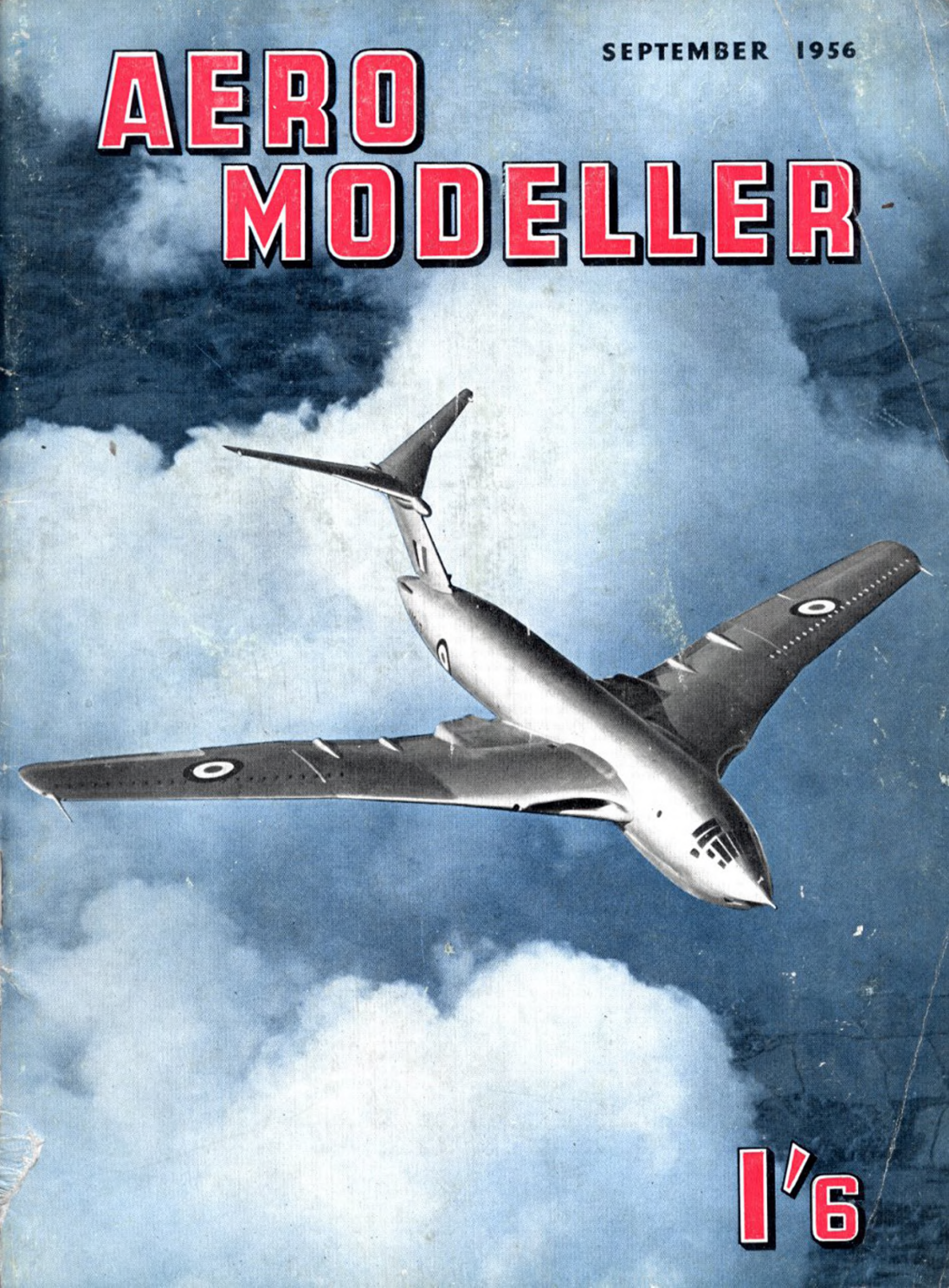
SEPTEMBER 1956

AERO MODELLER



1'6

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and the RIGHT engine no matter what your brand of modelling is undoubtedly the Allbon Sabre. Superbly finished internally as well as externally, it is ideal for free-flight, control-line and the smaller radio control model. Easy starting, power and flexibility are its main virtues, and refinements such as the positive action angled needle valve, will convince you that here is real value for money.

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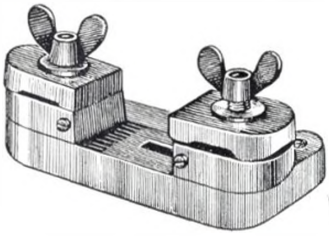
...the RIGHT Fuel

can be none other than Allbon Ready Mixed diesel fuel which contains the finest ingredients and special additatives which promote easy starting, more revs, and ensure that your Sabre will last a modelling lifetime. Tank up with a bottle at your local model shop and note the sparkling increased performance.

...and an Allbon TEST STAND



This will fit your Sabre and most other engines up to 5 c.c., thanks to adjustable slide clips which include adjustable bolts for radial mounting. It is a "must" for every modellers' workshop, and is available in quality cast aluminium at **12/11** including P. Tax.

See our full range of spares and accessories at your Local Model Shop or in case of difficulty send 6d. to the manufacturers for their latest catalogue and price list.

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Well done 'Veron'! says Mr. Willey

The following extracts are taken from a letter we have received from Mr. R. K. Willey, Ringwold Lodge, Middle Wallop, Wiltshire.

(Left) Mr Willey with his model "CARDINAL" described in this success story. It was flown virtually "straight off the drawing board".

DISTANCE A to B approx. 4 miles. FLIGHT 22 mins. O.O.S. Plane returned one week later and flown immediately—none the worse for its week out!

Dear Sirs,

I feel I must write to you about your kit of the "CARDINAL".

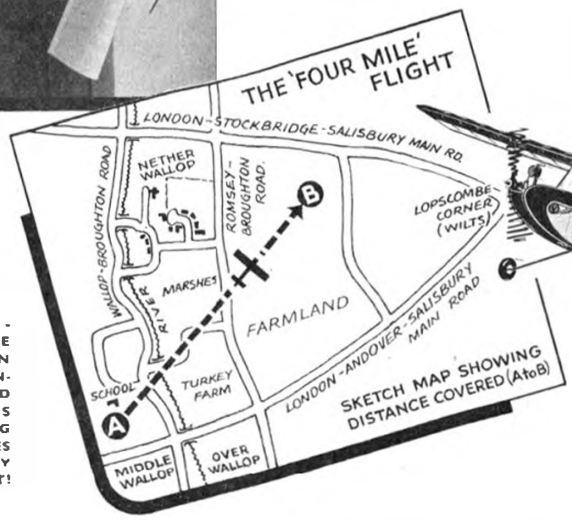
The model was airborne for 22 minutes before disappearing from view.

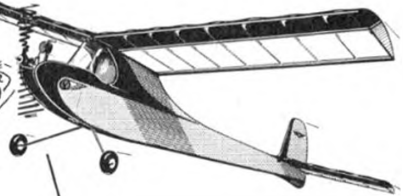
It was returned one week later after being found four miles away. This model was again flown many times after its weeks absence—still turning in 6-8 minute flights.

I do not think any praise is too high for this model and I would like to say, well done!—and lets have many more like them.

Yours sincerely,
R. K. WILLEY.

Mr. Willey who is Treasurer of the Wallop Model Aero Club, has described the "CARDINAL" as a really good looking, high performance model which in his opinion is an outright winner in the 1 c.c. F/F class.





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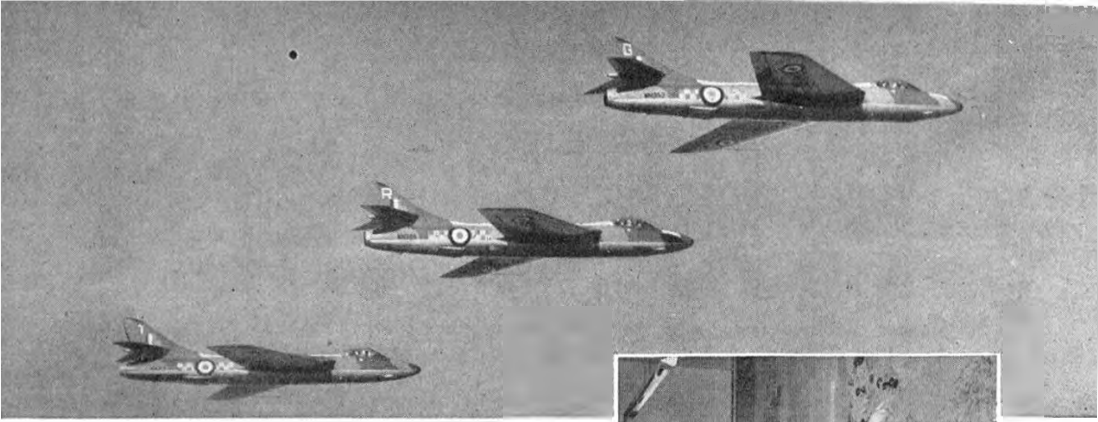
Heirs of 'the few'

Still young, they are already proved leaders of men, already shouldering great responsibilities, already confident of a satisfying future. For the exhilaration of flight is but one aspect of a career intensely interesting and of infinite variety.



Hunter F.2 fighters (Armstrong Siddeley turbo-jets) in echelon formation.

YOUNG MEN may long for a life of action and adventure. But they have also to plan a lasting career. In the Royal Air Force today both these needs are fulfilled: linked with ample opportunities of building a satisfying future there is the exhilaration of flying some of the world's most exciting aircraft. And more can now fly, with the new appointment of air electronics officers, highly skilled men who are trained to be responsible for all the electronic devices in the new V-bombers.

Flying plus

The adventure of flight is only one of the challenges you must master in the R.A.F. Consider the responsibilities of leadership, as important on the ground as in the air. You could be a Group Captain while in your early forties, flying regularly—and responsible for several squadrons of aircraft, perhaps 1,500 men.

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Off duty, life is just as full. Opportunities for sport are unrivalled. From football to ski-ing, yachting and athletics . . . everything comes within your reach. And an officers' mess has all the added amenities of a really good club.

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You can join the R.A.F. through the Direct Commission Scheme, confident of a permanent career right up to pension age. Or you can choose a twelve-year engagement, with the option of leaving after eight. If you leave after 12 years you take back to civilian life a tax-free gratuity of £4,000! And whichever you choose the pay is good. At the new rates, a Flight Lieutenant of 25 for instance, can draw, with full allowances, about £1,500 a year.

Per ardua ad astra

It is not easy to qualify for a place in the R.A.F., but its rewards are great and lasting. If you are between 17½ and 26 and absolutely fit, educated at least to General Certificate of Education or Scottish Leaving Certificate or equivalent standards, write for details of the schemes of entry to the Air Ministry (AM.315), Adastral House, London, W.C.1. Give date of birth and educational qualifications.

The Royal Air Force
Flying . . . and a career

RESPONSIBILITY. To fly a complex modern aircraft, perhaps half-way round the world, calls for those qualities of enthusiasm, self-reliance and careful skill for which aircrew are specially chosen.

AND RELAXATION. The sporting and social life that revolves round an officers' mess presents unusual opportunities and wide variety. Fencing is popular. It is quick, skilful and asks for concentration. It demands give and take. It could have been made for the R.A.F.

AERO MODELLER

"Covers the world of Aeromodelling"

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Managing Editor - - - C. S. RUSHBROOKE
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Special features

★

Regular features

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The World Power Championships

BY THE TIME this editorial is read teams from sixteen different nations will have fought a keenly contested-battle for the World Power Championships.

Writing in advance of the event and with such a galaxy of international aeromodelling stars assembled for one contest, we would be foolish indeed to forecast results. Sufficient to say how fortunate we are in being able to witness the first World Championship meeting held in this country in which entrants from both the East and the West are participating.

What a pity it is that America only sent models to be proxy flown and that the expected Russian entrants were unable to attend at the last moment. An original telegram received by the S.M.A.E. stated that a full Russian team would be attending and that the names were to be confirmed at a later date. This was followed by a telegram a few days before the event stating that the President of the Russian Aero Club regretted that the team was unable to attend "owing to commitments at National Contests".

However, our Czechoslovakian friends, who enter a full team, will have no difficulty in upholding the sporting capabilities of Eastern Europe, to judge by the performance they have put up at the Soviet Internationals these last two or three years. We can also view with satisfaction the excellent job aeromodelling is doing in bringing together the East and the West. In aeromodelling we have a common interest and the free interchange of ideas from National Aero Club level down to individual correspondence can do nothing but good.

Who wins this World Power Championship is of relative unimportance compared with the success of the meeting as a whole. Good flying, good weather and, above all, good sportsmanship are the main essentials of any successful competition. The first we can be assured of; the second we cannot guarantee with the vagaries of the British climate; the third, and by far the most important, lies in the hands of every competitor, of every team manager and of every official connected with the contest.

We are confident that on such an unique occasion none will be found lacking.

On the cover . . .

The production version of the Handley Page Victor is a familiar sight over the AEROMODELLER Editorial Offices during the daily flight tests of the aircraft as they roll off the production line at nearby Radlett Airfield. In this fine study by Charles E. Brown, the Victor is shown in its new form with altered fin and Vortex generators on the upper surfaces of the crescent wing.

Cut to shape

Quite the most novel set of Hangar Doors we have ever seen are those specially made for the Ellehammer monoplane depicted above. It was flown by the intrepid builder who is standing by the bullet shape engine fairing, and is being restrained from lifting away by the two equally well-bearded mechanics at the wing tips. The Ellehammer may well have been the earliest application of the shrouded or ducted propeller. More details of this remarkable Danish pioneer's work, and a drawing of his first successful aircraft are given on pages 490/1 of this issue.

The retrievers !

Response to our editorial request for amusing or outstanding retrieving stories was by no means terrific, so we can only assume that most of our home readers do not mind paying for their AEROMODELLER in view of the subscription offered as a prize. It was from abroad that the best yarns came and three of them are well worth the telling.

From Lieut. Thomas Stedman in Alabama, U.S.A., comes a tale of Korea where he was stationed as a helicopter pilot in 1954. As an off duty diversion he built a ½A sport model which gave 8-minute flights on a full tank. The inevitable fly-away occurred and the model could not be found that evening. The next morning he was briefed for a helicopter operation and was determined to keep an eye open for the missing ½A model. Oddly enough he spotted it between a road and a minefield, and to the amazement of a non-modelling passenger put his Bell H-13 down in the road and solemnly retrieved his "toy". The model is still in Korea, hanging from a dayroom ceiling and at the moment Lieut. Stedman is using the engine for a scale 1912 Blackburn Monoplane.

Brian Partridge, who hails from Johannesburg, South Africa, provides the next story. Brian was testing his Torp 29 powered Sandy Hogan at Hunters Farm flying field using a timer tank when motor went sick causing a long run and quite a high climb. Drift was in the direction of a large swamp with seven foot high reeds, and due to poor visibility in the evening light a search had to be left until the following morning. Two hours' search the following day with the assistance of Henry Heydenrych the S.A. speed champion proved fruitless, so Brian asked Bill Teague a modelling pal who was a member of the local lightplane club to fly over the swamp and locate the model.

Having briefed both Bill and Henry at the local 'drome, Brian returned to the area by car, waded into the swamp on foot when observing of the Tiger Moth. The aircraft made one run across the swamp without success; and on the next Brian was so intent on watching the machine so as not to miss the wing-waggle which would indicate a find, that he fell over something. You guessed it! The model ! !

The third recovery story comes from Stan Hill, well-known power flier from Santa Barbara, California, who was a member of the 1955 American Power team. Stan says that he and the local club boys converted a control line flier to radio control and sure enough the first flight of his first R/C ship resulted in a flyaway into the ocean about half a mile from shore.

Two days later and about 15 miles up the coast a friend of the fliers was shooting at sea birds (illegally) and saw a red "something" with two wheels in the air through the telescopic sight of his rifle. His first thought was "Oh, boy! An army target drone with one of those beautiful twin cylinder engines!" There began a *ten hour* expedition that involved going back to town for a boat; returning and lowering the boat down the cliff by rope to the beach, getting swamped by a wave in launching; and half an hour's extensive rowing out to the plane.

When he got there and saw it was only a model he was firstly shattered with disappointment and secondly filled with exasperated rage. Only a name plate indicating ownership by a friend prevented him smashing it with an oar and returning it to the deep! (Shows the advantages of putting your name and address on.—ED.)

Needless to say, it was returned to the grateful owner; the only damage was to the batteries, the receiver being completely dry. As Stan Hill says, "I guess some people just live right!"

Well they were our best stories and earn the senders a free year's subscription. Before leaving

the subject of retrieving, we heard a rumour that local residents in a certain area were extremely puzzled at the large number of trees sprouting six-inch nails. They apparently did not realise that these and a large hammer are standard equipment of a well-known contest flier in the district! Same bloke also carries an efficient-looking chain saw, which he says stows neatly in the average model box. Timber!

It's not only the models that get lost, either. A well-known club in Bedfordshire have a notorious character who spends his entire modelling life out of sight down wind. Nobody minds this, but they do get a little tired waiting in the club coach after the meeting until long after dark. Life has its compensations, however, as the flier fell in a bog during a recent recovery session. Most of the club felt this was a very appropriate place!

Dee-tee's for parachutes ?

Those who attend the Rallies at Radlett and Halton will be familiar with Eric Pritchard's 5-ft. cabin model which releases a stick of four most realistic parachutists when circulating at about 250-ft. altitude. Each 'chute is made of nylon, measuring 30 in. across, weighted with a 2¼-oz. miniature airman, and it is customary for the descent of the escaping crew to take about 30 seconds.

Imagine the concern, therefore, of owner Eric and his recovery team when number three of the stick appeared to go *up* at Northern Heights Gala while the rest of the quartet made a tardy if normal return to mother earth. A chase began, watched by the envious eyes of those who had failed to find a single thermal all day with their duration models. Soon it became evident that the retrievers were waging a losing battle, and wayward crew member eventually disappeared from view into the cloud base, one mile from the airfield. The question now arises—is this the first out of sight "flight" by a free parachute?

Russia to run International R/C contest

One of the East European correspondents states that the Soviet International free flight contest between Eastern states will not be held next year. It is, our correspondent reports, being replaced by a new competition exclusively for radio models which will be held in 1957 in Moscow. All States of the Eastern bloc were advised to send representatives to the F.A.I. World Championship and also some of the European International events which they seem to be doing to judge by the Czechoslovakian entries at Cranfield.

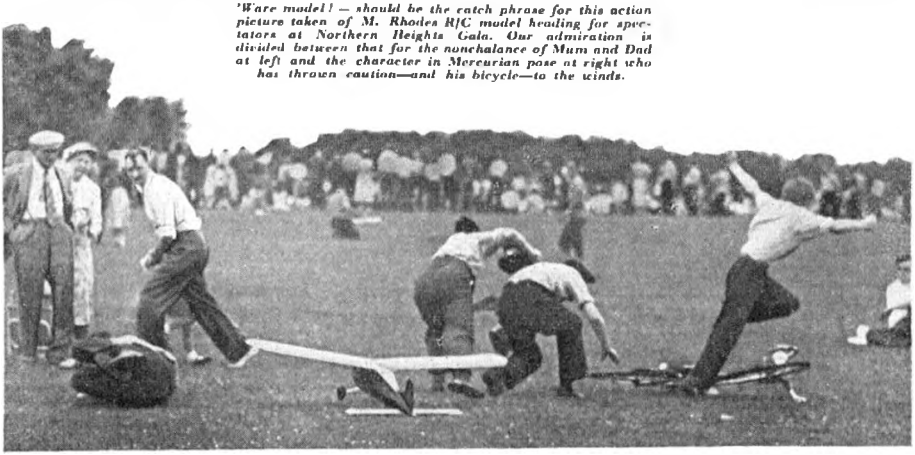
Take heed!

An Oakland woman filed suit for $20,000 damages in a Californian Superior Court during June, because of injuries assertedly received when a 61-inch model weighing 2½ lb. crashed into her face at a meeting near Sacramento. She accuses the clubs concerned of negligence in not providing a safe place for spectators. Moral of this news story is too obvious to explain, and the photo reproduced below serves to emphasise the ever-present hazards of model flying in crowded areas.

Photo service

After a lapse of some years, we are pleased to announce that reprints of photographs appearing in "AEROMODELLER" are available through our newly installed photographic service. The majority of the illustrations appearing in this magazine are from our own negatives: especially those taken at principal model events, so if you want a copy for your album, send 2s. 0d. for a 6 in. x 4 in. glossy print.

'Ware model! — should be the catch phrase for this action picture taken of M. Rhodes R/C model heading for spectators at Northern Heights Gala. Our admiration is divided between that for the nonchalance of Mum and Dad at left and the character in Mercurian pose at right who has thrown caution—and his bicycle—to the winds.



Scytale

Designed by
R. A. CHIVRALL

Something for the connoisseurs—a real beauty of a model, 6ft. 6in. span and designed for 5cc. sport flying or radio control

BEING ONE OF the scale fraternity, and with an eye to radio control, Mr. Chivrall cast round for a suitable design to provide a model capable of carrying a reed unit for experiments.

The best scale designs having been well "flogged" he decided on impulse, to design a "scale" model of his own design. This impulse grew as the model progressed, to an urge to make as neat a model as possible, and one which would be worth repairing. Ample room was allowed in the cabin for radio gear, and a 5 c.c. engine was reckoned to give enough power. Windows being what they are, provision was made for replacing them individually, and the undercarriage made detachable for adjustments on the prototype.

This is no model for the beginner: but one that the experienced sport flier can really get his teeth into. As a foretaste of the methods of construction, brief building notes follow: but for clarity, stencilling has been omitted from the reproductions opposite.

Building.—Cement three sheets of $\frac{3}{32}$ in. balsa together edgewise and cut diagonally across corners of middle sheet to form two panels. Add extra sheet to ends to make up length at the tail, and shape to fuselage outline. Splice $\frac{1}{4}$ in. sq. longerons and cement to panels, adding spacers and diagonals for positioning cabin frames, and include ply strut anchorage strengthener, and filling piece at undercarriage position.

Build up cabin frames, trimming longeron gaps to suit slant of front and rear frames. Face root ribs and fin spar with $\frac{1}{16}$ in. ply, and cut out engine mounting assembly and all other plywood bulkheads. The making up of undercarriage and tailwheel assemblies should now be done. The tailwheel assembly must be firmly fixed to the fin spar, but the undercarriage legs can be removed from their bulkhead until the fuselage is completed, when the hinge pin can be inserted through the side and the tensioning bands looped around the dowels.

Join fuselage sides, beginning with the rudder post and fin spar, working forward inserting cabin frames and undercarriage bulkhead, finishing at the front bulkhead. Fill in the various cross braces and mount the root ribs to the cabin roof, over the tongues left standing out. Slide the engine mount into to place and cement dowel tongues behind bulkhead to secure, and then build up front over balsa formers and stringers, sheeting the top from the noseblock back to the instrument panel. Fill in the sides between spacers with $\frac{1}{4}$ sheet forward of the undercarriage to strengthen, also the underside. Fill in the sides behind noseblock strongly, as weight does not hurt here.

All other balsa formers are now positioned, the cabin construction completed except for the windscreen framing, and the planking job undertaken. The rear window, side window flaps, and engine hatches can be fitted and the whole papered down smooth.

The tailplane centre section is made and slipped over fin spar, and cemented securely in place, after which the fin is erected and sheeted over, fairing into the fuselage. The tail block completes the job, the rudder being fitted after colouring.

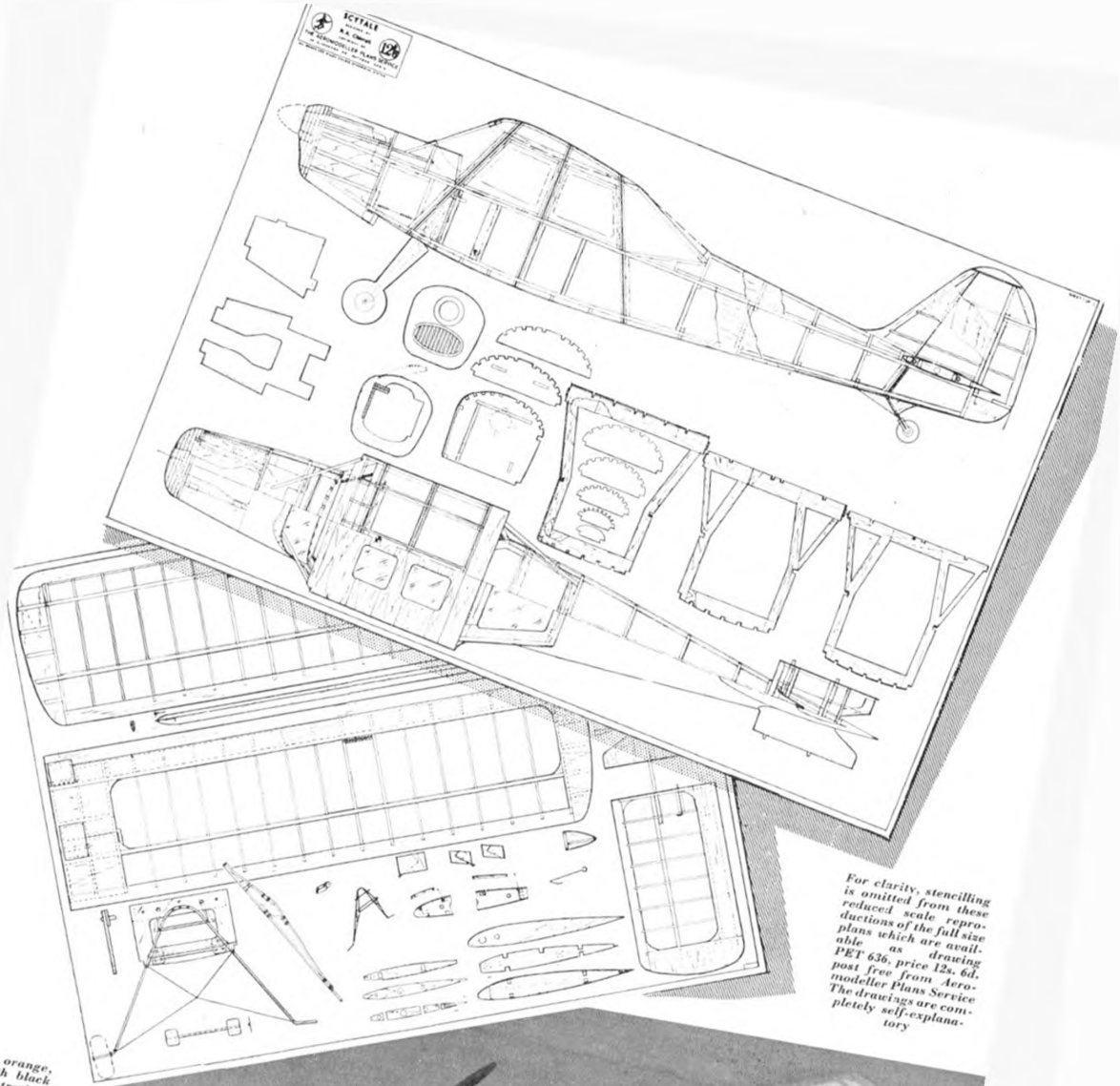
Cover the woodwork with lightweight tissue doped on, doped again, and rubbed down prior to colouring.

After the paint job, the window can be cut to shape and fixed in with strips of $\frac{3}{16}$ in. sq. balsa. The windscreen shape is found with a card template first, cutting acetate from this and bending to shape. Then the framing is fixed around it and painted.

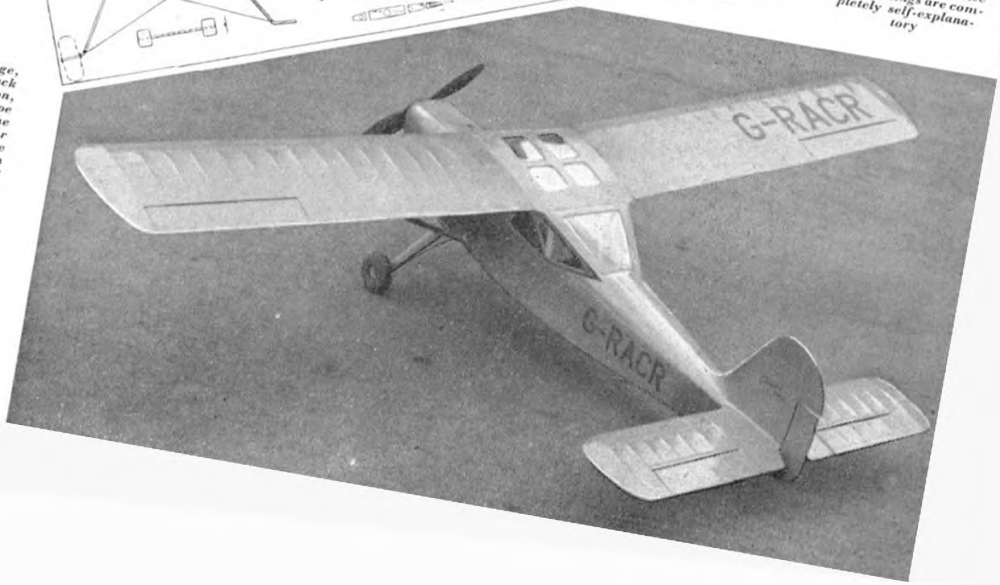
Mainplanes are built up on a preformed leading edge, adding ribs in slots and fitting trailing edges and wing spars. Wing hooks are fixed in and strut anchorage cemented firmly against spars. After building on the tips, the sheeting is added and the whole covered with silk. Flaps cover the hook apertures after wings are secured. Obechi would be advisable for the struts.

Tailplanes are built as for wings, and dowels join both halves together through the centre section.

Flying.—Get balance on the indicated C.G. correct. Test in a breeze to save a running launch for glide, and if this is not smooth don't attempt power until it is right, but adjust with weight. The model should turn gently to the left in wide circles. It is not advisable to decrease sidethrust for a turn.



For clarity, stencilling is omitted from these reduced scale reproductions of the full size plans which are available as drawing PET 636, price 12s. 6d. post free from Aeromodeller Plans Service. The drawings are completely self-explanatory



Bright orange, with black registration, the prototype has been the subject for considerable admiration wherever it appeared. Weighs 6 lbs 3 oz., flies on 5 c.c., but could take a wide range of power units

SOVIET INTERNATIONAL

Held at Budapest, Hungary, May 28—June 3

1. Power winner R. Cerny charms his RC-56 as it stands upon vertical take-off points. Uses Czech EM.1 2.5 diesel. 2. Wakefield winner by Radoslav Cisek has sheet fuselage. Pirelli rubber, is called XL-56

3. A/2 winner Vladimir Spulak who is now well established as leading Czech glider flier. 4. A Zeiss Activist motor powers Purice's Rumanian model as it prepares to TO

5. Control-line aerobatic entry from China had a British E.D. Racer diesel for power and bears the appearance of an American Veco series kit! Flown by Song Huang-Ming, it placed 4th in the results. 6. B. Gunic of Yugoslavia had a small power model for the Wehra 1.5 c.c. Record diesel, placed 5th with 1149. 7. Top three in Wakefield are Georges Benedek, Rad. Cisek and Vladimir Matvejev of Russia. Latter's model is made of Asiatic grasses and uses several new ideas in design, notably a 'bulbous trailing edge' section

A SOMEWHAT UNBALANCED points system gave Hungary the overall team championships for the second year in succession at the M.M.S. 1956 "Peoples Democracies" International, held at Dunakeszi, the Civil Airport for Budapest. This was the 5th of the Annual Internationals between States of the Eastern Bloc, the first taking place in 1949 in Budapest, the second in 1951 at Poznan in Poland, both of these being won by the Soviet Union. Czechoslovakia won in 1954 at Moscow and Hungary at Vrchlabi, Czechoslovakia, 1955.

This year saw several changes, the most notable of which was the substitution of controline aerobatic flying for Jet Speed, and also the withdrawal of Poland and Bulgaria from the contest. These countries sent observers to the meeting and a newcomer to the field was the team from China.

Unlike the Western World Championships, this Soviet International embraces five classes of model and only one representative is allowed for each class from any country. Thus the onus is placed rather heavily upon the individual, and when it is realised that poor performance by only one individual can wreck the entire team effort, it will be realised that the contest is perhaps more demanding than any other.

All events are run to F.A.I. Rules, with five flights of 3-minute maximum time in each of the free-flight events and to equalise the points scoring system, adjustment factors are applied to the results of speed and aerobatics, so that the total figure for best performance in these controline classes is equal to the 900 points gained in free-flight. For events where winners are fairly closely placed, this is most acceptable, but in the case of aerobatics, where it is rare for only a few points to separate five places, the system becomes a trifle unjust and differences magnified out of proportion. The classic example being this year's meeting where the Czechoslovakians won three of the free-flight events, tied for first in 2.5 c.c. speed, and were second in aerobatics, yet lost the team place by six points!

In order to eliminate any possibility of thermal influence, all free-flight was started at 5.0 a.m. and had to end before 8.0 a.m. This proved to be very advantageous in that there was hardly any wind at all and the results became all the more remarkable to Western eyes, when the high proportion of maximum flight times are seen in the results.

First of the contests was for A/2

Mf2 entries. August Franke of East Germany and A. Bedo of Rumania each had models capable of 2:50 in still air —or so it was claimed. They were 5th and 6th in results

Gliders, and as expected, it became a tussle between Roser of Hungary and Spulak the Czech., who had a steady still air performance of 2:50 with each of their models. They were by no means in the lead at the beginning of the event, but their superior towing technique and overall performance brought them out on top. Spulak had only one maximum, yet his total time was 14:09, which displays a high standard. Surprise of the event was the performance of the Chinese representative in third place and that by Sokolov of the U.S.S.R., who placed last with a model not perfectly tested for still air conditions.

Hot favourites for the **Wakefield** were famous aeronautical engineer, G. Benedek of Hungary, Rad. Cizek, the Czech., and Vladimir Matvejev of U.S.S.R. They were all very much on the same level and capable of making a quintet of maximums; but it was the Czech. who maintained form throughout the contest and returned the perfect score. Matvejev was unlucky in having a blade stick on his folding propeller in the third round and Benedek suffered from tailplane warp in the fourth. Of the models, Matvejev's had taken six months to make and was truly remarkable. Made of various Asiatic grasses and stalks from cereals, the construction was extremely involved and perfectly executed. The contest was won with Pirelli rubber, also used by two other competitors, while the rest used the Hungarian "Lactron" thin diameter round section rubber.

Most keenly contested event was that for **Free-flight power,** where 26 of the 35 flights recorded were maximums! Cerny used the Czech. A.M.A. 2.5 diesel for his perfect score and he was followed closely by Ordogh of Hungary using a Webra Mach 1 and Ming-Dao of China with a Hungarian X-3. Fitted to his reserve model was a Chinese engine known as the Peace-2. Although our results do not show farther than 3rd place, it should be mentioned that the time of the last place man was 13:49, only 71 secs. covering all competitors.

After a record claim last year and high performance in Paris, it was expected that Sladky of Czechoslovakia would place high in 2.5 c.c. **Speed.** He did, in fact, return the fastest speed of the meeting with his Czech. constructed engine, but this was tied by Roso Beck of Hungary, who gained first place by virtue of a better overall average. Beck had modified a standard lapped piston Super Tigre for rotary disc valve. In 3rd position, Gajevsky of U.S.S.R. used a Soviet motor constructed by Petuchov, just beating Emil Fresl with his well-worn Torpedo 15. It was here that the Chinese representative failed to return a speed and had he been successful, we might have found the Chinese highly placed.

There remained the decisive **Aerobatic** contest, which was won most decisively by Hungarian Geza Vass, with models very much after the pattern of the American designer by Bob Palmer. They had French Micron 5 c.c. engines and because of the fine standard of construction and flying, his lead in this class of the contest was so great that he converted what had been until then, a certain Czechoslovakian victory into a win for the host country, Hungary. (*Resultsoverleaf*)

Man who turned the tables on Czechoslovakia by obtaining such a lead in aerobatics that he eclipsed the Czech victories in free-flight, was Geza Vass of Hungary. Models look very much like Bob Palmer "Smoothies" and have French Micron 5 c.c. engines. Finish and standard of flying must have been very high to gain near maximum points

The Chinese performance must have been as great a surprise to the East European contestants as it is to ourselves. Here, Liu Ming-Dao releases his Mag X-3 powered model after a vertical take-off. Finished a close third with 14:36

Soviet International Results

		A 2					*Total*
1. L. Spulak	Czech.	162	154	176	180	177	849
2. P. Roser	Hungary	130	180	173	166	127	776
3. S. Min-Czian	China	120	118	180	180	142	740
		Wakefield					
1. R. Cizek	Czech.	180	180	180	180	180	900
2. W. Matvejev	U.S.S.R.	180	180	155	180	180	875
3. G. Benedek	Hungary	180	180	180	110	180	830
		Power					
1. R. Cerny	Czech.	180	180	180	180	180	900
2. L. Ordogh	Hungary	169	177	180	180	180	886
3. L. Ming Dao	China	180	180	180	156	180	876

Speed

			m.p.h.
1. R. Beck	Hungary	(Rear disc Super Tigre)	113
2. J. Sladky	Czech.	(Own engine)	113
3. O. Gajevsky	U.S.S.R.	(Own engine)	108

Aerobatics

		Points
1. G. Vass	Hungary	497
2. S. Fiala	Czech.	398
3. W. Goulbier	E. Germany	371

Team Placing

1. Hungary	... 4125	4. Rumania	... 3183
2. Czechoslovakia	... 4119	5. U.S.S.R.	3133
3. E. Germany	... 3625	6. Yugoslavia	2982
		7. China	2741

SIERRA SUE

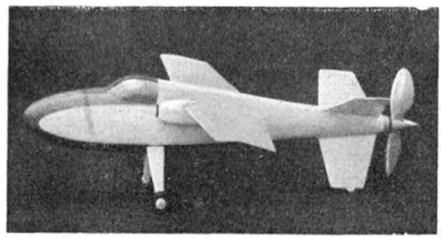
Building instructions continued from page 475

Knock out crutch spacers with the top of a knitting needle. Marry up nose unit with former 1, trimming and undercarriage legs for a good fit. Cement in place and sand the vicinity of the joint to blend smoothly. Apply the sealing mixture to this point, air intakes, nose plug and any visible seams and sand when dry. Repeat. Then give the whole model a coat of plain sanding sealer. Add wheels, prop and cockpit.

Install four strands $\frac{1}{8}$ in. flat rubber 15 in. long to begin with. Balance where shown by adding slivers of lead to nose or tail plug. If the model is less than $1\frac{1}{2}$ ounces, a full finish is recommended, if more, then a light coat of silver should be given. White dope is difficult to get "smooth" without a spray, but with blue trim, is the correct prototype finish. The writing "Sierra Sue" is authentic in blue, other lettering, air intakes and exhaust should be black.

Tests should produce a fast but shallow straight glide. When trimming for power, this layout should be treated as follows: If it stalls, insert card pieces in *top* of rear plug. If it turns too sharply with torque to the left (normal hand prop), add card to left. Have fun!

Vic Dubery's neat little all-balsa reproduction of the novel American Racer takes a rest between flights. See pages 474-477 for full size component details of this attractive model.



How much do you know about the Royal Air Force?

Bruce Fergusson explains the origin of the R.A.F. and other "off-duty" ties

MEMBERS OF THE Service like, when in mufti or plain clothes, to wear the tie of their Service. The R.A.F. tie originated from the Air Ministry in 1921 and, from the first, was intended for "Officers only". There are, unfortunately, no records as to who designed it in existence but, as well as the tie, there was a blazer, a hat-band and a scarf. Today the R.A.F. tie is worn by all ranks when not in uniform, although the right of "Officers only" has never been rescinded!

One of the most exclusive ties, within the Service, belongs to the R.A.F. Officer Pilots' Tie Club. This was instituted in 1937 by Squadron Leader (now Group Captain) G. A. R. Muschamp when Second-in-Command of No. 37 Bomber Squadron. The tie is blue, red-striped and eagle-spotted and in order to protect and control the sale of it, a club was formed under the Presidency of Air Marshal Sir Edgar Ludlow-Hewitt. Marshal of the R.A.F., Lord Douglas of Kirtleside is the present-day President.

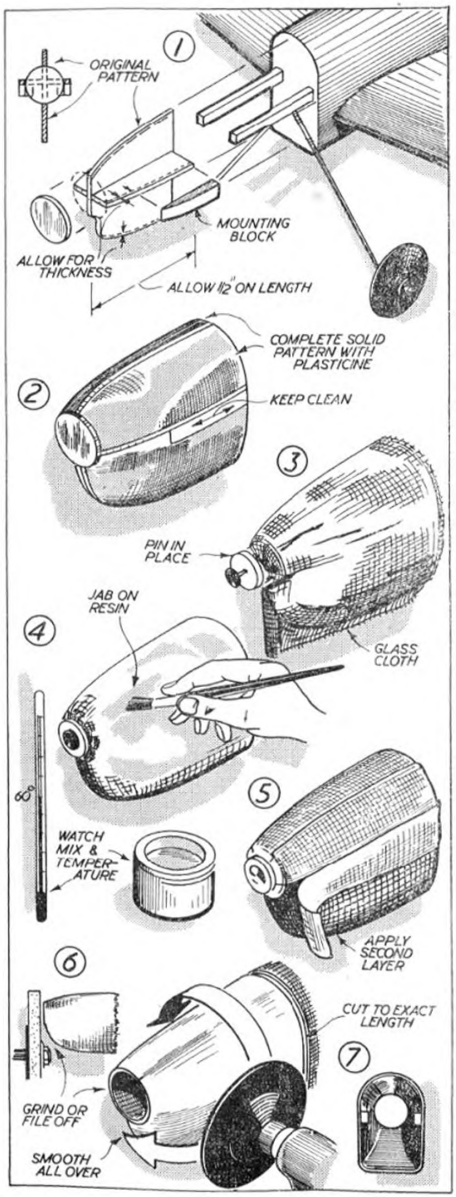
The tie of the Goldfish Club is black bespeckled with goldfish. Two of the emblems are so arranged where the knot occurs that when tied they appear the right way up. The secret of the success of this manoeuvre is that one has to tie the tie in the opposite manner to the normal method of tying a tie!

Maintenance Command has selected a dark blue tie with the Raven, from the Command Badge, superimposed in light blue. Boy entrants have selected an emerald green tie with diagonal stripes of red and green checkers, which are similar to those worn on their caps.

610 (County of Chester) Squadron of the Royal Auxiliary Air Force have adopted the black R.A.F. tie and have added to it one of the Garbs of the City Arms, in half red and blue, as their tie.

Gradually Command, Group, Squadron and other formation ties are coming into their own within the Service, which all goes to foster that great quality of Esprit de Corps.

Aeromodelling *Step - by - Step*



FIBREGLASS is a ubiquitous material which can be moulded or formed in many ways. To be produced as shell mouldings it has to be laid on or in suitable shaped patterns or moulds. Laying *in* a "female" mould is best for getting a smooth outer surface provided the mould face is finished glass smooth. Building up around a "male" pattern is generally easier and more suitable for one-off jobs, like cowlings. The outer surface of the moulded shell is then rather rough and requires smoothing down to finish.

The pattern can be made in a variety of ways. A straightforward method is to lay out the side and plan shapes required on sheet balsa and assemble these cruciform fashion—**1**. A hardwood mounting block can be attached to the pattern, which in the finished moulding will be bonded to the shell and give a fixing point aligned with the side of the bearers. A disc is added to the front of the basic pattern as a guide to nose section. Allowance should be made for the thickness of the shell (allow .008 in. per layer of cloth and .004 in. per layer of tape). Also make the pattern slightly longer than the actual cowling length to allow for trimming off the ends.

A solid pattern is then very quickly completed around this basic assembly by filling in with plasticine and moulding and smoothing to final shape—**2**. Compound curves can easily be moulded in this way if required. When finished, clean off any plasticine on the outer face of the mounting blocks.

The resin-hardener mix should be prepared at this stage. Coat the faces of the mounting blocks with resin and then lay on glass cloth cut to suitable size to completely cover the pattern—**3**. The cloth is sufficiently "mouldable" to form to shape by pressure. It will generally be a great help if the pieces turned around the front edge of the pattern are trapped by a small disc of wood pinned in place.

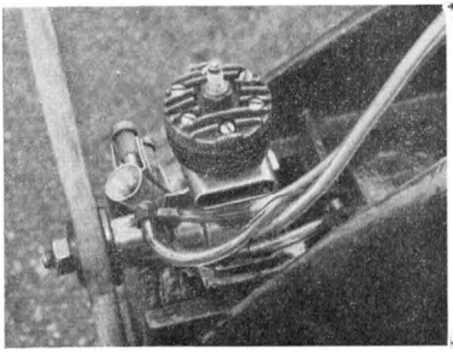
When satisfied with the lay of the cloth, jab on resin all over to completely impregnate the cloth, using a stiff brush—**4**. Do not try to *brush* the resin in, otherwise you will pull the cloth layer out of shape. If necessary, rearrange parts of the layer to bed down on the pattern smoothly.

Another layer of cloth should then be laid on, applied and pressed down whilst the resin is still fluid. Coat this also with a further layer of resin. For the outer skin a final layer of glass *tape* strips will give a smoother finished surface—**5**.

The moulding should then be left to set—twenty minutes minimum to an hour or more, depending on the amount of catalyst added to the resin and the temperature. Catalyst proportions are not critical, so err on the generous side if anything. But make sure that the temperature at which the moulding is left to dry is at least 60 degrees. The warmer the temperatures the quicker the moulding will set.

When set, simply dig out the plasticine and pull or break out the balsa pattern, leaving only the mounting blocks bonded to the shell. The last traces of plasticine can be washed off the inside with petrol.

The cleanest way to finish off the front is to hold it against the edge of a grinding wheel—**6**. The rear edge is cut to exact length with a hacksaw—**7**. Smoothing the outer surface is best done with a fine abrasive disc mounted on an electric drill. You can, if you like, apply a coating of "trowelling filler", made by mixing talc with a resin catalyst mixture to the consistency of a thick paste. Apply with a knife blade to fill all the hollows (all over if you like) and smooth off clean. Finish with abrasive when set, as before.



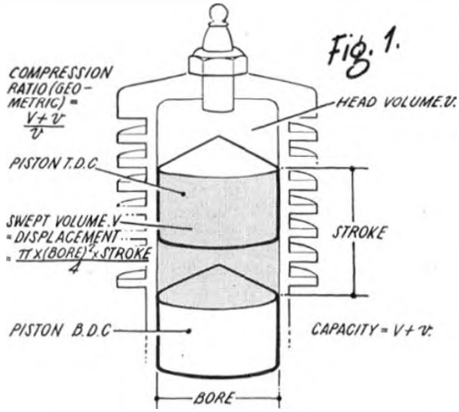
Know Your Engine

PART 6 EXPLAINS THE SIGNIFICANCE OF COMPRESSION RATIO IN MODEL ENGINES

Can you identify this engine and decipher the complex plumbing attached to its carburetter? See page 495 for the answer

THE EFFECTIVE compression ratio of an engine is determined both by the geometry of the engine and its efficiency as a pump. The latter feature is commonly overlooked and the *geometric* compression ratio taken as the absolute criterion for performance. (For example, full size engines normally have the compression ratio *lowered* when supercharged, except the low pressure blowers fitted to series production cars to improve performance.) But, for example, suppose the (geometric) compression ratio of any particular engine is 10 : 1 and its pumping efficiency 60 per cent. Then its *effective* compression ratio is only 6 : 1—or the same as, say, an engine with an apparent compression ratio of 6 : 1 with a pumping efficiency of 100 per cent (although the latter would be impossible in practice). This, in part at least, explains why some "hot" engines have (apparently) a relatively low compression ratio, compared with other racing designs which do not perform so well. It also explains why increasing the pumping efficiency of an engine can considerably improve its effective compression ratio and performance, although physically the engine is apparently unchanged.

Compression ratio is defined as the ratio of the total volume within the cylinder above the piston bottom dead centre position to the unswept volume, i.e., the small volume left in the head when the piston is at top dead centre—Fig. 1. The two "volumes" involved are the head volume (v) and the swept volume (V). The latter is readily calculated as the area of the bore *times* the stroke and is also called the *displacement*. The capacity of an engine, on the other hand, is equal to the swept volume or displacement *plus* the head volume, i.e., V + v.



The actual value of the head volume (v) is often difficult to calculate and, in fact, the actual volume required for a particular design is usually "guesstimated" rather than calculated, or arrived at by trial and error methods in altering the shape of the head, or the top of the piston, or both. Thus the only true "size" rating of an engine is *displacement* and to speak of the capacity of an engine without knowing the head volume or compression ratio is quite wrong. In fact, nearly always when an engine is stated as "X" c.c. capacity, when it is meant that the swept volume or displacement of that engine is X c.c.'s.

In the case of diesels, of course, the head volume and thus both the capacity and compression ratio is made variable. Although a few fixed capacity diesels have been made, it is now universally recognised that a variable compression ratio is the most satisfactory method of adjusting the engine to run on different fuels and at different speeds.

Self-ignition stage

Without going too deeply into the technology of fuels it can be stated, in simple terms, that to get the fuel to ignite in the cylinder it must be raised to its spontaneous self-ignition temperature. If the self-ignition temperature of the fuel is low enough, it can be ignited by the heat generated by the compression of the fuel-air mixture in the head, this heat of compression being directly related to the effective compression ratio of the engine. If the self-ignition temperature of the fuel is too high for this to be realised employing practical compression ratios, then some other method of supplying the heat must be provided, such as a spark plug or heated element. In the latter case, as in the glow plug, the fuel also has a catalytic action on the element, tending to heat it to red heat (e.g., as in the simple science experiment where a piece of platinum wire held in alcohol vapour will heat up to incandescence and set the vapour alight). The actual temperature at which the element will be maintained, however, is greatly influenced by the compression ratio, which has led to the variety of so-called "hot" and "cold" glow plugs.

The significance of compression ratio with diesels need not be discussed in detail since the working ratio is readily adjustable to give optimum running conditions. The main criterion, in fact, becomes the fuel. It can be mentioned, however, that conventional compression-ignition fuel oils, which are mainly paraffin-type oils, have a self-ignition temperature too high to be ignited by the maximum heat of compression normally generated in model engines. Hence they have to be mixed with a substance which has a lower self-ignition temperature (usually ether) and is a relatively poor fuel, as such. Add necessary lubricant and you have the basis of all diesel fuels a paraffinic oil (which is the base fuel), ether to promote easy starting and lubricating oil.

In addition, "dopes" are commonly added to promote smoother running—largely to reduce "ignition lag" and so make the mixed fuel burn quickly and uniformly. These are, to a large extent, inter-dependent on compression ratio, because they themselves tend to act as artificial compression raisers as the engine warms up. This means that it may be necessary to reduce the *geometric* compression ratio when the engine is hot; or, alternatively, compensates for the increase in compression ratio required with increasing operating speed. A particular virtue of the widely variable compression ratio is that it makes the diesel particularly flexible with regard to the types and formulations of fuels which can be used, although with at least one American diesel a doped fuel is essential for high speed running, because the available compression ratio is limited by a flange on the contra-piston.

In the case of glow motors, the position is rather different. The base fuel is methanol, which has a self-ignition temperature nearly twice that of diesel fuel and nearly three times that of ether. Hence a heated element is required to ignite it. (It is an interesting fact that an ether-methanol mixture *can* be used to start and run a diesel, although such a fuel mixture is not recommended! Similarly a "diesel" fuel can run a "glo" motor, with the same reservation!)

The basic "glow" fuel then becomes methanol and lubricating oil, which is satisfactory up to a degree. However, to maintain the element at the required temperature for consistent firing, quite high compression ratios are desirable. In other words, an appreciable heat of compression must be added to the "chemical heat" generated by the fuel action on the element to keep the element glowing. The higher the compression the brighter the element glows. The lower the compression the duller the element and the more prone the engine to cut as soon as the starting battery is disconnected.

The answer to this is the addition of another kind of dope to the fuel—a nitroparaffin, usually nitromethane. The actual action of nitroparaffin inside the engine is not clearly understood. Largely they appear to decompose and release oxygen so that the fuel burns hotter and the element glows brighter. A doped glow fuel thus requires a lower compression to maintain the element at its working temperature. Oddly enough, the addition of even a small percentage of nitro-methane to *diesel* fuel makes it useless. But some authorities condemn the mixing of nitroparaffins with paraffins as dangerous! This is harder on the element, but easier on the engine, for it has to do less work on the up stroke of the piston in compresssing the fuel mixture. And unlike diesel fuels, where more than about 5 per cent. added dope has not further benefits (and may, in fact, detract from performance), increasing the proportion of nitromethane up to as much as 40 per cent., is usually consistent with steadily improving performance. Thus the "top" performing glow engines usually employ a 40 per cent. "nitro" fuel.

The significance of compression ratio can thus be summarised in this form. For use with a "straight" glow fuel (i.e., no added nitromethane), a glow motor must be made with a high compression ratio. The geometric compression ratio required will depend a lot on the pumping efficiency and may need to be as high as 14 : 1 for good starting and continued running with the lead disconnected. On the other hand, such a high compression ratio will tend to make the engine kick back, particularly hand starting on small propellers, and be prone to start and run backwards, especially on "symmetrically" ported designs.

Decreasing the compression ratio will improve starting and enable the engine to go faster, because it has to do less internal pumping work. But unless nitromethane is added to the fuel it will be prone to stop, or run inconsistently, once the starting battery is disconnected. With a lower compression ratio still and a "straight" fuel, starting may be difficult even with the battery lead connected and the plug just goes out once the engine is running and the lead disconnected.

The average commercial design will therefore probably aim at a compromise compression ratio where a relatively inexpensive fuel can be used, i.e., with about 5 per cent. nitromethane. The use of a fuel with a higher proportion of nitromethane will still improve performance, because this is a characteristic of such a dope, but probably at the expense of shortened element life on a standard plug, if this were originally correctly matched to the design. A change of plug to a "hotter" type might well be advisable, or even necessary.

On the other hand, such an engine "hotted up" by the use of a dope fuel will not give as good a performance as a similar size of engine designed initially for peak performance around a particular doped fuel, because its compression ratio is wrong. Its performance with a heavily doped fuel could probably be improved by reducing the original compression ratio (e.g., with a short reach plug replacing a long reach one, and thus increasing the actual head volume; or additional gaskets under the head to increase the head volume), although this does not follow as a general rule. The other major factor to be considered is the pumping efficiency, which may well vary with speed. Hence a particular engine may even need an increase in *geometric* compression ratio to compensate for a falling off in pumping efficiency operating at a much higher speed.

Due to the difference in the calorific values of the fuels involved, a glow motor must, inherently develop less *torque* than a diesel, for the same speed. On the other hand the glow motor can, in general, be run up to much higher speeds than a diesel, so that ultimate power output, being the product of torque and speed, can be comparable. But to be truly comparable, or even superior in this respect, virtually means "tailoring" the engine around a particular fuel and, to oversimplify the problem, reduce compression ratio and increase pumping efficiency—in other words maintain the required *effective* compression ratio for the fuel used with the minimum of mechanical losses in so doing.

This normally means that the average glow motor, size for size, will invariably be inferior to its diesel counterpart as regards torque and power output, although it may be capable of running at higher speeds. Top performance from a glow motor can only be got out of a carefully-proportioned design, virtually built around a specific fuel. And although the compression ratio plays a major part in this, assessment of likely performance on the basis of *geometric* compression ratio alone can be most misleading.

World News

Swedish free-flight Champions are at left, Eskil Falk, tuning up his Oliver diesel in power, and right, Ragnar Ahman with his Wakefield, also leader of the Swedish team for the finals

IT MUST HAVE BEEN a disappointment to the hard working organisers of the '56 Coppa Ostali for Hydromodels at Milan, that the only International support for this fine event should have been a solo performance by Ian Lucas of Brighton G.B. We had the pleasure of attending this dunking session at the Idroscalo seaplane base last year, and it was one of the finest affairs we have ever experienced. This year, the victory in Power went to Roberto Bacchi—yet once more—and for the fifth time, with his evergreen Super Tigre powered *Tucano*. His victory was narrowly gained, for in actual seconds, his gross duration was identical to Ian Lucas's time with the Webra 1.5 *Clot V*—the decimal points determining a win for **Italy**.

Guido Fea and Carli of Milan fought it out for top place in rubber, the decisive O.O.S. flight by the latter in the only thermal of the day giving Carli the contest at the cost of one nice model. Such were conditions that Ian Lucas's third flight in power, needing 2.16 to win, was actually 2.15 with a perfect "landing" on the water only yards from the take-off. *Photos below.*

Also at Milan, on June 8,9th, there were the Italian Speed C/L championships, with results as follows:—

2.5 *c.c.*		*m.p.h.*
1. Marconi	Rome	106
2. Cappi	Milan	104
3. Marcenaro	Genoa	103
All Super Tigre G.20's		

5 *c.c.*		*m.p.h.*
1. Cappi	Milan	131
2. Berti	Milan	129
3. Beraamaschi	Milan	124
All Dooling 29's		

10 *c.c.*		*m.p.h.*
1. Berti	Milan	133
2. Vita	Pisa	132
3. Podda	Genoa	132
All McCoy 60-20's		

Jet		*m.p.h.*
1. Marcenaro	Genoa	132
2. Podda	Genoa	129
3. Varriale	Genoa	105
All Dynajets		

New World record claim is with the F.A.I. for 133 m.p.h. by A. Marconi for 2.5 c.c., with a Super Tigre and 7½-ounce model.

Shades of the famous old Wasserkruppe meetings of the Hitler Jugend, came with the Whitsun meeting at the same place for **German** slope soaring enthusiasts. Differing in political atmosphere, this year's event was for R/C, Orthodox A/2 or Magnet steering. Wind was fierce and spot landing for R/C very difficult.

At the Italian Hydromodel contest, 1 shows Mentovani releasing his Super Tigre non-pylon model. 2, Guido Fea and his Wakefield on floats which placed second. 3, Briton Ian Lucas of Brighton, second in power by a few decimal points, flying Clot V. 4, Roberto Bacchi dressed for the occasion, about to start up.

In all, some 15-20,000 people witnessed fine flying, including a 3-flight total of 43 min. 32 secs. by Fred Militky (one a 29-min. O.O.S. flight). Fred was once a famous model ornithopter flyer of 1940 or thereabouts. This time he had a magnet model based on the Gremmer principle. Best time for five flights in A/2 was 7.19, showing the advantage of the magnet steering.

Squally conditions also beset the **Swedish** Championships at Upsala on June 17th, and upset some of the anticipated winners. Both Gunnar Kalen (A/2) and Rolf Hagel (Power) collected four max's, but last flights let them down and right out of the results. Winner in Wakefield was Ragnar Ahman of Norrkoping, a name not too familiar overseas: but he was also the Rubber Champ. last year, and in the Swedish team at Finthen. Times were high, Ahman making 14.21, A/2 winner Rune Johansson 13.39 and Eskil Falk 14.18 in Power, so we can expect good Swedish performance at the World Championships this season.

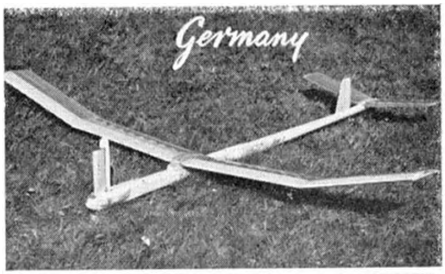
One cannot escape hearing exhortations in praise of the Oliver Tiger diesel from all parts of the world, but the latest tale, from **Uruguay** bears repeating. Hector Acevedo is a very keen team race fan, and crossed the River Plate to take part in the **Argentine** Nationals near Buenos Aires. An Oliver equipped racer was modified to come up to size for the Class "B" spec.: and in the first semi-final, the 2.5 diesel led a pair of K. and B. 29's by 18 laps. In the final, the *Yardstick* and its 11:1 aspect ratio was matched against a locally produced Columbi 29 and a Fox 19. Unfortunately, a ridge in the tarmac surface called for a prop change on the Oliver, and the motor mount went askew, so it had to withdraw. But the point was made to the Argentinians, who almost refused to believe that a 2.5 diesel could run so fast for so long on each tank of fuel. The race was actually won by Mr. Cea with the Fox 19.

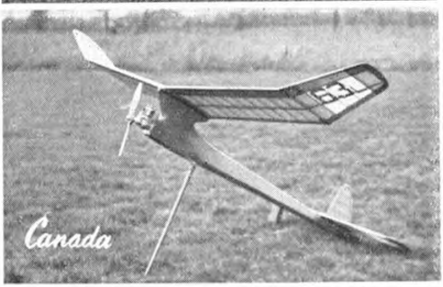
Team for **Canada** at the Power Champs. is Joe Eisen, Harold Lorimer, Bill Etherington and Sarjo Ranta. At the Eliminators, Joe Eisen turned in four max.'s from nine second engine runs, and other team men are reputed to be equally "hot". Our Canadian correspondent tells us the "Opposition at Cranfield had better watch out"—well as you read this, advance news of the Power results will be known and we'll see how right he was.

Other Team announcement comes from **Japan** and it is hoped to send models for proxy flying at all three events. Team leaders are N. Hasegawa (A/2), H. Nonaka (Wakefield) and T. Asano (Power). Models are patterned after leading Western designs, Asano using a K. and B. 15, which is surprising when one considers the fine output of some Jap motors.

From Ivor Stowe, whom we have seen described as an "Incredible mass of energy", we have an offer to organise, with **Australian** engines for prizes, a decentralised International Club event to F.A.I. rules. This to be held on September 29th this year, with teams of four per club. Airmail details to the Secretary, Doonside Aero Club, Doonside, New South Wales, Australia, if you want to take part—entry fees are only 6d., or equivalent, per head.

Pleasant point in the **New Zealand** Official Newsletter is that Frank Bethwaite has been awarded the Macdonald Memorial Award for his outstanding efforts in establishing radio control duration records, notably the latest 7 hour 37 min. marathon of slope soaring. Congratulations Frank.

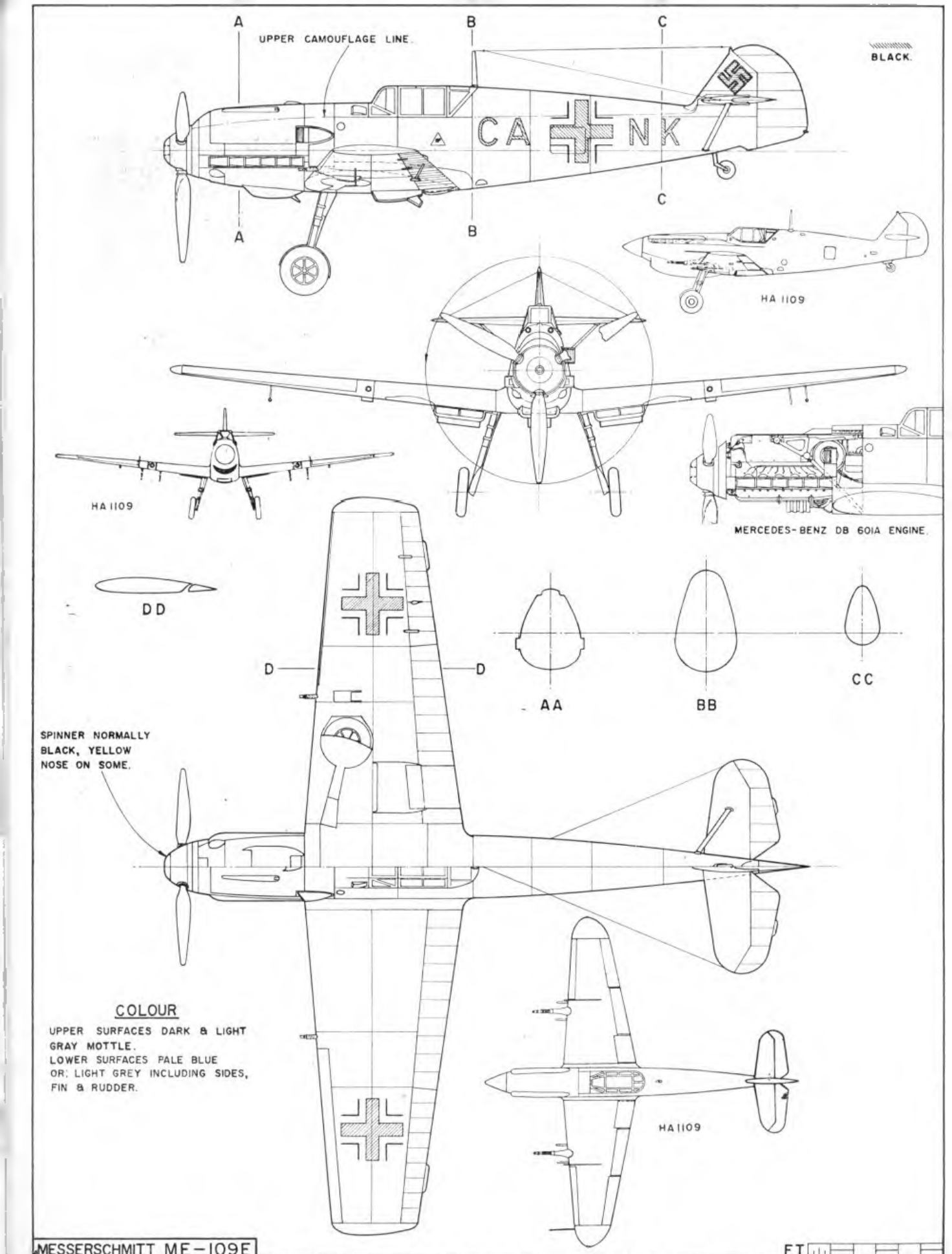




Top: 1956 Rhonz magnet steering contest winner by Fred Militky of Kirchheim/Teck. Model on pogo stick is Canadian Team member "Sarge" Ranta's "Reek" power model with Oliver Tiger. Bottom, in snow scene, is Japanese A/2 leader with his model which shows distinct Lindner influence. It is hoped that Hasegawa's model will go for proxy flying in Italy. Below is airfoil used for wing and tailplane of Soviet International Power winner R. Cerny's model. *See p. 462*

NACA 4406

% Chord	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
Upper	1.25	1.88	2.79	3.53	4.15	5.15	5.90	6.42	6.76	6.90	6.55	5.85	4.85	3.56	1.96	1.05	00
Lower	-0.64	-0.79	-0.82	-0.73	-0.69	-0.25	0.12	0.46	0.74	1.10	1.24	1.27	1.16	0.91	0.49	0.24	00



COLOUR

UPPER SURFACES DARK & LIGHT GRAY MOTTLE.
LOWER SURFACES PALE BLUE OR; LIGHT GREY INCLUDING SIDES, FIN & RUDDER.

MESSERSCHMITT ME-109E

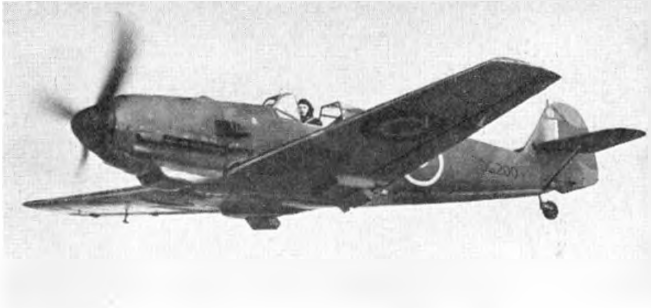
FT

"J" TYPE 1/72ND SCALE REPRINTS OF THIS DRAWING AND "A" TYPE 1/48TH SCALE DIE-LINE PRINTS ARE AVAILABLE PRICE 6d. AND 1/- RESPECTIVELY FROM THE AEROMODELLER PLANS SERVICE

AIRCRAFT DESCRIBED

No. 80

Messerschmitt 109 E



WHEN HERR PROFESSOR Willy Messerschmitt first laid down the design for a military fighter to equip the Luftwaffe in 1938, he could hardly have anticipated the long and interesting life story of his creation. From the original conception of a single seat interceptor, it became in turn an escort fighter, day intruder bomber, trainer and is today in production by Hispano Aviation (Spain) as the HA 1109, fitted ironically enough with a British Rolls-Royce Merlin 45 engine.

The 109E was used in greatest numbers when escorting the daylight bomber raids on Southern England in 1940. It had a great reputation for its rate of climb and performance at altitude (ceiling was 37,500 ft.), but suffered from heavy controls at high speeds (maximum level speed 354 m.p.h.) and a poor turning circle of 885 ft. at 12,000 ft. Landing was somewhat tricky, demanding a special technique due to the small track of the wheels and large angle on touchdown, in fact the many excellent biographies written by German wartime pilots have attributed the 109 u.c with a high pilot mortality rate.

Testing a captured version, British pilots found the cockpit too cramped for comfort, and visibility when taxi-ing not all that could be desired, as the side folding canopy prevented a view over the sill. There were, however, many points in favour, and it was obvious to engineers that the aircraft had been designed to ensure ease of maintenance requiring a minimum of skill in servicing. One much appreciated feature was the direct injection system of the Daimler-Benz DB 601A inverted engine which had no tendency to splutter or cut out under negative "G" conditions.

Used as a fighter-bomber for escort, the 109E had provision for one 110 lb. (50 kg.) bomb in a rack under the belly. This was aimed in a dive of 45 degrees by means of a red line painted on each side of the cockpit cover, and known as the "Revi" method. Maximum permissible speed in a dive was 445 m.p.h., at which the ailerons were virtually solid, and rolling impossible.

Considerable detail modifications were applied to the F version, which served to obviate most of the shortcomings of the "E". Controls were altered from slotted to Frise type ailerons, flaps made plain, and wing and rudder changed in outline.

As a model project the E version is perhaps more suitable with its smaller diameter spinner and humped engine cowling which could be used to hide a small diesel for free-flight. The spinner has a central air scoop for cooling the generator (original purpose was for a cannon to fire through) and was usually painted black, like the airscrew blades. An exception was a famous fighter group—the "Yellow-Nose" Staffel based in Northern France were first equipped with the 109E, and another famous Staffel distinction was a Bow and Arrow in a white shield on the cowl.

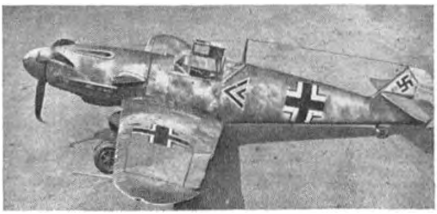
Base colour for the upper surfaces of early models was olive green, but the majority had a dark and light grey mottle, extending down the sides or terminating at the camouflage line as shown on the drawing.

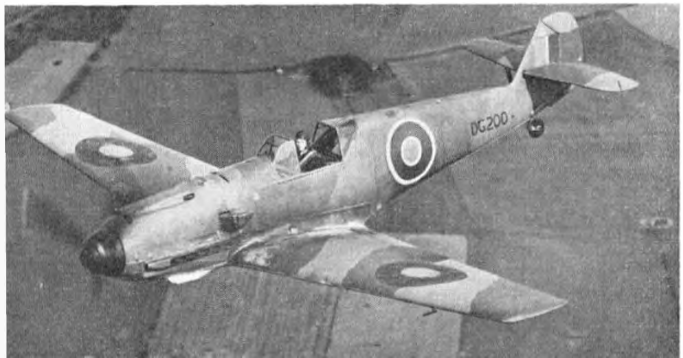
Principal details.—Span 32 ft. 5 in., wing area 174 sq. ft.; length 28 ft. 8 in., height 7 ft. 6 in.; weight empty 4,180 lb., weight loaded 5,520 lb.; wing loading 31·4 lb./sq. ft.

Performance.—Maximum speed 354 m.p.h. at 12,300 ft.; cruising speed 298 m.p.h.; stalling speed 75 m.p.h.

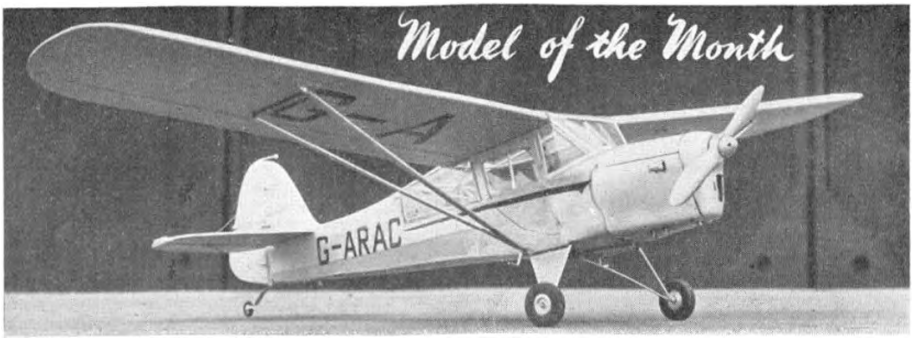
Armament: Two 7.7 mm. machine guns in fuselage; two 20 mm. cannon in wings.

Engine: Daimler Benz DB.601A twelve cylinder liquid-cooled engine of 1,150 h.p. for take-off.





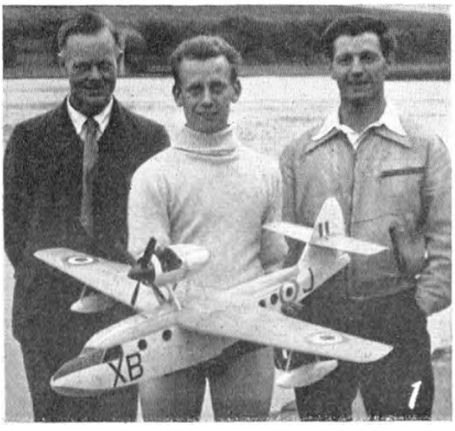
Heading, and view at left, show a 109E on test during the war years, and redecorated in R.A.F. camouflage and insignia. Note the precautionary measure of not fitting the sideways moving cockpit cover. Used to assess the comparative merits of the 109 and British Hurricane and Spitfire fighters, this aircraft was captured in France. Above, is a crashed 109F, later used for similar flight tests. Note the rounded tips, larger spinner, lack of tail struts and re-shaped supercharger intake. In the drawing opposite, based on an original by George R. Lawlor three views of the latest version, the H.A 1109 MII, Buchon are given for comparison



Model News

NO! THAT'S NOT a full size Auster in the heading photo, but a magnificent replica built by R. A. Chivrall, who was responsible for the nice semi-scale "Skytale" on pages 460/1 of this issue. The Auster was the undisputed winner of the Concour d'Elegance (scale section) of the Northern Heights Gala this year and is accurate right down to the airfoil section and miniature inspection zippers in the covering. All interior detail is perfectly reproduced and moreover, we have had the pleasure of seeing the model in the air and making very fine flights.

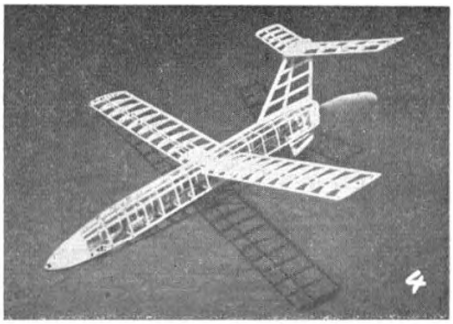
Pictures **1** and **2** show a most unusual model built by members of the Barry Model Racing Club in Glamorgan. The Club is mostly interested in fast hydroplanes, but as the photos show, they can make a very fine flying boat and one which displays considerable original thought. EX/J is "on the step" in photo 2, where it is being flown by someone standing in the middle of the local pool, appropriately dressed for an accidental "ducking". The boat takes off very cleanly and alights just like the real thing, skimming the surface and settling on the hull under full control.



The futuristic design for a a free-flight model seen in picture **3** is the work of Mr. Strange of Hayden Wick, near Swindon, and an A.M. 3.5 diesel driving a normal airscrew, powers this prototype for the moment, but Mr. Strange hopes to convert the model at a later stage for ducted fan installation. The fuselage was made on a broom-handle jig to line up the bulkheads for planking. As will be seen, the Sabre wingsweep and Handley Page Victor type tailplane lend a most modern air to this novel design.

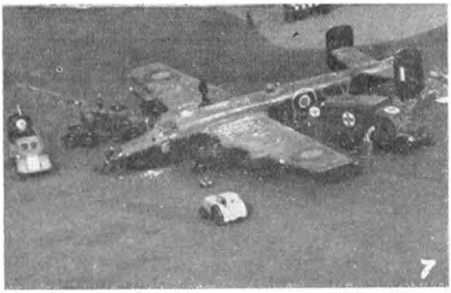
A similarly advanced approach to model design is seen in the next photo. Peter Shephard of Maidstone, Kent, is an enthusiast for unusual rubber models and photo **4** shows his latest effort, a 32 in. span high tail pusher with overall length of 30 in. The long nose of this model compares with the previous view of the power model, although lack of wing-sweep should be taken into consideration.

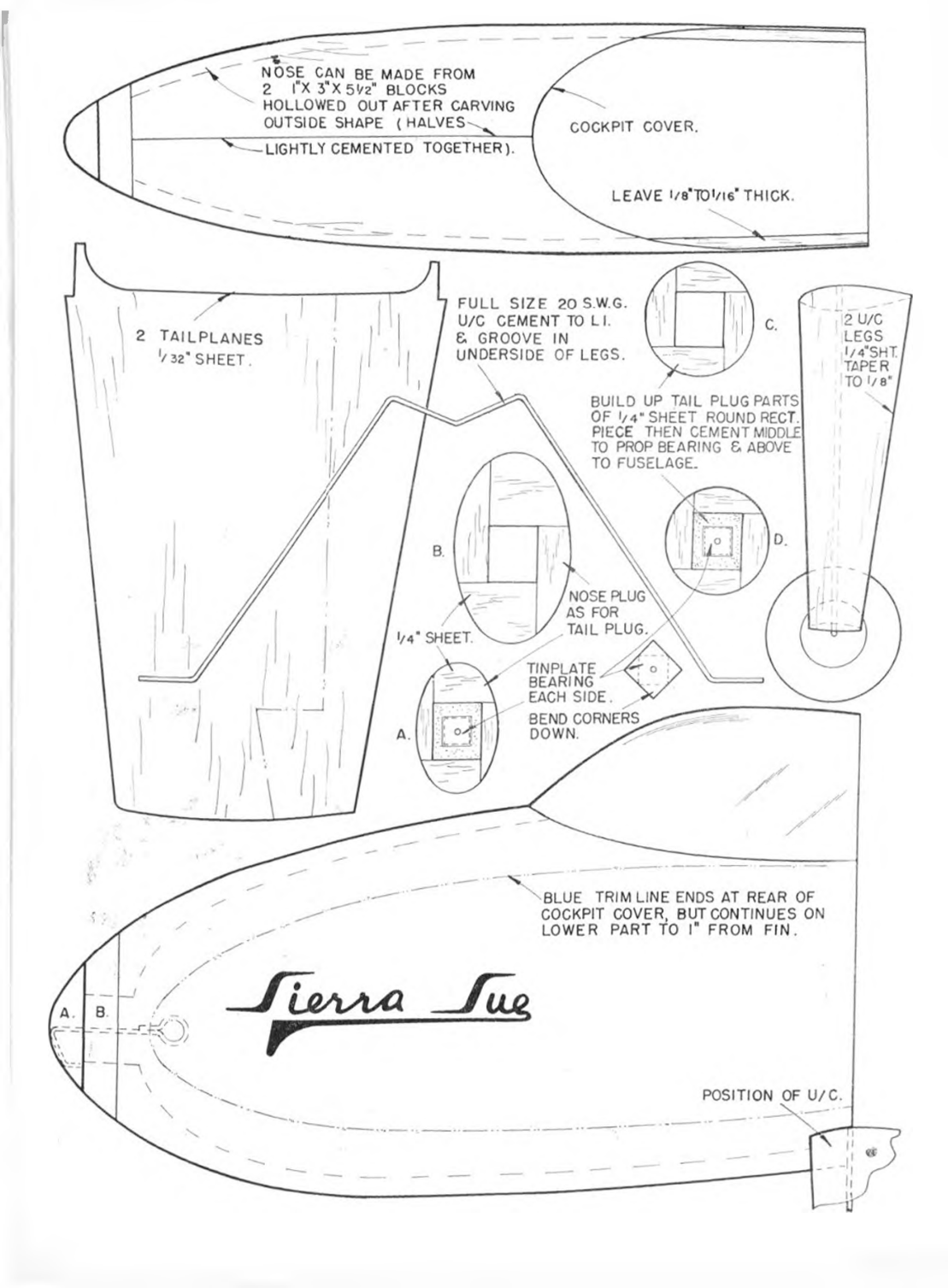
Two very popular scale designs in the "AERO-MODELLER" Plans Service are those for the German aircraft, the Focke Wulf, Stosser and Zaunkoenig. R. F. Creffield, who sent in this photo **5**, showing his Stosser and D. Tapsfield's Zaunkoenig, tells us that both of these models are most excellent flyers and are to be seen regularly at Chobham Common, which is an ideal soft landing ground for anyone to fly scale stuff and test out new models.

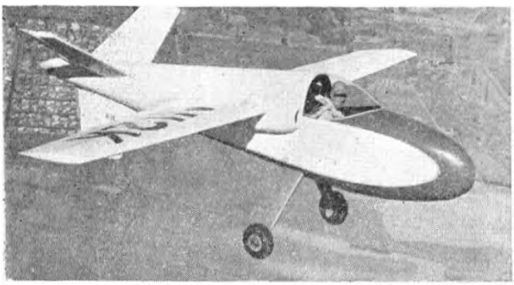


Our files contain quite a number of photos of solid model Vickers Viscounts, but few of them attain the very high standard of finish, as illustrated in picture **6** of T. Shortt's 1/24th scale version. Decorated in the earlier Aer Lingus colours, this Viscount is of course a fairly large solid and gives plenty of scope for obtaining a fine surface. Incidentally, a lot of readers write to ask why they cannot obtain this showroom silver finish as seen on the Museum models and in Airline display windows. Answer is that professional model makers use two silvers. First a base coat then the darker, more silvery finishing colour which gives the superb sheen. Without a spray gun, it is virtually impossible to eliminate brush marks with finishing silver, so our advice is to employ the base colour, sometimes sold as aluminium, and to rub down and polish to the final desired effect.

As a complete change on the solid aspect, picture **7** shows a scale "prang" of wartime Halifax, built and photographed by Cadet C. P. Hickling (R.N.A.) The aerodrome is of hardboard and is complete with hangar having authentic interiors and lighting, plus many 1/72nd scale vehicles and carved figures. By dropping the Halifax down from its undercarriage and scattering a little rubble over the surface, Cadet Hickling was able to pose a most realistic scene which is complete right down to the mobile crane about to deliver a new wheel for the unfortunate aircraft, while the ambulance takes wounded aboard. Smart work!




NOSE CAN BE MADE FROM
2 1"X 3"X 5½" BLOCKS
HOLLOWED OUT AFTER CARVING
OUTSIDE SHAPE (HALVES
LIGHTLY CEMENTED TOGETHER).
COCKPIT COVER.
LEAVE 1/8" TO 1/16" THICK.
2 TAILPLANES
1/32" SHEET.
FULL SIZE 20 S.W.G.
U/C CEMENT TO L.I.
& GROOVE IN
UNDERSIDE OF LEGS.
C.
2 U/C
LEGS
1/4" SHT.
TAPER
TO 1/8"
BUILD UP TAIL PLUG PARTS
OF 1/4" SHEET ROUND RECT.
PIECE THEN CEMENT MIDDLE
TO PROP BEARING & ABOVE
TO FUSELAGE.
D.
B.
NOSE PLUG
AS FOR
TAIL PLUG.
1/4" SHEET.
TINPLATE
BEARING
EACH SIDE.
BEND CORNERS
DOWN.
A.
BLUE TRIM LINE ENDS AT REAR OF
COCKPIT COVER, BUT CONTINUES ON
LOWER PART TO 1" FROM FIN.
Sierra Sue
A.
B.
POSITION OF U/C.



SIERRA SUE

Vic Dubery produces an all-balsa 1" equals 1' scale model of a snappy racer

"SIERRA SUE", I'm sad and lonely said a popular song nearly 20 years ago. You won't be sad with this cutie nor lonely when the others see it. The full size Sue is a 20 ft. sport plane project by a small American firm whose specifications include 500 miles with a 15 gallon fuel tank and top speed 200 m.p.h.

The construction and finish methods of this all-balsa model have *not* been devised for the "quicky" balsa-butchers, but for those who derive pleasure from building. The unusual layout produces an interesting exercise in trimming, but she flies alright and is fit to grace any enthusiast's stable of one-inchers.

You will need balsa:—

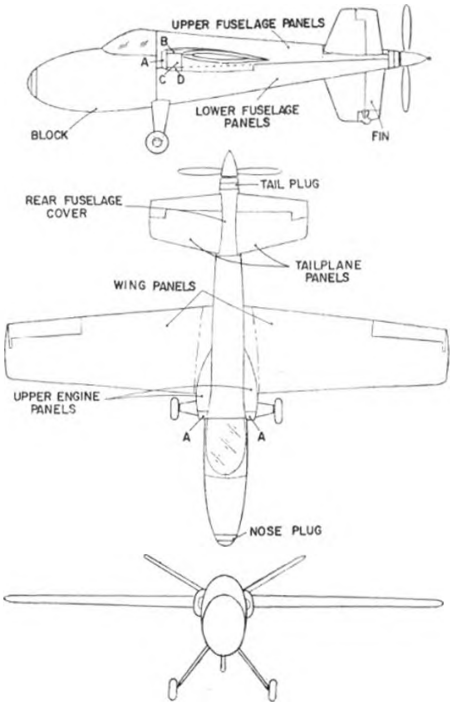
- 1/16 in. x 4 in. x 36 in.: One sheet, soft, for wings, fin, formers, strips.
- 1/32 in. x 3 in. x 36 in.: One sheet soft, *pliable*, for tailplane, fuselage panels.
- 1/4 in. x 3 in. x 36 in.: One sheet for nose unit, plugs, propeller, undercart, also 12 in. 20 SWG wire for undercarriage, front hook and propeller shaft. Acetate sheet 3 in. square or "team racer" cockpit cover. Long nozzle medium drying cement. Small jars sanding sealer, thinners, white and blue dope. 5 ft. 1/8 in. flat rubber. Balsa Sawcut prop. if you don't make your own.

Before construction, sand sheet balsa both sides with OO glass paper *using a sanding block* until all saw marks are gone. Start by tracing outline and cutting out the WING and JIG RIBS. Slightly dampen upper forward half and lower rear half of each wing. Pin down over jig ribs then cut out FIN and add 1/16 in. square strips.

Carefully trace, transfer and cut out FORMERS. *Take your time.* Cement any splits. Strip off some 1/16 in. square and build two FUSELAGE CRUTCHES over the top of each other. When dry, separate from plan and each other, put one on one side and replace the other on plan together with two shaded spacers. Add upper formers (U) at stations shown and 1/16 in. square strips along their tops.

Cut out the FUSELAGE and ENGINE PANELS (9 pieces) and TAILPLANE (2 pieces) making sure of the grain direction. Cement the bottom edges of the two upper fuselage panels up against the outside of the crutch longerons. Now dampen the outside of one of the panels and wait a short while. It will then be possible to curve the wood over to fit the formers. Then cement along formers and stringer and hold panel in place while drying. Now dampen and check that the other panel fits with a good seam before cementing. Add engine panels.

When thoroughly dry remove from plan and replace by the other crutch making certain that the longerons are *exactly* over the shaded lines and cement the lower formers exactly over their stations. Now add central stringer and fin making sure the latter is vertical. Proceed as for the previous half.



Real aircraft in photo and 3-view drawing above give a clue to the shape of the final model. Who'll be the first to make a powered version?

Cut out eight slats of 1/4 in. sheet for the laminated NOSE UNIT or carve from block as shown. Cement 1/4 in. sheet firmly together except the two innermost pieces, which should be lightly tack-cemented as we have to split into two halves later for hollowing. Carve outside shape, using nose plug and former one shapes as a guide, sand, but do not final finish. Split, carve the inside to 1/8 in. wall, and recement together with NOSE PLUG unit which should be carved and sanded to conform.

Make two AIR INTAKES and one TAIL PLUG unit (roughly finished). Make laminated PROPELLER as shown, or finish off a bought sawcut one. Bend UNDERCARRIAGE wire and make legs from 1/4 in. sheet. Discard the jig ribs from the wings and you now have a set of "pre-fab." parts.

To get a reasonable FINISH with the minimum of difficulty, the process should be started before final assembly. Mix equal part by volume of French chalk with half your sanding sealer and give a coat to everything except air intakes, tail plug and rear fuselage panel. Sand carefully, wherever possible, supporting the wood with figer tips immediately behind the part being sanded.

Return the upper fuselage to the plan and secure in place by means of lightly stretched rubber bands held to bench by drawing pins. Add wings (tips 1 3/4 in. above bench) and tailplane (tips 2 in. up), rear fuselage panel between. Remove from plan, cement well along longerons and former joints and hold together with the lower fuselage half until dry.

Add tail plug and air intakes and sand to conform to fuselage lines. Cement undercarriage to former 1, 1.

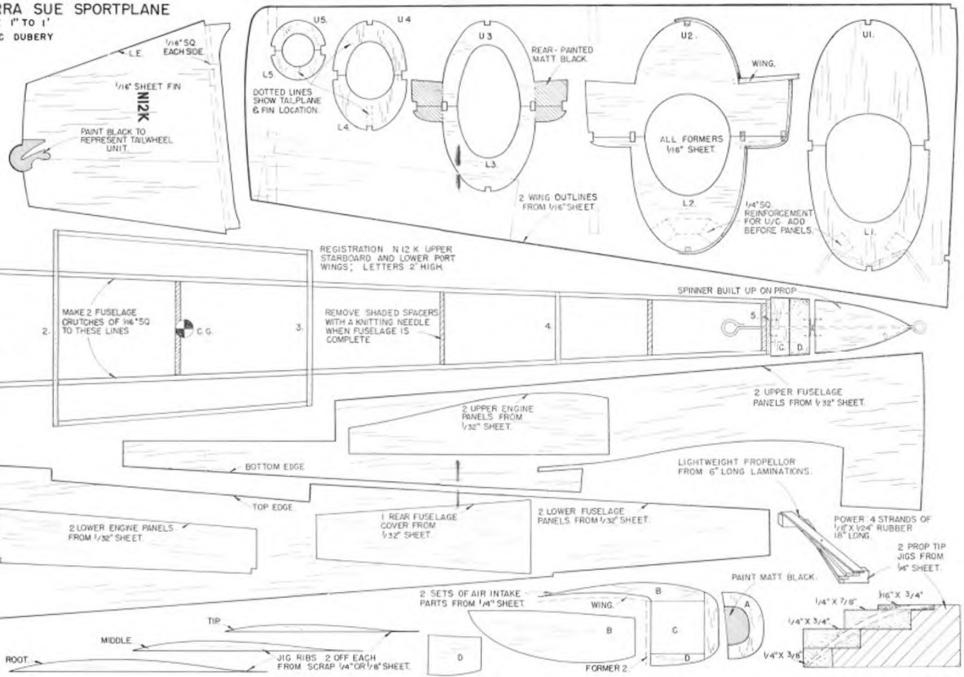
(*Continued on page* 464)

MORE FULL SIZE PARTS OVERLEAF

SIERRA SUE SPORTPLANE

SCALE 1" TO 1'

BY VIC DUBERY



Gadget Review

Hints and tips to improve your modelling

BUILDERS OF JIM WALDRON'S Pelican (March issue) will be specially interested in gadget **A** which comes from the famous Henley fliers. The auto-rudder system used by his Club consists of an operating lever pivoted near the top inside the fuselage, and passing through a slot in the bottom of the body so that a locking peg can be inserted to pull the lever, or trigger, forward. As the ring slips off the towing hook, so the rudder snaps over for the given correct rate of turn. Jim takes this a stage further on his own models by providing fine trim adjustment on the amount of rudder applied as shown in the sketch.

An adjustment lever swings sideways on the rudder trigger lever and a screw regulates movement on this, in turn shortening or lengthening the amount of rudder applied. This little idea is just one of several finer points which have led to the general success of the Henley Club in contest flying.

Large diameter airwheels are expensive items and do not always conform with the desired shape for a scale model. Idea **B** from R. E. F. Hill, of Watford, utilises sheet foam plastic, such as is available from multiple stores for bath mats and stair tread pads, the latter being ¼ in. thick (one 7d. piece is enough for three or four pairs of wheels). As the drawing shows, the wheels are made up of sandwiched foam plastic and balsa and ply discs with a bush to hold the lot together. The assembly should be glued down with balsa cement as the foam forms a perfect key. First cut a ring of plastic and attach it to one side of the wheel core then wrap the outer edge of the ring down and around the other side before fitting the outside ply discs. Embellishment in the way of domed side cones, etc., are added to produce the required effect for a scale model.

One would have thought that pendulum ideas were almost completely exhausted, but Colonel K. S. Binny, of Lymington, offers such a different approach **C** that we thought it would be of interest to all. Angled upwards from a cross bar passing through the rudder, are two sealed tubes each containing a small drop of mercury. Colonel Binny advises this method for radio models with the pendulum rudder mounted above the normal R/C rudder. The action is as follows. During straight and level flight and climb, or in climbing turns, the mercury remains at the lower or rearmost position and has no effect on the turn. If during a turn the nose drops and a spiral dive develops the mercury flows to the forward end of the tube the reaction is a pendulum effect giving a correction according to the turn. The degree of rubber offset can be adjusted by the spread of the two tubes on the cross bar.

Idea **D** is a simple adjustment system on controline handles made from ply for small models capable of flying on fishing line. Pass the line through the handle in the direction of the arrow and you will find a continuous length is very easily adjusted to give equal distance of each line from the handle to the model.

All glow plug operators will like idea **E** which is another very simple device from D. L. Goodsell, of Dulwich College. He uses old paste brushes to make glow plug connectors. The one on the left is a plain metal handle found in most paste pots, having its bristles removed and a lead connected to the battery to make it an ideal plug-on fit for the top of the KLG plug. The other view shows a paste brush handle nipped at the end so that it will just edge between the fins of the engine to complete the electrical circuit.

Who hasn't had trouble drilling holes in engine bearers in your favourite engine? Either the cylinder gets in the way of the choke so that you cannot use the engine for an accurate template or your measurement goes haywire and you end up with very weak bearers and four large holes.

Gadget **F**, from C. Clutterbuck of Yeovil, is a straightforward approach using a metal template which can be clamped on the engine bearers or held in position with rubber bands. Once you have made templates like this, you will have absolutely no bother at all drilling your engine bearers on your models. Also for the engine men is gadget **G** which comes all the way from Finland, where S. E. Lindberg has been using this downthrust adjuster for some time. The idea is self explanatory with a pivot point through a lug mounted on the front bulkhead and wing nuts clamp on this and a stud at the rear of the bearers. Down or up-thrust can be adjusted as you want, and the exact angle in degrees can be indicated on your fuselage.

Solid model enthusiasts will appreciate D. Dickie's idea **H** which is just the thing for obtaining a clean finish in your jet tail pipe! A piece of dowel has a small portion of sandpaper glued on to the end and an extension is used to wrap down the side of the dowel; this can be pushed and rotated in a roughly carved jet pipe, leaving a perfectly smooth wall which looks fine with a coat of matt black dope.

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There is nothing new in idea **K** but we print it to refresh the memories of many rubber fans and also for the novices who have yet to learn about shaft stops and folding propellers. Every folding propeller has its best position, this being when the blades are near to being flush with the fuselage sides and it is desirable to arrange the stop on the propeller shaft so that when the rubber motor tension decreases, the propeller is arrested and settled in the right place. L. Jackson of Ilminster lets an 18 gauge brass bush into his hardwood nose block and taps this bush for an 8 B.A. stop bolt which can then be adjusted in and out, so that the propeller folds at the right moment. The actual position of the propeller when this happens will depend on the relationship of the stop on the actual propeller shaft.

Simple gadgets always have a greater attraction and one of the simplest we have seen for quite a long while, yet offering a most useful purpose, is that seen in **L** by K. A. Bent of Torquay. Take an ordinary car fuse, which is a glass tube with metal cap ends, and remove the fuse material, replacing this with cotton wool. The brass end caps can be widened out to take fuel tubing and as shown in the sketch the unit now becomes a fine fuel filter which can be dismantled as required and clean cotton wool changed to ensure that only the purest of fuel can reach your favourite engine!

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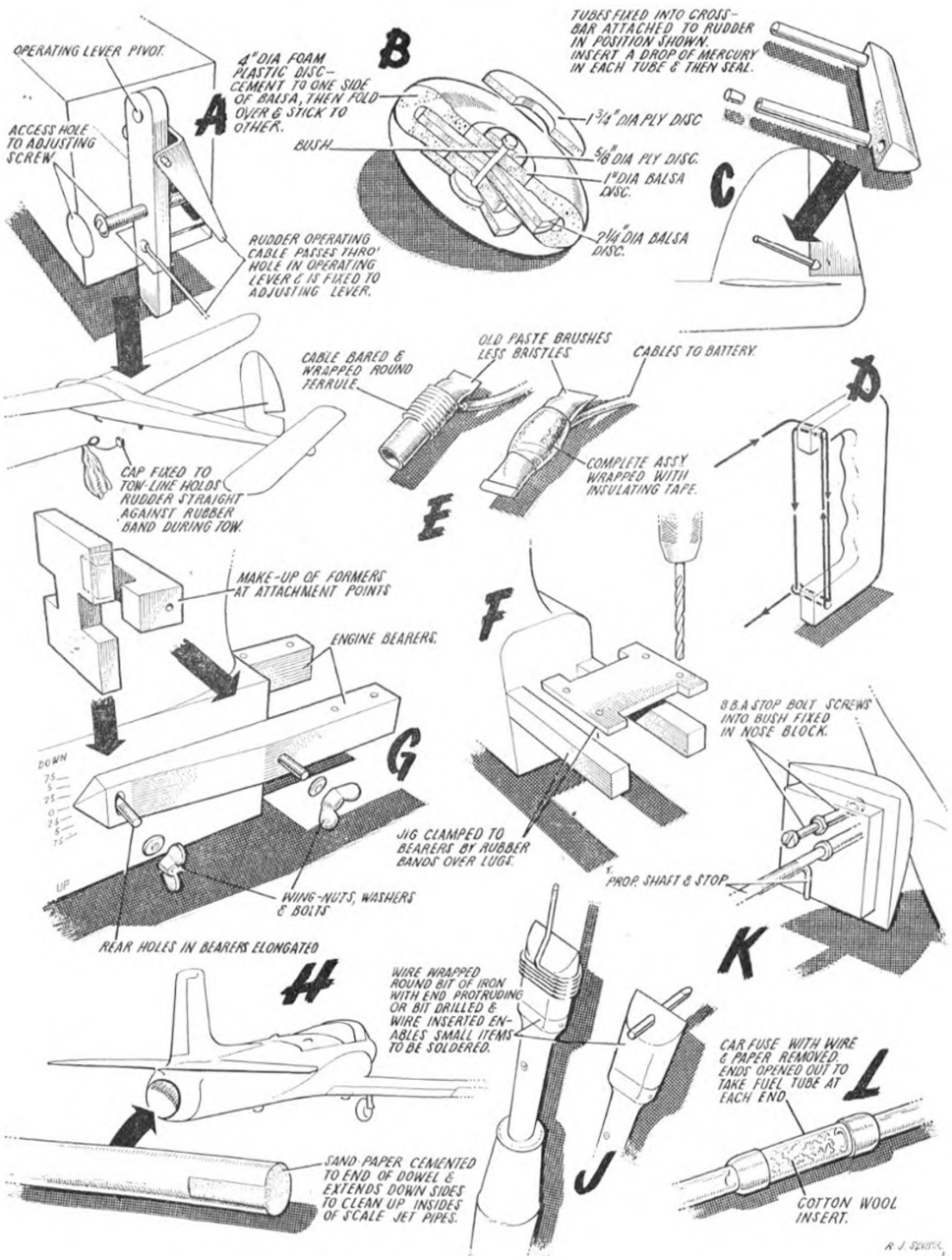
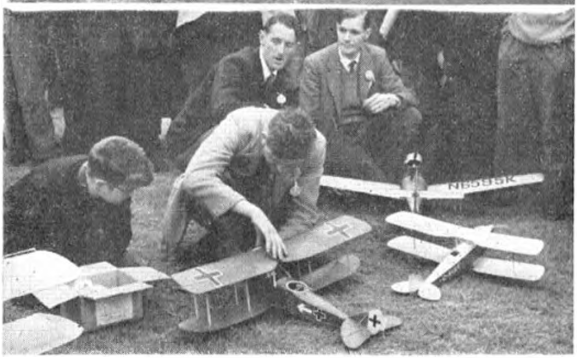

A
OPERATING LEVER PIVOT.
ACCESS HOLE TO ADJUSTING SCREW.
RUDDER OPERATING CABLE PASSES THRO' HOLE IN OPERATING LEVER & IS FIXED TO ADJUSTING LEVER.
CAP FIXED TO TOW-LINE HOLDS RUDDER STRAIGHT AGAINST RUBBER BAND DURING TOW.
B
4" DIA FOAM PLASTIC DISC— CEMENT TO ONE SIDE OF BALSA, THEN FOLD OVER & STICK TO OTHER.
BUSH
1 3/4" DIA PLY DISC
5/8" DIA PLY DISC.
1" DIA BALSA DISC.
2 1/4" DIA BALSA DISC.
C
TUBES FIXED INTO CROSS-BAR ATTACHED TO RUDDER IN POSITION SHOWN. INSERT A DROP OF MERCURY IN EACH TUBE & THEN SEAL.
D
E
CABLE BARED & WRAPPED ROUND FERRULE.
OLD PASTE BRUSHES LESS BRISTLES
CABLES TO BATTERY.
COMPLETE ASSY WRAPPED WITH INSULATING TAPE.
F
G
MAKE-UP OF FORMERS AT ATTACHMENT POINTS
ENGINE BEARERS.
DOWN
UP
JIG CLAMPED TO BEARERS BY RUBBER BANDS OVER LUGS.
WING-NUTS, WASHERS & BOLTS
REAR HOLES IN BEARERS ELONGATED
H
SAND PAPER CEMENTED TO END OF DOWEL & EXTENDS DOWN SIDES TO CLEAN UP INSIDES OF SCALE JET PIPES.
J
WIRE WRAPPED ROUND BIT OF IRON WITH END PROTRUDING OR BIT DRILLED & WIRE INSERTED ENABLES SMALL ITEMS TO BE SOLDERED.
K
B.B.A STOP BOLT SCREWS INTO BUSH FIXED IN NOSE BLOCK.
PROP. SHAFT & STOP.
L
CAR FUSE WITH WIRE & PAPER REMOVED. ENDS OPENED OUT TO TAKE FUEL TUBE AT EACH END.
COTTON WOOL INSERT.
R. J. SEWELL

ROUND the RALLIES



AEROMODELLER covers the Clwyd Slope Soaring Meet, Northern Heights Gala, Stockport Express and West Hants Rallies, Enfield C/L Gala

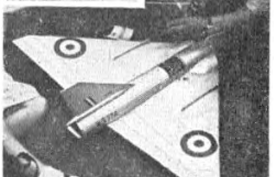
SUNDAY, JUNE 17TH, at the Vale of Clwyd, North Wales, saw the Chester Club's annual slope soaring rally where entries were good and weather conditions reasonable for this type of flying. There were no models in attendance designed specifically for slope soaring, most people being content to bring along their normal towliners and "chuck 'em about".

Highlight of the meeting was undoubtedly D. Bailey's radio controlled glider flight mentioned in last month's "Hangar Doors". Some idea of the size of the model can be gathered from its twelve-inch wing chord and all-up weight of 10 pounds. Wing section is MVA 301 and the tongue made of $\frac{1}{8}$-in. steel plate! Receiver is a modified Ivy. After a preliminary unsuccessful sally the model was launching for its second flight with "Lord Gosling of Clwyd" giving Don Bailey guidance on the gentle art of slope soaring. The model had just sufficient velocity to make headway against the wind, was spiralled down when it climbed too high, and circled back when it flew too far out, until it was deliberately landed like a feather on the downward side of the ridge some 14 min. 16 sec. later.

Slope soaring, whether free flight or radio controlled, is a fascinating subject and this excellent meeting is well worthy of better support than afforded on this occasion. What about it you glider kings!

Typical Northern Heights sunshine warmed the grassy surface of Halton Aerodrome on Sunday, July 8th, for this long-established club's annual gala.

Heading: Combateers in hot pursuit at Enfield. Right: Bleak slopes of Clwyd, North Wales, as modellers climb to the top. Underneath is a scale gathering at Woodford, ready for the E. J. Riding Trophy. Between Rumpler Bipe and Colonial Skimmer is the winning D.H. Fox Moth. Left: J. Chadwick collects the Gosling Trophy from its donor at Clwyd, for best flight of the day. Bottom: Youthful enterprise at Enfield was shown by M. Hales, D. Carter and P. Archer (Cosmo Club) with their all-sheet twins



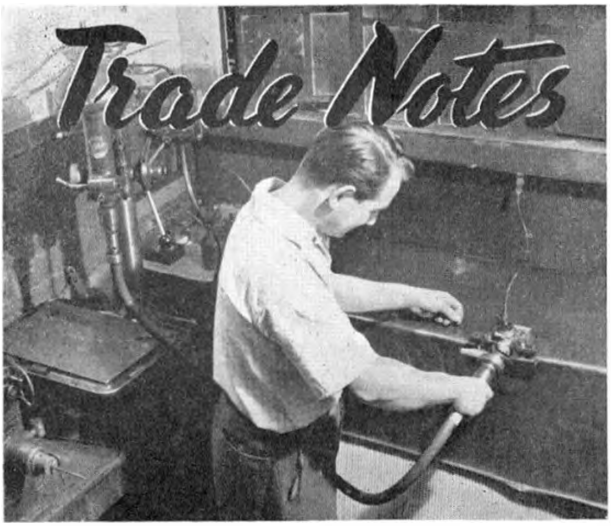
At Northern Heights: 1 Mr. Bamsay (Letchworth) demonstrates his r/c pusher before an international audience. Capt. Hawkins, U.S.A., C/Capt. Saw, Australia and R.A.F., and Father Amiard of France. 2. Bill Lunn of Victoria Club had a most streamline tailless model

3, Collins, Smith the pilot and Edmonds chapped their way through to win combat for High Wycombe. 4, Queen Elizabeth Cup winner, Bruce Rowe of St. Albans, with his Harvey Wakefield and the magnificent Trophy. 5, Flat plate wings, no washout, little dihedral and a tailless biplane, yet it flies like like a dream! H. Males made this Dart-powered replica of the amazing 1912 Dunne aircraft. 6, Phil Smith prepares his latest "IMP" model, the Fairey Delta 2 with Allbon Spitfire diesel and new multi-blade fan—a fine flier with an enormous long nose. 7, At Andover, the Northern Heights team control their glider in a fine four-minute flight. 8, Sid McGoun's winning racer at Enfield in the hands of capable pit man Len Steward. 9, Achieving fast popularity is the all sheet combat model, typical one is by M. J. Dumble of Epsom for Amco 3.5

General impressions as we ambled around the various events were that radio control flying gets worse instead of better; that in combat skill in argument must equal skill in flying if one is to reach the final, and only then does the real argument start! We marvelled at the diversity of design that these large galas bring forth, double deltas, flying wing biplanes and helicopters being but a few of the many examples seen. We were baffled, too, when espying a bare midriff coupled with a ducted fan Mig 15 to find that it was *not* P. E. Norman. Talking of ducted fans—we were almost pierced by Phil Smith's latest prototype of the Fairey Delta II, which, in view of its long proboscis, is a missile to be avoided when travelling at head height. The Queen Elizabeth Cup this year was for models to the famous Wakefield formula and was won by young Bruce Rowe of St. Albans with the latest of his "Harvey" series. Beautifully built, the model has 232 sq. in. of wing and 59 sq. in. of tailplane, weighs 8¼ oz. and used 13 strands of ¼ Pirelli rubber.

Farther North at Woodford Aerodrome another "AERO-MODELLER" reporter was anxiously surveying a somewhat depressing outlook which threatened to provide the proverbial music hall Manchester weather. Fortunately for the large crowd of spectators and competitors at the "*Stockport Express* Rally" (formerly "*Daily Dispatch* Rally") the day remained dry

Trade Notes



AS MENTIONED in last month's *Motor Mart*, the **ETA 29** is back in production at the Watford factory of Eta Instruments Ltd., and we paid a visit to the factory to see how the new Mk. IV's were coming along. Ken Bedford was about to put one through its paces on the bench (*see photo above*) and we were soon treated to the yowl of a new motor being checked out. Every engine has to surpass 17,000 revs on an 8 x 4 standard prop, using straight methanol/castor fuel, and is then examined for ring, disc or shaft leaks. The new Eta's are set up to a different standard than before. They are relatively tight (electric flexible drive is used for the initial start at the factory) and call for at least an hour's running in. Races are carefully aligned with a minimum of power loss in the shaft, and every effort is being made to see that quality and performance of this All-British product (all except the ball-races is made in the Watford factory) is top of its class.

Flying scale is catered for by the latest **Frog Senior** series with around 22 in. span, and selling at 5s. We built the *Moth Minor* (others are the *Seamew* and *Cessna Bird Dog*) and it performed most happily in the test area by "AEROMODELLER" Offices. Take-offs, climbing tight turns, and smooth glide descent come automatically with a fine piece of designing and kit engineering.

Also from the Merton factory are the plastic scale solids for the *Sabre*, *Westland Whirlwind Helicopter* and *Hawker Hunter*. The *Canberra* has also been assembled by us. One cannot deny that these are nice models, and very reasonably priced from 5s. 9d. up to 8s. 6d.

For the real enthusiast however, there is plenty of scope for individual improvement on these plastics, and removal of the Clyde-side size rivets on the Canberra is a number one recommendation. Colouring in correct camouflage can be most effectively applied in oil paints *not* cellulose dopes.

To come in the Frog plastic range, are the De H.11 0,Meteor 8, and Hawker Sea Hawk, which will round off a nice range of the more popular subjects in service with British Forces today.

Now that the **E.C.C.** company are no longer in active production, the news that George Davie of 7 Davidson Road, Thorpe, Norwich, will be able to service the famous E.C.C. receivers, is welcome indeed for all who are in trouble with their little black boxes and do not feel qualified to take things into their own hands.

Some idea of the wide range of **Britfix** products is given by the smartly produced colour brochure issued to most model-shops in recent weeks. We hope it will help to show some retailers a few lines they could well stock on their shelves. In particular, the Humbrol enamels seem to have a good demand, yet cannot be found in many shops, although perfect for the plastics and models wanting extra high gloss finish. And don't forget the famous Britfix solvent remover Mr. Dealer when you make up your order—its just the thing for removing cement smears from trousers, etc.

New from **KeilKraft** are two more Flying Scalers. The *Westland Lysander*, always a favourite, joins the 3s. 9d range, complete with plastic wheels, cowl and prop. If we know our young modellers, this will be an immediate choice for most who like these 15-20 in. rubber driven models.

Much larger is the new Star series, opened with a *Short Seamew* of 28 in. span, with moulded cockpit canopy, plastic prop and wheels, clear printed sheet and partly stripped wood. The Seamew kit was produced with the full co-operation of Short Bros. and Harland of Belfast, and first glance at the plan reveals that this is a model one can really enjoy making.

We like the touch of artistry in illustrating the expended cement tube used for balance in the nose, something which will not be needed by those who make the inevitable conversion to a power model for baby size engines. Price of the Seamew is 9s. including tax.

Frog Senior Scale Kit for Moth Minor at left Right: Frog solids in plastic: Sabre, Whirlwind and Hunter

A 33½" SPAN G/L COMBAT MODEL FOR 2.5 TO 3.5cc ENGINES

SHRIKE

DESIGNED BY
W. Courtier

4'9

THE AEROMODELLER PLANS SERVICE
38, CLARENDON RD., WATFORD, HERTS.

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED

MATERIALS REQUIRED	
SHEET BALSA 36"LONG	MISCELLANEOUS
1 SHEET OF 3/32"X 3"	25" OF 5/16"SQ HARDWOOD
" " " 3/16"X 3"	1 LENGTH OF 18 S.W.G WIRE
" " " 1/4"X 3"	" " " 16 " "
STRIP BALSA 36"LONG	2"X 4" OF 1/16" PLY
1 STRIP OF 1/2" SQ	1"X 3" OF 16 S.W.G DURAL

COVER WHOLE MODEL WITH SILK OR HEAVY MODELSPAN AND GIVE FOR 3 COATS OF CLEAR DOPE

3/32"X 1/4" CAP STRIPS

3/16" SHEET TIP FIN

LINE GUIDE

W7

W6

W5

W4

W3

W2

W1

1/4" SQ SPACERS

RIBS:
W1 TO W4 BUILT UP WITH 1/4"X 3/32" STRIP
W5 TO W7 3/32" SHEET

1/16" PLY LINE GUIDE

3/16" SHEET TIP FINS 2 OFF

3/16" SHEET END PLATES 2 OFF

A.M. 35 SHOWN.

1/4" SHEET SPAR

1/4" SHEET TOP & BOTTOM

1/4" SHEET

CUT OUT TO SUIT TANK

3/16" SIDES

5/8"SQ HARDWOOD BEARERS

5/8"X 1/4" SPACERS

18 S.W.G. WIRE LEAD-OUTS

16 S.W.G DURAL BELLCRANK

1/2" SQ L.E.

CUT OUT FOR L.E.

CUT SIDES TO ALLOW FITTING OF L.E.

16 S.W.G WIRE PUSH ROD

1/4" SHEET PACKING PIECES

1/4" SHEET SPAR

CUT-OUT FOR BELLCRANK

CUT OUT FOR SPAR

1/4" SHEET FIN

1/4"X 3/32" CAP STRIP TYPE RIBS

CUT OUT FOR T.E.

1/4" SHEET T.E.

1/4"X1⅞" T.E/SPAR

NOTE. ASSEMBLE WING OUTLINE COMPRISING SPAR, L.E. & T.E./SPAR WITH THE FUSELAGE SIDES THREADED ON. ADD REAR T.E. COMPLETE FUSELAGE & ADD RIBS.

LINEN HINGES

3/16"SHEET END PLATES

SCRAP BLOCK

3/16" SHEET T.E.

3/16" SHEET ELEVATOR

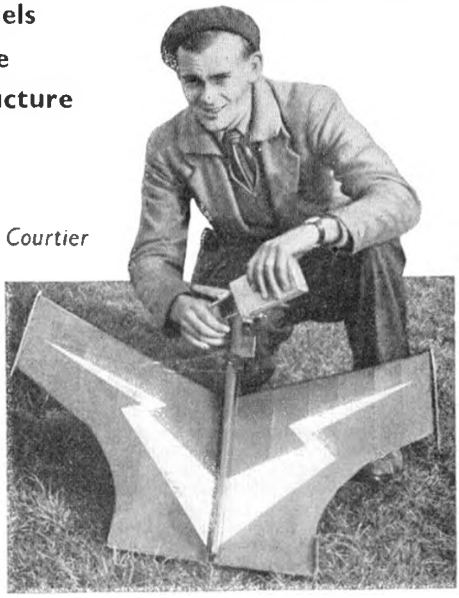
18 SWG DURAL ELEVATOR HORN

PUBLISHED AEROMODELLER SEPTEMBER, 1956

GL 634

A new shape in control-line models for sport aerobatics or aggressive combat flying. Extra simple structure reduces building time to three evenings. Why not try one?

designed by W. Courtier



SHRIKE

COMBAT FLYING is catching on fast and everyone is looking for a model that can be built with a minimum of time and expense, yet still stand up to the rough and tumble of occasional crashes and will retain a reasonable appearance. Why not consider this swept forward wing for your next controline model?

The Shrike is fully aerobatic, although it takes quite an amount of height to execute a vertical eight and it is by virtue of its planform, quite fast on the end of a pair of lines. It suits any engine from 2.5 to 5 c.c., but as most of the Combat regulations limit maximum capacity to 3.5 c.c., this capacity is recommended.

Construction

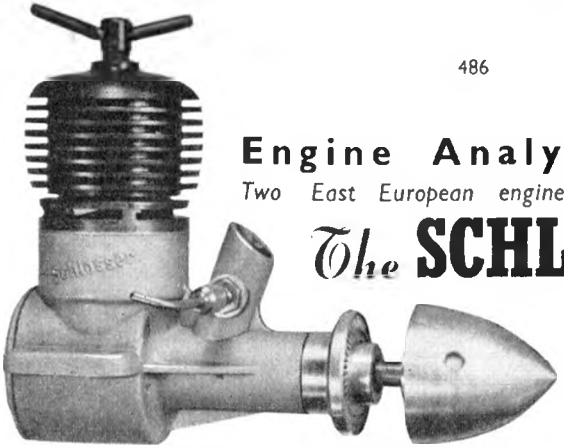
Building commences by mitre joining the leading and trailing edges at the correct sweep angles and reinforcing this joint with cement soaked cloth or gauze. Leave these parts to set completely whilst cutting out other components, notably the $\frac{3}{16}$ in. fuselage sides which have holes cut out for the leading and trailing edges. Pin the sides around the stout $\frac{3}{8}$ in. square hardwood engine bearers and check to see that the holes cut for the leading and trailing edges of the wing are correct. If this is satisfactory the fuselage can be dismantled and the bearers cemented firm on one side and then fit the bellcrank pivot bolt to the upper bearer, fit spacers and also the L.E. T.E. spar and the $\frac{3}{16}$ in. "tailplane", threading on the second side.

Fit ribs W.7 with the assembly over the plan as these enable the wing to be checked for accuracy, then revert to W.1, working outwards to each tip by applying $\frac{3}{32}$ in. strip rib contours "blocked" out from the spar and trailing edge. If medium hard sheet is used to strip the $\frac{3}{32}$ in. caps, it will be found that the contour follows automatically, and construction is remarkably quick. $\frac{1}{4}$ in. square spacers between upper and lower contours are a wise precaution against breakage when the model is subsequently handled.

Finish with ribs W.5 and 6, add the tip fins and $\frac{3}{4}$ ounce balance weight in the outer tip, the line guide and then fit the bellcrank assembly. The elevator is tape hinged in the conventional manner to the "tailplane" and connected to the push rod, which is external and easily adjusted. Finish by adding $\frac{1}{4}$ in. sheet top and bottom to the fuselage, the offset fin and mount the engine and tank.

Cover the model with heavyweight Modelspan tissue, using several coats of clear dope before colour doping to suit your personal choice.

In flight the Shrike is steady as a rock and gives a steady pull on the lines no matter what the attitude of the model. Unlike the conventional "point-first" Delta, it is extremely ready to execute all aerobatics and its appearance at any model meeting is guaranteed to cause a stir—why not be the first with one in your club?



Engine Analysis Number 25

Two East European engines reviewed by R. H. Warring

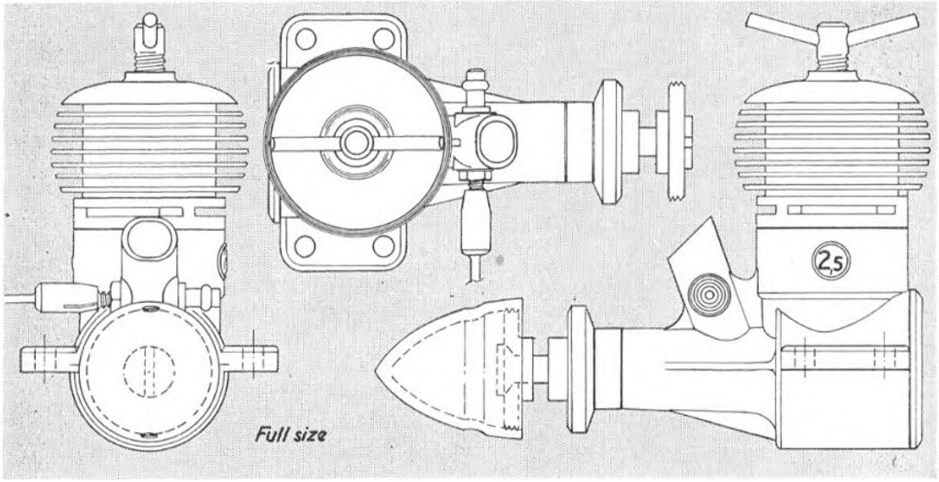
The SCHLOSSER 2.5 cc.

IF WE START by saying that this engine retails at thirty shillings it will probably give a wrong impression of its quality and performance. Produced in the East Zone of Germany, the Schlosser is an extremely fine example of production engineering with considerably more work done on it than most comparable Western engines, and for a plain bearing engine, its performance is right in the top class. Certainly it would not be possible to fabricate an equivalent engine in this country to sell at anything like the price.

The Schlosser is quite conventional in design, with the exception of the propeller fitting. This consists of a soft steel bolt screwing into the crankshaft, which is quite ordinary in itself, but the edge of the front washer is threaded and onto this screws a light hollow spinner. The arrangement appeared a little agricultural at first, but after handling the engine through dozens of propeller changes and having to fit the spinner each time as a convenient contact surface for the tachometer, we ended by thoroughly approving it. You *could* lose the spinner if it was not screwed on tight and the engine cut sharply, but the whole arrangement seems far less clumsy than the usual type of solid spinner nut.

The crankcase unit is a very clean pressure die casting, most attractively finished by shot or vapour blasting. It appears that the back cover is screwed into the crankcase for this finishing operation. The cylinder is quite thick walled, of hardened steel, screwing into the crankcase on well formed threads, It is sealed by two thin aluminium gaskets and beds down on the machined-off top face of the crankcase casting. Exhaust ports are cut in the thickened cylinder flange in the usual manner, whilst six almost semi-circular transfer ports are formed on the inside of the cylinder to a distance of approximately $\frac{1}{16}$ in. below the bottom of the exhausts.

The crankshaft is of generous section, .315 in. diameter and with a journal length of 1 $\frac{1}{4}$ in. The front end is tapered to accommodate the prop driver and the shaft is finished by grinding all over (including the edge of the crank disc). Crankpin diameter is .197 in., the rear face of the crank web also being ground to a mirror finish (presumably by the edge of the wheel in grinding the crank pin.) The intake passage drilled through the centre of the shaft does not extend past the port



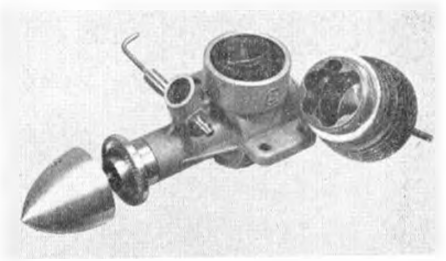
opening, this being rectangular in section with the longest dimension parallel to the shaft.

The shaft runs in the crankshaft casting, the bearing surface of which is very highly finished. The casting also has thick walls at this point. Again we would say a really excellent fit and finish for these two mating surfaces. The crankpin is drilled through to distribute oil to the thrust face. The crankcase fit is a little "tight" due possibly to an original design error, so that a shallow groove has had to be machined in it to give clearance to the con. rod big end. This still leaves adequate metal for strength in this region.

Of the remaining features, the cylinder jacket is of dural, anodised blue, screwing onto the cylinder. The intake tube cast in with the crankcase rakes forward and brings the needle valve uncomfortably near the propeller disc, but the needle thimble itself, although of simple design, is carefully soldered and just right as regards friction fit.

Starting characteristics are excellent, finger choking being adequate with the compression slackened off. Both controls are not critical and the compression can be used as an effective throttle. Reducing the compression over a matter of a turn or so enables the engine to be throttled right down to almost any speed, regardless of propeller load and it will continue to run consistently at a mere tick over. Thus hand starting is easy and safe, even with the smallest sizes of propellers.

The performance curves as given perhaps rather flatter the Schlosser. It certainly develops a remarkably high power for a plain bearing engine of this size, but at certain speeds—between about 10,000 and 12,000 r.p.m.—it is not entirely happy and loses a lot of power on warming up. On propeller loads, for instance, the change in note is most apparent and rather too rapid to measure both initial (peak) and end (steady) r.p.m. for comparison. At higher and lower speeds there is far



Large transfer passages are milled "Amco style" in the lower cylinder

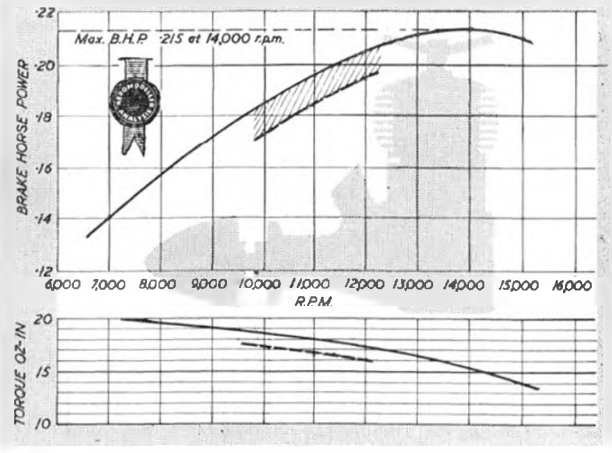
less tendency for the engine to "die" on warming up, so that around 13,000 r.p.m. say, the engine starts and holds a steady speed.

This could possibly be bearing trouble, the load on a bearing tending to decrease with increasing speed (since the torque or effective pressure producing the torque decreases with increasing speed). This "unhappy" area is indicated on the graphs and would appear to be one to avoid with this particular specimen, although not necessarily general to the design itself. The engine again appears to be in trouble at speeds of 15,000 r.p.m. and more on light wooden propellers, although much better in this range of plastic propellers. Our overall impression, too, was that although the performance was high the general behaviour over the most useful speeds was not as good as most of the British engines of similar size. We cannot help thinking though, that thirty shillings for this class of production and workmanhsip leaves little room for criticism. And we imagine that British manufacturers are thankful that it is never likely to be available in this country at anything like that price! *FOOTNOTE: This diesel was used by E. German entries at the Soviet Internationals* (*P.*462).

PROPELLER–R.P.M. DATA

Propeller dia. pitch	*r.p.m.*
9 x 4	9,500
9 x 8	7,300
9 x 4	9,800
8 x 8	9,250
8 x 5	11,400
7 x 6	13,350
7 x 5	15,000

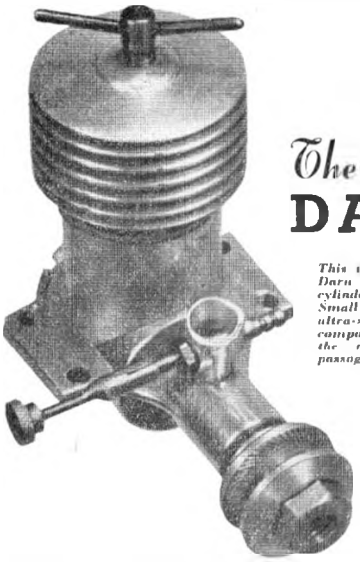
Stunt propellers, Mercury No. 8 fuel



SPECIFICATION

Bore: .603 in.
Stroke: .521 in.
Displacement: 2.496 c.c. (.1488 cu. in.)
Bore/Stroke ratio: 1.16
Bare weight: 3½ ounces
Max. B.H.P.: .215 at 14,000 r.p.m.
Max. torque: 20 ounce-inches at 7,500 r.p.m.
Power rating: .086 B.H.P. per c.c.
Power/weight ratio: .0575 B.H.P. per ounce

The DARU



This view typifies the Daru with its "tall-cylinder" appearance. Small crankcase for ultra-short stroke, the composite piston, and the milled transfer passages are revealed at right

SPECIFICATION

Bore: .632 in.
Stroke: .457 in.
Displacement: 2.35 c.c. (.1433 cu. in.)
Bore/Stroke ratio: 1.38
Bare weight: 4 ounces
Max. B.H.P. (approximate): .154 at 11,000 r.p.m.
Power rating: .0655 B.H.P. per c.c.
Power/weight ratio: .039 B.H.P. per ounce

PROPELLER R.P.M. FIGURES

Propeller dia. pitch	*r.p.m.*
9 x 4	9,100
8 x 8	8,200
8 x 6	9,500
8 x 5	10,500
8 x 4	11,200
7 x 6	11,500
7 x 4	12,500
7 x 8	11,300
6 x 4	14,400
8 x 8 (TR)	9,400
7 x 6 (TR)	9,400

All Stunt propellers

THIS HUNGARIAN ENGINE has all the appearance of a hand-made product, utilising the minimum of machine tools. In appearance it is rather austere and not particularly well proportioned, yet it starts and runs well and gives a good average performance for a plain bearing engine of this capacity.

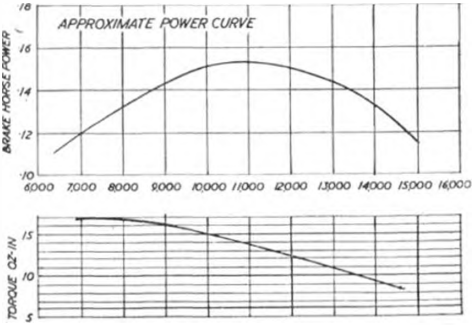
The crankcase appears to be a gravity die casting in light alloy (it might be a sand casting) which has been bright finished on the outside, presumably by buffing. The cylinder is a somewhat massive affair of soft steel screwing into the crankcase on a rather coarse thread, but of adequate length, sealing with a couple of gaskets. Six by-pass ports are milled on the inside of the cylinder to just below the level of the exhaust flange. The cylinder jacket is quite large in diameter, machined away into deep fins. This screws onto the top of the cylinder.

Piston assembly is of composite construction. A light alloy insert screws into the piston shell, the gudgeon pin being mounted on this insert. There is an appreciable amount of hand working on this assembly which appears to be more than adequate for its duty. However, there is the distinct possibility of the cast iron piston shell being distorted due to the greater rate of expansion of the aluminium core as the engine heats up, which is commonly a failing with this type of piston construction.

The contra piston is turned from dural. When the engine is cold it is a nice easy fit in the cylinder. After a short period of running, however, it virtually "freezes" in the cylinder due to its high rate of expansion and is almost impossible to adjust smoothly. In fact, the only satisfactory adjusting technique was found to be to back the compression right off with the engine cold, start rich and gradually advance the compression up to the correct setting. If over-compressed at this stage, the contra piston would not go back if the adjusting screw was slackened. Hence it is difficult to get optimum settings on this particular engine being virtually limited to a one-way-only compression adjustment once the engine is running (and adjustment that way still far too stiff for comfort).

Apart from this particular feature the "Daru" was pleasant enough to run. It started readily on all sizes of propellers right up to a 6 x 4 Frog nylon, exhibiting no particular viciousness with the smaller propeller diameters. It appeared happiest running slightly rich and although it continued to run consistently and well right through the range of speeds tested, power fall off was quite marked beyond about 11,000 r.p.m. The torque and power values extracted are approximate since this particular engine was not tested on the dynamometer.

A "straight" diesel fuel was used for test running, since a nitrated fuel would only have aggravated the difficulty of arriving at a stable compression setting. Despite the lack of "dope", no missing was experienced at speeds right up to 15,000 r.p.m., although, undoubtedly the higher speed performance would have been improved somewhat had it been possible to employ a nitrated fuel. Even so, its performance would still have been down on the best of the British 2.5's.



Czech c/l Contest

We have chosen just a few out of many photos taken at this contest, showing the high standard and diverse selection of types, mainly Russian and Czech origin. Top left: Nagovsky's Yak 18 trainer has the model engine camouflaged in scale cylinder fairings. Right: Gigantic 15 ft. 8 in. Zlin 26 has a 90 c.c. engine, takes three to fly it, and weighs 90 lb.—surely the world's biggest c/liner?

High wing model with Soviet Star insignia is Hudek's Yak 12R, and the twin to the right of it is a Super Acro 15 with a pair of 2.5 c.c. diesels. This has an electrically-operated undercarriage, is about 45 in. span, and was voted best made model of the meeting, built by Beno

Above, left: Simonik's model of the Zlin 22 had a pressed cockpit with full interior detail, telescopic undercarriage, and inverted engine. At right, above: A beautifully-made Zlin 381 by Jakubcik having neatly built up cabin structure and almost hidden engine cylinder. At left: The Czechoslovakian utility aircraft, the Brigadyr, is generally selected for free flight. This one by Pecenka is control-line, having a third line to operate the powder sprayer seen below the fuselage. Windmill on top is to scale from full-size

Big control-line models are popular in Czechoslovakia, this Zlin being over 9 ft. 6 in. span, having a 45 c.c. engine and fully controllable on its long lines. This one is by Burek who also made the engine. A full-sized development of the Zlin 26 Trener the 226 with larger engine, was flown recently in the International Aerobatic Contest in connection with the National Air Races and King's Cup. All who saw it performing outside loops, classic inverted flight, and other indescribable manoeuvres cannot fail to agree that it is a fine subject for c/l aerobatics as well

A FABULOUS BIPLANE OF 1906 VINTAGE BY THE FAMOUS DANISH AVIATION PIONEER

FEW PEOPLE IN THE English-speaking world will have heard of Jacob Christian Ellehammer; but this worthy gentleman was a character of great renown in his native Denmark. As an aviation pioneer his remarkable achievements and inventions have made such an impact on the Danish public that on September 12th this year they celebrate the 50th anniversary of his first flight with the amazing aircraft depicted opposite.

These celebrations will include a travelling exhibition of two full scale replicas of the 1906 and 1909 Ellehammer aeroplanes which have been specially built by enthusiasts. In addition, an aeromodelling competition was organised by the Danish Aero Club for miniature replicas of these same types and the Ellehammer Cup was presented to the winner, Bjarne Felsted Jacobson of Copenhagen, by H.R.H. Prince Axel on the occasion of an exhibition in May this year. Prince Axel was himself an aviator in 1913 and an old friend of Ellehammer, whom he had known from 1904 when he bought and drove motorcycles of Ellehammer design and from whom he had learned most of his knowledge concerning internal combustion engines.

Ellehammer designed and built an air-cooled radial three cylinder engine in 1903, probably the first air-cooled radial in the world. He experimented with kites and with models (one powered by a CO_2 engine), and in 1905 he built a monoplane with which he began experiments in January, 1906, on a small island where he made a circular track (round the pole flying!).

Later that year with a more powerful (20 h.p.) radial engine he made his first flights using the biplane as opposite, and on September 12th he concluded his experiments on the island after making a flight of 137 ft., maintaining an altitude of 18 in. above ground!

He continued in 1907 near Copenhagen with a triplane powered by a 5-cylinder radial, and in 1908 he won a prize of 5,000 marks at a meeting in Kiel for the first flight from German soil (11 seconds!). In 1909 he made a flying boat as well as a monoplane which in 1910 was one of those competing for the first flight over Oresund, but here Ellehammer was not so successful.

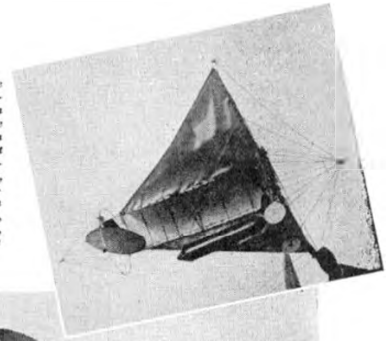
Then he stopped work on aeroplanes, but continued to develop his engines which now were 6-cylinder, two-row radial. During the war he even made a 12-cylinder unit. In 1912-13 he made a helicopter which lifted itself in the presence of, among others, H.R.H. Prince Axel, President of the committee for the Ellehammer year. After that he devoted his energy to a number of other inventions, among which is included a model of jet driven helicopter built in the middle 'thirties—truly a pioneer of aviation!

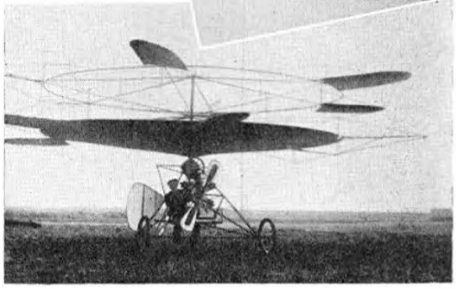
As will be seen in the 1/60th scale reproduction of the original Danish drawing, opposite, the 1906 "biplane" is unique in more than one respect.

Points to note are that the elevator was pendulum controlled, but exactly how the device worked on the original remains cloaked in a cloud of mystery. It is known that on the very first aircraft the propeller was situated above the engine and pilot, with engine and propeller moving as a pendulum, but when the propeller was moved forward as shown on this drawing it could hardly have moved without some more complicated drive system.

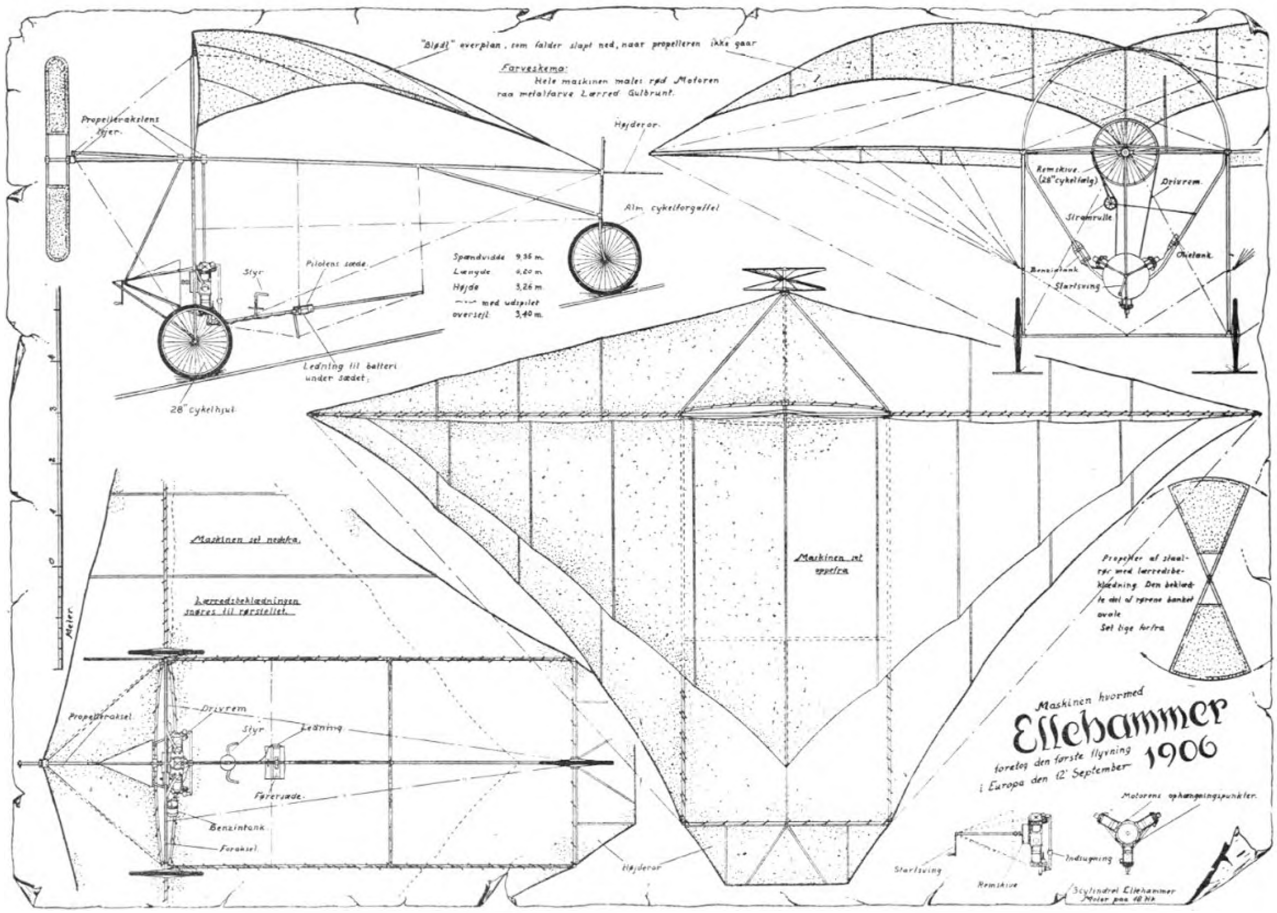
Wing loading of the biplane was incredibly low as the span of 30 ft. 10 in. offered an enormous amount of wing area for the comparatively low weight. While the lower wing was held more or less rigid through bracing and steel tube structure, the upper wing relied entirely upon the slipstream to maintain its form and acted more in the manner of a sail.

It would be interesting to see if anyone could make a flying scale model operated using the same principle!





Heading shows the historic first Ellehammer flight in 1906, below it is the 1907 Triplane with 5-cyl. radial. At right: the CO_2-powered model, similar to the aircraft illustrated in Hangar Doors, p. 458, and below, the remarkable 1912 Helicopter



Annotations are left in original Danish, and can be interpreted phonetically in most cases: e.g., Styr for Steering, Hjul for Wheel

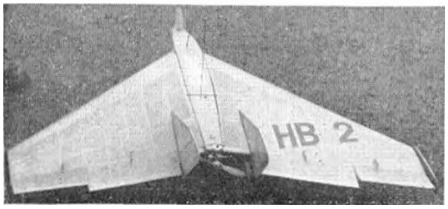
RADIO CONTROL NOTES

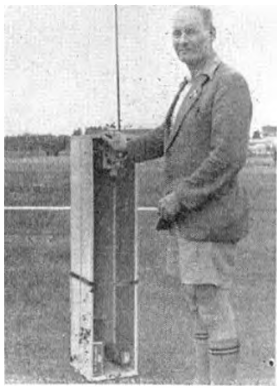
Conducted by Howard Boys

THESE ARE THE FIRST of these "Notes" to be written since returning from the contest in Belgium, so perhaps the writer's own impressions of that contest will be of interest.

The most outstanding point was the success of the Swiss team who having entered three competitors in each single control class, gained first and second in the power section, and first, second, and third in the glider class. They were all using flapping rudder proportional control which they said they took up after seeing the writer's demonstration of them two years ago. (Just raise your hats to the writer please!) (Or do you want to kick him in the pants for showing someone else how to win?) Our Mr. Fisher came fourth with a similar control system, and it is interesting to note that his aggregate was the second highest. It is obvious that now, to win this contest in future, proportional control is essential. The rules require more precise manoeuvres than are specified for the present contests in this country. From take-off the model has to fly a straight line upwind to a pylon, around which it turns one and a half circles to the left. It then comes straight downwind and does a figure eight with the centre over the centre of the landing circle, starting with a circle to the right and finishing with one to the left. Then comes a right angle turn to the right, and a flight in a straight line across wind to another pylon around which two turns in a spiral dive can be made. After that the model descends and approaches the landing circle from downwind. This circle is 50 metres diameter, and the model must land in it, and further points are gained if the model does not run out before coming to rest. Points are also given for the quality of the landing. During the flight the model must not fly over the spectators' enclosure or points will be lost, or for a second offence the model is disqualified. There were two rounds, and two attempts were allowed to get airborne in each round. For the second attempt it was possible to wait until after the round if desired. Gliders had to make the same flight with a 200 metre long towline. Multi control models had a choice of additional manoeuvres which could be done in any order, but the order had to be written down and handed to the judges before the contest. These manoeuvres were—flat spin, vertical figure eight, stall, dive and recovery, stall turn, inside loop, outside loop, inverted flight, Immelmann, roll, and figure eight inverted.

Strangely enough, Gobeaux of Belgium was drawn to fly first and made the winning flight in the multi section. He appeared to be using a standard E.D. six reed equipment. The model was a utilitarian design with the tailplane protruding behind the rudder and flying characteristics similar to a control-liner. Lichius of Germany also used E.D. six reed equipment in a scale Cessna which was a well-constructed model and flew very beautifully until it was put into a dive from which there was insufficient height for recovery. Steemaier of





Author demonstrates his novel model box with incorporated transmitter which attracted much attention at the Bourne International

Germany, who was second, did some very good flying, using his pneumatic controls and a well-made home-built radio. Ted Hemsley did well to achieve third place as his model seemed too big and heavy for aerobatics. Mr. Bickel of Switzerland won the single control class with a most interesting Delta using a pusher engine and fitted with a flapping proportional rudder up front. Tricycle undercarriage of course. You could not think of a better scheme for a Delta. The receiver was the subminiature version of the one described in these notes in December, 1954. Dziech of Germany had a model after the writer's own heart. It was six years old and powered with a Mills 1.3 c.c. engine. It carried the E.D. miniature 3-valve receiver but unfortunately used an escapement. The model was his own design based on high thrust line with low centre of lateral area, and flew well. Mr. Berglund of Sweden had a beautifully made model with a Triang receiver which had been sent to him only two days before the contest. He used Bolton type governor actuator, and the flying although not as good as proportional was better than escapement.

De Hertogh had an interesting multi control equipment using two radio frequencies, 27 and 32 mc/s, which are allowed in Belgium. A soft valve was used for each receiver, one operating the rudder, and the other the elevator. With one receiver long pulses gave right turn and short pulses gave left turn. With the other receiver long and short pulses gave up and down elevator respectively. With no pulse from either receiver the controls went neutral and the engine stopped. With full signal the rudder and elevator went neutral. The double transmitter was crystal controlled. De Hertogh stated that by arranging for different speeds of pulsing, up to nine controls could be obtained.

One very good point of the organisation was the provision of a monitor to check transmissions. For instance, when Mr. Airey made his first attempt the model turned off the line, but the monitor had picked up a spurious signal at that time so he was allowed another attempt to replace the first. He was also allowed time in which to check the model to see if the resulting nose-in had done any damage. Also the writer was allowed to switch on his transmitter for a check during a lull in the flying. Again, when the writer unexpectedly had to face the judges without the team manager/

Alfred Bickel's winning Delta has a Swiss 2.5 c.c. Castor diesel. Note Loop aerial and the nose mounted rudder control surface

Smart radio design by Bill Hittenburger of the Pacific Radio Controlled Models Society, California, is called the XQRM-1 and uses a Forster 29 engine with speed control

interpreter, they were very good and worked with only a couple of words in French to guide them as to the intended manoeuvre. In fact the only real difficulty was due to the wind which changed direction, and was so strong at the top of the 200 meter line that the model could not make headway. The experience gained, however, will help towards next year, when it is hoped such a pleasant trip will be repeated.

It was interesting to see that the R6B was used by one of the Dutch competitors. It was also used by Mr. Parkinson and an engineless one used as a glider by Mr. Airey. The writer's own model was a one-and-a-half times version of the rudder waggler power model with a glider nose, the tailplane having done service 16 years ago as the centre section of a flying wing. The transmitter used by the writer was the McQue crystal-controlled, built into the model box. This transmitter has a very good output for the power used, and has operated a single valve receiver at a range of at least half a mile.

This transmitter in the model box is a very convenient scheme, and has been used by the writer before for travelling. It cuts out one of the boxes to be carried. In this case also it makes a good aerial mounting, the box being stood end up with the transmitter works four feet above the ground, and the aerial starts from this height. An earth wire is taken to an aluminium plate on the other box end, this wire also carrying the H.T. negative, the battery being in that end of the box. The control switch is mounted by the transmitter and is at convenient hand height. With the H.T. battery in the end of the box on the ground, the box is not blown over too easily.

It is difficult to compare signal strength produced with this arrangement with the more conventional, because with both of them still working half a mile away there seems no point in climbing hedges to find out how far away you could land the model if you could see it.

The question of signal strength of different transmitters has been raised by Mr. P. C. Lovegrove of Bedlington. The specific request being for a comparison of signal output of the AEROMODELLER No. 1 transmitter and the crystal-controlled type described in another book. This latter transmitter uses two 3S4 valves and crystal of one quarter of the output frequency. Crystals of this frequency are often available at about 10s. each ex-government. In this case the simpler transmitter would give the greatest output. This sort of thing has led some people to believe that a crystal-controlled transmitter cannot give as much output as the simpler type, but there are all sorts of other considerations. A valve works more efficiently as an amplifier than as an oscillator, so if this amplifier is driven by a crystal oscillator the output will be greater. The output of the amplifier also depends on how hard it is driven by the oscillator. The driving power of the oscillator depends on the quality of the crystal, its frequency relative to the final frequency required, and the type of circuit used. One of the best circuits so far is the McQue, but the only way to get a direct comparison is to build one each of various types, and test them at the same time and the same place, measuring the total battery current and tabulating the results. The writer has three or four suitable types which need only suitable battery connections, but another one or two are needed. It is hoped to complete these and give the results with circuit diagrams in the next issue of these notes.

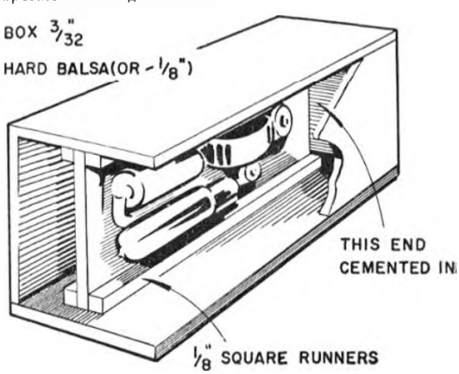
Mr. Lovegrove also sends along a tip for the AEROMODELLER receiver. If the short sides are increased by ¼ in. top and bottom, it is simple to make a box into which it slides. This box can then sit in a block of sponge rubber. Access holes for tuning can be cut in the box. *See* diagram below.

The Ripmax A.30 Relay

The writer is prejudiced against a design of relay such as this because it is not dynamically balanced, and would not touch one with a barge pole for receiver duty. However, one was sent for test so the only thing to do was to see just what conditions were required to operate it. It was first adjusted to work around one milliamp. It closed at 1·3 m/a, and opened at 0·9 m/a. On turning it upside down it closed at 1·7 m/a, and opened at 1·4 m/a, without touching the adjustment. Just the sort of thing to be expected from a relay of that design. This means that it could be used satisfactorily with a current change of about 1½ m/a, from say 0·5 to 2 m/a. A disadvantage, however, is that the contacts are easily operated with very little vibration, and if the relay were mounted vertically in a model aeroplane, taxi-ing shocks, even with pneumatic wheels would probably be enough to operate the contacts. The safest way would be to mount the relay on its side. The relay would then be adjusted to operate around 2 milliamps. The closing and opening was tested with the relay upright and inverted alternately, the current values being:

Upright		Inverted	
Close	*Open*	*Close*	*Open*
2 m/a	1·7 m/a	2·4 m/a	2 m/a
1·7 m/a	1·4 m/a	2·3 m/a	1·9 m/a
1·9 m/a	1·5 m/a	2·3 m/a	1·9 m/a

Trying the relay on its side gave 2·3 and 1·9 m/a one side and 2 and 1·6 m/a on the other side closing opening respectively. In this condition then a current change from 1 m/a to 3 m/a would be required for reasonably satisfactory operation, but it was still very prone to operate with slight vibration.



CLUB NEWS

IF I OPENED these columns to give a free list of all the models lost in a month, there would be no space for legitimate club news: but this month I'm making an exception. Not that I approve of models flying around the sky without identification in the form of a sensible name and address label, there's no excuse for that. These two cases concern radio controlled (?) models and they have each been rather unfortunate. No. 1 is an A.P.S. Sparky, which went up in a thermal due east of Stamford, Lincs and has not returned home to roost. It *did* bear an address label so it *might* have got into the wrong hands. Has an E.D. 1.46 and A/M No. 1 Receiver. If you see it about let me know and I'll tell the rightful owner.

Second case is that of a much larger model, an A.P.S. Mercury, weighing 13½ lb., with two speed Forster 99, six-channel radio and three motorised actuators. I've no doubt that when that little lot came down somewhere around Chobham after disappearing into low cloud, it created no small stir in the community, but no news of its whereabouts has been received to date. Apparently the owner let it go with the wrong aerial on his transmitter, which is a new one on me.

London

The **ST. ALBANS** lads have been doing well, Bruce Rowe collecting the Queen Elizabeth Cup at Northern Heights, Charlie Christie getting 3rd in open rubber at the same Gala, and irrepressible George Fuller placing second in the **CROYDON** Gala at Chobham. Sorry I missed this latter event, and that no details have been submitted for a report to be made—it must have been quite a day for Chobham to judge by the calm, humid conditions that existed that day in the London District. It was the same day as the **ENFIELD AND D.M.A.C.** C/L Rally (pictures and results elsewhere in this issue), where the speed fiends were certainly doing their best to vindicate their status quo. Gadget Gibbs of **EAST LONDON** maintained his reputation with a fine 159 m.p.h. for a new British record in 10 c.c.: but not quite great enough a margin over the existing World record to make any claims on that score. A pity this—it would have made Gadget holder of all the speed records except Jet. Enfield free-flighters knocked the **BRENTFORD** Club out of the London Inter-Challenge Cup.

The **HAYES M.A.C.** contest men have not been covered by Lady Luck at recent Rallies, although they've been fairly high in the results. Irish member John Thomson is top of his country's power team—very handy for Cranfield! After looking on at the Combat final in the N. Heights Gala, the Hayes boys are certain that the main essential for combat success is a stentorian voice for shouting down the ref. Agreed! But not at every event—it just happened that the organisation was more than tolerant at Halton. **COSMO** Club, that's Bexley Heath area, are running a Team Race Rally at Danson Park on August 26th. Shame—that clashes with the South Midland "do" at Cranfield why can't we use some of these vacant September dates?

READING AND D.M.A.C. is active again with membership hovering on the 30 mark. Doubtless a few more local modellers will join up when they learn that Booker Aerodrome is available to club members for the monthly flying meetings. Go to G. Sleep's at 22 Kings Road, Reading, if you are interested.

For your Diary

August 19th
The C. H. Roberts Cup—Rubber Driven Flying Boats—Pond on Blackheath, London S.E.3.

August 26th
S. Midland Area Rally—Cranfield O/f, T/R, R/C, Combat.

August 25th/26th
PAA Scottish Festival—R.N.A.S. Abbotsinch—f/f, PAA, T/R

August 26th
Devon Rally—Woodbury Common, Exeter—f/f, C/L

September 2nd
Northern Area Rally—venue to be announced.

September 16th
All-Britain Rally—Radlett.

Southern

I hope the **WEST HANTS A.A.** is pleased with the results of their Rally, at least they ought to have some satisfaction with the weather this time, and from what I've heard around and about, everyone who competed was most happy with the organisation. **FARNBOROUGH M.A.C.** was among the many who attended, and are another club enjoying a new lease of life this season.

I'm not so sure that the next item shouldn't be in "World News". **SOLENT HEIGHTS M.F.C.**, across the water in the Isle of Wight, held a postal contest with the Badnoevdorp and Sluten Club in Holland. It was an A/1 glider event, and as the weather was perhaps kinder to the I.o.W. fliers, J. Wood and J. Hitchman came first and second. A very good thing these postal events, I wish more clubs would try them.

Western

BRISTOL ACES are also active in the demonstration business, including one for the Bristol Aeroplane Company Sports day. Interest is mainly control-line, and combat appears to be a favourite. In the Inter-Area Rally, at **SWINDON** on June 3rd, the Westerners were trounced by Southern area with 80 points against 56 in fine conditions. Only a minority of the area clubs turned up as is usual it seems. In contrast, the weather for the **TROWBRIDGE** Gala on July 1st could not have been worse and cancelled events will now take place at the September 9th meeting.

South Midland

Five model displays are scheduled for the **NORTHAMPTON M.A.C.**, with c/l and static shows. The club is also breaking new ground with its own newsletter, one item in which concerns one John Harris, who returned home having lost a model through timer gremlin trouble, only to have his mother tell him all about it—and present him with the model safe and sound. Quick service on someone's part!

East Anglian

July 22nd was the date for the Area Rally at Debden, and it included a plain Stunt contest to the **S.M.A.E.** schedule. Congratulations! ! About time this side of flying was catered for outside of the one and only "Gold" at the Nats. held but once per annum. Members of the **CAMBRIDGE** Club have been weighing up the pro's and con's of buying an old funeral hearse for transport. Shall we see peculiarly shaped model boxes, mauve curtains and tall toppers too?

NORWICH M.A.C. has had unfavourable weather they say (what about us—say all the rest in Britain!), but anyhow, D. Rushmore is pleased to have his Mills .75 *powered* A.P.S. *Seraph* glider (?) flying again after six weeks in a cornfield, surviving four of the best thunderstorms for years and the clutches of a combine harvester. Sounds like the Seraph has a charmed existence.

Midland

LEAMINGTON M.C. tell me that their "Local" field is not R.A.F. Wellesbourne as mentioned last month, but at Chesterton, about four miles from home. Membership is now limited to 50 until organisation is running smoothly and they feel they can take more on. Now that's a most healthy sign. In **DERBY M.A.C.**, there's a heart-rending plea for a free-flight field. Any clubs in the area got one to share? Roy Adamson and others seem to have had a right spell of losing models, talk is that they are thinking of r/c as a lesser evil. Don't you believe it boys, take a look at the introduction this month. Unbreakable is the password for the Derby combat types. Even when they go free flying off the lines, they come back undamaged, thanks to silk covering, as witness one incident at Woodford. **WEST BROMWICH** also have due cause to remember Woodford, where they set up four sets of lines in one 5-minute combat joust.

LEICESTER is one of the few clubs I know that possesses its own club tie, and most reasonable too at 5s. each. One can hardly do better for a plain, mediocre piece of neckwear. Thinking of the future, Leicester clubsters will have winter use of the Catharine Street School, obtained through the good offices of club president, Mr. Bowden, M.P. There's a moral there—have you a Club President?—If not, write to your M.P.!

Northern

Area newsletter tells me that the *Yorkshire Evening News* will not be sponsoring a rally this year and have consented to allow three of the perpetual Trophies to be awarded at the Area meeting, probably on Baildon Moor, September 2nd. Events will be the three f/l classes plus hand launched glider. **HALIFAX** knocked **HULL** out of the Northern inter-club challenge, and reading between the lines, it seems that it was due to the efforts of veteran cross-country runner K. Attiwell. He was the only man to bring back a model from two max.'s, which were restricted to 2½ mins. due to the high wind.

In the same knock-out event, **STOCKTON** beat **SHEFFIELD** with a 1.29 margin, bringing the Teeside club through to the final in the first year of entering.

In a local "do", Stockton also led over **SOUTHBANK M.F.C.** by 5½ mins., best individual performer being John Ward of Stockton with 5.03 (2 min. maximums).

North Eastern

Club Championships in **SEAHAM AND D.M.C.** have influenced some of the c/liners to lay down the handle in favour of free flight. Leaders at the moment are Tom Oliver and Bill Hume (who has a 20 ft. ceiling performance on one rubber job which flew for 90 secs. at that height). Top Junior is J. Calvert. Other big interest item is an ancient steam engine which might find its way into a boat. For the moment it serves to convert the clubroom into a Turkish steam bath.

North Western

Arthur Seal of **MERSEYSIDE M.A.C.** burned the midnight oil in vain to get the massive slope soaring glider ready for Clywd, and I gather that the willing assistant, who made two left hand wingtips has had to take some measure of responsibility. However, it'll be ready for 1957 and with a foolproof system of control. (lights on wingtips to indicate which rudder is applied). Only problem, is how to get it to the slopes, it's so huge.

S.M.A.E. Results

KEIL TROPHY (Power)

June 24th, 1956. 54 *Competitors*

1. D. W. Stenning	C/Member	12:00 +	4:11
2. R. Draper	Coventry	11:58	
3. G. Moss	Luton	11:20	
4. S. Lanfranchi	Bradford	11:16	
5. A. Barr	Coventry	11:09	
6. J. Bickerstaffe	Rugby	10:50	
7. G. Ford	Novocastria	10:44	
8. E. Clark	Novocastria	10:18	
9. A. Farrar	Wakefield	10:16	
10. F. Fox	Worthing	9:45	

FROG JUNIOR

June 24th, 1956. 20 *Competitors*

1. D. Greaves	Leam'gton	9:45
2. A. Cordes	Novocastria	9:13
3. M. Watson	Whitefield	9:11
4. P. Manville	B'nemouth	9:00
5. G. Rushton	Bolton	8:05
6. M. MacConnell	Sharston	7:39
7. J. Harris	Blackheath	7:29
8. A. Ward	Bolton	6:37
9. J. R. F. Langford	Darlington	5:45
10. P. Rennison	Leeds	4:41

ASTRAL (Power)

April 22nd, 1956. 160 *Entries*

1. R. Averill	Birm'gham	15:00 +	4:00
2. V. Jays	C/Member	15:00 +	2:55
3. J. Bickerstaffe	Rugby	14:28	
D. W. Jackson	Ashton	14:28	
5. G. Upson	Northwick Park	14:15	
F. Pass	Cheadle	14:15	

WESTON (Wakefield)

April 22nd, 1956. 105 *Entries*

1. P. Read	Birm'gham	15:00 + 12:32
2. L. Moore	Leam'gton	15:00 + 6:36
3. A. Yale	B'nemouth	15:00 + 6:35
4. R. Trahearn	Birm'gham	15:00
5. R. Baldwin	Wigan	14:54
6. J. Palmer	Croydon	14:49

HAMLEY (Power)

May 4th, 1956. 62 *Entries*

1. A. Wisher	R.A.F. Thorney	11:58
2. R. Firth	York	10:09
3. J. West	Southern Cross	9:26
4. A. Mussell	Brighton	8:55
5. J. Trainer	Whitefield	8:43
6. G. Moss	Luton	8:41

HYDE M.A.C. will hold their rally in September or late August, and as that seems to be awkward for inclusion in the next calendar, enquiries should go direct to R. Wilson at 21 Harding Street, Hyde, Cheshire. He also offers to aid others with the flying field problem.

A. Sedgebeer's Webra Mach. 1 *Creep* followed its 3rd in the Shelley with 2nd at Woodford to bring the **SHARSTON D.M.S.** name to the fore again. Junior M. MacConnal also doing well with 7.39 in the Frog Junior Trophy.

ASHTON M.A.C. lads went to Clywd and for the third year running, J. Shadwick returned with a medal, his 6.35 O.O.S. taking first in the open section. Dave Jackson gained a tied 3rd in the Astral and J. Ardern smashed his way through to 2nd in combat at Woodford, so the club has had its share of prizewinners in recent weeks, plus a number of other high placings. Junior B. Hoy only just missed the Junior Championship at Woodford by scant seconds.

Scotland

KIRKCALDY M.A.C. had their annual c/l gala on August 5th, including combat to rules which are similar to those used at the Wycombe and Enfield rallies in the London Area. I believe the S.M.A.E. is getting down to a set of rules for standardisation which will be issued in time for next season.

ARBROATH had a club competition at H.M.S. "Condor" on June 17th for A/1 gliders, which are popular among the members just now. In breezy conditions, A. Roberts won with 163 seconds. Runner up was Peter Paterson with 127 seconds. Both are juniors and were flying A.P.S. *Golden Wings*.

A new duration record for Club was set on June 24th by Raymond Stewart (also a junior). His *Y-furno II* A/2 flew for 16 min. 41 secs. O.O.S.

H.M.S. "Condor", Arbroath, Angus, was venue for all Scotland S.A.A. open Power, Glider and Rubber comps. on Sunday, July 8th. Times in these events were also taken as eliminators for the Scottish team to compete in U.K. Challenge Cup.

Weather was mild and mostly dull with a force three east wind. Rain early in the day had made the grass wet, so that what little sun there was could raise few thermals with result that no max. times were recorded. Three of the strong **PRESTWICK** contingent each lost a power model among the crops beyond the wire. Even "Condor" couldn't hold them!

Ireland

Brief note tells me that L. Blair won a scramble event with a *Creep* at the meeting run by **LARNE M.F.C.**, and a visitor from **BELFAST M.F.C.** came second. No more activity on the Emerald Isle?

Wales

Down **CARDIFF** way, the club is hectic in preparation for the local "M.E." Exhibition, hoping to get 300 models on show, and run flying displays. Anyone able to help with exhibits should contact K. Horlock, 33 Conway Road, Canton, Cardiff, before August 20th.

Pen Pals

Wanted in Britain for J. Ochoa, Gimnasio Moderno, Carrera 9a No. 74-9.9 Bogota, D.E., Columbia, South America. And from France, Germany or America for young Scots enthusiast, L. Miller, 5 Cluny Terrace, Letham, Perth, Scotland.

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CANTERBURY PILGRIMS M.F.C.
E. Rigden, 7 The Close, Downs Road, Canterbury, Kent

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R. J. Tuthill, 79 Birkbeck Road, Enfield, Middlesex.

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F. E. Smith, 19 Broughton Place, Eastfield, Northampton.

NORTH WEST MIDDLESEX M.F.C.
D. S. Posner, 24 Narcissus Road, West Hampstead London, N.W.6.

Rally Results

Northern Heights Gala

The Queen Elizabeth Cup (*Wakefield*)
1. B. Rowe, St. Albans — 789 points

Flight Cup—(Open Glider)
1. W. G. Winder, D.H. Hatfield — 8:00

Fairey Cup—(Open Rubber)
1. P. J. Crossley, Blackheath — 8:00

De Havilland Trophy—(Open Power)
1. V. Jayes, County Member — 6:11

Thurston Helicopter Trophy
1. C. M. Ingram, Southampton

R.A.F. Flying Review Cup (R/C spot landing)
1. D. J. Fisher, County Member — 21 feet

Keil Combat Cup
1. M. Smith, High Wycombe

"AEROMODELLER" *Challenge Cup—Gala Champion*
1. R. Lennox, Birmingham

Stockport Express Rally

Glider—1. W. S. Neild, Cheadle — 5.22
Power—1. O'Donnell, Whitefield — 6.00
Rubber—1. G. Evans, Cheadle — 6.00
Jetex—1. R. Roberts, Bolton — 18.5

Flying Scale
1. G. Barton, Doncaster — 76 points

Class "A" Team Race
1. B. Thompson, Foresters.

Class "B" Team Race
1. P. Lawton, Heath Aeromodellers

Combat
1. N. Fletcher, Monkseath and W. Brom.

Ladies Event
1. Mrs. Smith, English Electric.

West Hants Rally

Rubber
1. Elliott, Man of Kent — 8:58

Radio Control (Glider)
1. R. Copland, Northern Heights

Class "A" Team Race
1. R. Studer, Northern Heights

Class "B" Team Race
1. M. Muscutt, West Essex

Glider
1. P. Manville, Bournemouth — 7:00

Power
1. A. Mussell, Brighton — 8:15

Clywd

Open—1. J. Chadwick, Ashton
Nordic—1. Mrs. R. Sutton, Wallasey
Tailless—1. H. F. Wilde, Chester
Junior—1. K. Wilde, Chester
R/C—1. D. Bailey, Burton-on-Trent

Enfield C/Line Rally

Class "A" Team Race
1. R. Edmonds, High Wycombe — 8:38.0

Class "B" Team Race
1. S. McCoun, West Essex — 9:15.4

Combat
1. J. Templeman, Sidcup — 18 points

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1. R. Gibbs, East London, 10c.c. (159.8 *m.p.h.*)

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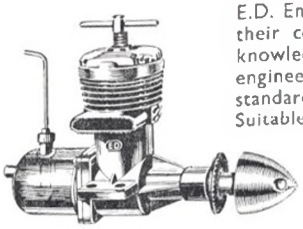

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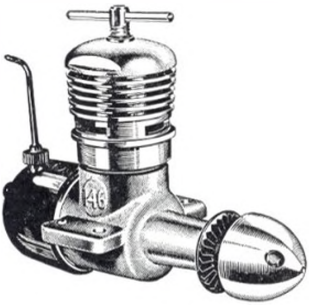

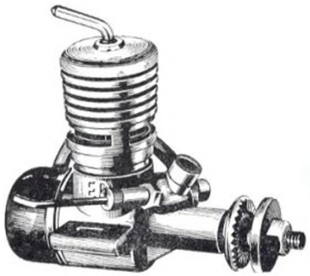

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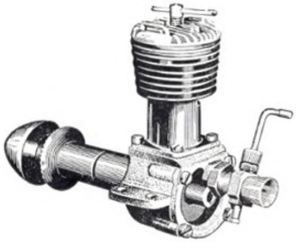

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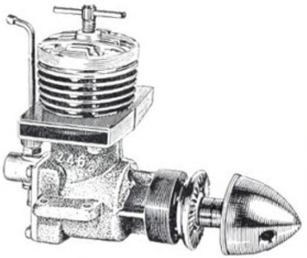

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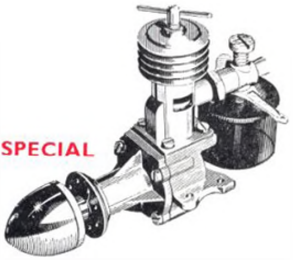

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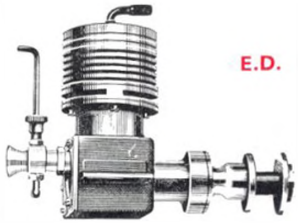

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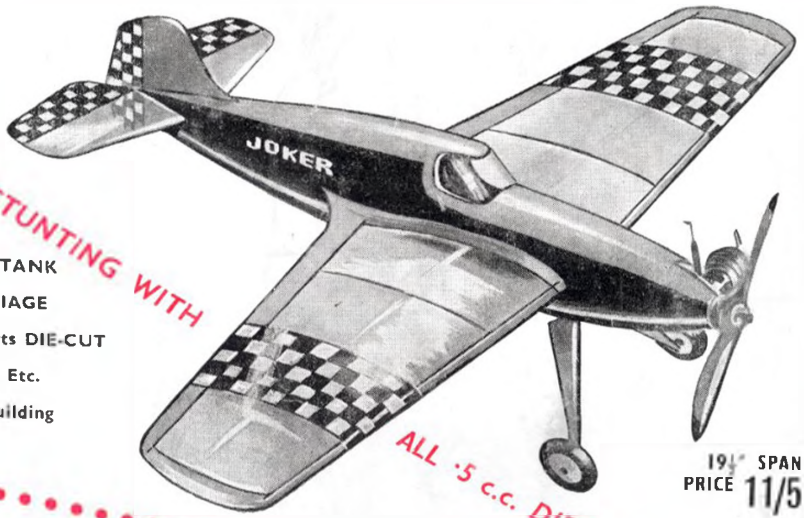

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