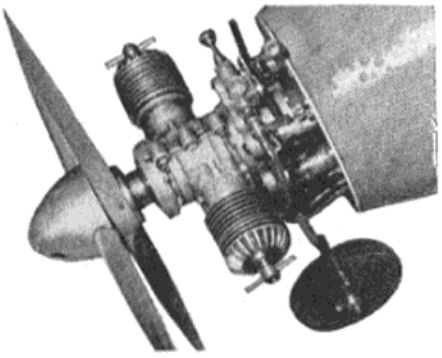




POINTS EAST

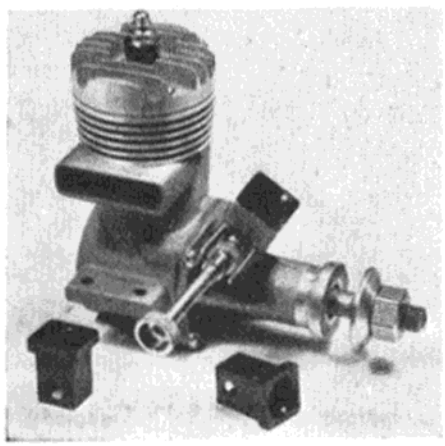
by PETER CHINN

THE unique and impressive horizontally opposed twin-cylinder diesel (below) now being used by German R/C maestro Stegmaier was especially designed for use in conjunction with his famous pneumatic servo control



system. It was constructed by one Herr Ruppert, and we understand that these engines are being marketed in small numbers by G. Brunnenkant of Heppenheim. The price is quoted as being in the region of DM.195 (about £17).

The engine embodies a compressor unit attached to the rear of the crankcase and an effective throttle control which is said to permit throttling down to about one-quarter speed. Unfortunately, we have little technical information on the engine at the moment. Total capacity is given as 7 c.c. and weight, complete with compressor, only 225 grammes—i.e. a little less than 8 oz. Power output is quoted as being 0.6 b.h.p. at 8,000 r.p.m., which, however, would appear to be a trifle optimistic, as it would require the somewhat improbable b.m.e.p. of 70 lb./sq. in. at this speed and, if 8,000 r.p.m. represents the peaking speed, a considerably higher b.m.e.p. at the peak of the torque curve. Just visible in our photograph, incidentally, is the radio controlled brake which operates on the nosewheel tyre of this superb 8-channel model.

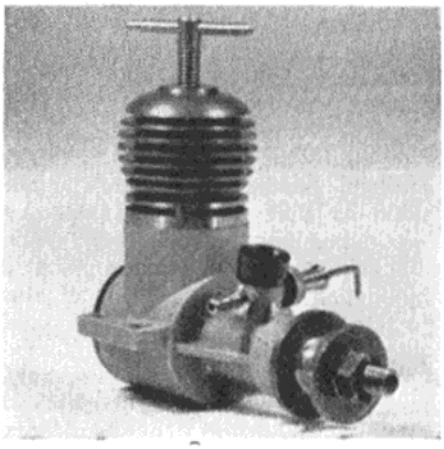


The revised Model 5103 "Enya 29" glowplug engine. Also shown are the interchangeable plastic choke inserts.

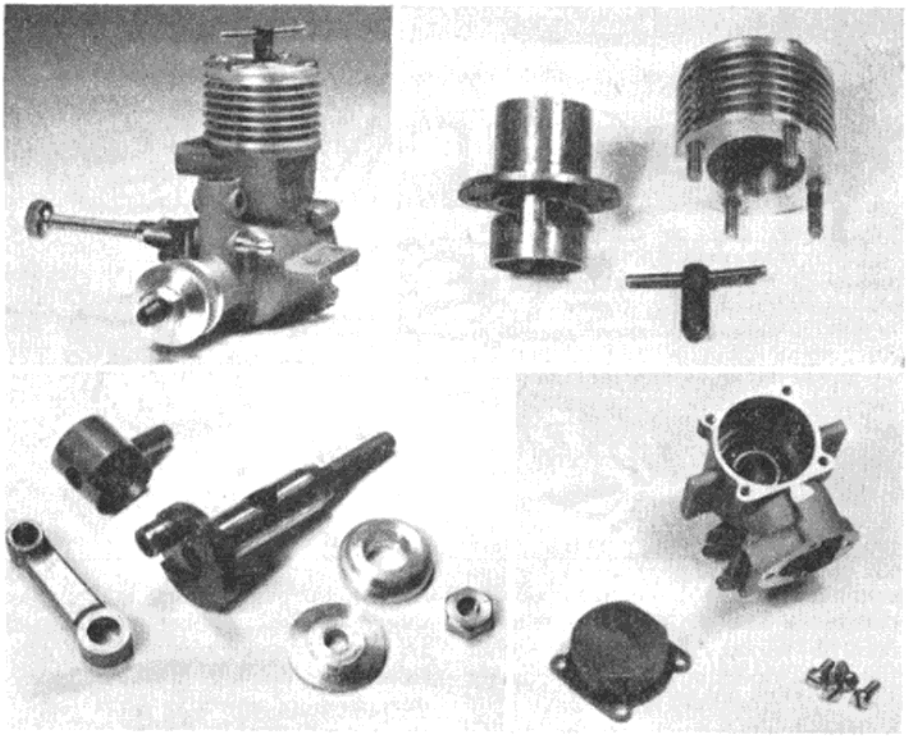
We have remarked before that two lines of thought are today apparent in the design of 2.5 c.c. engines. Roughly, these engines can be segregated into reverse-flow scavenged diesels and loop-scavenged glowplug engines. Where the two overlap, however (as in the case of the Barbini B.40 tested last month), it is very much more usual to find reverse flow scavenged glowplug models, than loop-scavenged diesels. The new Japanese Enya 15 D, therefore, is particularly noteworthy for the fact that it is a motor of the latter type and embodies features which definitely set it apart from the usual run of 2.5 c.c. engines.

One might be forgiven for supposing that the 15 D diesel might be an adaptation of the Enya 15 glowplug model (see September 1956 issue). In fact, it could hardly differ more from its glowplug brother, for the only item common to both engines is the needle-valve.

In accordance with diesel requirements, the engine is more heavily built than the already quite robust glowplug model, with particular emphasis on the bearings. Wielding the micrometer, we found that the crankshaft journal is of 0.394 in. (10 mm.) diameter against 0.355 for the glowplug model, while the crankpin is a full ¼ in. diameter. The shaft is supported by one ball bearing supplemented by a bronze bush. A much heavier connecting-rod is used by the diesel and the gudgeon pin is increased from 0.1575 in. diameter (4 mm.) to 0.197 in. (5 mm.). The connecting-rod is fractionally longer between centres.



The Hungarian "Alag X-3" of 2.47 c.c. Tests disclosed that this was one of the best performing diesels so far seen from Eastern Europe.



First pictures of the entirely new "Enya 15D" diesel. Among the unusual features of this out-of-the-rut Japanese design are the loop-scavenged cylinder, stepped-skirt piston, divided transfer passage, steel bushing for the compression-screw and the optional twin needle-valves.

Like the glowplug engine rod, however, it is bronzed bushed at the big end.

The design of the engine is interesting. The cylinder liner has two conventional rectangular ports, exhaust and transfer, each occupying about 150 degrees of the cylinder circumference. The actual transfer passage, however, is not quite the same as that commonly employed with this type of porting. It is divided into two passages, separated by contact between the liner and the casting. The liner is flanged above the ports and a close fitting finned barrel of duralumin encases the upper section. The entire cylinder assembly is secured by four long screws which extend into lugs on the crankcase. An unusual refinement is the fitting of a threaded steel bush in the cylinder head for the compression screw.

The crankcase is a robust pressure diecasting of high quality and includes provision for twin needle-valves. The crankshaft has a machined in counterbalance and a circular valve port as distinct from the rectangular port of the glowplug Enya 15. The piston is most unusual in that the skirt is drastically cut away on the transfer side. This is in order to avoid blanketing the lower end of the transfer passage.

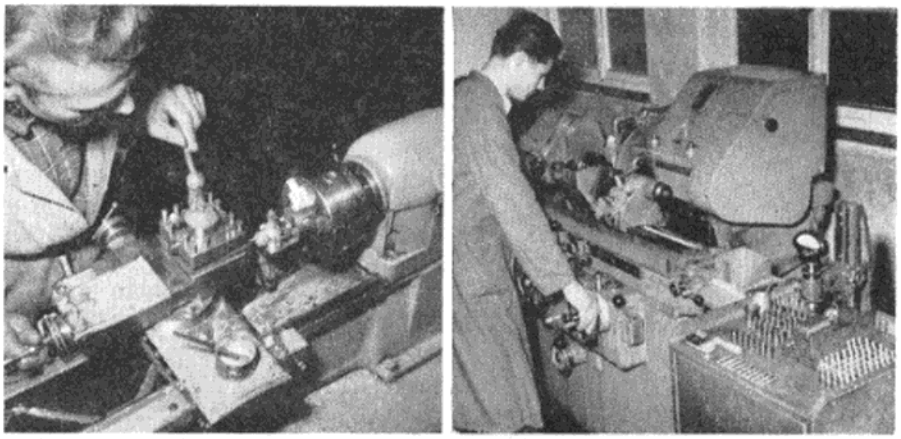
The Enya 15D has only just been put on the market in Japan and the first example to be received in this country reached us, by air, only a few days before the preparation of the foregoing description, so that we have not yet had the opportunity of conducting full tests on the motor.

Designer Saburo Enya stated, however, when submitting the engine for test, that he believed the scavenging system adopted was very efficient and commented that he had previously recorded a maximum torque figure of 1.7-1.8 kg. cm. on his own dynamometer. Converted to more familiar English measurement, this is equivalent to 0.123-130 lb. ft. or 23.6-25 oz. in. and, representing b.m.e.p. of *circa* 61-65 lb./sq. in., is very good indeed. If confirmed by our own tests, this should be ample support for the maker's claimed output of 0.28 b.h.p. at 13,000 r.p.m. We shall be reporting on this in due course.

Also from the Enya Metal Products Company we have received two examples of the new Model 5103 Enya 29 glowplug engine. This is an improved version of the Model 5002 Enya 29 that has been one of the best 5 c.c. Japanese motors of recent years. It features three interchangeable plastic choke inserts for use according to the performance characteristics required—high output versus greater fuel suction, in various stages to suit speed, F/F or stunt applications. We shall be describing this engine in more detail in a future issue.

During 1956, we featured two Hungarian engines, the Aquila Baby and the Proton SM-03, that had been received through the Hungarian exporting agency in Budapest and in respect of one of these, the Aquila, negotiations have been going on for the import of small numbers of engines into the United Kingdom. We were also called upon to vet and test another Hungarian product, the 2.47 c.c. Alag X-3, which it was also hoped to import.

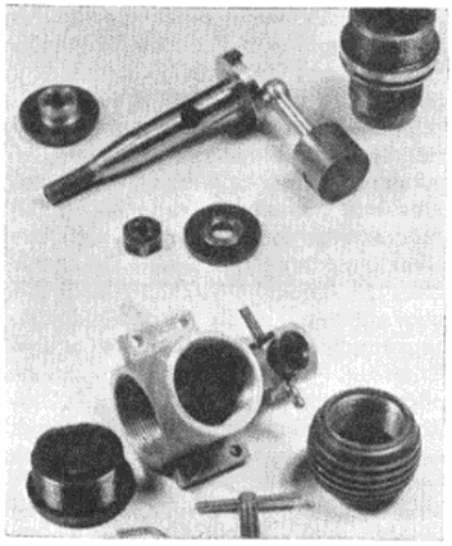
The disastrous failure of Hungary's valiant attempt to rid herself of Soviet shackles makes us wonder if we shall now see the Alag X-3 in this country. However, in recognition of the fact that this is, or was, one of the most promising model engines yet seen from an East European country, we are including three photographs of the Alag X-3, two showing the component parts.



Pictures from the German Johannes Graupner (Taifun) engine factory show (left) crankcases being threaded and (right) finishing piston and cylinder assemblies to matched fits.

The engine is of neat, compact and attractive appearance and generally comparable with equivalent Western products. The pressure diecast crankcase is nicely turned out and well finished and an unusual touch is the use of a moulded red plastic crankcase cover, as well as a venturi insert of the same material.

The Alag X-3 is of the shaft-valve, reverse-flow scavenged type with cylinder porting similar to that used by the Webra Mach-1, except that six transfer flutes instead of eight are employed. The exhaust period is approximately 135 degrees while the transfer period is about 90 degrees. The rotary valve opens at approximately 60 degrees after bottom dead centre and closes 145 degrees later, but is supplemented by a 50 degree sub-piston induction period.



Parts of the "Alag X-3". Features include internal transfer flutes of large volume, counterweighted crankshaft, bushed main bearing and plastic backplate and venturi.

The piston is hardened, with a pressed-in gudgeon pin and is coupled to the shaft by a turned duralumin conrod. The crankshaft has a balance weight machined in and has an 8.5 mm. dia. journal. A screw-on finned duralumin cylinder barrel, anodised red, is employed. The prop driving hub assembly is also red anodised. No gaskets are used anywhere. The engine has a bore and stroke of 15 × 14 mm. and weighs 4.2 oz.

On the performance side, this was one of the liveliest plain bearing shaft valve diesels we have handled and was markedly superior to the Russian MK-12 disc-valve ball-bearing diesel of the same capacity recently tested. The peak output was 0.235 b.h.p. at 13,600 r.p.m.

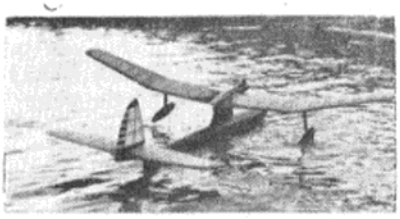
M.A.'s "Easy 8"

Two Guineas goes to the winner of our new Cash Quiz Contest

Entries must reach us by January 30th—the first "all correct" line opened on that date gets the prize. It's as simple as that!

Address is "Model Aircraft," 19-20 Noel Street, W.1

1. Used by many contestants in International power events is the Webra Mach-I engine. It is made in:
   (a) Germany (c) Holland
   (b) France (d) Japan



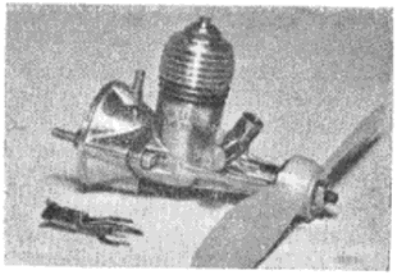
2. A popular model flying-boat is the Berkeley *Sea-Cat*. It was designed by:
   (a) Don McGovern
   (b) C. E. Bowden
   (c) Henry Struck
   (d) Charles Hollinger

3. A potentiometer is a device used in connection with:
   (a) Engine testing
   (b) Radio-control
   (c) Microfilm models
   (d) Wind-tunnel research

4. Readily identified is the push-rod and elevator horn of a "U-Control" model. U-Control first appeared in:
   (a) 1937 (c) 1944
   (b) 1940 (d) 1947

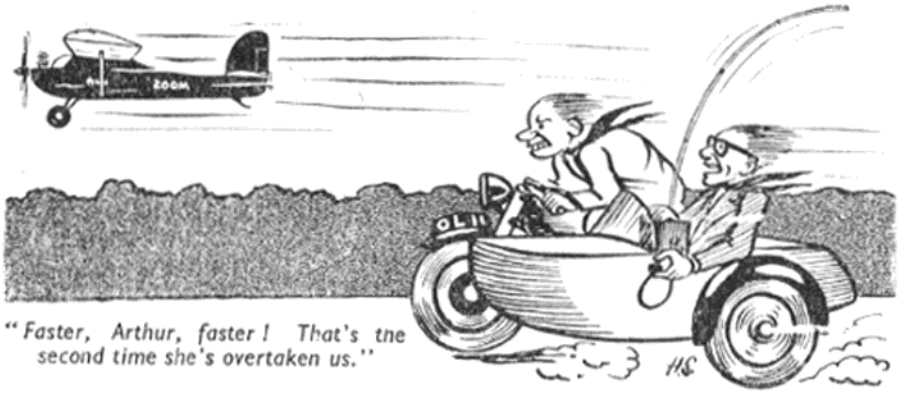
5. Of which of the following makes of aircraft is this a scale model:
   (a) Taylorcraft (c) Luscombe
   (b) Auster (d) Cessna

6. When doping tissue covering, you would do so preferably in conditions of:
   (a) Dry air 40-45 deg. F.
   (b) Damp air 50-55 deg. F.
   (c) Dry air 60-65 deg. F.
   (d) Damp air 70-75 deg. F.



7. This Half-A class engine is:
   (a) a McCoy (c) an O.K. Cub
   (b) a Wen-Mac (d) an Atwood

8. Which of the following wings has the greatest area?
   (a) 22 in. span, with 3½ in. constant chord.
   (b) 19 in. span, with 4 in. constant chord.
   (c) 22 in. span, 4½ in. root chord, 3¾ in. tip chord, with straight taper planform.
   (d) 25 in. span, 4 in. root chord, elliptical taper.



"Faster, Arthur, faster! That's the second time she's overtaken us."

IS EVERYTHING UNDER CONTROL?

by HARRY STILLINGS

PART FOUR

LAST month I ended by saying that *Homer* was my first R/C model to be equipped with a hard-valve receiver. This was the then recently-introduced ECC "951B," and I can confirm from experience that it is a first-class receiver. Inevitably, I had to learn a few new tricks, especially in regard to the tuning. With the soft-valve I had used up to then, tuning was effected simply by rotating the aerial tuning arm until the point of biggest "drop" was found on the milliammeter, with signal on. With the hard-valve RX two controls have to be adjusted —sensitivity and selectivity, sometimes called secondary and primary. It is important to understand, especially, the function of the sensitivity control, as this can cause a lot of trouble if not properly adjusted.

The most important thing to remember is that, if screwed down too far, it prevents the standing current from rising again after cessation of signal, and this means, of course, a stuck-on rudder. Similarly, it can cause relay chatter through engine vibration if too far down. The drill is to screw down until the meter needle just starts to drop, then key to see if it stays down or "hesitates" after cessation of the signal. If so, unscrew a quarter-turn, and try again. Continue in this way, unscrewing a quarter-turn at a time, until the current rises immediately every time. Now (and this is the important part!) UNSCREW a further 1½ turns. This gives a safety margin which will ensure that the standing current will *always* return to its top value when the TX button is released, and the rudder, of course, will thus neutralise.

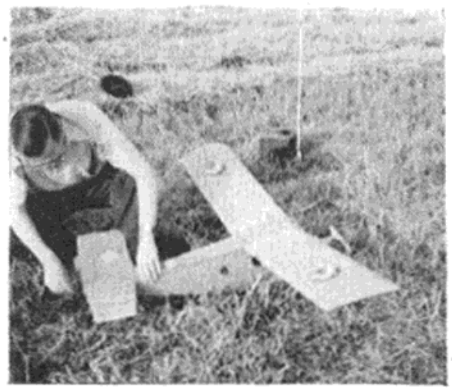
The 1½ turns back also effectively eliminate relay chatter due to vibration. With too-sensitive an adjustment your model will suffer from rudder-waggle with the motor running, and nothing you do will stop it until the sensitivity is turned back sufficiently. Having got this setting correct, the selectivity control is simple—just hold down the button, and rotate the primary control until the meter shows the biggest drop. This should, of course, be done with TX and RX about 100 yards apart. If you change the batteries, valve, or effect any other replacement, reset the sensitivity control before tuning, to make sure you still have a margin of 1½ turns.

I "boobed" badly on this point only a short while ago. I had to fit a new valve owing to the original having hit the top of the cabin in a heavy landing, knocking off the "pip." The new valve happened to be rather more sensitive than the old one, and although everything seemed all right before launching, within a minute or so the rudder started spasmodic movements without any signal from me, and then stuck over on right. Naturally, this put the model into a spiral dive, and with engine going flat out, it plunged right through a 40 ft. tree, knocking off the wings and tailplane, which fell to the ground, while the fuselage stopped in the bottom fork. Thanks to the special "knock-off" construction of my present model it escaped with only tissue tears and one or two cracks in the fuselage sides, and was flying again a couple of hours later.

However, the fact that I "got away with it" did not excuse in any way my carelessness in not resetting the sensitivity control, and I consider I was far luckier than I deserved to be. So, take my tip, always make sure you have the safety margin of 1½ turns back! The loss in range is very small, and not worth the heavy risk involved in adjusting the sensitivity to the last decimal point.

With an efficient transmitter and good batteries, the modern receiver has an effective range of anything up to a mile, and believe me, this is far more than you will ever need in normal circumstances. Even at half a mile a model looks surprisingly small, and it is difficult to see whether you are coming or going. In general, the best practice is to fly to and fro about 500 yards upwind, until the fuel is running out, when the model can be brought back towards the transmitter, ready to make the approach on the glide for a spot landing. By keeping the model upwind you ensure that it will blow back *towards* you if anything should go wrong with the radio control, not *away* from you.

During many hours of controlled flight, the polarised relay of the 951B has never once let me down, and although it needs careful adjustment, it is a thoroughly reliable unit. It is well worth while fitting a spark suppressor (made up of 0.1 mfd condenser in series with a 50 ohm resistor) across the relay points. Fit as near the tags as possible. This eliminates the sparking which otherwise occurs as the relay points make and break, which in turn causes pitting and occasionally sticking.



Putting on the turns for another 'Homer' flight.

Homer never gave me the slightest worry, and never strayed from the straight and narrow path of strict obedience to signals—it seemed that choice of name has an important bearing on a model's behaviour. I flew at every possible opportunity, at weekends and evenings, and was favoured all that season with excellent weather conditions. Came the winter, however, bringing with it strong winds, and I began to be dissatisfied with *Homer's* lack of *extra* penetration. It would make progress against winds of up to some 15 miles an hour, but over this it sometimes actually flew backwards. I started drawing up a new design intended to give what I might call "super-penetration" which I could fly in winds up to 25 miles an hour. So my present model, *Zoom*, was born.

I realised that, to achieve my aim, the model would need to be compact, with no surface area that was not actually essential, would have to be pretty heavily loaded, and be over-powered compared with the accepted formula. For strength and simplicity, the fuselage was made up from solid $\frac{3}{16}$ in. sheet sides and bottom, with $\frac{1}{16}$ in. top decking from wing mount to tailplane platform. A small switch panel was the only side opening, all the radio gear being inserted and maintained through the cabin top. I wanted knock-off wings with a single aluminium tube strut either side, yet I had to be able to get at the cabin through the top. This problem was solved by making a removable centre-section, held on by strong rubber bands for flight, but quickly removable for radio inspection purposes. The entire "knock-off" engine pod was constructed of ply, using $\frac{5}{16}$ in. for the motor web, $\frac{3}{16}$ in. for the firewall, and $\frac{1}{8}$ in. sides, all well cemented and screwed together.

When completed, *Zoom* had a wing-span of 53 in. with an all-up weight of $4\frac{1}{2}$ lb. The wing-loading came out at almost exactly 20 oz. per square foot, which was the figure I wanted. To overcome any tendency to power-stall I built in about $3\frac{1}{2}$ deg. downthrust, and to achieve straight flight on neutral under power 4 deg. right-thrust. Wing chord was 10 in. with Clark Y section. When I took the model along to the flying ground for its trial flights, I had no idea what would happen, but, having checked the radio, I started the $3\frac{1}{2}$ c.c. Allen-Mercury, and launched in the normal way. *Zoom* merely left my hand, put its nose down, and hit the ground hard about eight feet away! What now, I thought? What should I do to get the thing airborne? I decided it was under-elevated, and put $\frac{1}{16}$ in. packing under the tailplane T/E, and tried again. This time the model managed 12 ft. before hitting the deck.

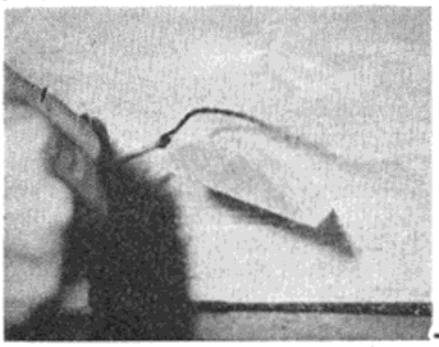
In desperation, I packed the T/E by $\frac{1}{8}$ in., and this time *Zoom* somehow just missed the top of the grass on the falling ground upwind, and got airborne. Almost at once it started to stall—not violently, but badly enough to make control a tricky business. I had, of course, only put in enough fuel for a 2-minute engine run, and when the motor cut I studied the glide—the model still stalled to the same degree. I got it down safely, then pondered the position once more. Suddenly the penny dropped! I had overlooked the fact that, with considerable built-in downthrust, and high wing loading, the model could not develop lift until it was moving really fast. So, taking out all the packing, I tried again, but this time took a 15-yd. run, and really *shot* the model out of my hand. It dipped towards the ground, but just before it touched the top of the grass the wings started to lift, and up she went.

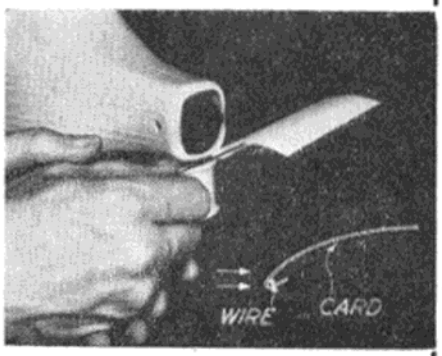
This time there was no stalling, and I was amazed at the speed and penetration. There was a fair breeze blowing, but *Zoom* simply tore into it, and was half a mile away in no time. With a large rudder, and a flying speed of 30 m.p.h. (rising to 50-60 in dives) response was, to say the least, lively, and a completely new technique of control was required. Short signals of only $\frac{1}{2}$-1 second were enough to turn the model around 45 deg. but recovery was equally rapid. As time went on and I became more confident, and tried loops, rolls off the top, barrel rolls, and even completely inverted flight. I have never been able to remember exactly how I achieved that inverted effort, but I shall suddenly find myself doing it again one fine day. *Zoom* can be stunted to within a few feet of the ground quite safely, and quickly regains height with judicious use of opposite rudder. I have tried one short cross-country flight with it, of about three miles, a friend acting as chauffeur while I controlled the model. We found we had to maintain a good 30 m.p.h. to keep abreast of the model, flying crosswind. Downwind legs forced our speed up to 45, and upwind brought the speed down to 15-20.

Zoom is now published as M.A. Plan No. 252, and will be found on page 38 of this issue. Next month I will wind up this series with a summary of do's and don't's, and illustrated hints which will help you to attain success in R/C flying.

A DO IT YOURSELF WIND TUNNEL

MANY modellers would like a wind tunnel of their own, but very few indeed ever face up to the time (and cost) needed to make equipment of this type. As the photographs show, however, you can undertake simple wind tunnel testing with nothing more elaborate than an electric hair dryer.

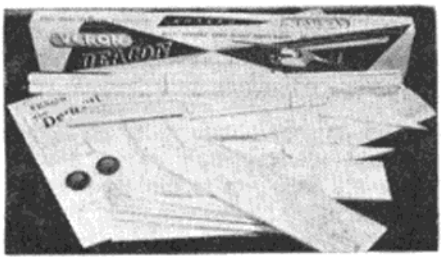




In the first photograph, airflow over a thick wing section is being investigated with the aid of a wool tuft. In the second the property of a cambered (curved plate) aerofoil to generate lift is clearly demonstrated, the trailing edge of the section rising above the pivoted leading edge.

OVER THE COUNTER

Latest news from Veron's is of a new 52 in. wingspan multi-purpose power model. Designer Phil Smith tells us this is a development of his very successful *Cardinal* design and in addition to sport flying can be used



for 1 c.c. payload, clipper cargo, or lightweight single channel R/C work.

The kit, known as the *Deacon*, is well up to the established Veron standard of presentation and quality and sells at 34s. 6d.

* * *

Completing a recent talk to youngsters on model flying we made the usual remarks about any questions and were amazed that the first question was " what are bobbins ? " A few enquiries elicited the fact that not one of them had ever heard of, what was, a few years ago, the mainstay of all rubber fliers. Should your local shop also be in ignorance of these worth-while items of equipment, tell them that Keilkraft market four different sizes varying in price from 3½d. to 5½d. Also from Keil's we received samples of transfers suitable for their flying scale range of kits. Quality is excellent and price is 9d. per sheet.

* * *

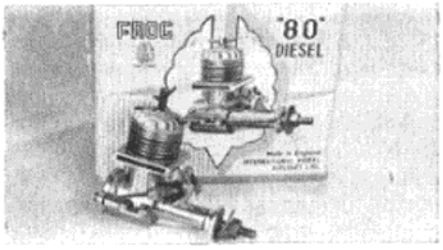
A standard handbook among C/L fliers has been Ron Warring's " Stunt Control Line Flying." This has now been reprinted in a special cheap edition, that retains all the original photos and drawings. Copies may be obtained from your local shop or direct from Percival Marshall & Co. Ltd., 19-20, Noel Street, London, W.1, price 6s., post free.

* * *

First " giant " plastic solid to be made in this country is the Frog *Britannia*. Following it quite shortly —probably in early February—will be another B.O.A.C. " giant " also to 1/96th scale. This is the Douglas D.C.7 *Seven Seas*, another collectors' item.

* * *

The new Frog " 80," mentioned in the December '56 " Over the Counter," is by now well and truly launched on the market. Selling as



it does for only 42s. 6d. it is already a best seller, and bids fair to become one of the most popular under-1 c.c. engines available.

* * *

Wakefield enthusiasts who prefer Pirelli rubber strip have probably found it difficult to obtain this past year, since no imports have been made following its last rise in price. We have, however, details of a " direct delivery " service and will forward details on request.

* * *

We checked with High Flash Petroleum on the effect of fuel rationing on the future supplies of Mercury model fuels. No likelihood of any shortages, they confirm.

* * *

Following their new 8 × 4 high-impact polystyrene power propeller, retailing at the extremely low price of 1s. 3d., Keilkraft are coming up with a 6 × 4 and 7 × 4.

* * *

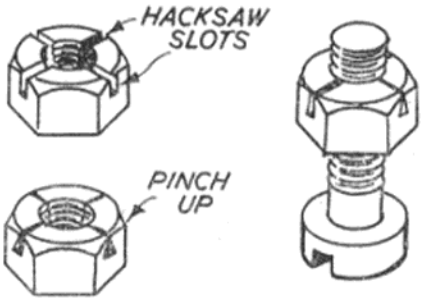
A limited range of Berkeley kits is being retailed by Bond's o' Euston Road, notably the Colonial *Skimmer*, Mitchell B-25 (twin-engined control liner) and Super Navion (64 in. span for free flight or radio control.

* * *

Latest from the Mike King stable (Contest Kits) is a ready-to-fly towline glider of all-sheet construction and hollow box fuselage. Printed and coloured, this model is to sell at something over 10s., but there is absolutely no finishing at all to do on it.

Self Locking Nuts

AN effective method of turning an ordinary nut into a self-locking nut which will not vibrate loose is shown in the sketches. Make two hacksaw cuts across the nut at right angles to each other, taking these cuts down to between one third and one half the depth of the nut. (This is very easy to do with a small Eclipse saw if you hold the nut in a vice.) Then simply pinch up the slots you have made to close the end of the nut. Start on the bolt thread from the other end and simply screw up tight in the usual way.

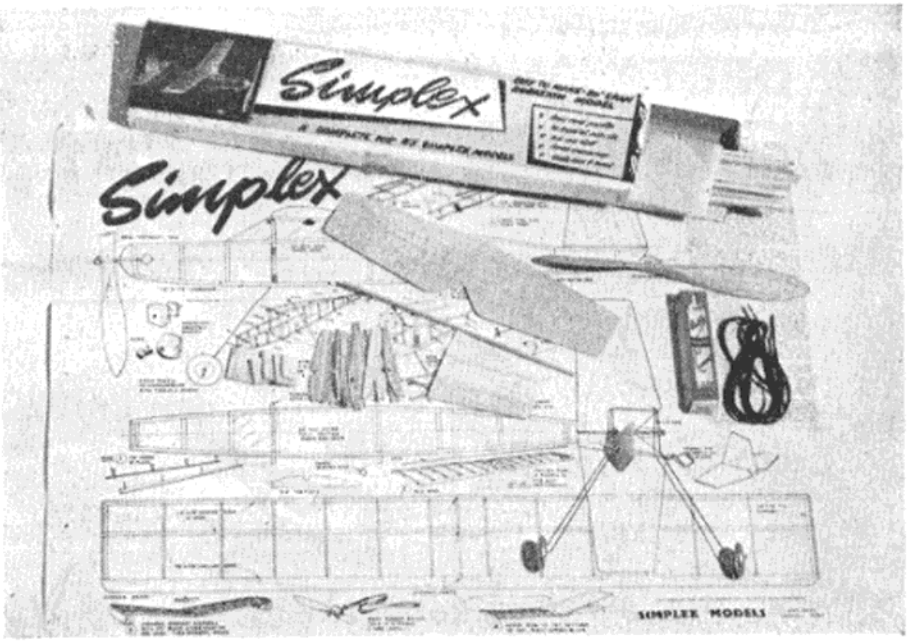


OVER THE COUNTER

KIT REVIEW

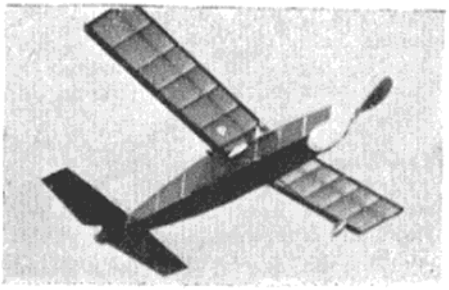
THE

SIMPLEX



THIS is a 20 in. span rubber duration kit with a difference —the main difference which shows up before opening the box being the price—7s. 6d. Judged against the numerous low-priced kits on the market, that seems a lot, but there is a very good reason for this extra cost which shows up in the contents.

Briefly, the *Simplex* is a straightforward, conventional cabin design which has been engineered along the simplest possible lines for a beginner. It still retains built-up construction for the fuselage and wings, but there are no awkward shapes or curves to form with the strip wood, and the wood sizes are generous enough for the roughest of handling. Straight away, though, parts of the model already begin to click into place—the set of ready-to-fit wing ribs (not a die-cut sheet), the sheet fin and tailplane ready shaped, the undercarriage bent and with the wheels already in place.



The nose assembly—usually one of the trickiest parts for the inexperienced builder—merely consists of boring a hole in the shaped plug and cementing on the finished noseblock (ready bushed), slipping on the shaft and propeller, and bending the front hook. The propeller is a first-class job of prefabricating—hand carved and sanded down completely finished.

Add to this the fact that you also get a rubber motor and a tube of cement and the higher price would appear more than justified. This, in fact, is a kit which even a beginner would find difficult *not* to complete and get flying properly. And with some experience in trimming, the *Simplex* has a most creditable performance for its size.

LETTERS . . . . . *Continued from page 44*

1956 World Power Champion Ron Draper admitted the change took him by surprise and went on to say:—

. . . Keen competition is the key to all development so why cut down the competition by 50 per cent. I can only hope that one of these days the F.A.I. will pass at least one rule that will really help modellers (wishful thinking !). Until then, I suppose we shall just have to grin and bear it.

Wakefield flier John O'Donnell forecasts a complete decline in his class of flying and states:—

. . . it is an act of utter folly. Anything more certain to reduce interest in World Championship events seems difficult to imagine.

The reason for the F.A.I.'s decision has been given as the cost of sending teams to four Championships annually. The most realistic attitude would appear to be for countries to support the events that they can afford instead of reducing the programme so that they can attend "everything."

Bob Amor, another A.2 team member, seems to suggest that modellers should make a stand when he writes:—

. . . my feeling towards the changes in the World Championships is one of disappointment.

I think the last thing to do is to sit back now and let this go through, because I think a lot of interest will be lost in these competitions once they get on a two-yearly basis.

Ray Monks sent us a lengthy letter stating his views and thought that:—

. . . for 1957 I should have thought that the S.M.A.E. could have run a combined Wakefield and Power event and Czechoslovakia the A/2 and speed.

Of course, we shall have to reconsider the importance of F.A.I. events in our domestic programme. In the past few years the S.M.A.E. contest programme has been built around the World Championship meetings. With A/2 contests being what they are at present, and speed a very specialised event in which very few entries are received, there seems very little to build around for 1957 !

Perhaps the answer is that we should give more attention to our own contest programme and devote less time to the F.A.I.'s latest rule change—or proposed rule change—or possible rule change—or . . . ?

Geof Lefever, 1956 Wakefield team member, says:—

. . . as I see it this change must create less interest in each class, coupled with a complete retardation of design progress. A modeller could not be expected to develop a series of models, completely unsuitable for ordinary contest work, to the new Wakefield specification or the newly proposed power rules, when he will only have the opportunity to compete once every two years.

Now for a word from the man who has flown in more Wakefield contests than anyone else in the world, Bob Copland:—

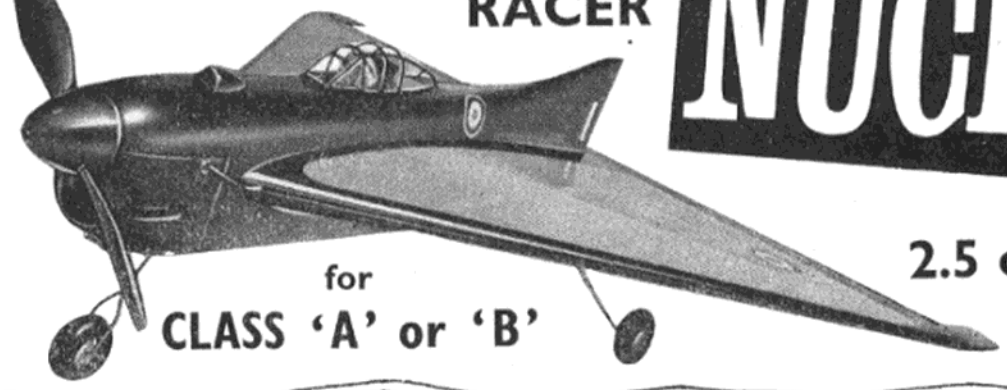
. . . I view with some dismay the decision to hold the Wakefield Trophy contest on alternate years.

Changes brought about by the F.A.I. in recent years have contributed largely to a very great reduction of interest in this contest. This is due to the fact that the Wakefield model is no longer the best type of model for "open" contests and few modellers will devote the time and study necessary to produce a model worthy of a place in an international team.

. . . if expense is the main object, a very worth-while change would be to reduce the number of competitors from each nation and still retain the events on a yearly basis.

DELTA WING TEAM RACER

NUCLEUS



for

CLASS 'A' or 'B'

2.5 c.c. — 5 c.c. Engines

designed by

W. P. WOODROW

NUCLEUS is the development of four models, and though primarily designed for Class A racing, owing to its large wing area it can quite easily be converted into a Class B job by modification of engine mounting only. The Class A version with an E.D. Racer and 8 × 6 Stant prop has regularly clocked 75 m.p.h., while the Class B version with an O.K. Hothead, has been timed at 95 m.p.h. The model is very stable and easy to fly, and it is an ideal trainer for the newcomer to C/L flying.

Wing

Make up the rear undercarriage from 16 S.W.G. wire and bind and cement to the ply mount. Cut out the centre section ribs, cutting the lead-out holes in the port rib only. Cement the undercarriage in place. Cut out formers W.1 to W.4 and cement into place, carefully checking that the assembly is square. Whilst the centre section is setting, make up the trailing edge and elevon from laminated sheet as shown on the plan, recessing both to take the silk or tape hinges. Fit the elevon horn, and when set, sand to shape.

Now cement to the front of the trailing edge the $\frac{3}{4} \times \frac{1}{8}$ in. rib support and then cement the assembly to the centre section, again ensuring that the whole assembly is square. Cement the centre section and leading edge into place, also the tips. Do not forget the tip weight in the starboard tip. Make up the leading edges from $\frac{1}{4}$ in. sheet and add the rib supports, then cement into place. Add the two spars either side. Now cement into place the strip ribs, making them from hard balsa. If soft or medium is used, they will buckle as the wing covering shrinks.

Drill the port leading edge to take the lead-out wires and cement the brass tubes into place. Drill, and cement the bellcrank mounting platform of $\frac{1}{8}$ in. ply between W.1 and W.2. Make up the control mechanism and fit into place, taking the extra precaution of soldering the two locknuts of the bellcrank pivot. Holding the elevon in the neutral position by bulldog clips at the tips, bend and fit the push rod to the horn, at the same time ensuring that the bellcrank is also in the neutral position. Check for freedom of movement and then bend the ends of the leadout wires to take the lines.

Now cover the centre section with $\frac{1}{16}$ in. sheet and cut a slot in the underside for the push rod. Sand the leading edge to shape and also the tips. Do not yet fit the wheels to the rear undercarriage.

Fuselage

Make up the two nose doublers. Cut the bearers to length and cement to the $\frac{1}{4} \times \frac{3}{8}$ in. strips. Drill the bearers to take the 6 B.A. screws, fit the screws, and lock by soldering wire across the slots. Now cement the bearer assembly to the doubler.

Cut out former F.1A from $\frac{1}{8}$ in. ply, make up the front undercarriage complete with wheel and cover, then bind and cement into place on F.1A. Make formers F.2, F.3 and F.3A and cement into place thus completing the nose doubler assembly. Cement tank into position.

If a Class B version is being built, do not fit F.2 but double the length of the tank. Cement into place the $\frac{1}{16}$ in. sheet doubler base. When the assembly has fully set, cement the assembly to the centre section. Cut out the two sides and cement into place, noting how the top sides come together at the rear to form the fin. Fill in with soft sheet as shown on the plan view. Cement into place the 3/32 in. sheet bottom and cut out the exhaust air port and fit baffle.

Now fit rear undercarriage wheels. Partially shape the $\frac{1}{2}$ in. sheet fuselage top and cut out the recess to take the pilot and dummy ejector seat. Cement neoprene tubing temporarily into place on the tank filler and vent, and fit the $\frac{1}{2}$ in. sheet into place. When set, remove the neoprene tube. Now make up nose block from soft block, recessing to fit over the bearers and flush with the engine mounting face of the bearers. Finally, sand the whole fuselage to shape, after suitably blanking off the tank.

Cowling

The cowling is made up by sandwiching the front block between $\frac{1}{4}$ in. sheet and a base of $\frac{1}{4}$ in. sheet. Before finally shaping, fit the two dowels and locate them in bearers. Place cowling into place and cement F.1 in position. Now sand to shape.

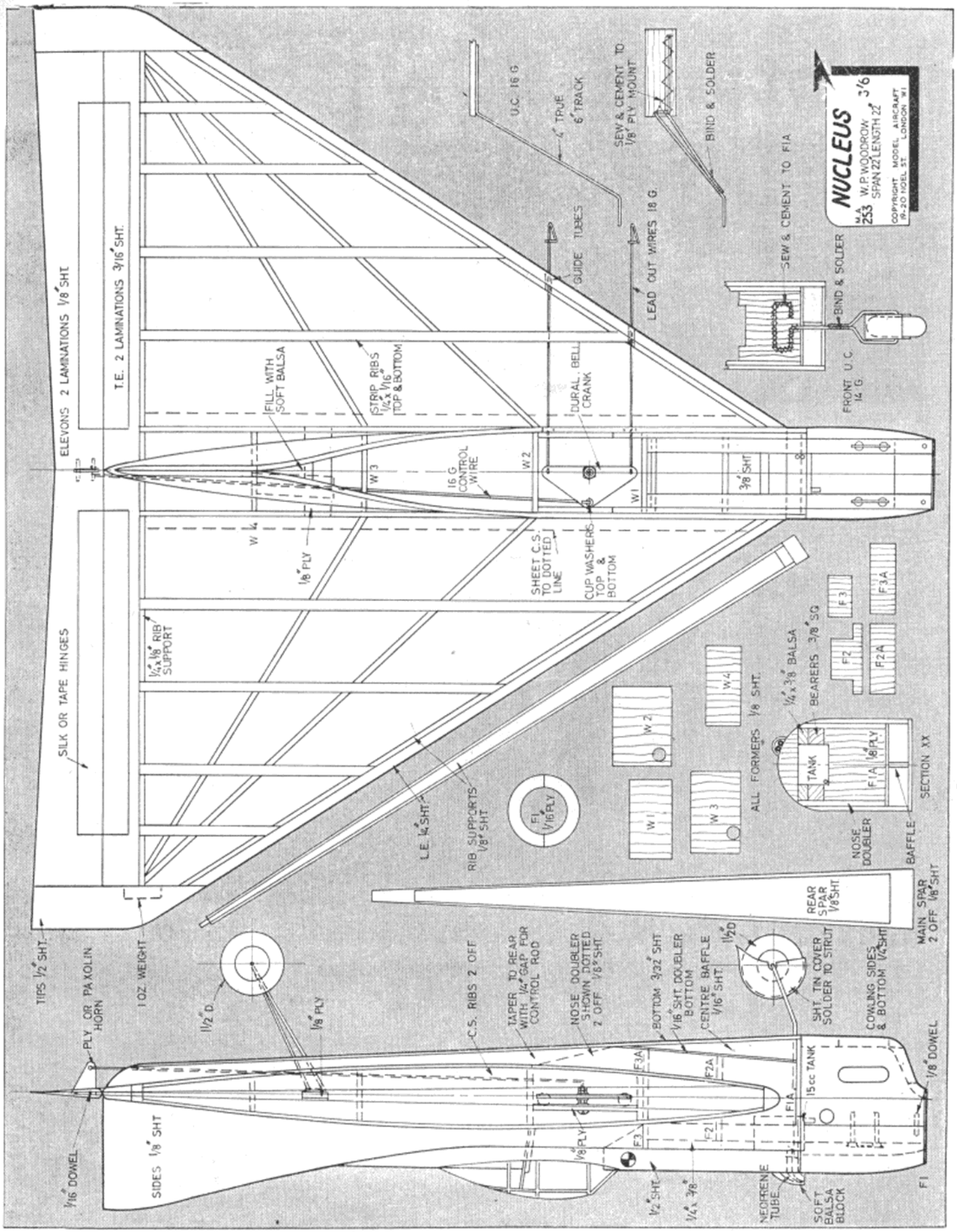
The cowling is held in position by the dowels and needle valve, this being done by soldering on the needle an extra knurled lug from an old valve. Fit the filler and vent fairing and the neoprene tube to the tank vent and filler.

Covering

Cover the complete model in lightweight Modelspan and give all sheeted parts of the model two coats of sealer ; then colour as required. Do not colour dope the wings but give them three coats of clear dope and, if required, a coat of Aerolac. Fuel proof the entire model, but before doing so, fit the pilot, canopy, R.A.F. roundels and paint in the ejection warning triangles in red.

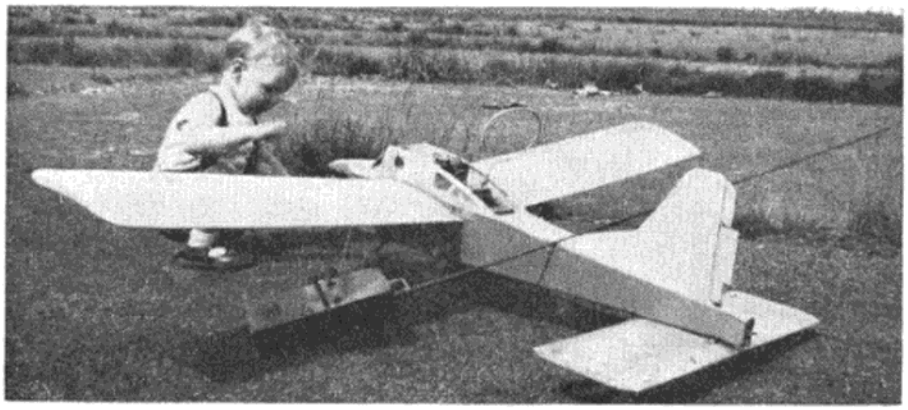
Flying

Nucleus flies the same as any other C/L model and has no peculiarities through being a delta. It will fly on lines of up to 65 ft. radius and has a very fast landing speed. An ordinary screw-on spinner was fitted to the original model, but later a supersonic was fitted which greatly improved the appearance. Note: The c.g. must be as indicated on plan, for on delta wing models of this nature it is critical.



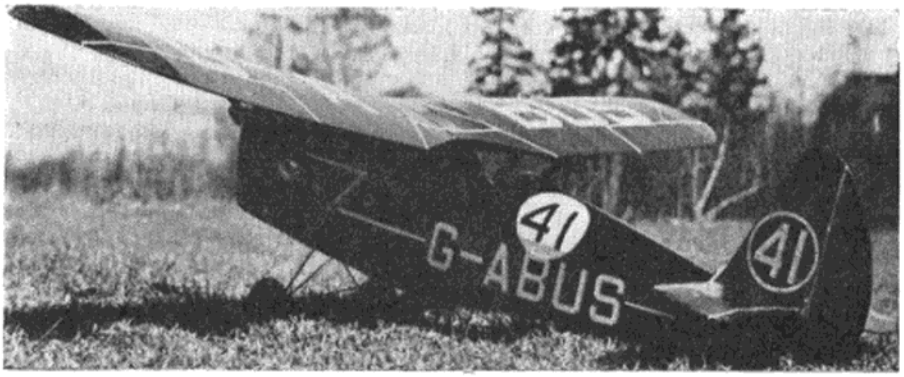
FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1, 3s. 6d., POST FREE

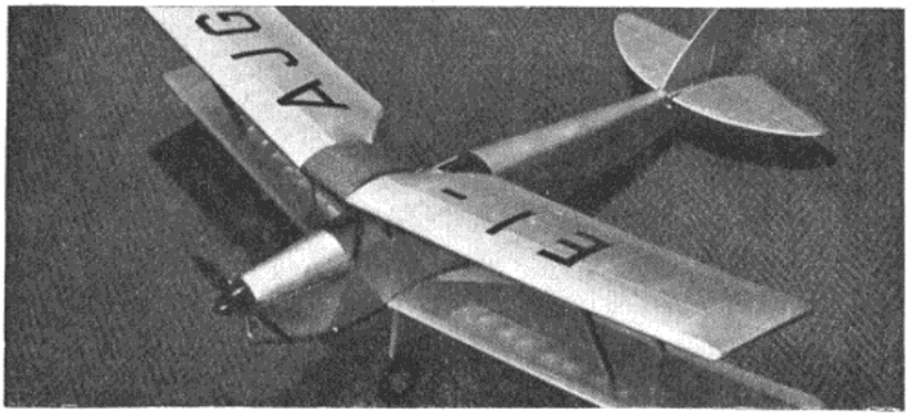
photonews——————————*brings you readers' pictures*



"Let's start her up and have a quick flight before the owner comes back," says David Scholes, son of North Lincs M.A.S. Secretary, Ted Scholes. Model is Eric Fearnley's R/C design, but where was Eric while all this was going on ?

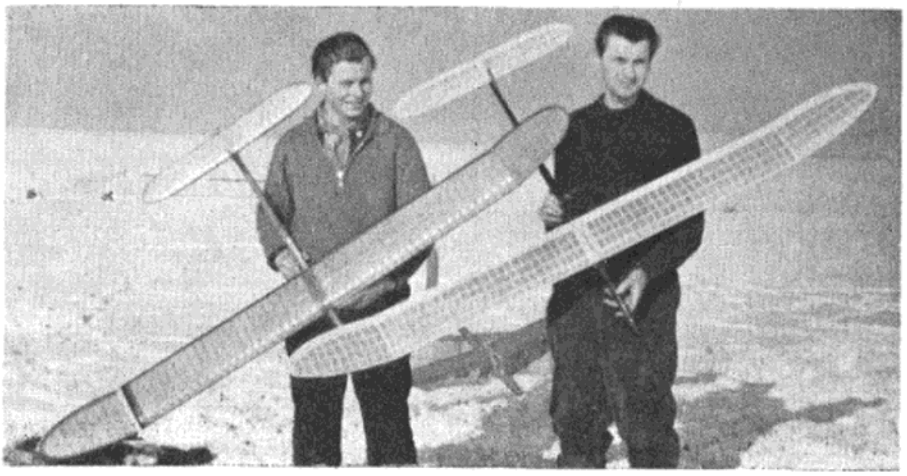
A Taifun Hobby 1 c.c. motor powers this scale F/F *Comper Swift*. Model is of 42 in. span, weighs 22 oz. and was designed and built by Chinese enthusiast Hoh Fang Chiun. Finish is black with white trim as per the well-known original hangered at Elstree.

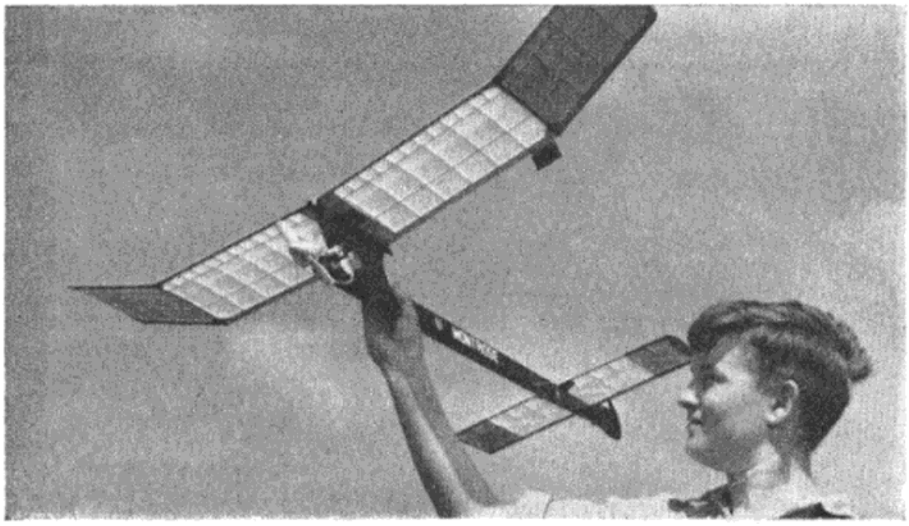




This model is, of course, a "Tiggie." Built from a Mercury kit, it is powered by a Mills 0.75 and the sprayed finish is silver with red tank and u/c. Owner G. Woodworth will add the final authentic details now that the model has been trimmed and tested.

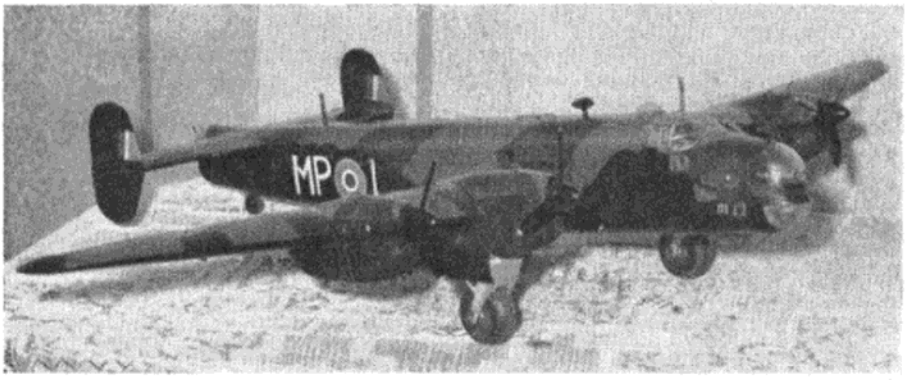
An average time of over 2½ min. is claimed for each of their models by Czech A/2 fliers Haropat and Cimbura. These times are vouched for by Radislav Cizek, who sent us the photo, which shows the snowbound conditions under which all the flights were made.





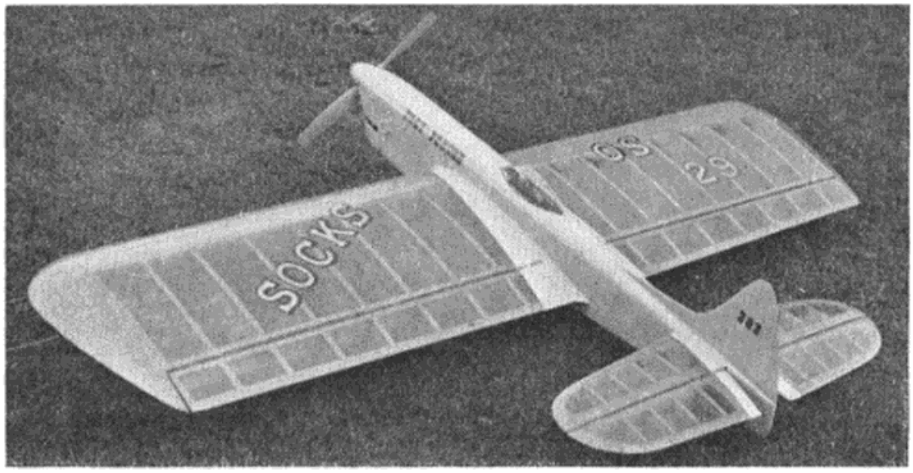
No prize for guessing which part of the country this is from. Model is K. B. Whyte's Allbon Merlin powered, power duration design. Apparently ease of construction is of prime importance as K.B.W. seems to lose more machines than anyone else. Junior W. Petrie is holding, and Ian McIntosh took the photo. In case you didn't guess, the club concerned is Montrose M.A.C.

If the finish wasn't so good we might have mistaken it for the real thing! B. Downham built this superb Sopwith *Camel* from "M.A." Plan 115, and the nylon covering and fibreglass cowling doubtless contribute a lot towards its all up weight of 3 lb.



More multis is a constant plea from readers, well here you are, a *Halifax* II designed and built by Maurice Booth, secretary of the Heanor M.A.C. E.D. Bees (4 off) provide the power, but we have no details of performance from photographer J. Brown.

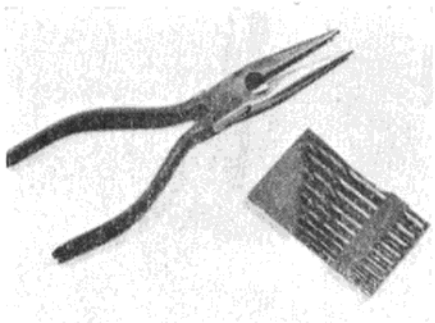
We regularly receive news and photos from Tony Farnan, of Melbourne, Australia, and his latest contribution is this shot of his Victoria State Stunt Championship winning design. Power is an O.S. Max 29, and the model is silk covered and has a wing span of 48 in.



MODELLING MADE EASY

"TOOLS? The only tool you need is a razor-blade." Most of us are apt to make this sort of reply when a layman asks us what tools are necessary for building a model aeroplane. And when one is building up a simple kit model, it is often perfectly true.

A lot of us started out with nothing more than a few old razor-blades and some pins and sandpaper, and perhaps it is because this is the time-honoured "standard equipment" that so many still struggle on after years of modelling



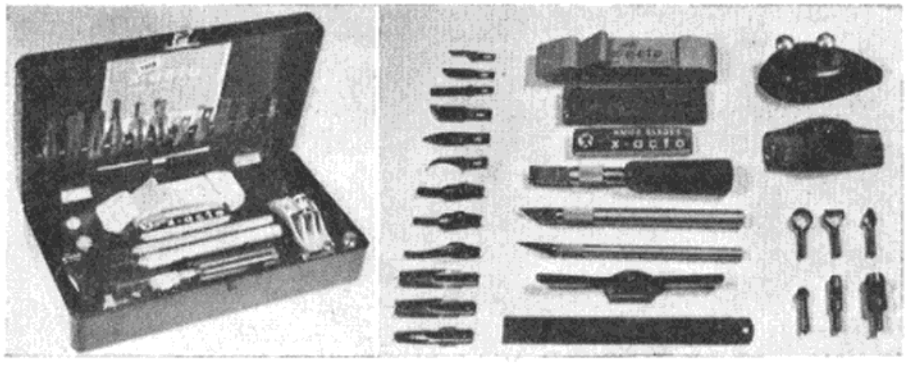
Two valuable additions to the tool kit at a cost of only 4s. 9d.; needle-nose pliers and a set of drills from Woolworths.

with a negligible tool kit. The average aeromodellist is surely unique among his fellow model builders and amateur craftsmen, in the scanty building aids he allows himself. Yet he thinks little of spending three or four pounds or more, every so often, on the latest thing in engines, plus many other smaller sums on various items which may be cast aside after a few months. In fact, it is only when one has sampled the use of some decent modelling tools that one begins to wonder how on earth one managed with the oddments previously tolerated.

A complete modelling kit need not be expensive and, in any case, can be bought piecemeal until one has all the most useful items. First on the list, obviously, are one or two modelling knives to supplement the ubiquitous razor-blade. We say supplement because there are still plenty of jobs which the razor-blade can do as well as any modelling knife. There is still no better tool than the steel-backed "Star" or "Ever-Ready" blade for trimming off balsa strips to length. How often, though, have you wanted to cut small radius curves in thin balsa sheet, or needed a narrow chisel-point to notch a rib or former? The answer, of course, is one of the many modelling knives now on the market, such as "X-acto," "Ragg," "Multicraft," etc.

The X-acto range, which is of American origin but manufactured in this country by Trix Ltd., is particularly impressive in the extremely wide variety of blades and tools available. Three sizes of tool handle are available and no less than 25 different blades, routers, gouges and punches, instantly interchangeable, can be used with them. We can think of no tools better suited to hollowing out block balsa parts than the X-acto routers and gouges. The chisel point blades and hollow punches, too, have numerous uses, particularly with sheet balsa and thin plywood.

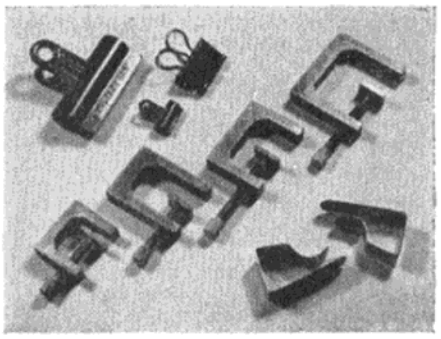
Not everyone will want to invest in the elaborate 87s. 6d. X-acto Burlington Hobby Chest at one fell swoop, but there is no reason why any equally complete kit should not be built up gradually. All the tools in the Burlington kit can be purchased separately. They include three handles and the complete range of knives and tools comprising ten different shapes and sizes of knife blades, plus $\frac{1}{4}$ and $\frac{1}{2}$ in. chisel blades, two cranked chisels, two V gouges, two U gouges, four routers, two hollow punches and one saw blade. Additional items include a balsa stripper, a small plane, a spoke-shave, a sanding-block and a six-inch steel rule.



The X-acto Burlington Hobby Chest; the contents can be purchased separately.

Mention of the balsa stripper recalls to mind many not too successful attempts at this in the past, but here is a stripper which, used properly, does work. It is particularly useful for cutting flat strips from sheet wood up to $\frac{1}{16}$ in., but can be used for $\frac{1}{8}$ or even $\frac{3}{16}$ in. balsa by making the cut from both sides. The miniature plane we have also found useful, especially for planing up trailing edge sections and trimming plywood.

A set of twist-drills of from $\frac{1}{16}$ in. to $\frac{3}{16}$ in. by 64ths is a tremendous help to the power modeller. Unfortunately, to buy standard h.s. or jobber's drills in all these sizes would cost in the region of 12s. and a particularly happy discovery, therefore, was the set currently available at branches of Messrs. Woolworth's and costing a mere 2s. 6d. complete in useful plastic holder. These are shorter than standard and one would scarcely expect them to be of top quality, but this is of small moment to the modeller who uses his drills mainly in wood and seldom in anything harder than aluminium.



Useful clips and clamps. Office clips, X-acto clamp set and Terry's drawing-board clips.

Another useful find from the same source, and something which every modeller needs, was a pair of excellent needle-nose pliers at 2s. 3d. Of Sheffield make, they also have a useful pair of cutting edges that will give good service if not abused with heavy gauge wire.

No one likes holding parts together while the cement dries and all too often we are tempted to let go before the cement has set. Rubber bands often come in useful here, of course, but where they cannot be employed, as well as for innumerable other jobs, it is very useful to have a selection of clamps and clips in one's kit. X-acto have an excellent set of four very robust cast aluminium clamps which will serve a score of different purposes.

For clamping small parts together during assembly, some office clips, obtainable quite cheaply at any stationer's and in various sizes, are worth having. Another type of clip is the Terry's drawing-board spring-clip which, costing only a few pence each, can be useful for exerting a firm, even pressure when making laminations or otherwise joining two flat surfaces. They are best used in conjunction with a table top or a piece of flat timber.

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

HALIFAX M.A.C.

Four members of the club were very lucky to be able to fly our section of the Flight and C.M.A. cups with our friends from York—at York. Lucky, because the fog was so dense locally that it is rumoured a number of Leeds-Bradford members disappeared into the mist at Baildon after 30 sec. and have not been seen since.

At York the fog obligingly lifted for a couple of hours allowing us to make our flights in almost dead air conditions. K. Grant did a two-minute overrun with his *Swiss Miss* and picked it up within a quarter-mile. That's how still it was. Our top scorer was J. B. Pool with 11.06 min. using his old lightweight-Wakefield.

Despite a postponement, our 100 sq. in. contest took place in weather which wrote off all but three entrants. Winner was J. B. Pool with a five-flight aggregate of 3 min. 16 sec. K. Grant was second and "unknown" B. Hepplewhite, from Bolton Brow Boys' School M.F.C., third.

The first of our winter film shows was badly attended, but the "few" now know "How an Aeroplane Flies" by courtesy of Shell-Mex and B.P.

DEBDENAIRS M.F.C.

Best news this month is that the club has obtained the use of a local cleaner's shop window, in a prominent position, for a display of models and photos with advertising material, which has increased membership.

One of the members supplied the framing for the background, which was covered with brown paper on to which were fixed large model plans. This proved quick and easy and gave the show a professional look.

We also hit the front page of the local Press with a good photo and verse!

Several new members were present recently, when the club constitution and rules were passed. Captain Scott's Antarctic motto *festina lente*, literally "make haste slowly," has been adopted. This is as good a motto as any for aeromodellers. Also, a transfer design is in hand.

LOUGHBOROUGH COLLEGE M.A.C.

We are holding a friendly rally on the 27th of January, for all types of models. All are invited to a good day's flying on our drome. Notify the hon. club secretary, D. R. Topham. Address, Loughborough College, Leics.

LEICESTER M.A.C.

This club is still very much alive and membership is now over 60. Our annual dinner was held recently and proved, once again, that our members still eat even if they do not sleep much. A number of "pots" were duly presented and J. Andrews was proclaimed club champion on maximum number of points obtained in all comps.

Our winter building comp. which is now a hardy annual is under way and this year's model is any power duration.

Winter meetings are now held every other Wednesday in Catherine St. Schools.

HAYES M.A.C.

A knock-out competition is held in the London area each year for the London District Inter-Club Challenge Cup. The final was held at Chobham Common recently, between St. Albans and Hayes.

L.D.I.C.C. FINAL

Top left: Back lighting from the setting sun gives dramatic effect to this shot of Pete Hedgeman, as he winds for his final rubber flight. Lower left: The winning Hayes team—Pete Hedgeman, Eric Welbourne, and John Thompson. Below: A St. Albans team member launches their glider entry.

Conditions were ideal with weak ground lift and moderate wind speed. Hayes started early and the score began to mount. They maintained their lead and it seemed that they were all set to win, barring accidents—then came the accident. John Thompson, flying power for Hayes, had his model cut in half by the new power wire and had to fly his spare. B. Cox, flying power for St. Albans, also had trouble and was unfortunately unable to complete his last flight. The rubber and glider men of both sides completed their flights without a hitch, the slightly larger models from Hayes having the edge over their opponents on performance.

After an enjoyable day's flying the score was 28 : 45 to 20 : 58, a win for Hayes by 7 : 47 (St. Albans being one flight short).

ST. ALBANS M.A.C.

The efforts of the St. Albans contest men have paid off well for 1956; recent successes being: second place for Brian Cox in the Frog Senior and Bruce Rowe's three max's and 5 min. 13 sec. in the fly-off for the Flight Cup in almost perfect conditions. He flew his Queen's Cup Wakefield winner plus an extra ounce of rubber to give it an old rule! 53! type of climb.

A very lucky progression to the final of the L.D.I.C.C.C. brought us up against Hayes M.A.C. Our run of good fortune in this contest failed to continue, though their power man endeavoured to give us a sporting chance by planting his model on top of one of the dreaded Chobham pylons! But we considered that this was a rather unfair advantage to us, so Brian Cox proceeded to send his model up for a test flight whereupon it alighted safely in the Chobham undergrowth, only to have the D/T fuse set light to his tailplane. The final outcome of the contest resulted in a well-earned win for Hayes by 7 min.

Leading in the club points for both junior and senior championship is our very active junior Paul Finn. This state of affairs where the juniors give the seniors a good run for their money is likely to end up with the juniors giving instruction to the seniors—a very simple solution to the junior question.

NORWICH M.A.C.

With the advent of the dark winter evenings, our members have turned to Jetex R.T.P. flying as being the warmest branch of aeromodelling! After two or three evenings' flying at the club-room, the record now stands at 42 m.p.h. with a Jetex 50 powered model.

A new acquisition of the club is one of those supreme rarities, an aeromodelling female! This probably explains the fact that 20 new male modellers joined the club in a month!

Outdoor flying has been confined to the local parks, due to St. Faith's aerodrome not being available.

WOLVES M.A.C.

A car load of members travelled to Highgate common for the Frog Senior Cup. J. Barrett had bad luck when his model D/T'd into a dense wood after his second maximum. In spite of a thorough search the model was not found for a third flight. A club combat comp. to the new S.M.A.E. rules was recently held. Big surprise was when one of the F/F boys, on his first attempt at two-in-a-circle flying, got through three heats before being beaten in the final by R. Sills.

N.W. AREA

Chester was the social rendezvous for the A.G.M. and dinner. At 2.30 p.m. the annual general meeting and elections began; chairman Frank Nixon remained in his present position in company with secretary Roy Musgrove, competition secretary Joe Chadwick, and area delegate Don Salloway. A vote of thanks was made to Don Fletcher for his work as P.R.O.; the new P.R.O. is now John Harvey.

News of the 1957 world championships for speed and A/2 only was greeted with mixed feelings of relief and disgust. That current bogy petrol rationing was blamed for dropping F.A.I. power; members present felt that interest in F.A.I. power will die right out, especially with the increased wing loading. Least said about Wakefield the better! One advantage will be that we can switch the wing bands and the rubber motor for the second flight under the new rules. John O'Donnell was overheard to be discussing F.A.I. speed models.

At 7 p.m. the dinner was held, followed by the speeches and the prizegiving. The area glider, rubber and overall championships went to

" Old Fred's a good all rounder ! "

John O'Donnell. D. W. Jackson, of Ashton, was the area power champion.

A novel team race between Ashton, Wallasey, Chester, Cheadle, Timperley and Whitefield, was held which Whitefield did not win ! Teams had to tear round the room when their number was called out ; e.g. " E.D. Racer," when Nos. 2, 4 and 6 disappeared into a whirl of humanity—most confusing !

TYNEMOUTH M.A.C.

After a pleasant contest and display season the members are thinking about new designs for next season (we never use plans). However, the topic of the moment is how to do 45 laps at 85 m.p.h., and we aren't losing a moment in the process.

At the Darlington rally, our over-anxious mechanic was only filling the tank half-full, and even though *Crescendo* was lapping at 86 m.p.h. we didn't make our heat ! The only Tynemouth winner at the event was T. Stoker in the combat.

Our chief E.D. 246 fixer, Bill Polwarth, is due for National Service so there won't be any more spinners " made to measure."

Tom (D.H.110) Stoker is planning to build an even larger version of the D.H.110 for the " Gold " this year.

CHANGE OF ADDRESS

HALIFAX M.A.C. K. Attiwell, 118, Cousin Lane, Illingworth, Halifax.

Taken at the Novocastria M.A.S. Social and Prizegiving, our photo shows S/Ldr. James Rush, A.F.C., who holds the magnificent James Rush Trophy presented for award at the forthcoming Novocastria Gala, and left to right W. Mann (team race trophy), A. Cordes (best all rounder), G. Cordes (rubber champion), J. Younger (scramble winner, with " Cockle Shield "), T. Christer (power champion with Lutman Trophy), and Des Anderson (best prang of year, Order of the Wooden Spoon!)

BRITISH NATIONAL MODEL AIRCRAFT RECORDS

as at November 30th, 1956

RUBBER DRIVEN

Monoplane :	BOXALL, F. H.	(Brighton)	15/5/1949	35 : 00
Biplane :	YOUNG, J. O.	(Harrow)	9/6/1940	31 : 05
Wakefield :	BOXALL, F. H.	(Brighton)	15/5/1949	35 : 00
Canard :	HARRISON, G. H.	(Hull Pegasus)	23/3/1952	6 : 12
Scale :	MARCUS, N. G.	(Croydon)	18/8/1946	5 : 22
Tailless :	WOOLLS, G. A. T.	(Bristol & West)	25/9/1955	4 : 56
Helicopter :	TANGNEY, J. F.	(Croydon & U.S.A.)	2/7/1950	2 : 44
Rotorplane :	CROW, S. R.	(Blackheath)	23/3/1936	0 : 40
Floatplane :	PARHAM, R. T.	(Worcester)	27/7/1947	8 : 55
Ornithopter :	WHITE, J. S.	(Barking)	20/6/1954	1 : 55
Flying Boat :	PARKER, R. A.	(Kentish Nomads)	24/8/1952	1 : 05

SAILPLANE

Tow Launch :	ALLSOP, J.	(St. Albans)	11/4/1954	90 : 30
Hand Launch :	CAMPBELL-KELLY, G.	(Sutton Coldfield)	29/7/1951	24 : 30
Tailless T.L. :	LUCAS, I. C.	(Port Talbot)	21/8/1950	22 : 34
Tailless H.L. :	WILDE, H. F.	(Chester)	4/9/1949	3 : 17
A/2 T.L. :	ALLSOP, J.	(St. Albans)	11/4/1954	90 : 30
A/2 H.L. :	CAMPBELL-KELLY, G.	(Sutton Coldfield)	29/7/1951	24 : 30
Radio/Cont. H.L. :	COPLAND/YOUNG	(N. Heights M.F.C.)	21/10/1956	51 : 29

POWER DRIVEN

Class A :	SPRINGHAM, H. E.	(Saffron Walden)	12/6/1949	25 : 01
Class B :	DALLAWAY, W. E.	(Birmingham)	17/4/1949	20 : 28
Class C :	GASTER, M.	(C/Member)	15/7/1951	10 : 44
Tailless :	FISHER, O. F. W.	(I.R.C.M.S.)	21/3/1954	4 : 12
Scale :	TINKER, W. T.	(Ewell)	1/1/1950	1 : 37
Floatplane :	LUCAS, I. C.	(Brighton)	11/10/1953	4 : 58
Flying Boat :	GREGORY, N.	(Harrow)	18/10/1947	2 : 09
Radio Control :	O'HEFFERNAN, H. L.	(Salcombe)	7/10/1954	151 : 20
Class I Speed :	BASSETT, O. M. J.	(Sidcup)	16/9/1956	88.4 m.p.h.*
Class II ,, :	GIBBS, R.	(East London)	18/12/1955	129.3 m.p.h.
Class III ,, :	HALL, J. F.	(Chingford)	20/9/1953	114.7 m.p.h.
Class IV ,, :	GIBBS, R.	(East London)	25/9/1955	146.2 m.p.h.
Class V ,, :	HALL, J. F.	(Chingford)	16/9/1956	131.5 m.p.h.
Class VI ,, :	GIBBS, R.	(East London)	15/7/1956	159.7 m.p.h.
Class VII Jet :	STOVOLD, R. V.	(Guildford)	25/9/1949	133.3 m.p.h.

LIGHTWEIGHT—RUBBER DRIVEN

Monoplane :	WIGGINS, E. E.	(Leamington)	11/7/1954	40 : 13
Biplane :	O'DONNELL, J.	(Whitefield)	18/5/1952	6 : 46
Canard :	LAKE, R. T.	(Surbiton)	7/4/1952	7 : 32
Scale :	WOOLLS, G. A. T.	(Bristol & West)	26/6/1955	1 : 22
Floatplane :	TAYLOR, P. T.	(Croydon)	24/8/1952	5 : 15
Flying Boat :	RAINER, M.	(North Kent)	28/6/1947	1 : 09

LIGHTWEIGHT—SAILPLANE

Tow Launch :	GREEN, D.	(Oakington)	11/4/1954	36 : 02
Hand Launch :	REDFERN, S.	(Chester)	11/7/1954	11 : 15
Tailless T.L. :	COULING, N. F.	(Sevenoaks)	3/6/1951	22 : 22
Tailless H. L. :	WILDE, H. F.	(Chester)	11/7/1954	9 : 51
Canard T.L. :	CAPLE, G.	(R.A.F. M.A.A.)	7/9/1952	22 : 11

LIGHTWEIGHT—POWER DRIVEN

Class A :	ARCHER, W.	(Cheadle)	2/7/1950	31 : 05
Class B :	JAYS, V.	(C/Member)	23/9/1956	5 : 23
Class C :	WARD, R. A.	(Croydon)	25/6/1950	5 : 33
Tailless :	FISHER, O. F. W.	(I.R.C.M.S.)	27/7/1954	3 : 02
Floatplane :	MUSSELL, A.	(Brighton)	11/10/1953	2 : 53

INDOOR

Stick, H.L. :	READ, P.	(Birmingham)	10/10/1954	23 : 58
Stick, R.O.G. :	MONKS, R.	(Birmingham)	12/9/1954	20 : 30
Fuselage H.L. :	PARHAM, R. T.	(Worcester)	12/9/1954	13 : 16
Fuselage R.O.G. :	PARHAM, R. T.	(Worcester)	12/9/1954	12 : 10
Tailless H.L. :	MONKS, R.	(Birmingham)	12/9/1954	4 : 13
Tailless R.O.G. :	POOLE, D.	(Birmingham)	29/6/1956	3 : 31
Ornithopter :	POOLE, D.	(Birmingham)	2/11/1956	1 : 39*
Helicopter :	MONKS, R.	(Birmingham)	19/11/1954	5 : 01
Rotorplane :	POOLE, D.	(Birmingham)	8/5/1955	1 : 26
R.T.P. Class A :	READ, P.	(Birmingham)	16/11/1956	7 : 27
R.T.P. Class B :	PARHAM, R. T.	(Worcester)	20/3/1948	4 : 26
R.T.P. Speed :	TAYLOR, R. L. S.	(Brixton)	16/10/1956	45.1 m.p.h.

(*Ratification pending)

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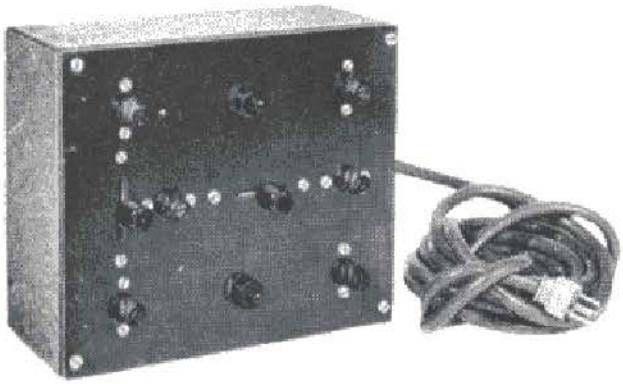

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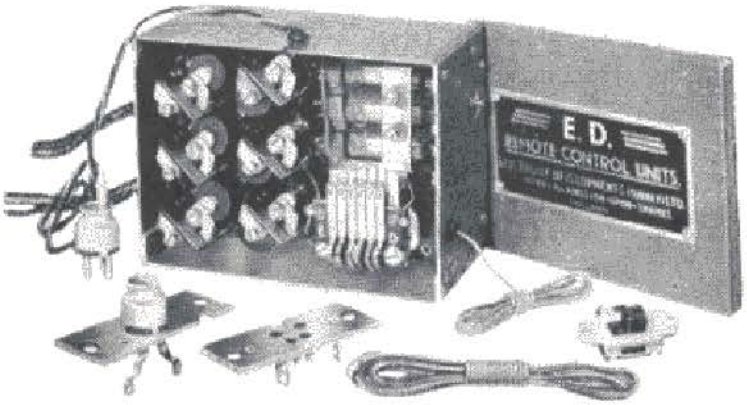

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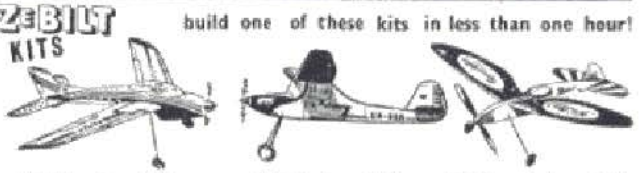

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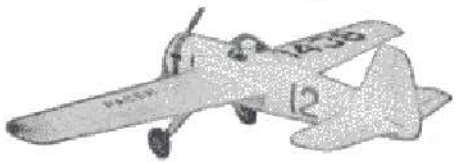

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