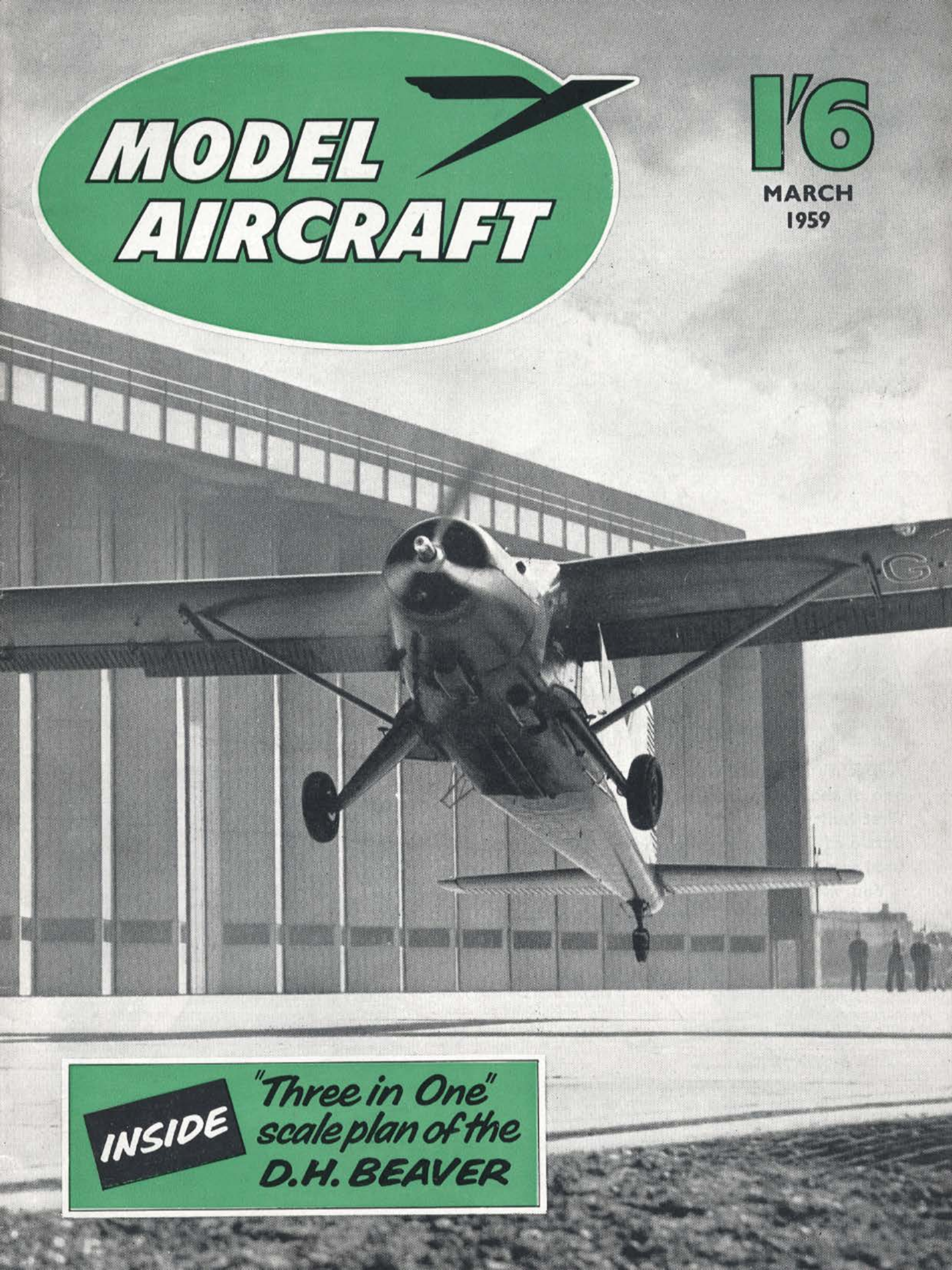
MODEL AIRCRAFT

1'6

MARCH
1959



INSIDE "Three in One" scale plan of the D.H. BEAVER

A NEW SUPER DE LUXE KIT!

FOR THE CONNOISSEUR

KEILKRAFT TIGER MOTH

with these exclusive features

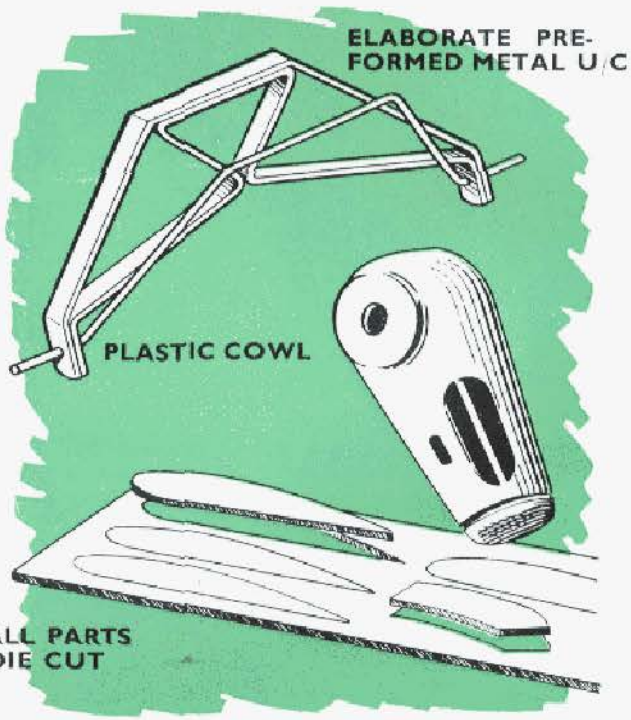
A beautifully detailed, rubber powered model of one of the most famous planes in the world.

First built in 1931, this is the aircraft in which the Battle of Britain pilots learned to fly, and has been used as a basic trainer in air forces all over the world.

You will find the Tiger Moth a most interesting model to build, and an excellent flier. Wingspan 25 in.

Price 19/10

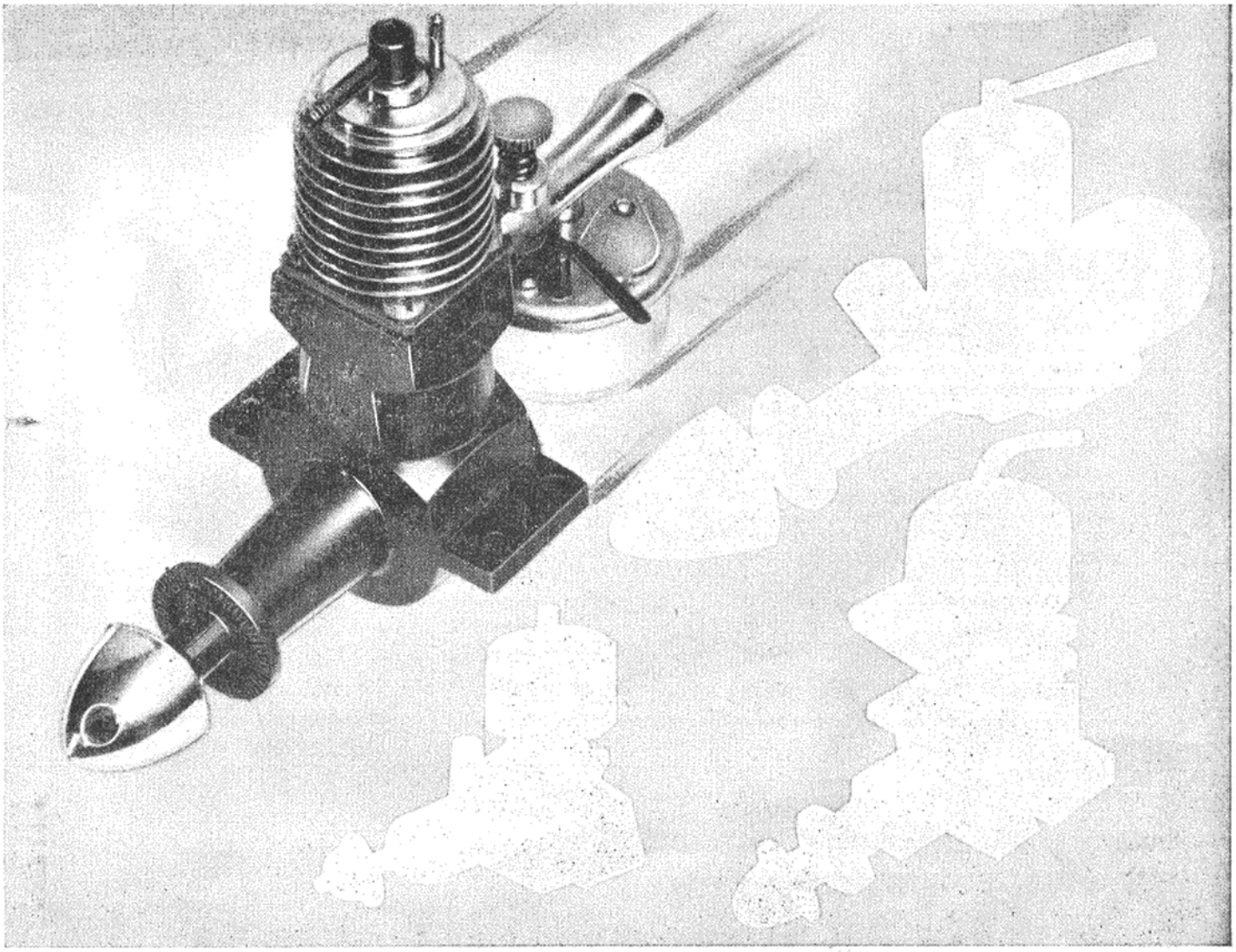
Sister ship to the Tiger Moth is this fine Short Seamew, 28 in. span, rubber powered model that looks and flies just like the real thing. **9/-**



KEILKRAFT

THE GREATEST NAME IN MODEL KITS

E. KEIL & CO. LTD., WICKFORD, ESSEX



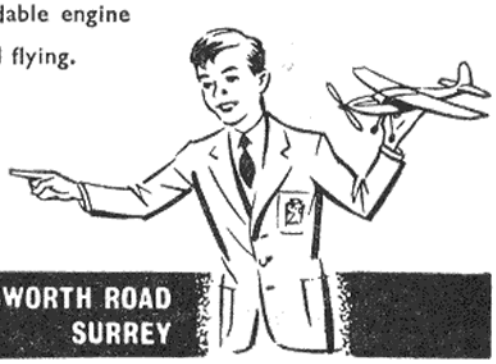
Mills DIESEL

stands out above all

For trouble free flying you cannot beat the Mills. It's the world's most reliable starter, built to maintain its excellent qualities under the most arduous conditions. This dependable engine is the surest guarantee for successful model flying.

P.75 without cut-out **59/8d.**
S.75 with fuel cut-out **65/7d.**
I.3 „ „ „ „ **89/5d.**
Prices include Purchase Tax.

Your Mills reaches you complete with guarantee and an easy-to-follow test certificate giving accurate starting settings. There is no guess-work with a Mills.



MILLS BROS (Model Engineers) LTD | 143 GOLDSWORTH ROAD WOKING SURREY

WE ARE NOT JUGGLING WITH WORDS

When we speak of

KEILKRAFT

SANDED BALSA

Everybody knows that
the only way to make
balsa wood really smooth
is to sand it and
that is just what we
do at KEILKRAFT!

INSIST ON KEILKRAFT

THE ONLY SANDED BALSA

MODEL AIRCRAFT

Executive Editor
C. E. WALLER

Editor
R. WESSON

Assistant Editor
N. J. BUTCHER

Consulting Editor
A. F. HOULBERG
M.B.E., A.F.R.Ae.S.

Advertisement Manager
A. R. MILLER

★

MARCH 1959

Vol. 18 No. 213

CONTENTS

★

The official Journal of the
SOCIETY OF MODEL AERONAUTICAL ENGINEERS

★

Published on the 20th of each month prior to date of issue by
PERCIVAL MARSHALL & CO. LTD.
19-20 NOEL ST., LONDON, W.1.
Telephone: GERrard 8811
Annual Subscription 22s. post paid. (U.S.A. and Canada $3.)

1909 – 1959

IT seems incredible that 50 years have passed since model flying first became established on an organised footing in this country, particularly as its entire span is remembered by a person who is still very active within the movement—S.M.A.E. chairman, A. F. Houlberg, M.B.E., A.F.R.Ae.S.

Chatting with him recently he kept us enthralled with his recollections of some of the model highlights of these years, and of the many famous names that have been connected with the hobby.

A brief history of the S.M.A.E. will be found elsewhere in this issue—together with historic photographs from Mr. Houlberg's own collection—and details of the part played by him, and many others, in raising the Society to its present stature.

We cannot see into the future but if the next 50 years produce similar progress then we hope we are still around to write of the centenary celebrations, even though we'll be a bit old in the tooth!

Other S.M.A.E. News and Comments

The International Contest Calendar appears on page 98, but there has been the not-unexpected foul-up of the World Championships. After all the ballyhoo about combining the events the Russians have now adroitly side-stepped their offer to run the Rubber, Glider and Power this year, and we now appear to be as we were. Belgium stepped into the breach with an offer to run the A2, but when, where, or if, the others will be held, is anybody's guess.

A resolution managed to creep

LOOKING BACK . . .

10 Years Ago. March 1949 saw the introduction of the first flexible "crash-proof" airscrew: Fred Borders' plastic "Truflex" props marketed by Keilkraft in four sizes from 8 to 11 in. dia. . . . In MODEL AIRCRAFT for March 1949, the formation of the Federation of Model Aeronautical Manufacturers and Wholesalers, under the chairmanship of Eddie Cosh, was announced . . . Glowplug ignition was just beginning to catch on in Britain and newly announced engines included the 5 c.c. Yulon 30 at £6 15s., subsequent winner of the 1949 Gold Trophy, and the Nordec RG.10 at £12 . . . Josh Marshall's British power-tailless record of 1 : 50 was accepted by the F.A.I. as a new world record. . . .

20 Years Ago. A Wakefield kit for 1s. 3d. Fantastic but true. In March 1939, the Burd Model Airplane Company of Baltimore began offering their dollar kit of Dick Korda's famous Wakefield for 29 cents (the cent being worth about a halfpenny at that time) and this included a bottle of balsa cement and a bottle of tissue cement, too! At the other end of the scale, the most expensive kit on the market was the Avion Model Aircraft Company's 10 ft. 7 in. *Oriole*, costing $21.50. This model, which had more spruce than balsa in its construction, had an all-up weight (F/F) of nearly 12 lb. and was claimed to be capable of carrying a payload (R/C or aerial camera) of at least 4 lb. To cope with this, the company offered a special 25 c.c. engine for the model, known as the Avion-Mercury, costing $25, plus $3.50 for a special 20 in. dia. laminated prop. The kit, incidentally, was prefabricated to a degree seldom seen in modern kits: the longerons were actually supplied steamed to shape!

in and get passed that World Championship teams should be reduced to three in number, thus making it financially easier to send full teams to events—we hope there will be some events to send them to.

* * *

Hungary has offered to organise the first [*sic*] World Control Line Championships next year—this offer has been accepted and it should be a most interesting meeting.

* * *

In Hungary this year will be held the first International Indoor Meeting, on May 15th-18th, at the University of Medical Science, Debrecen, which is about 125 miles from Budapest. The hall of the university in which the contest will be held is about 100 ft. high, but we have no details of other dimensions.

Two events will be run—one for microfilm models of under 35 cm. wingspan and one for microfilm models of over 35 cm. wingspan. Two attempts for each of three flights will be allowed and the best flight of three will score—hand launching throughout.

If anyone is interested in going, the entry fee is approximately £3 12s., and the closing date for entries is April 1st—full details from S.M.A.E. headquarters.

* * *

On the home front the indoor Nationals were held on the 14-15th of this month; this information was not available when our last issue went to press, so we regret that we were unable to notify our readers through Contest Calendar.

* * *

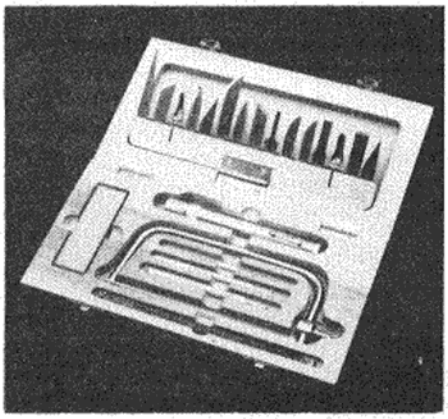
Back to the F.A.I. We note that their merit certificates have been dropped due to lack of interest—as one well-known modeller remarked to us, if the F.A.I. continues in its present manner it will kill the interest of all modellers in everything, and thus drop itself.

EAGER BEAVER

THIS issue's "Plane of the Month" is the rugged D.H.C. *Beaver* and the 1/72nd scale plan on the centre pages shows the three basic variants—land-plane, float-plane and ski-plane. It will be obvious to most that the *Beaver* is a "natural" as a flying scale job, but before anyone starts getting out rulers and drawing boards to scale up these drawings, we would like to point out that all the hard work is already done for you. M.A. plan 93 (price 5s.) features a 48 in. span model of the D.H.C. 2 *Beaver* suitable for 1-1.5 c.c. engines. This particular *Beaver* plan is of the land-plane version, but it is a comparatively simple matter to modify the model for either floats or skis.

TOOLS for TIPS !

WE are well aware of the merits of the ubiquitous razor blade for model building, but in this age of electric shavers it makes the job so much easier if one has a comprehensive tool kit. We are also well aware of the penurious state (stony broke to you) of most modellers to whom such fancy tool outfits are always on the wrong side of the plate glass. However, we have a large quantity of Multicraft Major tool chests to give away free. All we want are your hints, tips and bright ideas for doing various jobs in building model



The Multicraft Major Tool Kit complete in fitted beech chest.

aircraft. Fuller details of the type of material we want are contained in the next column.

Also the writer of any outstanding letter published in our Letters page will also receive one of these really magnificent tool outfits.

As a matter of interest the Multicraft Major (one is shown in the photo above) has been chosen by the Council of Industrial Design for display at the Design Centre in London—an accolade not bestowed lightly and one which is given for only the highest standards of workmanship.

Make your Hobby Pay !

SOUNDS too good to be true, doesn't it? But it really is easy. We want your contributions, and we're willing to pay for them at the usual rates, or in the case of certain hints and tips we offer one of the tool chests described in the previous column if preferred.

Every time you read MODEL AIRCRAFT at least one of the features must be of especial interest to you, yet most were sent in by readers just like yourself. So remember, ideas that you have developed, models that you have designed, photos you have taken—all could be of equal interest to other readers.

This is what we want

Articles—Should be of as wide an interest as possible and accompanied by illustrations, i.e., photographs and/or sketches.

Plans—It is not necessary to send "drawing office" drawings to us; we've worked from all sorts and sizes including wallpaper (used !), but we must have clear photographs of the model, and some seven to eight hundred words of general notes. These must only be complementary to the plan and are of greater interest if they cover development, trimming and flying details rather than just dry "how I did it" gen.

Photographs—All we need say is that they must be of at least postcard size, clear and sharp, or if it is not possible to get enlargments made send the negatives.

Odds and Ends—Everyone at some time or another has had a bright idea on doing a "standard" job easily, modifying equipment for a special use and similar brainwaves. Well, why not let other readers in on your secret? A few words and a sketch or photograph is usually enough.

We would emphasise that we are quite prepared to knock your article into shape ourselves, make enlargements from your negatives in our darkroom, while, provided your sketches and drawings are clear, our draughtsmen can soon give them a "face lift."

THE First Fifty Years

To mark the half century that has passed since model flying first became "organised," **Ken Brookes**—P.R.O. of the S.M.A.E.—tells how the Society was formed and of some of the people who have been instrumental in raising it to its present status.

ON Thursday, January 21st, 1909, there took place a meeting from which the whole history of the S.M.A.E. may be traced. Curiously enough, the meeting—held at Caxton Hall, Westminster—was quite unconcerned with model aircraft, for it was called to inaugurate the Kite-Flying Association of Great Britain. Major B. Baden-Powell was president, W. H. Akehurst, hon. secretary, and other members of its council included S. F. Cody, B. S. Vannals, J. H. Ledeboer and Major G. H. Fink.

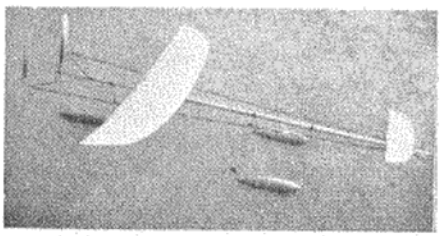
This photo, taken in 1923, shows A. F. Houlberg with an exact replica of the model which set up the record flight of 123 secs., in 1913. F. de P. Green took the photo immediately after the model had made a flight of 114/5 secs., and if anyone is sceptical of this, Mr. Houlberg still has the model, which was flying just as well at the All Britain Rally three years ago.

The Kite-Flying Association had a most ambitious programme for popularising both the scientific and sporting aspects of their hobby, but they could not stem the advance of progress. Model aircraft had, of course, existed in sophisticated form for many years, and local clubs were beginning to spring up throughout the country. In 1908 the young A. V. Roe had won £100 in a competition for model aircraft sponsored by the *Daily Mail*. The Kite-Flying Association was thus soon infiltrated by model aircraft enthusiasts and, within a very short time, its name had been changed to the Kite and Model Aeroplane Association.

The K.M.A.A. was the first national organisation of its kind and had eight affiliated clubs by early 1911. During the formative years, most of its activities were necessarily concentrated in the London Area, and flying generally took place on Wimbledon Common or the Hundred-Acre Field at Greenford, Middlesex. Its membership in those early years included such names as Mann and Grimmer, C. R. Fairey, Bragg Smith, E. W. Twining, V. E. Johnston, and T. W. K. Clarke, not forgetting Mr. C. Graham-White, who was generally present to distribute the prizes.

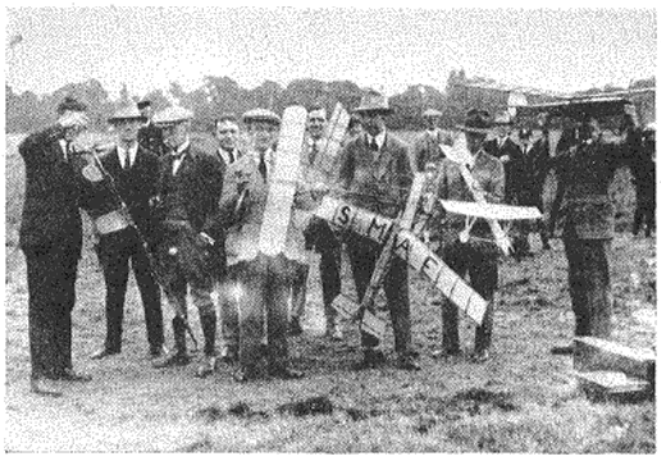
One of the mysteries of model aeronautics is the many cups and trophies which have vanished over the course of half a century. What, we wonder, became of the Wakefield Gold Cup, won by E. W. Twining in 1911, certainly competed for in 1912, and apparently an early (and valuable!) ancestor of the now world-famous Wakefield Trophy? It is of more than passing interest to note that at least six trophies contested as recently as 1946 are no longer with us.

Around 1912 a familiar name began to crop up. In a distance event of the Northern Branch of the London Aero Models Association, at Finchley, A. F. Houlberg won a set of Mann Monoplane parts with a distance of 1,443 ft. and a height of 160 ft. (how was it measured?). Around this time, hydroplane contests were also being held at the Welsh Harp, Hendon.



This floatplane was shown by A. F. Houlberg at the Olympia Aero Show in 1913. It flew well and had an average duration of some 90 sec.

In 1913 the first big Model Exhibition took place at Olympia, in conjunction with the Aero Show, and the K.M.A.A. was recognised by the Royal Aero Club as the national governing body for the sport and hobby of model aeronau-

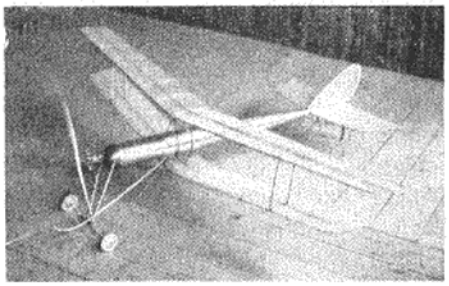


In 1925 the Gamage Cup was competed for on Wimbledon Common. This group of competitors features, from left to right, A. F. Houlberg, unknown, F. de P. Green, Levy, Richard Langley, B. K. Johnson, S. C. Herson, R. M. Bullock and Plater, who was at that time one of the best fliers of fuselage models. At that time the Common, a very popular venue, was largely grass, but following a fire it was replanted with shrub leaving it as it is today.

Fairey's Aerodrome played a prominent part in pre-war modelling. This group in the competitors' pen includes B. K. Johnson (centre) and 1934 Wakefield winner, J. B. Allman (right).

tics. This momentous step gave British model aircraft enthusiasts a true independence which has lasted to this day, and which is almost unique in the modern world.

Even in those far-off days, models were by no means the primitive contraptions we like to imagine. Besides duration and distance competitions, there were stability and steering contests (shades of R/C !) payload contests and even competitions for rocket planes with gunpowder motors ! There was even a deputation to meet the Wimbledon Common



A. F. Houlberg also showed this compressed air model at the 1913 Olympia show. With a motor run of 45 sec. the total duration was in the region of 2 min.

Conservators at Lincoln's Inn Fields to discuss the flying of model aircraft and *man-lifting kites* on Wimbledon Common. Official notices of the K.M.A.A. were given in *Flight* on a page entitled "Models," and edited by V. E. Johnston. *Hobbies* also featured model aircraft, and *Aeronautics* took considerable early interest in the K.M.A.A., but mostly regarding their kite activities—not surprisingly, as the Editor was Major B. Baden-Powell !

The 1914-18 war led to an almost complete cessation of model flying activities. Many of the leading exponents served with distinction in the armed forces, whilst others, including C. R. Fairey, Sidney Camm, A. V. Roe and Handley Page, found their talents of far greater value in the aircraft industry generally. After the war many difficulties were experienced in re-establishing the movement, and it was not until the end of 1922 that a national organisation was again established, with the London Aero Models Association forming the nucleus of the new Society of Model Aeronautical Engineers. Under the chairmanship of Alex Houlberg (a post which he has fulfilled ever since, except for a short period when he was prevented by business commitments), the S.M.A.E. acquired the remaining assets of the K.M.A.A., including such valuable trophies as the Gamage Cup, K.M.A.A. Cup, Model Engineer Cup, Farrow Shield, Sir John Shelley Cup and Lady Shelley Cup. The Society was later granted recognition by the Royal Aero Club as the body to whom all matters concerning model aircraft were delegated.

One of the most enthusiastic members of the S.M.A.E. at this time was Mr. F. de P. Green, and it was he who approached Sir Charles Wakefield (later Viscount Wakefield) to present a trophy for what would become the first international model aircraft contest. With his usual generosity Sir Charles provided a magnificent trophy (now the World Championship trophy for rubber-powered models), the rules for which were worked out at length in conjunction with the S.M.A.E. and especially its then president, Sir Sefton Brancker, who was at the time Director of Civil Aviation. In these days, when the term "Wakefield model" is so closely defined, it is amusing to note that Rule 8 read: "Any form of power plant may be used," and Rule 9: "No model must weigh more than eleven pounds."

The first S.M.A.E. secretary, A. E. Jones, was succeeded in 1927 by R. M. Balston, S. A. F. Crouch and S. G. Mullins following in rapid succession. Mr. E. F. H. Cosh became secretary in 1935, and served in this capacity until he joined the R.A.F. in 1941.

For many years the activities of the S.M.A.E. revolved around the annual Wakefield Cup contest, as, indeed, they still do. It was during the contest of 1930, which J. H. Ehrhardt won for America for the first time, that British aeromodellers first became aware of such exotic building materials as balsa wood, jap tissue, banana oil and cellulose cement. The Wakefield contest set the pace for model development, but its history is too well known to need repetition here.

During the 1939-45 war, the S.M.A.E. was kept alive by a relatively small group of dedicated enthusiasts who remembered the difficulties which followed 1918 and were determined that there should be no repetition. Until 1937, the S.M.A.E. was conducted largely on club lines, and its members even competed against affiliated clubs. This very largely ceased by 1938,

Continued on page 99

The 1939 Wakefield team aboard the "Aquitania" en route to America. Left to right: C. Gibson (proxy F. E. J. Almond), Norman Lees, Bob Copland, A. F. Houlberg, Eddie Cosh, Reg Parham, Len Stott and R. Hill.

and so to... RADIO

PART III—in which HARRY STILLINGS deals in more detail with the radio equipment

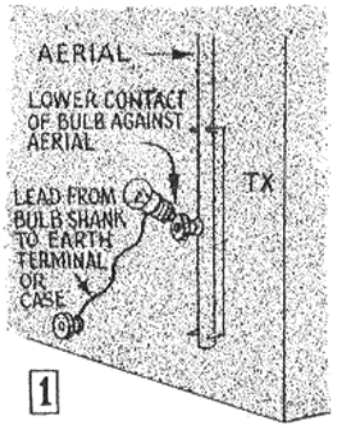
PART I of this series gave a general introduction to radio control; Part II was devoted to *Radio Railcar*, the model specially designed for the series. This month *and next* we shall examine the radio equipment in detail and familiarise ourselves with all its parts, so that in spite of our lack of theoretical knowledge of the subject, it ceases to hold any terrors for us and begins to "make sense." Now don't be frightened off at this! I have no intention of becoming technical or blinding you with science, but if we are to make successful use of our radio gear we must obviously have a reasonable working knowledge of the whys and wherefores.

Everything that follows is severely practical and is based on personal experience; whilst it is obviously impossible to cover every eventuality, the information and guidance given in the two parts are a sound basis on which to build your R/C career. Once again I must emphasise that the series is directed at *beginners only*, although some of the advice may be new even to those who have already flown radio.

The Transmitter

We take this first, not only because it is the source of control, but also because it is soon dealt with. It has one function only, namely, to transmit a simple carrier-wave signal each time we press the button, and as long as it does this over adequate range (¾ mile or more) it is completely fulfilling its purpose. All that you, as a novice, need to know is what can go wrong and how to put it right. Most transmitters are very simple one-valve circuits which rarely give trouble, and the following should cover most possibilities.

(1) It is advisable to have some visual means of checking that the transmitter is, in fact, operating satisfactorily, and the simplest method is to purchase a MILLIAMMETER having a reading of 0 to 50 mA (about 7s. 6d.), and fit this to the case where it is easily visible during use. This will show a reading of 25-30 mA each time the button is held down, and will instantly indicate if anything is wrong. The wiring-up is simplicity itself. Merely remove the plug from the H.T. positive (red) battery lead, and fit this lead to the negative (—) terminal of the meter. Then take a fresh length of flex, connect to the positive (+) terminal of the meter, fit the plug on the other end, and plug into the H.T. socket on the battery. Thus, the H.T. lead now goes from the circuit THROUGH THE METER to the H.T. socket, instead of direct, and so gives us our reading.

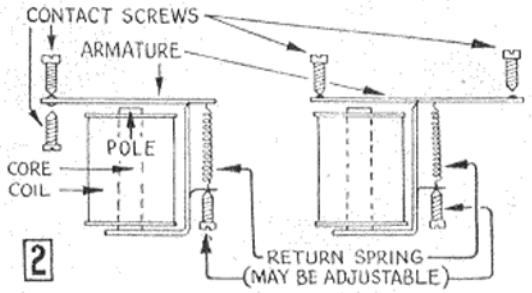


SPECIAL NOTE. *This covers all but extremely rare cases of failure, but if you find the reading is slightly below normal (although you know the batteries are O.K.) it may indicate a break in the internal connections to the aerial fitting, in which case the meter would show about 22-24 mA, but only a very weak and useless signal would be radiating. You can check whether the aerial is, in fact, radiating, by putting a 2.5 v. flashlamp bulb in series between the aerial and the earth terminal (or, if there is none, the metal case). See Fig. 1. This should glow fairly brightly each time the button is pressed. If it doesn't, examine the internal aerial connections and repair any break.*

(2) The most common causes of failure are (a) run-down batteries, (b) a bad or broken connection or "short" in the button lead, (c) faulty valve. A flat L.T. battery will show no reading at all, while one which is almost "out" will show a fluctuating reading. A run-down H.T. battery will show a low reading which will continue to drop with use. Check voltages with TX switched on and button held down, and replace the faulty one. If both are O.K., check the button, lead, and 2-pin plug for soundness and continuity; in fact, this should be done at intervals throughout the season to avoid being "caught out" during a flight.

Personally, I always leave off the plug cover, as this would hide the connections to the pins, and an imminent break might go undetected —this being the most likely place for fractures. Don't, however, pull out the plug by the lead—ease it off gradually, with the fingers gripping the paxolin disc.

Valve trouble is less easy to trace, but if the above checks prove abortive, take the valve to a qualified radio engineer, who will test it for you. If O.K., then the fault must be a bad or broken internal connection or component. Trace through the wiring for any obvious break, and rectify. If none can be found, don't fiddle about—return the TX to the makers (or a radio engineer) for servicing. One last point—treat the transmitter with reasonable care—don't bang it about in transit to and from the flying field, and keep the aerial sections clean to ensure good contact.



Two examples of typical "balanced armature" relays. Reed type is similar in layout to one on left, except that armature is attached to a fixed "springy" reed which returns to rest position by own elasticity, no return spring therefore being required.

The Receiver

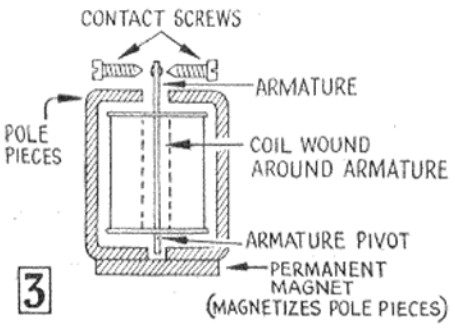
This is a much more complicated piece of equipment to deal with, partly because there is a variety of makes and types, and secondly because it is more delicate than the TX, and has more complex work to do. I shall, therefore, not attempt the impossible by trying to catalogue every conceivable case, but give general guidance which, with a little thought and common-sense, can be translated to your own particular problem.

The function of the receiver (as its name implies) is to receive and act upon the transmitted signal. It does this by reacting in such a way that the RELAY (an electro-magnetic switch) moves and switches on the ACTUATOR circuit, which in turn moves the rudder. The receiver can, therefore, be regarded as two separate components—the receiving part and the relay [which acts upon the resultant change in the H.T. current flowing through the valve(s)]. Thus the receiving part could be operating perfectly without result if the relay is at fault, or the relay could be fully operational without result if the receiving part is not working properly. In tracing faults, therefore, it is well to bear this distinction in mind, as it can be a great help in isolating the trouble, so locating and correcting it.

Taking the relay first (again there are several different makes and types) this is merely a switch which is operated by an electro-magnet. When the magnet is energised by a current flowing through its coil it develops sufficient magnetism to draw in a strip of metal suspended above it (called the "armature") which makes contact with an adjustable screw, thus "making" the actuator circuit. When the current flow ceases the magnetism stops, and the armature is pulled away from the contact screw, either by a return spring or its own "springiness," according to whether it is a "balanced armature" or "reed" type (see Fig. 2).

There is a third (and now very popular) type of relay—the "polarised," where the coil is wound around a pivoted armature instead of an iron core. A permanent magnet at the base of the relay makes the pole pieces magnetic (see Fig. 3). When the coil is energised the armature *itself* becomes magnetic and is repelled by one of the two pole pieces, so that it rests against a contact screw which again "makes" the actuator circuit. As there is no return-spring or reed to keep the armature away from the contact screw with "current-off," it depends on its own position and weight to maintain the "rest" position, and this tends to make it more difficult to adjust correctly, especially for a narrow "gap" in the cut-in and cut-out values. Modern commercial receivers are, however, sent out with the relay accurately adjusted to suit the recommended operating currents, and no further adjustment should be necessary, unless the settings have been disturbed through crashes, etc. A study of the diagrammatic sketches should clarify the make-up and action of typical relay types.

Basic layout of polarised relay.



Assuming that the relay is correctly adjusted, the main faults which occur are:— (a) "Chattering" (fluttering spasmodically between the contact screws), (b) "Sticking" in the "make" position, (c) Complete failure to respond to signals. Taking these one by one, chattering is almost always caused through engine vibration, either because it shows up and aggravates a loose or bad connection, or because it is present in excessive degree, through a badly-balanced motor and/or prop, or insecure mounting.

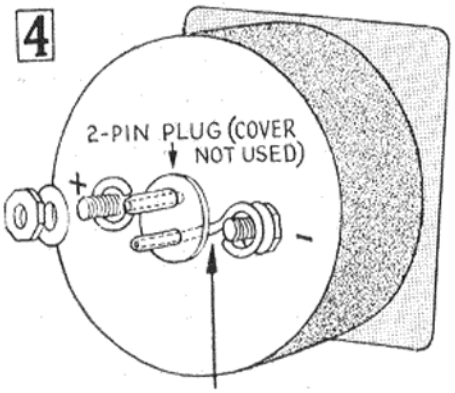
If, however, after satisfying yourself that these possibilities have been accounted for, the chattering continues, the only cure is to reduce vibration effects by improving the receiver mounting (suspension on rubber bands is more effective for this purpose than a foam-rubber "nest") and/or modifying the motor mount to prevent, as far as possible, any vibration reaching the cabin. If you have a "knock-off" nose pod, it often helps to insert strips of flat rubber between the pod and the fuselage. Incidentally, do make sure it is the *relay* which is chattering, and not the actuator, as in certain types of fuselage a resonant vibration can often be far worse at the tail end than in the cabin, thus causing the cross-arm and pawl to vibrate and "skip" although the relay might remain unaffected. If in any doubt about this, substitute temporarily a $3\frac{1}{2}$ v. flashlamp bulb for the actuator; if relay chatter *is* the trouble the bulb will flash on and off intermittently.

"Sticking" is usually caused by the failure of the standing current to return to idling value after the signal ceases, and is almost always due to the sensitivity control being screwed in too far; in the case of single (hard) valve receivers, it is vital to allow a safety margin on this adjustment, and at least one full turn back from the optimum position is recommended. This reduces range slightly, but is far preferable to a stuck-on rudder which almost invariably ends in disaster. Too fine

an adjustment can also cause a certain amount of " skipping " when the engine is running.

Sticking can also be caused in the case of balanced-armature and reed relays by the absence of an " air-gap " between the armature and the magnet pole in the cut-in position—residual magnetism lingers even after the coil ceases to be energised, and if there is metal-to-metal contact it may be strong enough to hold in the armature. A visible clearance (about 2-3 thousandths of an inch) must be present; this adjustment also affects the point at which the relay " cuts out."

Finally, sticking may be due to dirt or pitting on the relay contacts —if so, clean carefully with methylated spirit (and very fine emery paper if pitted), leaving smooth,

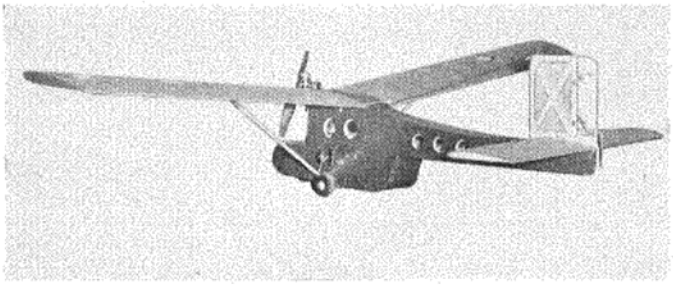


clean faces. To prevent pitting it is advisable to fit a " spark suppressor " which eliminates the sparking which would otherwise occur at the relay points as they make and break. This is made up of a 0.1 mfd. condenser and 100-ohm resistor connected in series across the relay contacts. These can be obtained for a few shillings from most radio engineers.

The actual cut-in and cut-out adjustments of the relay depend on the particular receiver you use—some have a current change (i.e. between signal-on and signal-off) of only 1½ mA, while others may be as much as 8 mA. Some show a current RISE on signal, others a current DROP. Obviously, adjustments have to be far more critical for a small current change than for a large one; the gap in the latter case can be much greater, and therefore more positive and reliable. Taking 4 mA as an average, the relay should cut-in and cut-out at about 1.8 and 2.3 mA; thus leaving a margin on either side. Whether it cuts-in at 1.8 and cuts-out at 2.3 or the other way around depends on whether your RX is current-drop or current-rise, but the result is much the same. (See Part I, M.A. January, under " Milliammeter.") Don't mess about with the settings unless you are absolutely sure it is necessary, and then follow the maker's instructions exactly. If none are given or you are in doubt, send it back to the factory for adjustment (in fact, one manufacturer markets his receiver as a " Sealed Unit " which HAS to be returned if any relay or internal fault develops). Above all, don't blame the relay for anything and everything that goes wrong—more often than not it's a bad connection, the relay being completely blameless.

Lastly, if the relay fails completely to respond to signals (provided the meter shows the current rising and falling as the button is pressed and released) it is either badly out of adjustment, the return spring (if there is one) is too strong, or there is a bad or broken connection to or from it. Test each connection carefully, and remember that even what looks like a good joint could be " dry "; make sure by re-soldering any suspect connections with a really hot iron which properly " flows " the solder, and see that all contacts are clean. If the relay is still lifeless the trouble may be a break in the coil windings, and this can only be rectified at the factory.

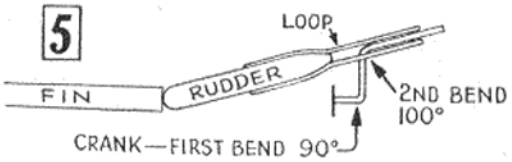
Now we come to the " receiving " part of the RX. Without a sound knowledge of radio it is folly for a beginner to attempt more than to check all leads and connections, check that correct battery voltages are reaching their appropriate tags or sockets, and have the valve(s) tested. Individual components very occasionally break down, and if the checks mentioned do not solve the trouble, return the RX to the makers for servicing. It cannot, however, be too often stressed that 90 per cent. of R/C faults are caused by bad or broken connections,



" Radio Railcar " —another view of the model designed for this series, which was fully described last month.

so take special care with the wiring-up. This subject will be covered in detail in Part IV.

Remember that all RXs are subject in varying degree to " hand-capacity " effects. This means that their tuning is altered if the hand or a metal object is brought close to the aerial or tuning coil (with the meter plugged in you can see the effect by the rise and fall of the needle as the hand is moved towards and away from the receiver). When tuning the RX to the transmitter, therefore, you must use a fairly long non-conducting tool—a plastic knitting needle filed to a screwdriver-end is ideal. For similar reasons, any change in the position or quantity of wiring may affect the tuning, so keep the aerial clear of other wiring in the cabin, allow sufficient slack to take up impact movement, tie a knot in the wire, then take through a small hole in the cabin and stretch it fairly taut with a rubber band to the fin. In this way it will not move about in flight. The 2-pin plug must also be secured to the milliammeter direct by soft wire hooks, as shown in Fig. 4; if a long flex were used the tuning would be inaccurate when the meter was replaced by the shorting-plug, the total amount of wiring being much reduced. Finally,



Plan view showing how 100° bend follows angle of loop as rudder moves outward (exaggerated for clarity).

when the immediate pre-launch checks are being carried out, have the model some yards away from the TX, as some receivers are subject to " swamping " close to, which would cause erratic response and might mislead you into thinking there was something wrong.

Continued on page 97

the LATEST engine news

compiled by P.G.F. Chinn

BY the time these words appear, the new Frog 349 should be reaching the model shops. Compared with the prototype engine, described and illustrated in our November issue, the production model has undergone one or two small changes, plus general cleaning up, which have improved its appearance.

The 349, of just under 3½ c.c. capacity, is intended mainly for C/L combat and R/C use. Combat enthusiasts will welcome its robust construction, with strongly webbed front bearing housing, substantial mounting lugs and expendable, alloy, prop retaining bolt, plus the slight edge in power which the engine offers over the 2.5 c.c. class engines currently favoured for combat. R/C modellers will view with favour its leak-proof exhaust duct for use with pipes or exhaust throttle units. The ends of the duct are suitably thickened to form lugs which can be easily drilled and tapped for such fittings and are ready "centre-popped" for this purpose.

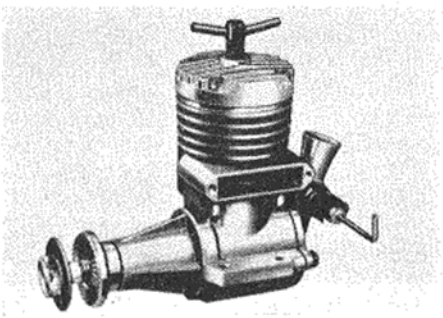
A new cylinder barrel and head has been designed for the production 349 and its appearance thereby improved over the prototype, which had 249 type components. The head has now been fitted with a nylon thread insert to prevent any possibility of the compression screw working back.

As described earlier, the 349 has several unusual features, including an uncommon type of rear drum rotary valve and a loop scavenged cylinder. The 349 will cost 81s. 8d. as described, or in a plain-bearing version 75s. 6d.; the only external difference is in the finish—matt for the BB model and shiny for the PB.

* * *

Latest addition to "upper crust" 2.5 c.c. class diesels is the new David-Andersen "Drabant 25" from Norway. As regular M.A. readers will be aware, D-A motors have been manufactured for several years, first in a 2.5 c.c. capacity and, later, in a 1 c.c. size as well. Made in relatively modest numbers, David-Andersen engines have always been of the highest quality, noted for their exceptionally long life and excellent finish. The Drabant, however, is Jan David-Andersen's first essay into the international contest diesel class.

Latest addition to the ranks of high-quality International Class diesels is the David-Andersen Drabant-25 from Norway.



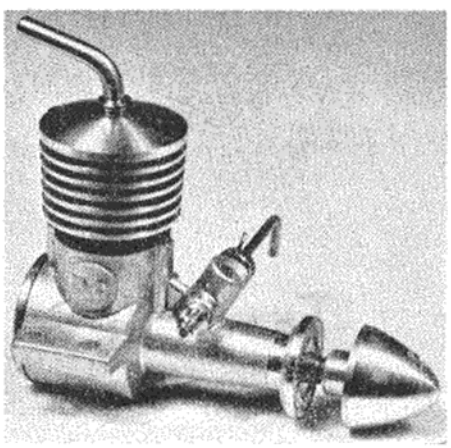
Right—another D-A diesel is the 1 c.c. "Satellit," a development of the original D-A 1 c.c. featured in our Engine Test series in July, 1955.
Left—the new Frog 349.

The Drabant is a twin ball-bearing, shaft valve, reverse-flow scavenged engine, having the popular Continental bore/stroke combination of 15 × 14 mm. and weighing just over 5½ oz. The casting comprises crankcase and bearing housing and is very cleanly diecast with a fine sandblasted finish. The crankshaft, which is of the plain, disc web type, has a 5 mm. gas passage and is carried in two 8 × 22 mm. Swedish ball journal bearings. A separate, 5 mm. stud, with machined spinner-nut, is used to secure the prop.

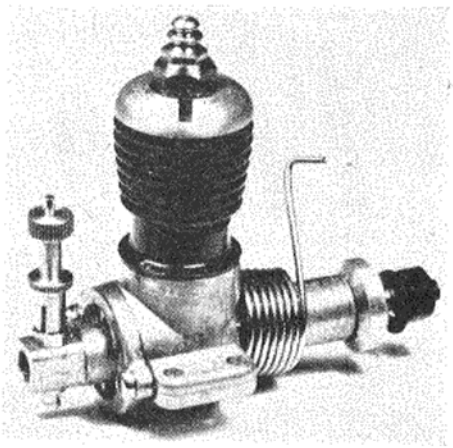
An interesting feature concerns the front bearing housing. This extends $\frac{3}{16}$ in. beyond the front ball bearing and partially encloses the prop driver, which is fitted on a taper on the front end of the shaft. Clearance between the prop driver periphery and the housing is but 0.003 in. and the front ball bearing is thereby effectively protected against the entry of dirt. Incidentally, the front face of the driver is turned down to 20 mm. for a depth of just over 1 mm., the purpose of which is to ensure perfect alignment of the D-A flywheel (supplied as an accessory for marine work) or, alternatively, for a spinner backplate.

The cylinder liner has a flange below the exhaust ports, the face of this flange being ground and forming a metal-to-metal joint with the top edge of the crankcase. Four radial exhaust ports and four inclined, drilled, transfer ports are used. These latter are neatly blended into short vertical flutes on the outside of the liner and are also worked on the inside to provide a smooth entry into the combustion chamber. The liner has a generous wall thickness of 2 mm. (0.0787 in.) above the ports and is topped by a machined alloy one-piece barrel and head, the entire assembly being tied down by two 3 mm. screws passing into lugs placed fore and aft on the crankcase.

An interesting refinement is the steel bushing provided for the compression screw. This extends slightly above the head, where it is also externally threaded and bifurcated and equipped with a gland nut, by which means the grip on the compression screw can be adjusted and any tendency for the latter to work



Right—the new Enya 06 beginners' 1 c.c. glow engine. It is equipped with a simple coil spring starting device. Left—parts of the D-A Drabant-25. The front ball-bearing is protected by the prop driver which is closely fitted inside the extended bearing housing.



back thus eliminated. The piston is of the usual conical top pattern and features a 4 mm. (0.157 in.) fully-floating, solid gudgeon-pin. The connecting rod is of machined alloy and couples to a 5 mm. (0.197 in.) solid crankpin.

The engine is shortly to be made available in a specially " works tuned " version at a cost of approximately £2 extra. This will have a special light-weight piston, balanced crankshaft, opened up intake and further work on the porting.

* * *

In last month's issue, we mentioned the special " custom-built " racing version of the American Fox 29X that is being offered to speed enthusiasts this year. This is what designer Duke Fox says, in a letter to Fox owners:

" I have been quite proud of the reputation that the Fox 29X and 29R have established for themselves. So, after watching another make of motor set the top time at the last Nats, I found myself with a burning desire to see Fox motors win 1, 2, 3, 4, 5 next summer. As a result, I have spent most of my spare time, since, experimenting to see what could be done to produce more urge in either the 29X, 29R or an entirely new motor if necessary. We built a double ball-bearing 29R, tried all sorts of piston configurations, head designs, porting arrangements, compression ratios and about everything else you might think of.

" There seemed to be no magic formula. However, there was one piston that seemed to run a bit faster, one cylinder porting that I seemed to sense a bit more co-operation from, one head shape that seemed a bit livelier and so on. All these refinements were assembled and tried in the 29R case, 29X case, 29R case with two ball bearings, packed and unpacked. Contrary to all reason, the stock 29X case seemed to be faster. The total result is a modified 29X which is faster and has more ' wind-out ' than the 29X with which Bob Lauderdale turned 149.82 m.p.h.

" George Moir and I have decided to offer a few of these hand-built motors to modellers of proven ability. The price will be $25.00 net, payable with your order. If you will state just how you want the exhaust stack and intake tube cut and whether you want the fin sides trimmed, we will be happy to do this. The motor will be ported, faired, polished and given every advantage. It is my opinion that, under ideal conditions and in an A-1 plane, 160 m.p.h. is possible.

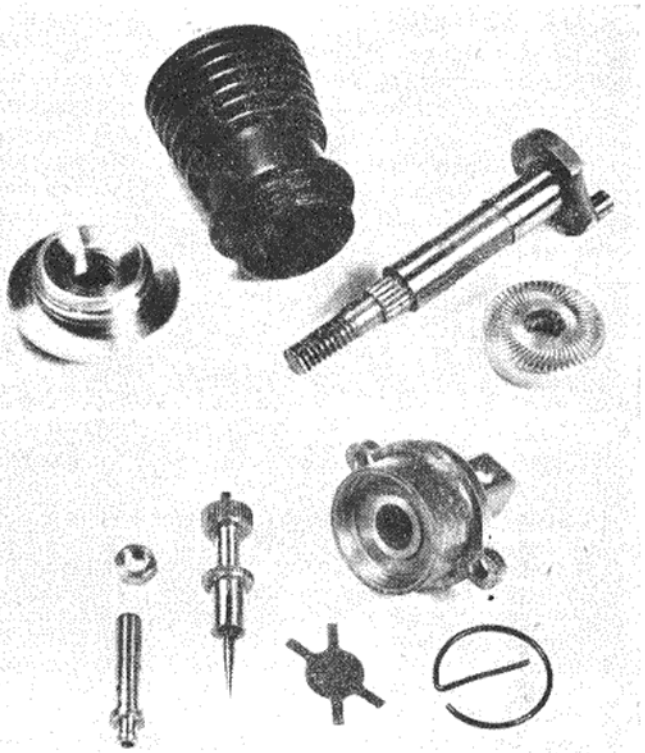
" During our experimenting, one thing was brought forcibly to my attention and that is that an out-of-balance prop or spinner will sometimes cause a vibration period somewhere around 18,000-20,000 r.p.m. and nothing will seem to get the motor past it. Moral: pay particular attention to prop and spinner balance, especially the spinner, after a rough landing. Here is a second thought: a properly made metal tank, pressurised from a crankcase tap, will give you the same run, flight after flight, without touching the needle valve setting. Just make a wire shut-off clip and open it after the motor is in the starter.

" As to fuel and plugs, I would suggest you try them all—Herkimer, Testor and Cheminol plugs and our Hi-Nitro and Fairbends fuel. If you mix your own, you can safely go down to 17 per cent. castor, and up on the nitro as high as the weather permits."

* * *

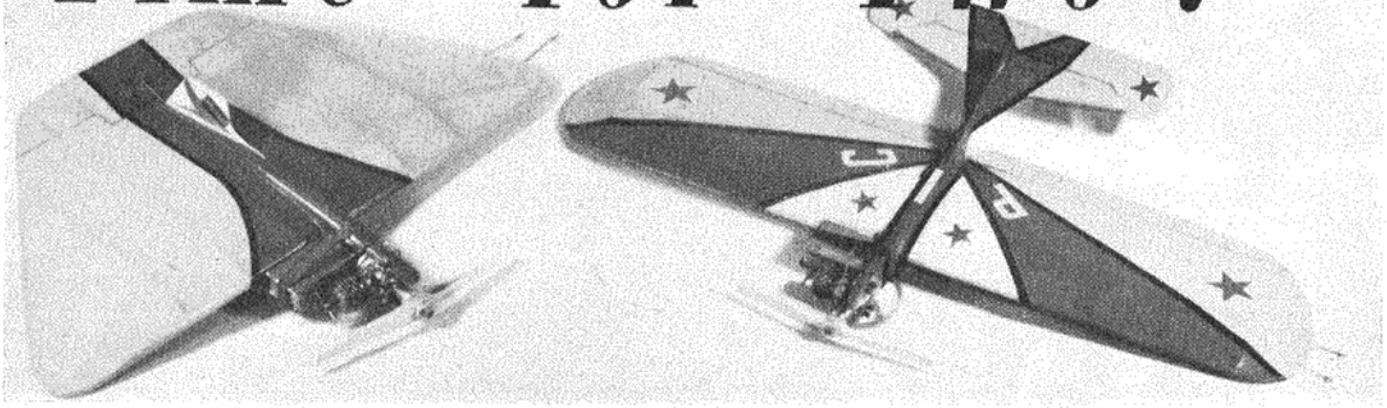
Since writing last month's " Engine

Continued on page 80



The cylinder, crankshaft and induction unit parts of the Enya 06. Note the Cox pattern cylinder, two-journal counterbalanced shaft and the reed-valve assembly.

Time for Two?



. . . or only one if you wish, but a newcomer to C/L flying couldn't make a better choice than **PIC,** or **CHOOSE,** or both ! Simple, cheap, robust and easy to fly, **J. Wylie's** double attraction will appeal equally to any C/L addict.

WHEN the club budget time came around we were amazed to find how much had been spent on model building. If funds get low something has to be done, so obviously something cheap is wanted, yet giving the fun of combat and stunt flying. *Pic* and *Choose* are the answer.

Pic has done very well indeed with a selection of engines, e.g., Dart, Merlin, Mills 0.75, etc., but the best power plant, in our opinion, is the diminutive Webra Piccolo. With this motor it proved to be extremely fast, highly manoeuvrable, yet robust enough to do a wingover on to a tarmac playground with only a split fuselage, and shattered tissue to show for it.

Choose was designed with the same objects in mind as for *Pic*, but for larger motors, in this case 1-1.5 c.c. It is just as easy to build, but a little more responsive to fly, though still remaining an ideal beginner's combat/stunt design.

PIC

If you are looking for something cheap, rugged, simple, highly manoeuvrable, and able to do "the Book" in the hands of the right person, why not try *Pic*? Construction is straightforward—even the club's biggest idiot managed to complete one successfully, and even fly it !

Pic has gone through five different Mks. each one better than the last ! A bomb-site in South London provided a flying ground or combat field, as the case may be, and when flying commenced the design became popular with the club, most of the members building one or two.

Construction

This begins with the wing. Eight ribs are cut out to the full line, two ribs to the dotted line, as shown on the plan ; these two ribs are the centre ones. Take four ribs and drill holes as shown, so that the leadouts can be threaded through. The wing is then built in the ordinary way, and completed by adding the tips, stitching the leadout tubes in place, and cementing the tip weight firmly in position.

The bellcrank is mounted on two pieces of ply ($\frac{1}{16}$ in. thick × $\frac{1}{2}$ in. wide—length to suit distance between centre ribs) and secured with a 6 B.A. bolt and nut (as shown). This assembly is firmly cemented in place. Hook up the leadouts and push rod, fit flaps, hook up, then ensure that the flaps are giving the same movement 25 deg.-30 deg. each way (up and down). Finally sheet in the centre section top and bottom, cutting a hole to clear the push rod.

CHOOSE

Build the wing first (some of the construction notes for *Pic* will apply) and when completed add the bellcrank assembly, hook up the push-rod and leadout, then sheet in the centre section. When dry cut holes in the top and bottom for the engine bearers, cutting a notch to locate on the spar. Fix "D" between the bearers before the cement is dry.

Continued on page 80

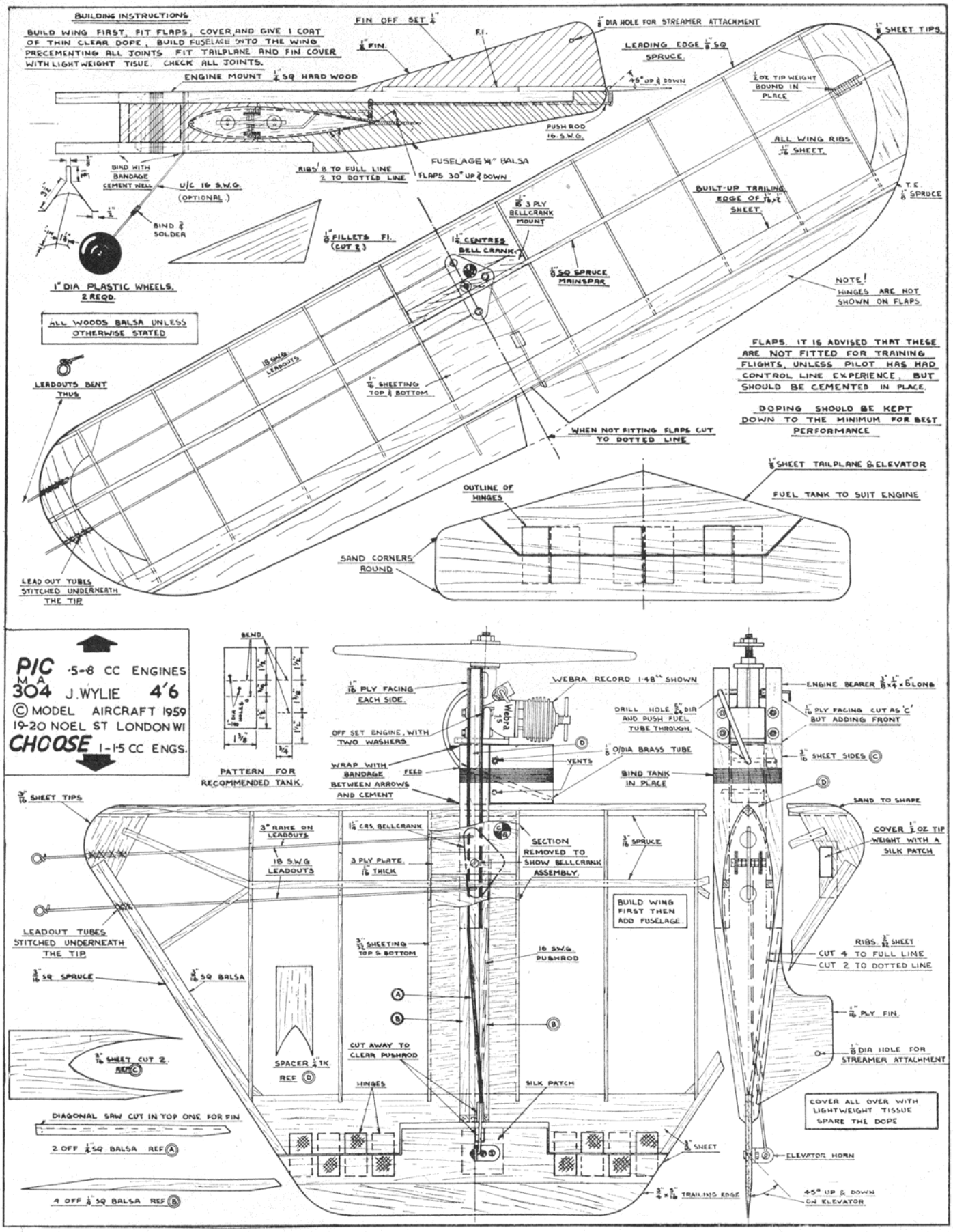
What you will need

for PIC

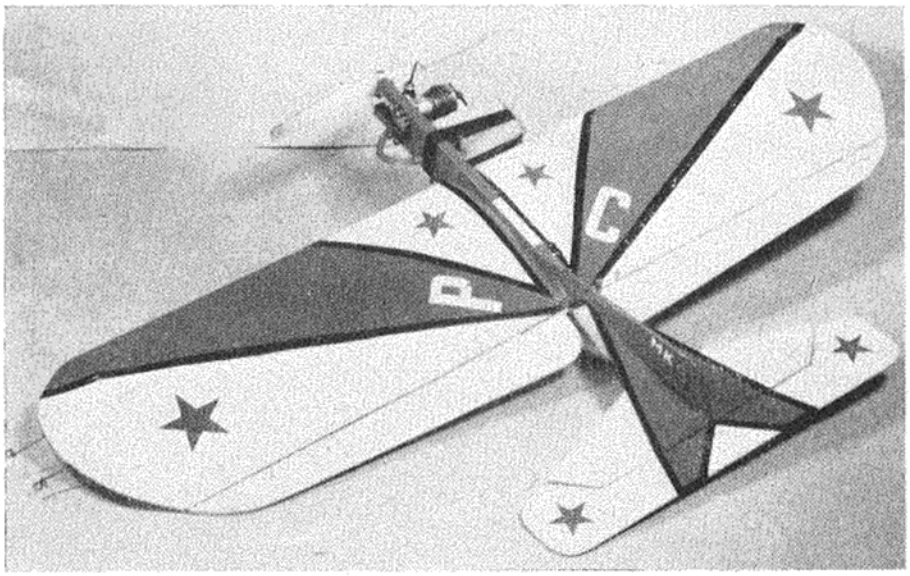
1 strip 1/4 sq. x 36 in. spruce
1 sheet 1/16 x 4 x 36 in. balsa
1 sheet 1/8 x 3 x 36 in. balsa
8 strips 1/8 sq. x 36 in. spruce
2 lengths 18 s.w.g. x 36 in. piano wire
1 length 16 s.w.g. x 36 in. piano wire
2 tanks
2 1½ in. centres bellcranks
tissue, cement, dope, etc.
The above will supply two models.

for CHOOSE

1 sheet 3/16 x 2 x 36 in. balsa
1 sheet 3/32 x 3 x 36 in. balsa
4 strips of 3/16 sq. x 36 in. spruce
1 strip of 3/16 sq. x 36 in. balsa
1/16 ply 1/2 x 4 in. wide
Bellcrank—1 1/4 in centres
Balsa cement, tissue, dope, tank, etc.
The above is sufficient to build one model.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20 NOEL STREET, LONDON W.1 4s. 6d., POST FREE



Pic, the more orthodox model of the pair—recommended for absolute beginners.

After the bearers are secure on the wing, add the ply facing (cut as "C" but adding front piece), then add "C."

After this, cement "A" and "B" in place cutting the slot for the fin in the top one—ref. "A"—add the fin, sand down, then cover with tissue. Finally, remember to keep the dope down, as too much will ruin the performance; also keep the controls as free as possible.

Flying

The model was flown on 40-45 ft. lines with a streamer to S.M.A.E. specifications. It is fast with a 1.5 and highly manoeuvrable, so be careful.

The fuselage is cut from ¼ in. thick medium balsa. Note that the fuselage is built in two pieces, one half pushed on from the front and cemented well, the other from the rear and cemented well. The bearers are cemented, one on top running right along to the tail, the other on the bottom. Wrap bandage around the nose and cement (this stops the nose splitting).

Fit the tailplane, cement well, and add the fin giving ¼ in. offset, then add the fillets, and hook up the controls, making sure that the elevator gives the same movement each way (about 40 deg. to 45 deg.). One does not use all the movement when flying but it comes in handy for those last minute pullouts.

Cover with lightweight tissue, giving two coats of thin clear dope, and one of thin sanding sealer; sand lightly when dry—finish off with two coats of thin colour dope. Do not add too much as this will affect the performance.

You now have a tough little model capable of a surprising performance and hours of fun. When flying, the u/c is optional but it comes in handy for landing on hard ground. Mount the motor with two washers under each front bolt hole in the lug giving out-thrust. Fit tank by binding in position.

Flying

The lines used are approximately 30 ft. long and these are just right for combat flying with a ½ in. × 3 ft. streamer, plus 2 ft. of thread between model and streamer. It is recommended to fly over grass as one can often do a wingover straight on to the ground, and get away with only a few tissue splits (but it is not recommended—it does not always work).

LATEST ENGINE NEWS

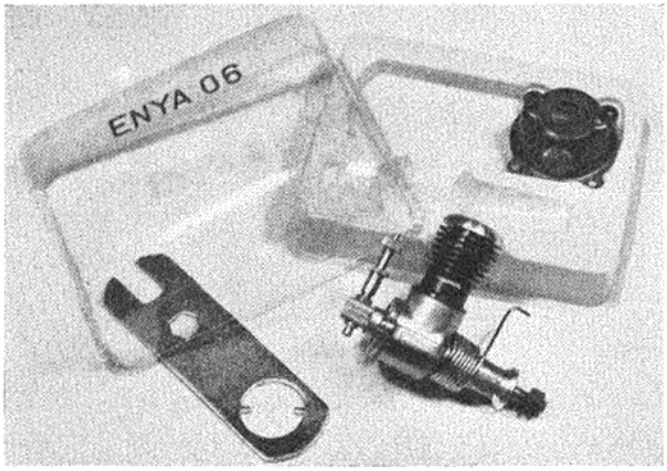
Continued from page 77

News" (in which it was briefly mentioned) we have received a couple of examples of the new Enya 06. As can be seen from the photographs, this 1 c.c. glow motor is of the reed-valve type, with reverse-flow scavenging. Aimed, as we have said, at the low-priced, beginner market, the engine is equipped with a simple "starter spring" which is hooked around the prop blade—similar to that fitted to some of the American Cox power models. The engine is attractively packaged in a moulded plastic box, complete with radial-mount adaptor and combination spanner but (as is usual with Japanese engines) less glowplug.

Structurally, the 06 features a diecast crankcase and front bearing (unbushed) of simple design. The crankshaft is counterbalanced and is relieved in the centre (like the Cox engines) to provide two journals of just over ¼ in. dia. The one-piece, machined cylinder has two, diametrically-opposed exhaust ports, with transfer flutes between them. It screws into the main casting and is topped by a screw-in, machined alloy head. The piston is flat crowned and the gudgeon-pin bosses are contained in a separate insert which is retained by a wire circlip inside the piston skirt.

The reed valve is of simple design. A deep section diecast backpole with integral central intake is used. The inner face of this is slightly recessed for the circlip which retains the 0.003 in. valve reed, the shape of which can best be understood by reference to the photograph. The complete backplate unit is secured to the case with two screws which also serve to attach the radial mount adaptor.

The engine has a bore and stroke of 11.1 × 10.3 mm. and weighs slightly over 2 oz.



The Enya 06, at present available only on the Japanese home market, is attractively boxed, complete with radial mount adaptor and combination spanner.

J.W.R. Taylor's

aviation newspage

BUSIEST PAINT-SLINGER in the world must be the character who applies the ever-changing dark green and white decor on the Aer Lingus fleet. When the first of the company's twin-Dart Fokker *Friendships* was delivered, spotters noted that it lacked the familiar white cockpit roof of Aer Lingus' *Viscounts* and had a white-painted fin and dorsal fin, with green rudder, which reversed the earlier tail colours.

Before the changes had time to register they were already out-of-date, and when the *Friendship* set out on a series of demonstration flights in December, 1958, it sported the attractive new tail markings shown above. The rudder is now (or was, in mid-January !) also white, with the airline's shamrock badge in green, between green bands and surmounted by a small reproduction of Eire's green, white and orange national flag.

Other news from Aer Lingus is that the company is selling its four *Viscount* 707s which have been in service since 1954. From this summer, it will have an all-turboprop passenger fleet of six *Viscount* 808s and seven *Friendships*, but will retain about five of its DC-3s.

SIZZLER is the name chosen by Lawrence Heuberger for the all-metal two-seater (below) which he designed and built himself. Seems quite appropriate, because although accommodation is more roomy than in most amateur-constructed lightplanes, the *Sizzler* will still do 160 m.p.h. on the power of a 125 h.p. Lycoming flat-four.

An earlier design by Mr. Heuberger, known as the *Doodle Bug*, is even hotter. Spanning only 18 ft. and with an empty weight of 717 lb., it is a beautifully-streamlined single-seater which gets 196 m.p.h. out of a 90 h.p. Continental C90 engine.

ANOTHER ULTRA-LIGHT built by a member of America's Experimental Aircraft Association is the Smith DSA-1 *Miniplane*, the "DSA" standing for "damn small aeroplane." It is too, with an upper span of 17 ft., length of 15 ft. 1 in. and empty weight of 616 lb. Powered by any engine in the 65-125 h.p. range, the *Miniplane* is fully-aerobatic. The machine illustrated is one of the first two built, which have identical cream and red paint-schemes and, despite their biplane design, fly at 135 m.p.h. when fitted with a 100 h.p. Lycoming.

The *Miniplane* was designed by Frank Smith, who was assisted in its construction by Howard Terrill and Leland Wainscott. Smith is dead, but his colleagues are carrying on the good work, by producing a series of three all-wood lightplanes which will be powered by 65 h.p. Continental engines and will have an empty weight of under 350 lb.

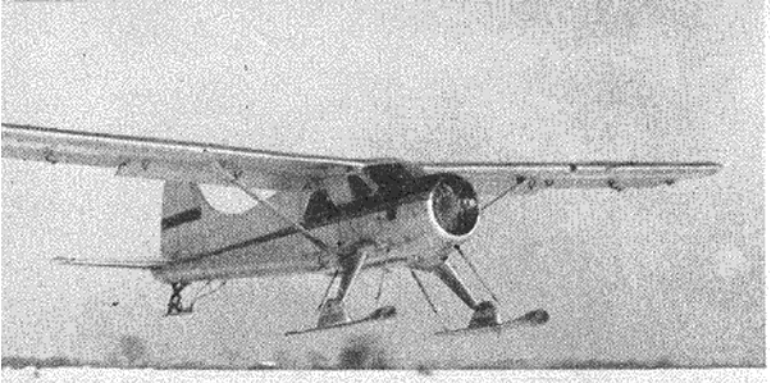
Despite its top speed of Mach O.62, the **CHANCE VOUGHT F4U-7 CORSAIR** is still giving good service with the French naval air arm. At the last count these well-liked piston-engined fighter-bombers equipped three close support squadrons—Nos. 12F, 14F and 15F—and it looks like being some time before they give way to the supersonic Dassault *Etendard IVM*.

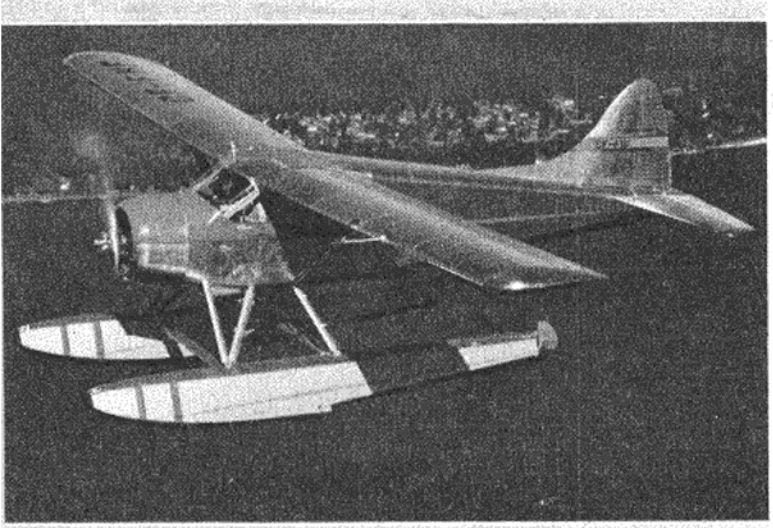
Ordered specially for the Aéronavale, under the M.D.A.P. programme, the F4U-7 was the final *Corsair* variant. When the last one rolled off the line on Christmas Eve 1952, it was the 12,571st *Corsair* built since production started in the autumn of 1941. Powered by a 2,400 h.p. Pratt & Whitney R-2800-18W Double-Wasp, it carries an armament of four 20 mm. cannon, plus 10 5-in. rockets and up to 3,200 lb. of bombs, and has a top speed of about 470 m.p.h.

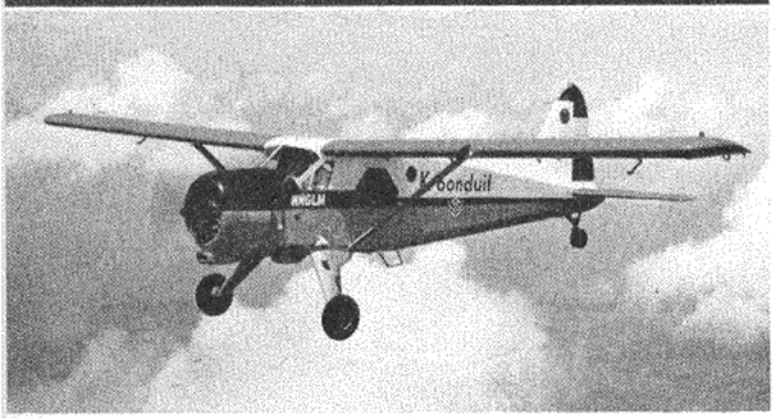
Still going strong, at least with the French Air Force, is the "Corsair." An article, photos and plans of this aircraft were published in the May, 1957 issue.

Smart cabin job in the photo below is Heuberger's "Sizzler," while on the right is another "home-made" the "Miniplane."

DE HAVILLAND'S beaver







Top to bottom: the three basic variants. The lower photo shows a " Beaver " operated by Kroonduif in Dutch New Guinea. The fuselage has a white top with a red flash running from the cowling to the tail. with Kroonduif also in red. The fin is white with letters JZ-PAD in red. Rudder, in red, has a white dividing strip. The tailplane and wings are grey, with the registration JZ-PAD in red.

SOON after the war, de Havilland Aircraft of Canada asked some 80 Canadian operators what they considered to be the ideal light transport for " bush " flying. The answer was a sturdy high-wing design, with all-metal construction, simple fixed undercarriage with interchangeable wheels, floats and skis, a well-proven 450 h.p. Pratt & Whitney Wasp Junior engine and seats for a pilot and at least four passengers.

The company wasted little time, and the prototype of the DHC-2 *Beaver* flew on August 16th, 1947, only 10 months after its design was started. It soon proved capable of carrying eight passengers in lightweight collapsible seats, which were made interchangeable with stretcher racks or cargo attachments. The cabin doors were so designed that a 45-gallon petrol drum could be rolled into the cabin on its side, while hatches in the rear wall allowed long items of freight, such as 10 ft. drilling rods, to be carried. Optional equipment offered quick conversion for air survey photography, crop spraying and dusting, or supply-dropping from racks under the wings and fuselage.

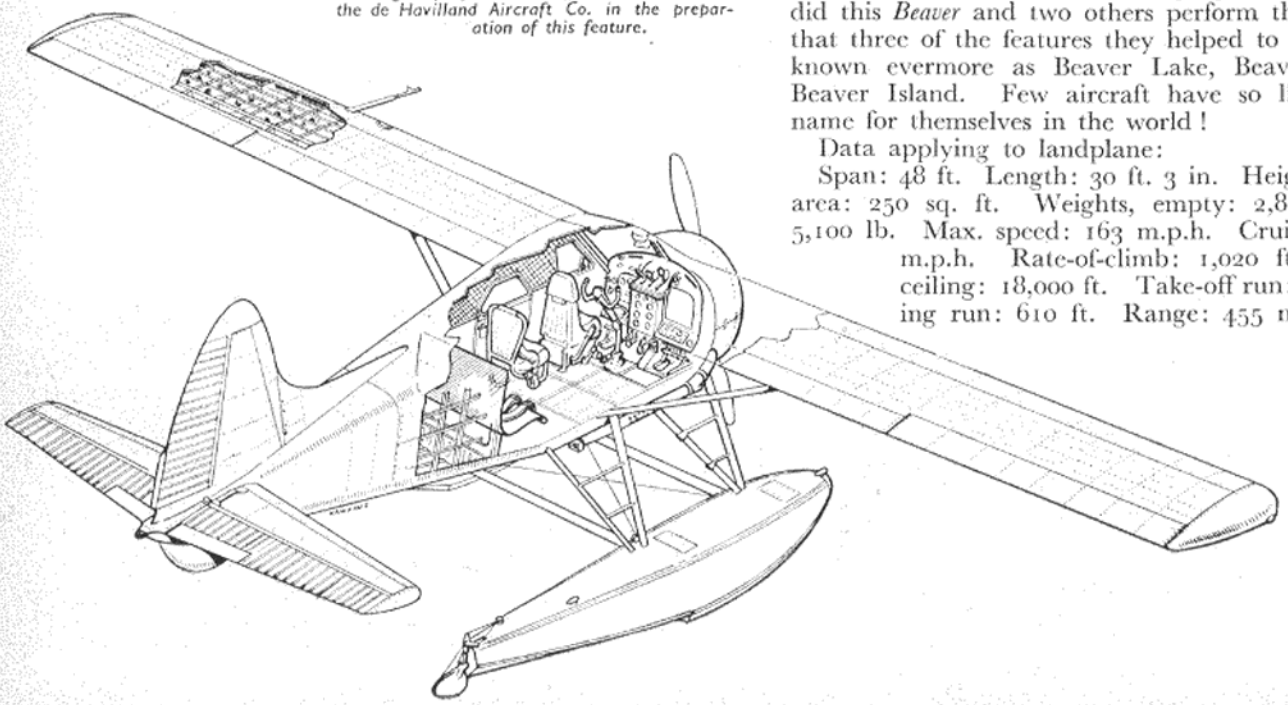
By the end of 1950, 100 *Beavers* had been sold. Then, in a U.S.A.F. design contest for a liaison aircraft, the *Beaver* completely outshone its American competitors and was ordered into large-scale production for the U.S.A.F. and U.S. Army as the L-20. As a result, by the summer of 1958, more than 1,250 *Beavers* had been delivered to customers in 58 countries, a large proportion of them in the U.S. Army Field Force's olive drab camouflage with yellow lettering.

Most unique markings were probably those carried by a *Beaver* assigned to Australia's National Antarctic Research Expedition in 1956. The red kangaroo that formed the centre of its roundels was an experimental one, sitting upright, whereas the insignia adopted officially by the R.A.A.F. features a leaping kangaroo. So well did this *Beaver* and two others perform their varied tasks that three of the features they helped to discover will be known evermore as Beaver Lake, Beaver Glacier and Beaver Island. Few aircraft have so literally made a name for themselves in the world!

Data applying to landplane:

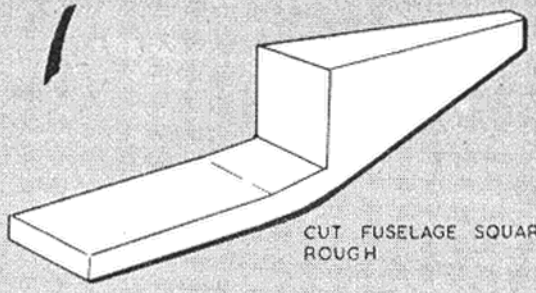
Span: 48 ft. Length: 30 ft. 3 in. Height: 9 ft. Wing area: 250 sq. ft. Weights, empty: 2,850 lb.; loaded: 5,100 lb. Max. speed: 163 m.p.h. Cruising speed: 143 m.p.h. Rate-of-climb: 1,020 ft./min. Service ceiling: 18,000 ft. Take-off run: 560 ft. Landing run: 610 ft. Range: 455 miles.

We gratefully acknowledge the assistance of the de Havilland Aircraft Co. in the preparation of this feature.



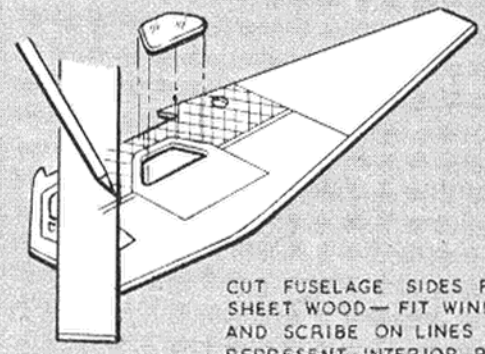
BUILD THE *Beaver*

1



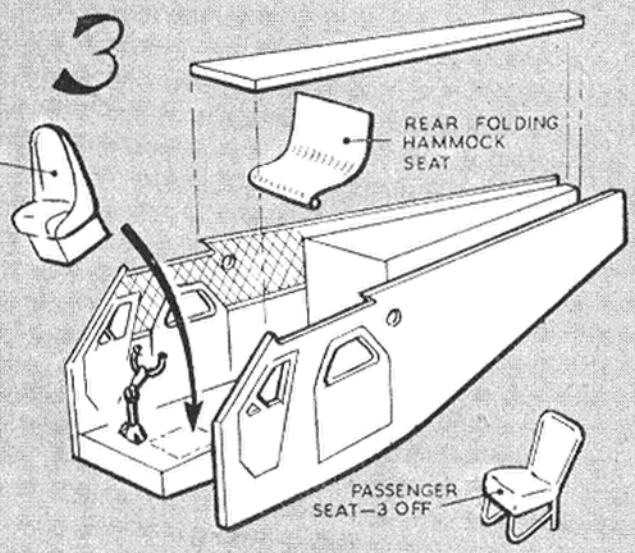
CUT FUSELAGE SQUARE ROUGH

2



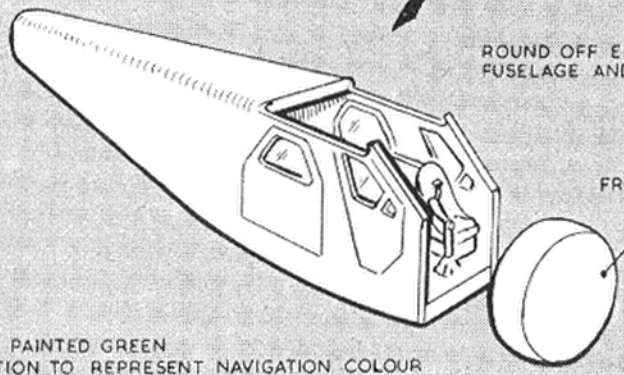
CUT FUSELAGE SIDES FROM SHEET WOOD— FIT WINDOWS AND SCRIBE ON LINES TO REPRESENT INTERIOR PADDING ABOVE WAIST LINE

3



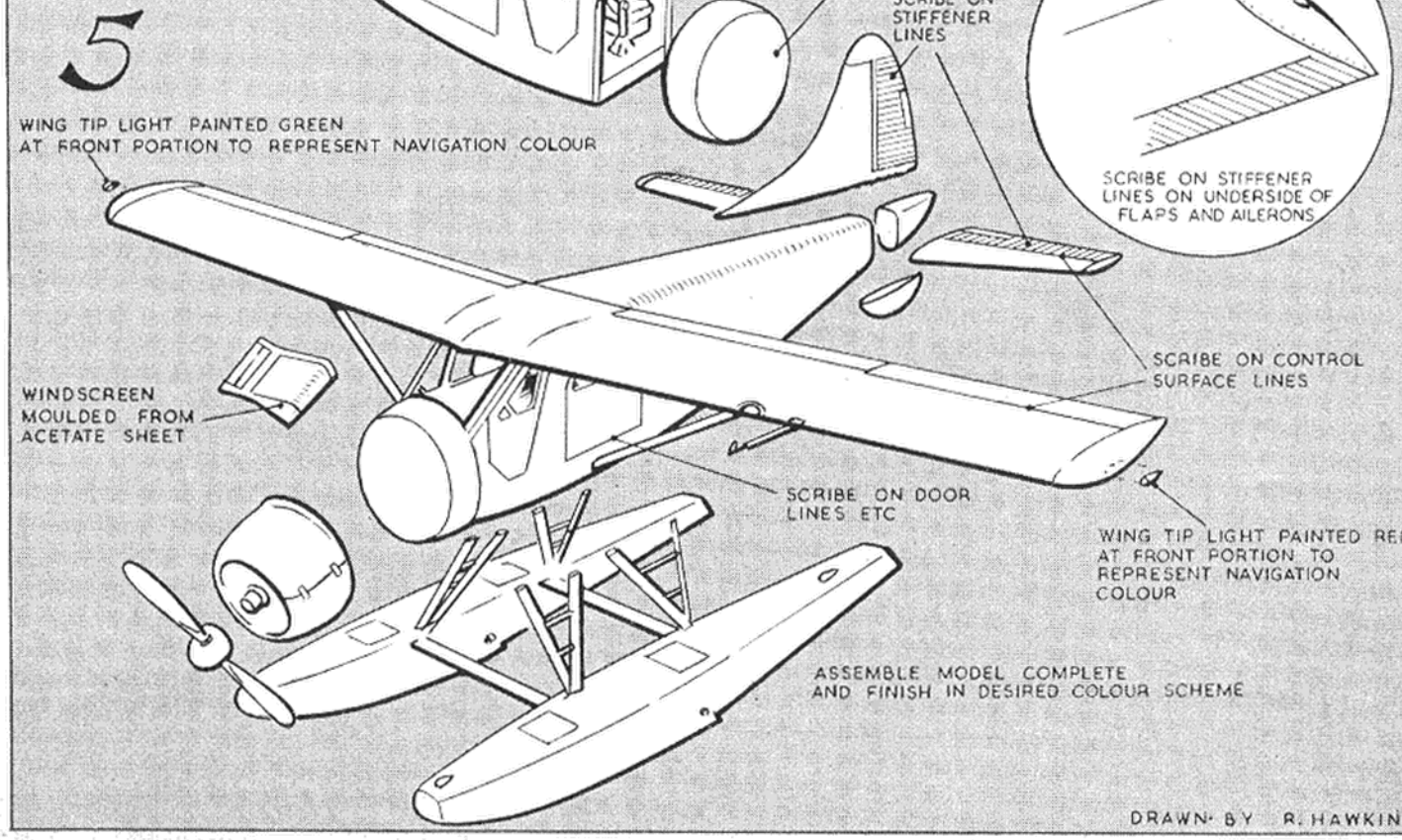
JOIN FUSELAGE SIDES TO FUSELAGE SQUARE ROUGH PAINT INTERIOR AND FIT SEATS ETC

4



ROUND OFF EDGES OF ASSEMBLED FUSELAGE AND FIT FRONT BLOCK

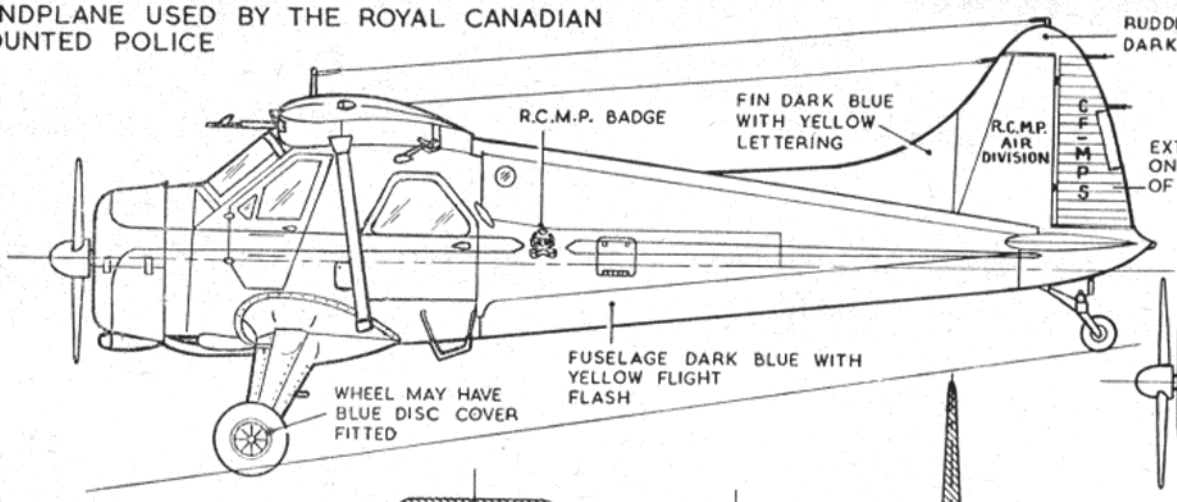
5

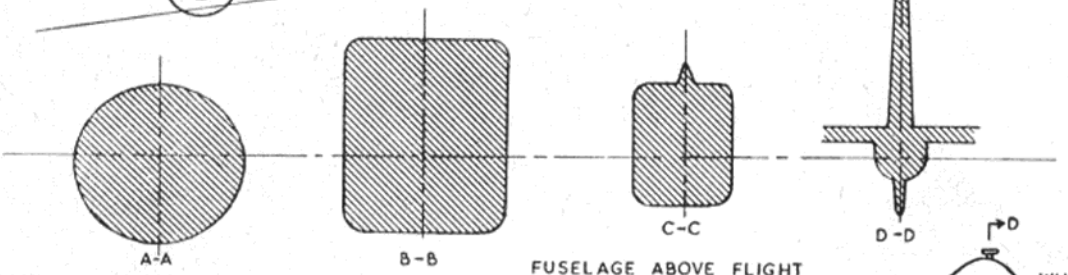


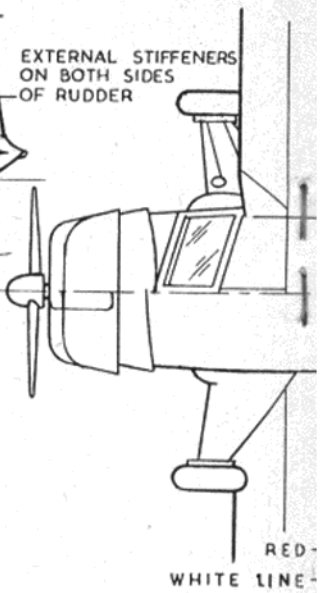
ASSEMBLE MODEL COMPLETE AND FINISH IN DESIRED COLOUR SCHEME

DRAWN BY R. HAWKINS

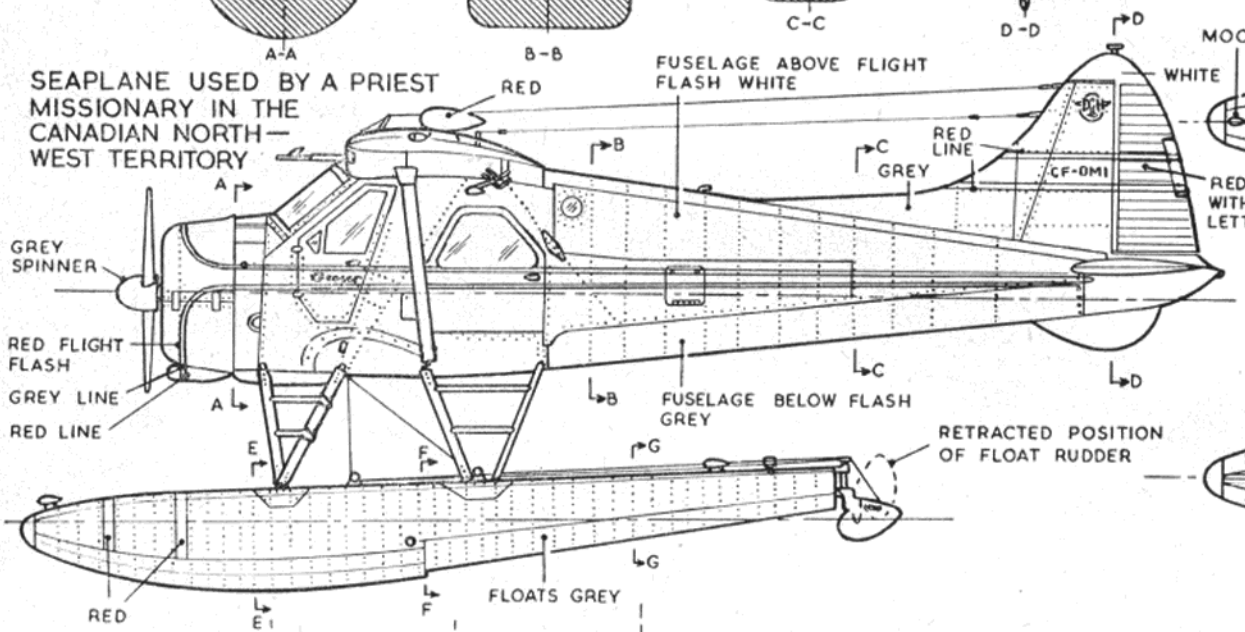
LANDPLANE USED BY THE ROYAL CANADIAN MOUNTED POLICE

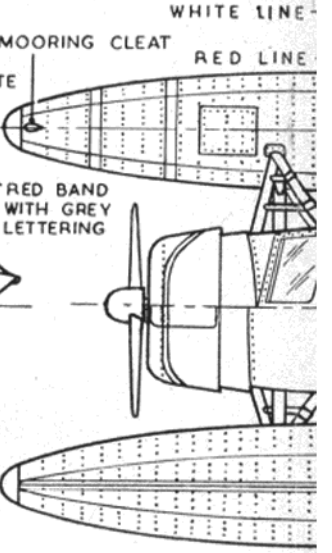


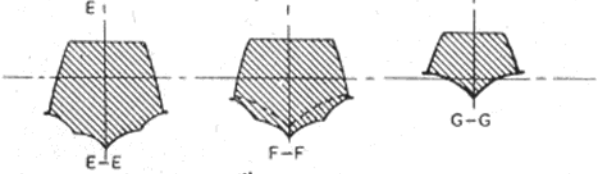




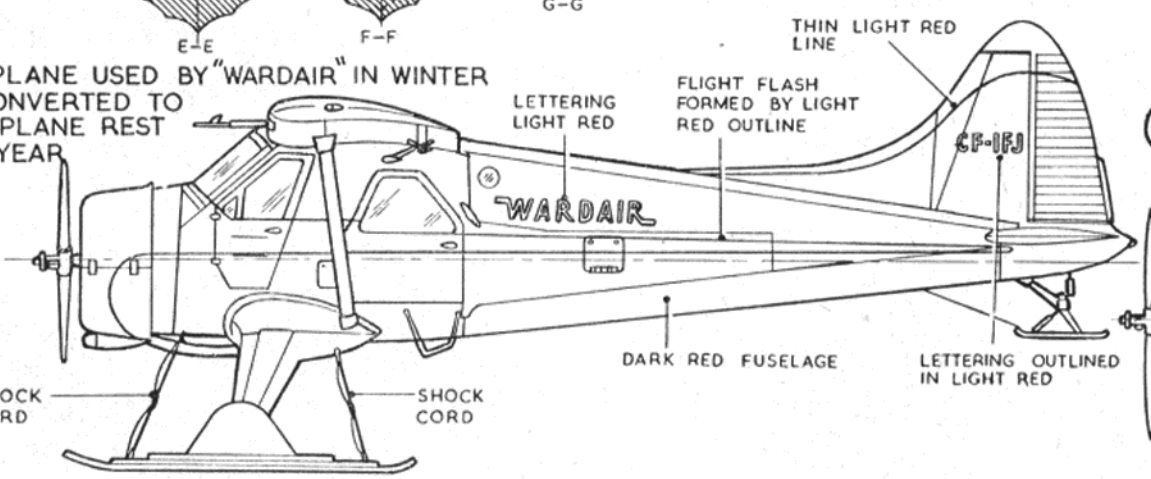
SEAPLANE USED BY A PRIEST MISSIONARY IN THE CANADIAN NORTH—WEST TERRITORY

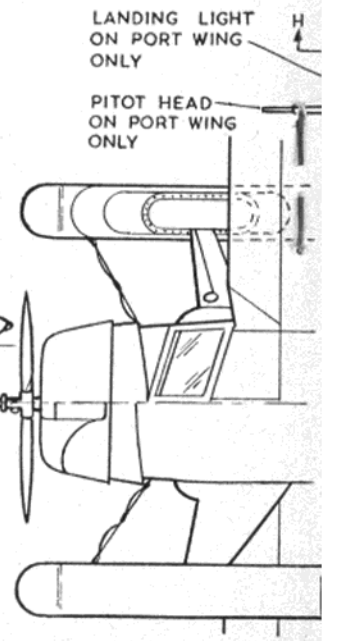






SKIPLANE USED BY "WARDAIR" IN WINTER —CONVERTED TO SEAPLANE REST OF YEAR

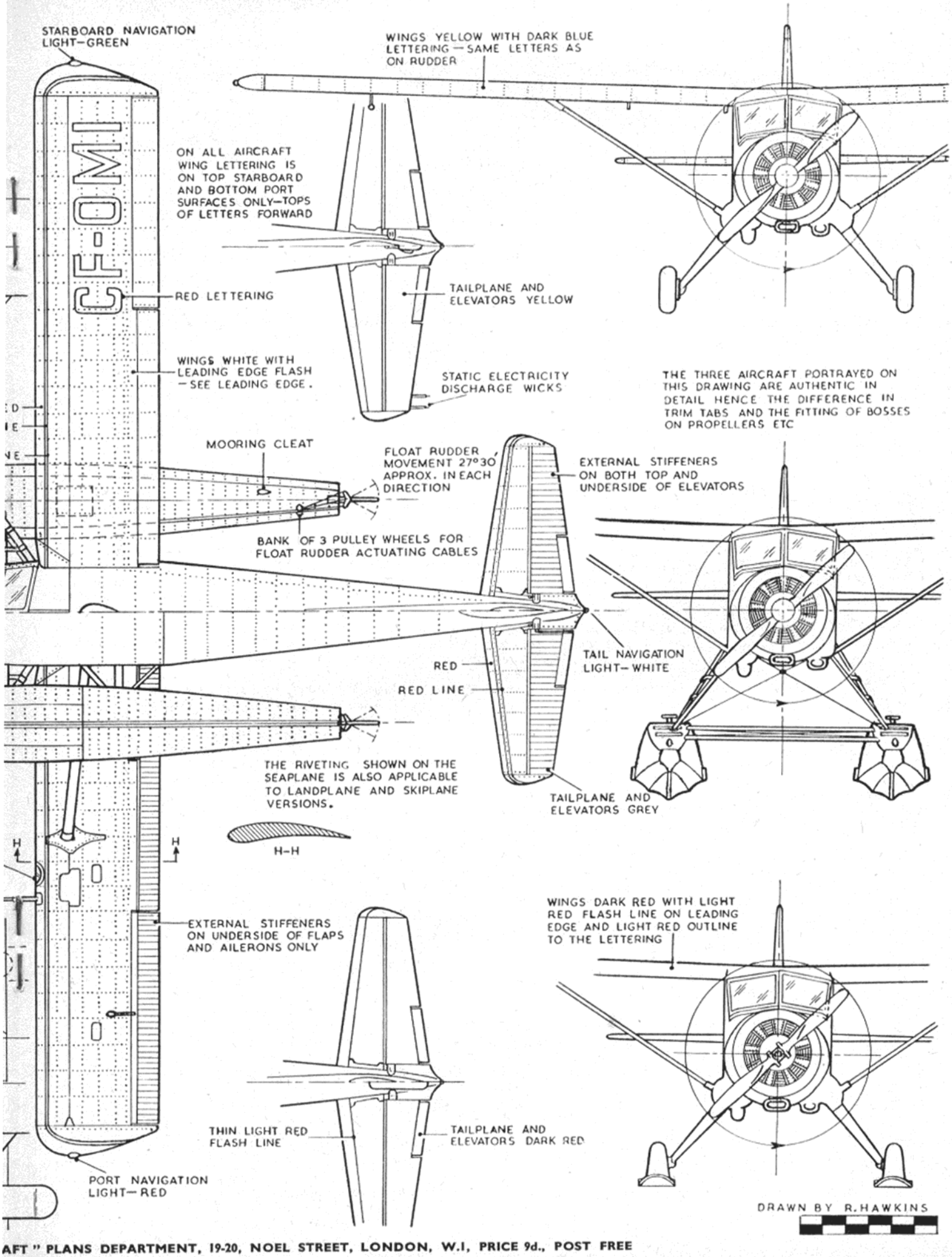




DE HAVILLAND DHC-2 BEAVER

SMA 88

COPIES OF THIS 1/72nd SCALE DRAWING ARE OBTAINABLE FROM "MODEL AIRCRAFT"



AFT " PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, PRICE 9d., POST FREE

Topical Twists

by PYLONIUS

Pot Luck

As all you beginners know, the model movement is suffering from an acute expert shortage. There are shoals of us obtuse beginners floating around—in fact, we're two a penny, with some desperate club secretaries prepared to take even less—but the number of experts on the balsa market, acute or otherwise, are so few they can be counted on the fingers of one hand and still leave sufficient digits for a cub salute.

This state of affairs doesn't worry us beginners unduly. As far as we're concerned the fewer the experts the better—might give us a chance to win a comp if ever their car happens to break down. But some people find the shortage disagreeable. Model editors are not finding those six-page articles on rubber motor torque curves so readily forthcoming, and the V.I.P.'s who hand out the prize hardware must get tired of looking at the same old faces.

Perhaps the people most to be pitied are the contest organisers, with huge masses of pots and plaques to dispose of. Stocks have accumulated during the shortage period, and, with too many pots chasing too few experts, a spiral has been set up, even more vicious than a beginner's power model. Anxious to whittle down the surplus, officials are constantly on the alert to heave a few chunks of hefty hardware at any expert who comes within range.

But the pot-happy expert is getting cagey. The odd silvery pot or two on the family sideboard might boost morale and help to liven up the home decor, but when the influx of pottery begins to encroach on valuable building space by overflowing onto the kitchen table, it is time to call a halt. For one thing it's lowering to the prestige of the movement to have the Wakefield Cup used as a mixing bowl, although some of the smaller pots make useful dihedral jugs. Then, of course, there is the weekly Brasso bill to contend with, and care must be exercised in closing the front door, as with all that jangling pottery lying about, a hearty slam causes the neighbours to run to their doors to look for the fire. And, worst of all, there is the nail biting job of keeping tabs on the return date of each pot as it nears its annual sideboard stint. All in all, the pot saturated expert can be excused for shying at the sight of another metallic intruder.

One way out of his dilemma would be to give up entering contests, but this would hardly be fair on the officials who like to know that their pots are going to a safe home. And, in any case, no self respecting expert could stand by and watch some thermal-lucky beginner win one of their contests—that would be sacrilege.

No, the only pot dodging tactics he can reasonably employ is to win the contest and then disqualify himself on some technicality. This leaves him minus the onerous pot but with honours—easy. But the officials are not so easily deluded. They immediately present him with another pot by way of compensating him for his bad luck.

Certain people, with a sympathetic feeling towards the expert, are objecting to some over-eagerness on the part of the pot disposers. They feel that the poor old expert is being imposed upon in being presented with pots which he never knew he had won. This is taking unfair advantage. They should stick to the rules and give the expert time to duck.

To my way of thinking the only way to end this unwanted pottery campaign is to follow the example of our American friends and substitute chromium plated cars for ditto pots. This would at least ensure that our experts could reach the contest field in comfort.

First in the Field

To have been a model pioneer way back in the spoked wheels and open ironwork days must have required great strength of character, and even greater strength of arm in order to get 20 lb. worth of ragged girder safely airborne. And being a one-off modeller must have had its lonely moments. Plagued by a bad pioneer stall you had to go it alone in digging the model out of the ground, with no one to consult whether to give the model 6 in. extra downthrust or to pack 5 lb. of lead in the nose. Altogether it must have been a lonelier existence than that of active modeller in this plastic static age, but at least you could draw comfort from the fact that the public was behind you, to the cloth capped man—and, with a 20 lb. nobbly missile in free orbit the further behind the safer.

But however lonely, it was at least quiet. Children in those days were never heard and seldom seen; either being in Sunday school or in bed. Dogs had hardly been invented, and the few that existed were untrained in the art of model worrying.

The only thing that puzzles me is the presence of two pioneer policemen to six pioneer spectators. The six gentlemen look harmless enough to me, and don't seem to be carrying any weapon capable of inflicting damage on 20 lb. worth of ragged ironwork. It might be that they are about to take both modeller and spectators into custody for causing a breach of the peace. Or, perhaps, the modeller has broken the law by failing to have a man preceding the model with a red flag. But, most likely, spectators were so few and so reluctant in those days they had to be brought in by force.

Desert Group

I've always been under the impression that a sky pilot was an irreverent term for a reverend gentleman, and from this I presumed that the El Adem Sky Pilots were a group of clerical gentlemen who had run off to join the Foreign Legion. However, it turns out that the Sky Pilots in question are a quite down to earth, or rather sand, forces model club, situated in the arid wastes of North Africa.

What it's like to fly models in a broiling sun, or any sun at all, we wouldn't know, but flying in the desert couldn't be all dates and dancing girls. It might not rain every day, but just think, every time you venture out on the dunes you get violently homesick for Chobham Common. And, while you're dreaming wistfully of soggy sand and wet winds a foraging goat has chewed off the rear end of your new Wakefield. You chase off after the bearded gastronome, bent on administering revengeful damage to its rear end with your size 12 desert issue boot, and finish up in the guardroom. Well, how were you to know it was the regimental mascot?

Fourteen days later as you stare over the shimmering sands you can almost see the thermals bubbling up. So strong are these desert type risers that ordinary d/t fuse is too weak—you have to use pure gelignite.

Retrieving is also made hazardous by the appearance of mirages. The model you're chasing is actually being flown on Chobham Common, and when eventually you catch up with it you'll have to content yourself with a word of thanks from J.O.'D. as compensation for being posted as a deserter.

M.A.'s ROVING REPORT

- brings you up to date on the latest world model news

HOW much does it cost to operate a multi-channel radio model? Few of us bother to keep accounts of what our hobby costs us, so it was rather interesting to read, among other interesting facts, just how much one American modeller (who *had* taken the trouble to keep a record) spent on maintaining a five-channel model over a 13-month period.

A total of 204 flights were logged during this time, totalling 40 hours, 48 min. with an average time of 12 min. per flight and using a total of 38 (U.S.) pints of fuel. In addition, four 30-volt receiver batteries, three sets of transmitter batteries, 20 pencells and 14 props (a case for nylon, here) were consumed. The bill came to approximately $43—just over £15—for the total running expenses.

* * *

It is remarkable how rapidly a good F/F design becomes recognised in America and quickly establishes itself in "big time" contests. In no time at all, everyone is building the new favourite. A couple of years ago, Ron St. Jean's *Ramrods* were all the rage; just after the war it was Shulman's *Banshee* and, in between, there have been such famous designs as Gilliam's *Civy Boy*, Davis's *Hogan* and Taibi's *Spacer*.

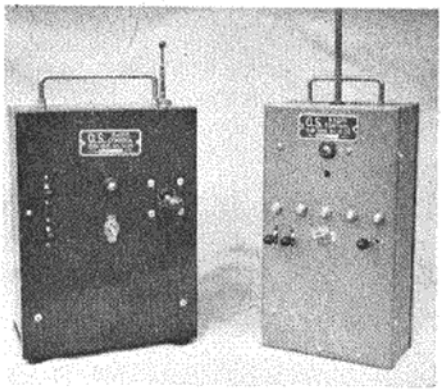
The latest success story is Bob Hunter's *Satellite*. This is a model of more than ordinary interest because it is a break away from the ultra-simple, slab-sided, square-cut type of design. In many respects it goes back a decade or so, to the days when modellers spent weeks, instead of days, building a contest model. It reverts to an under-cambered wing, tapered, elliptical-tipped surfaces and a relatively complex construction. There are, for example, approximately 200 separate pieces of wood in the wing alone.

The original *Satellite* appeared, early in 1957, as a "C" class model, spanning 8 ft. 3½ in., with a wing area of nearly 10 sq. ft. An Italian 10 c.c. Super-Tigre G.24 racing glow motor provided the urge for a spectacular vertical take-off and climb. From this design, smaller models to suit all other classes were developed: the *Satellite*-800 for 0.29-0.35 cu. in. motors, the 600 for 0.19-0.23 cu. in., the 460 for 0.09-0.15 and the 320 for "Half-A" motors. In each case, the figures represent the approximate area, in square inches, of the model and all have achieved numerous contest wins, including several successes at the 1958 U.S. Nationals. Plans of the 600 version have now been published by *Model Airplane News*.

* * *

The ability of Russian engineers must now be clear to all of us, following their remarkable achievements in the field of rocketry. Nevertheless, from time to time, we come up against examples of "copying the West" that appear strange to us—accustomed, as we are, to consider "copying" to be an admission of incompetence. For many years, for example, Russia's biggest and best car was a close copy of the American Packard. Then, of course, there was the classic example: the Russian-built Boeing B.29.

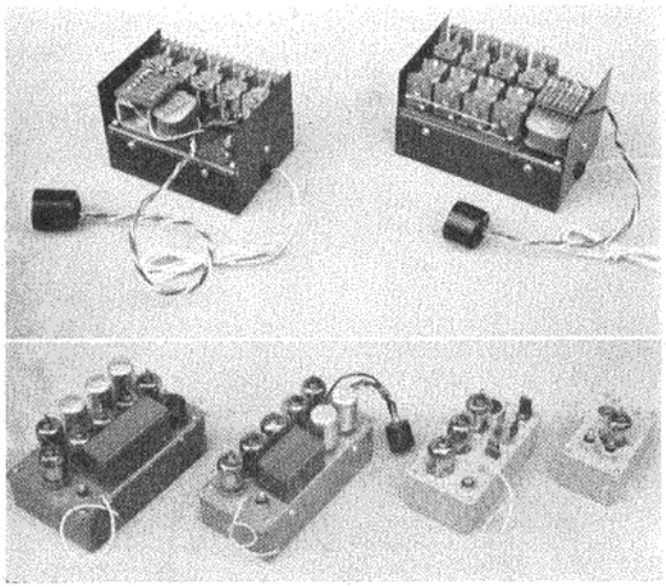
It is not altogether surprising, therefore, to find that Russian model engine designers, far from confining themselves to designs merely based on Western practice, do not hesitate to copy, part for part, any foreign engine which takes their fancy. Their "Kometa" carbon-copy of the Italian Super-Tigre G.21—described in our April 1958 issue—is a case in point and, now, we learn of a Russian copy of the West German Webra Mach-1 diesel. It was with a model powered by one of these engines, known as the MK-12B, that the Russian modeller, Eugeni Verbitki, won the European International F/F event at Bucharest last year.



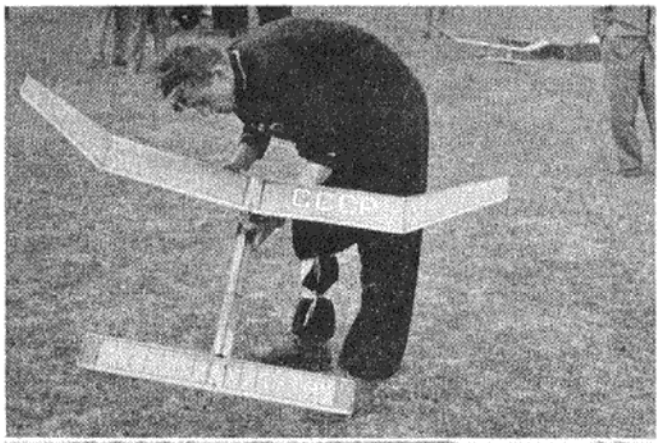
The new O.S. eight-channel and five-channel hand transmitters. Note the stick control on the larger unit.

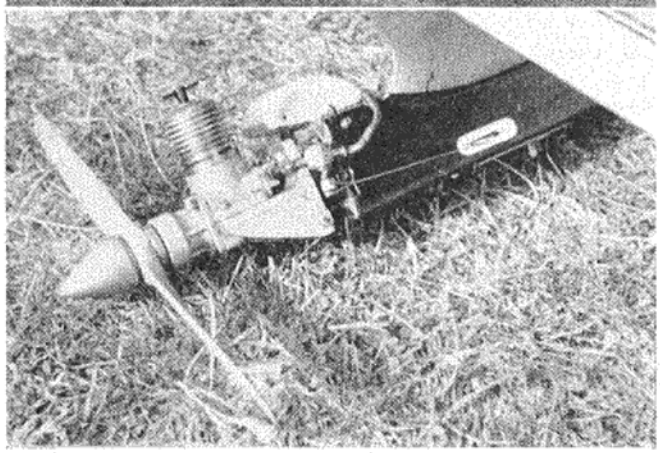
* * *

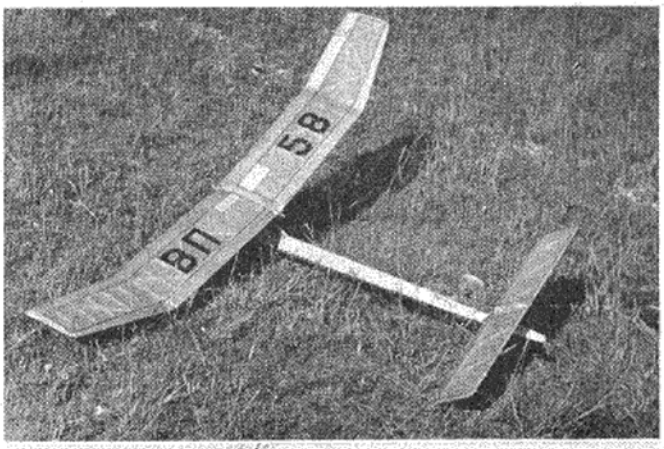
In contrast, another new Russian 2.5 c.c. engine appeared last year, which does appear to be original—insofar as any model two-stroke designed in accordance with current trends can be "original," that is. This motor is a Petukov design, known as the VIP-20 and was used by Petukov to power his F/F entry at the last M.M.S. Internationals held in Hungary. It is a twin ball-bearing glowplug motor with disc induction and a lapped piston and is

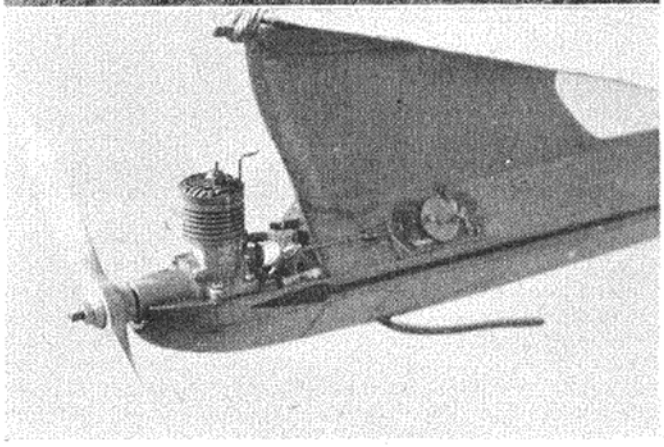


Following the American trend. Soon to be available are the two new O.S. fully-transistorised receivers for five and eight channels, illustrated above. Below are shown four receivers, one- to six-valve, in the current O.S. range.









Verbitki of the U.S.S.R. and the model with which he won the European F/F International event in Rumania. A close-up of the nose of the model shows the MK-12B motor which is a Russian copy of the German Webra Mach-1.

Russian modeller V. Petukov was responsible for both model and engine shown in these photos. The model was flown at the 1958 Communist States Internationals. The engine, known as a VIP-20 (taken from Petukov's initials), is a twin b.b. 2.5 glow engine with disc induction.

alleged to develop 0.32 b.h.p. at 14,500 r.p.m. It is a neat looking engine with well finished die-castings and has a valve rotor of a Tufnol type material. Ian Russell, of the Hayes Club, who attended the Brussels Criterium d'Europe last September, managed to get hold of one of these engines. So far as we know, it is the only one in Britain.

* * *

For some time now, we have been expecting to hear that the enterprising O.S. concern in Japan would enter the "luxury" R/C field with a modern transistorised eight-channel receiver and stick control transmitter on the American pattern. We now learn that just such an outfit is about to go into production, together with a simplified five-channel version. We await further details of these interesting-looking sets, an outward impression of which can be gained from the accompanying photographs.

* * *

If anyone thinks that i.c. powered models must still be regarded as suitable only for pukka "model engineers" and therefore unfit for "the masses," we would refer him to this extract from an American trade publication:

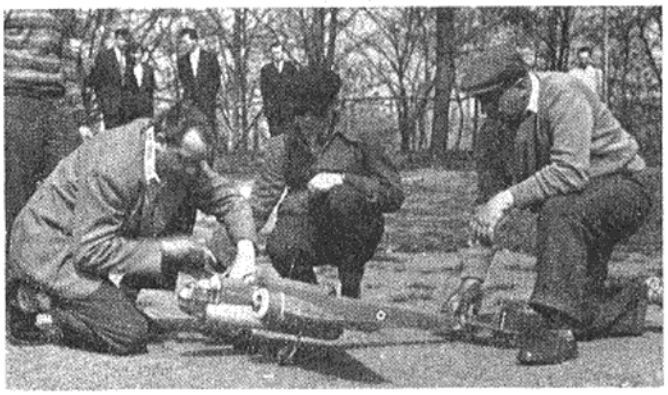
"Statistics show that the age group that has been most active and enthusiastic about power models encompasses a twenty-two million segment of the American public. What does this mean in terms of potential sales? Here is a multi-million dollar market that is moving right up alongside electric trains. . . . Along with it is the additional, continuing sales potential of fuel and accessories—another million dollar market."

Did Bill Brown and Bill Atwood envisage such a future when, in the early 'thirties, they pioneered the quantity production of model i.c. engines?

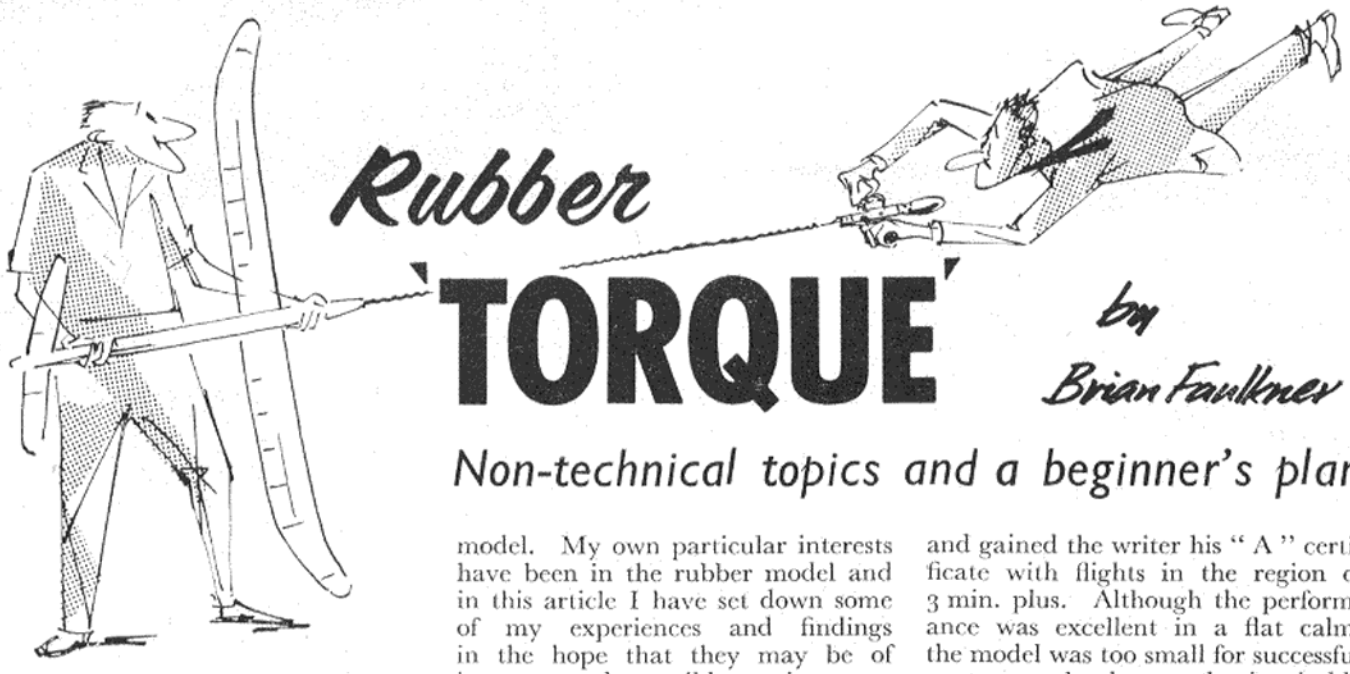
* * *

Many R/C types will remember French Champion Albert Wastable's elegant model which, back in 1951, first showed us how a multi-channel model should be flown. His AW-3 R/C model is now being sold in kit form by the Paris model firm, La Source des Inventions. The kit is extensively prefabricated, with many hand-cut parts.

Wastable, incidentally, like his Belgian opposite number, Gobeaux, has recently gone over to the German Ruppert flat-twin diesel—or, to be more accurate, to the Webra built production version of this engine. Our French correspondent, Jean Mouttet, also has one of these motors. He describes it as being well finished inside, if a little rough externally, and quite easy to start by varying the compression on one cylinder only.



Unusual scale subject from an unexpected quarter. A. Svoboda, of Kladno, Czechoslovakia, starts up his Handley Page Hampden, powered by two 3.2 c.c. engines of his own design. The model spans 64 in. and weighs 5.3 lb.



Rubber 'TORQUE'

by Brian Faulkner

Non-technical topics and a beginner's plan

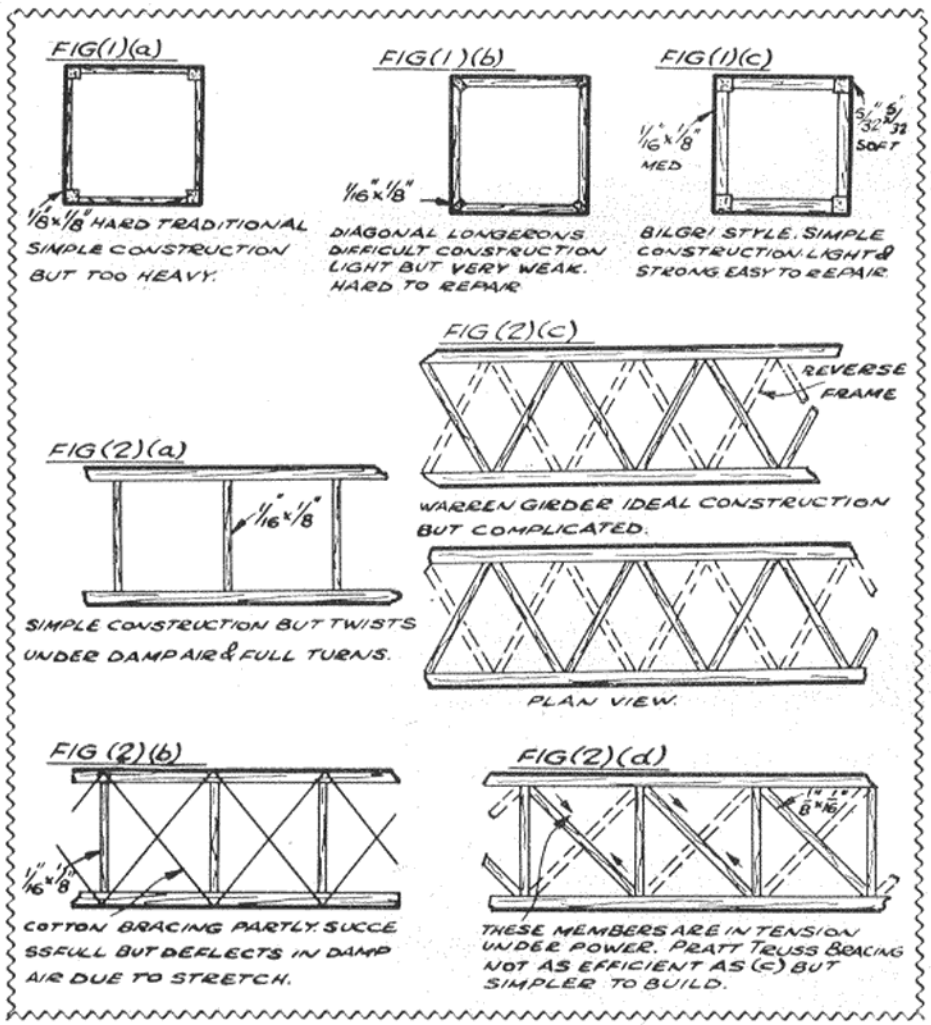
PART of the fascination of the model aircraft hobby is its scope for developing new ideas, or one can concentrate on the evolution of a particular design or type of model. My own particular interests have been in the rubber model and in this article I have set down some of my experiences and findings in the hope that they may be of interest—and possibly assistance—to other readers.

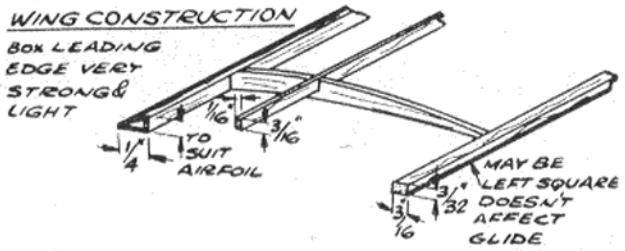
Until recently I have pursued the diamond pylon layout developed from a 20 in. r.t.p. model. As an experiment this was flown outdoors, and gained the writer his " A " certificate with flights in the region of 3 min. plus. Although the performance was excellent in a flat calm, the model was too small for successful contest work, due to the inevitable down-wind drift taking it o.o.s. very quickly.

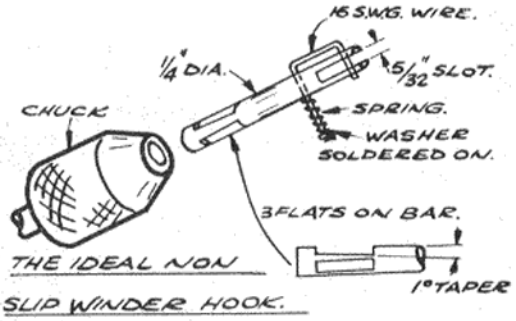
Three or four models were built, scaled up in the first place to 30 in. wingspan and eventually to 36 in. span. Surprisingly the performance potential went down. This was due to a percentage weight increase of airframe to rubber weight, and it became obvious that a reduction in airframe weight was a very important step to achieving a longer duration. The *Thermaleer* (M.A. Plan 195) series was developed structurally to reduce the airframe weight from 3 oz. to 2 oz. when the performance increased from 3 min. to 4 min.

At that period (1952) the Cheadle club favoured free-wheeling propellers purely on the grounds of simplicity and consistency, and it was possible to obtain a good calm air duration of 4 min. by using a long motor. The original 10 strands of $\frac{1}{4} \times 40$ in. were replaced by eight strands of $\frac{1}{4} \times 50$ in. which would take 1,200 turns, and give a motor run of 2 min. with a 14 in. prop. The reduction from a 15 to a 14 in. prop improved the glide so that a further 2 min. was easily achieved.

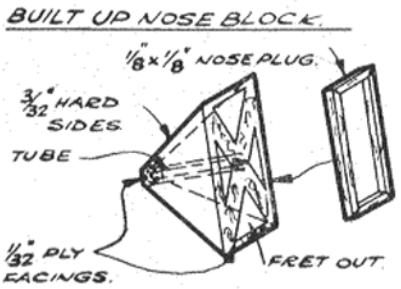
The bogy of long motors is, of course, bunching, and a special winding technique was developed to overcome this. The motor was stretched by four to five times and 50 per cent. of full turns were piled on; for the remaining 50 per cent. of turns, the winder edged slowly towards the model, until the 1,199th turn was crammed into the nose (with a shoe horn !). (Cont. overleaf)







Although we all favoured the 36 in. span job for ease of transport and cheapness, it always fell down on the score of visibility—on the usual comp. day it would go o.o.s. at 3 min. For this reason the Wakefield size model was regarded as a better proposition and several ver-



sions of a 44 in. span diamond pylon Wakefield were built over six years.

Some notes on the various types of structure may be worth recording:

Fuselage. From $\frac{1}{8}$ in. sq. hard longerons I "progressed" to $\frac{1}{4} \times \frac{1}{16}$ in. diagonal longerons resulting in a weight reduction from 1.65 to 1.3 oz., but I soon got fed up with repairing the nose section and was almost glad to lose the model. My pen friend, L. H. Conover, sent me a batch of 5/32 square "Bilgrie" stock and very soon I had a model built. It is the lightest I have ever made; the fuselage was only 0.9 oz., which really surprised me, and in practice the model was very rigid and lasted almost three years!

Wings. From straight ribs and a $\frac{1}{8} \times \frac{1}{2}$ in. trailing edge I developed in the "geodetic age" finally settling for $\frac{3}{16}$ in. sq. leading edge, $\frac{1}{16} \times \frac{3}{16}$ in. spar placed on the top of the wing, and a $\frac{3}{16} \times \frac{3}{16}$ in. t.e. Ribs were cut from quarter grained 1/32 in. stock, and these are satisfactory provided you don't forget to glue the tissue to both top and bottom of the ribs. This prevents the ribs from failing in compression into a nasty wiggle.

The latest wings I use have a triangular box leading edge from medium $\frac{1}{16}$ in. sheet, which makes for a very strong and light wing. I prefer Jap tissue covering for a rubber model wing, as it helps to keep the finished weight down. In any case the finished weight should not exceed $\frac{3}{4}$ to $\frac{7}{8}$ oz.

Tailplane. This unit can easily be built to $\frac{1}{4}$ oz. and I find that $\frac{1}{16}$ in. sq. spars are adequate. I now favour the chopped ellipse plan form, with a laminated l.e. and square tips. When fitting the trailing edge, lightly dope the underside to camber it $\frac{1}{16}$ in.; this gives the tail a tendency to warp with wash-in and aids stability—but don't overdo it!

Props. These are a subject on their own, but, being a lazy type, a single bladed folder suits my needs. I have found that provided it has a large radius and low pitch, it can almost equal the best Bilgrie type prop. Use a light balsa—not the stuff that looks like candy floss—for the blade, and you can get this unit down to $\frac{7}{8}$ oz.

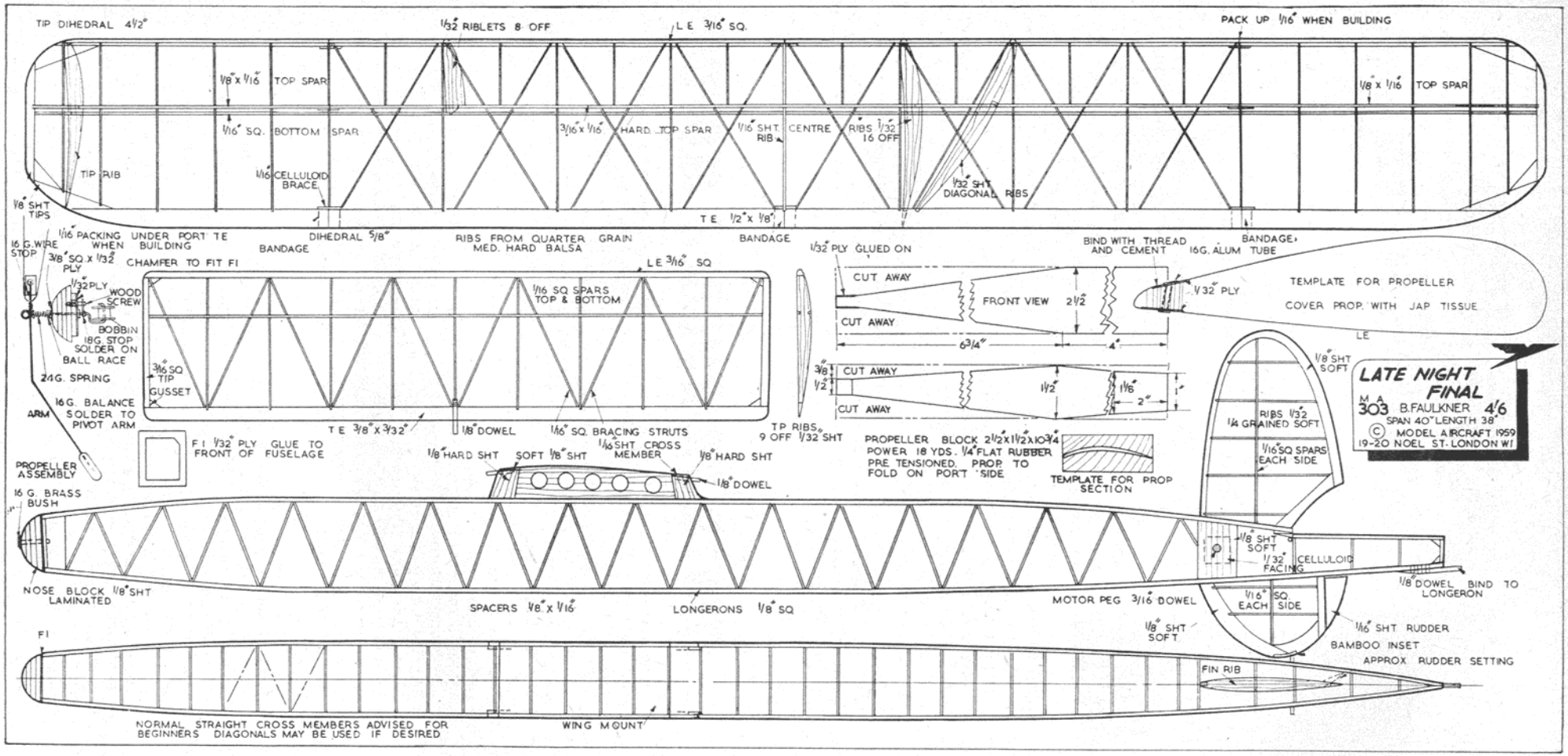
Thus for an open Wakefield an airframe weight of 2.9 to 3.25 oz. should be aimed at, for the lighter they are the better they go!

THIS model was specifically designed for a beginner, but I was so pleased with my original that I have temporarily discarded the diamond layout in favour of the slab-sided model.

The model is an economical minimum competition size of 40 in., using only 18 yd. of $\frac{1}{4}$ in. flat Pirelli. The layout is straightforward and construction should present no difficulty, provided that you are not too ham-fisted. Remember, building a rubber model is not carpentry, and always keep the scales handy to check the weight as you build.

Wing. This is of geodetic construction up to the first

Continued on page 92



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, 4s. 6d., POST FREE

The writer fits the nose-block to his "Late Night Final" for a flight in the Model Aircraft Trophy at last year's Nats.

dihedral break—from there conventional straight ribs are used. It is possible to build a lighter wing than the one drawn by using a triangular box leading edge built up from $\frac{1}{16} \times \frac{3}{16}$ in. medium balsa, and a $\frac{3}{16} \times 3/32$ in. trailing edge, but beginners are not advised to do this.

It is important to build in the following warps during construction to aid stability. Left wing tip, $\frac{1}{16}$ in. under the trailing edge at the tip. Left wing panel flat. Right wing panel $\frac{1}{16}$ in. under the leading edge at the dihedral break. Right tip flat.

Tailplane. Use medium soft wood here and build in the following warp. Trailing edge to be lightly doped on the underside to give a slight positive warp at the tip.

Fuselage. Construct the side frames on the plan and join together using cardboard jigs. A stout piece of cardboard is used for the jig, and this has a rectangle cut out to the size of the fuselage. Make one for the nose, two for the centre of the fuselage, and one for the rear. Make the distance to the datum line from the bottom of the cardboard 3 in. The fuselage is then easily assembled on the building board and will line up perfectly.

Covering. Cover the fuselage with light Modelspan in black or red, and for the wings, tail and prop use Jap tissue. Be certain to stick the tissue to every rib and use only banana oil on the prop.

Trimming. After hand gliding and adjusting the rudder to a 100 ft. right-hand circle, wind on 300 turns. The model should turn right under power with a perfect entry into the glide. If height is lost in transition put more pre-tensioning turns on the motor, or if this fails move the c.g. forward and retrim. Be sure that the prop folds level with the port fuselage side, otherwise a spin may occur in windy weather due to extra side area at the front.

Gradually increase the turns up to a maximum of 800. The model is almost certain to powerstall at one stage, and this should be overcome by careful application of 1/64 in. right side thrust. If this fails use down thrust, of which the original needed only a small amount.

As a guide the model should clock 3 min. on 500 turns and over 4 min. on full bang—the best of British luck!

---

and here are some . . . HINTS ON RUBBER MOTORS

WHEN you buy rubber strip from your model shop and do not want to use it right away, store it in a sack or clean airtight tin and keep in a cool, dry cupboard. Sunlight, heat, grit, etc., are all enemies of rubber and cause deterioration.

Rubber motors must *always* be lubricated before being wound up. Lubrication increases the maximum number of turns you can put on the rubber, gives a smoother power output, and prevents strands chafing. Use a proprietary rubber lubricant or castor oil. All other oils or greases *attack* rubber and are quite unsuitable. If you are absolutely stuck for some lubricant, you can try brushless shaving cream in an emergency, but wash it off after the day's flying.

The white powder found on new rubber strip is simply chalk. It is not necessary to wash this off before making up and lubricating a motor, although many articles in the past have said this should be done. If the chalk coating is particularly liberal, just shake to remove the excess.

When making up a motor, tie your knots *before* lubricating the rubber. Any sort of locking knot will do, but make it as neat as possible. Moisten the rubber (e.g. lick it) to reduce the risk of tearing the strands when knotting. Knots made in lubricated rubber should be bound with wool to prevent slipping. Knots *can* be tied in rubber lubricated with castor oil and will hold, but not in rubber lubricated with a soft soap lubricant.

You *must* "break in" a new motor, if you want it to give a lasting, consistent performance. This means winding it up in stages, starting with about one-third full turns, and working up gradually to 80 to 90 per cent. full turns. You are asking for trouble if you put a new motor straight into a model and try to wind it right up.

A good rubber motor should last for months if you never wind it beyond 80 per cent. full turns. If you have to use above 90 per cent. turns for contest work, then three contest flights is the "useful" life of that motor.

You *can* leave motors corded or roped for long periods without harm. The rubber strip is deformed, but does not seem to suffer any loss of strength. Best practice is to break down corded motors after a day's flying and re-make them the evening before the next outing.

Remember, cording turns are wound onto a motor the same way as you wind the propeller, when you are using a freewheeling propeller; but the *opposite way round* if you are using a folder in conjunction with a mechanical stop.

To prevent bunching on a long motor, rubber tubing over the end of the motor *and* the bobbin or motor hook is the answer. The tubing must be anchored to the hook or bobbin in some way and acts as a lever to prevent the wound motor from "climbing."

Use castor oil as a lubricant for the propeller shaft. If this gets picked up on the rubber motor it will do no harm.

Bunching can be caused by improper winding technique. Practise outside the model with the motor hooked onto a doorknob. Practise "coming in" on the latter half of the winding and get to know the "feel" of a rubber motor as maximum turns are approached. An experienced modeller winds as much by "feel" as by counting the number of turns.

Over the Counter
reviews

Glo FUELS

GLOWPLUG engines are on the increase in Britain, now that fair numbers of excellent American, Japanese and Australian glow motors are becoming available—plus the imminent appearance of two or three British designs. And to cope with the expected demand for fuels to meet specific requirements, **E. Keil & Co. Ltd.** are now marketing two new mixtures: Record "Methanex" and Record "Super-Nitrex."

These Keilkraft fuels represent a new approach, in this country, to the problem of providing suitable formulae for *all* types of glowplug ignition model engines. As most readers know, glow motors, unlike diesels, are highly sensitive to the type of fuel used. Different types of motors require different mixtures and the ideal formula will also vary according to weather conditions, the type of glowplug employed and the amount of running the motor has had.

Glow fuels can be roughly divided into two types, "cool" and "hot," and it is now the practice of many U.S. manufacturers to market *two* basic fuels which can be used individually or, where appropriate, mixed together, by the purchaser, to provide the exact characteristics required. Typical of this approach are the Fox fuels, "Superfuel" and "Hi-Nitro," the K. & B. fuels, "Supersonic-100" and "Supersonic-1000" and now, for the first time in this country, the K-K Record fuels, Methanex and Super-Nitrex.

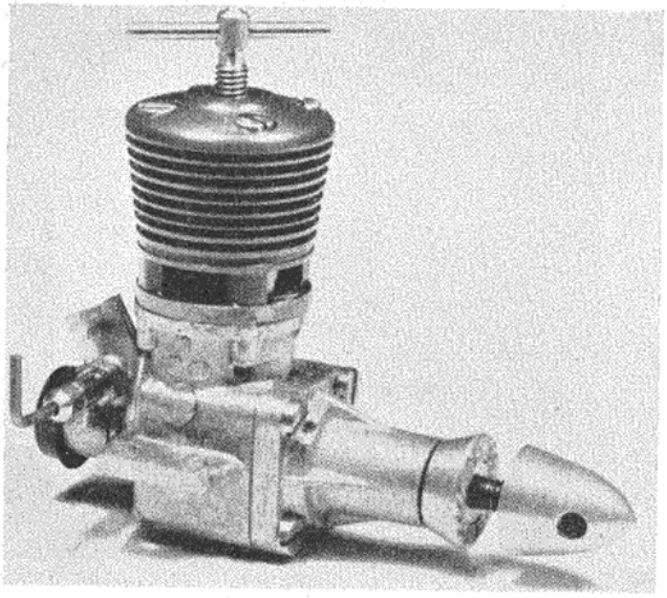
Originally produced in small quantities mainly for competition use, Record brand fuels date back to 1948-49 when the first British high-performance glow fuel and the first nitrated castor-base diesel fuel were marketed under this name. Record "Powerplus" glow fuel was used by Brian Hewitt to win the 1950 Gold Trophy, the fuel having excellent flexibility for stunt work and raising the output of the Yulon engine from 0.32 to 0.37 b.h.p. Record diesel fuel also enjoyed a number of National successes in F/F during 1951-52, including first places in the Sir John Shelley, Halfax Trophy and Astral Trophy events. Difficulty in obtaining adequate supplies of essential nitrated materials restricted output for some time, Powerplus glow fuel eventually being withdrawn due to supplies of 2-nitropropane becoming exhausted. (It is interesting to note, in passing, that a fuel of virtually identical composition has now appeared in America.) In 1955-6, Record fuels were taken over by the present manufacturer and Messrs. Keil became the sole distributors. The fuels are now sponsored by the British Petroleum Co. Ltd., who supply certain of the base constituents and in whose familiar green and yellow colours, the fuels are currently marketed. M.A.'s Peter Chinn, who was responsible for the original Record fuels, still acts in an advisory capacity.

Both the new K-K Record glow fuels consist, of course, of a methanol and castor-oil base. Methanex is intended for general-purpose use and, to ensure ample lubrication when used as a running-in mixture, contains 30 per cent. castor oil. A small proportion of nitromethane (3 per cent.) is included. This is not enough to render the fuel too "hot" for use in a new engine, but is just sufficient to give that slight extra flexibility, which fuels not containing a nitro-paraffin seem to lack. During our tests, the fuel appeared to be well suited to general use with popular stunt engines of the K. & B. Torpedo, O.S. Max and Veco type. Methanex is low priced at 5s. 6d. for a *pint* tin (cheaper than equivalent U.S. fuels, in fact).

Super-Nitrex, on the other hand, contains no less than 30 per cent. nitromethane (by far the heaviest nitro-paraffin content of any racing fuel so far offered in Britain) and is capable of liberating anything up to 30 per cent. more horsepower *in suitable engines and under appropriate conditions.* We tried the fuel in a number of well run-in engines and, in several instances, revolutions on a given prop were increased by a clear 1,000-1,500 r.p.m. relative to standard mixtures. The label carries a warning: "Do not use in new engines" and points out that, except for racing performance, the fuel is intended to be mixed with Methanex for economy and cooler running. As the proportions of nitromethane and castor-oil contained in each fuel are clearly stated on the tins, the expert modeller has a guide on which to base his experiments here, although, for the benefit of the less experienced, we would like to see a leaflet issued, giving more specific recommendations in this respect.

Apart from its use in racing engines of the Dooling, McCoy and Eta calibre, Super-Nitrex should prove valuable for extracting top performance from engines in the "half-A" (0.8 c.c.) class. Most of these little motors tolerate (and greatly benefit by) a "hot" fuel, more readily than some of the larger motors.

Super-Nitrex costs 4s. 9d. per half-pint tin. One (pint) tin of Methanex and one (½-pt.) tin of Super-Nitrex, therefore, provides a powerful, 12 per cent. nitromethane mixture at the reasonable cost of 3s. 5d. per half-pint. Incidentally, it was at the suggestion of M.A.'s former managing editor, Eddie Cosh, that tins were adopted. All previous Record fuels were sold in 8-oz. clear bottles and the switch to tins was made in deference to the S.M.A.E.'s campaign against the dangers of empty glass bottles left on airfields.



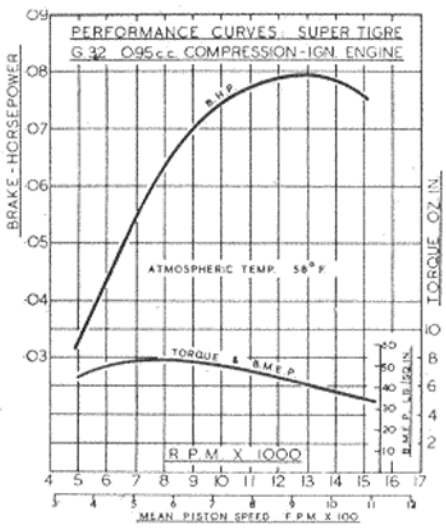
ENGINE TESTS

The Super-Tigre G.32

"just about the most elaborate 1c.c. motor produced to date"

IN their advertising, the manufacturers of the Super-Tigre G.32 claim an output of 0.090 CV. (just under 0.089 b.h.p. to be exact) for this interesting Italian-made 1 c.c. engine. We mention this at the outset by way of qualification for our test figures, which, at a little under 0.080 b.h.p., fell short of the claimed output by about 10 per cent.

A measured power output of approximately 90 per cent. of a maker's advertised figure may be considered quite acceptable, having regard to the fact that most manufacturers' claims, quite obviously, tend to be a little on the optimistic side. On the other hand, a figure of 0.089 b.h.p. for a modern 1 c.c. model diesel is by no means excessively high and, in the light of this, it would not be unreasonable to suggest that our test engine may have been slightly below standard in respect of power output. (Unfortunately, a second engine was not available for a re-check.) Bearing these facts in mind, therefore, it would appear realistic to assume that the output of the average production model G.32 lies somewhere between 0.080 and 0.090 b.h.p.

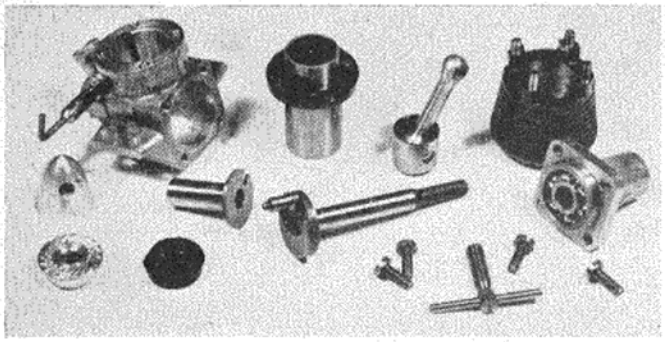


The G.32 was first described in our March and April 1958, issues. As then remarked, it is just about the most elaborate 1 c.c. model motor produced to date, featuring, as it does, a ball-bearing crankshaft, separate rear drum-valve induction and other interesting refinements. The engine is, in effect, a scaled-down version (but with a single ball bearing instead of two) of the 2.5 c.c. class Super-Tigre G.30 (featured in our March, 1958, Engine Test) and is also very similar to the 1.5 c.c. G.31 (November, 1957, Engine Test).

In common with the G.30 and G.31, the G.32 has an integral beam-mount crankcase and drum valve housing, with detachable main bearing unit. The valve bearing is bronze-bushed and the carburettor intake is inclined at 60 degrees to the vertical. The induction period is approximately 150 deg. The crankshaft is partially balanced, i.e., it is provided with a machined-in crescent counterweight which does not quite balance the weight of the crankpin. It is well supported by a ball journal bearing at the inner end and by a short iron bush at the outer end, cast into the light alloy bearing housing. The ball bearing, which projects approximately 1/10 in. from the rear face of the bearing housing, also forms the means of locating the latter accurately in the main casting, in which it is a close fit.

Except for a higher stroke/bore ratio, the cylinder design is virtually identical with that of the G.30, comprising a flanged liner surrounded by a close-fitting alloy finned barrel and held down with four long screws. Porting is also similar, being of a reverse-flow scavenged pattern using two opposed exhaust ports and two, generous area, inclined transfer ports fed by passages, fore and aft, in the crankcase casting. As on the G.30, too, small deflector faces are cut on the edge of the piston-crown, registering with the transfer ports, to aid smooth gas entry to the combustion chamber. Again, like the G.30, the gudgeon pin movement is restrained by a special circlip inside the

Next month's test will feature
The AM-25 Mk. II



Inside story of the G.32 which, as 1 c.c. motors go, is a very refined job.

piston skirt which has one end turned up to engage holes in the gudgeon pin boss and gudgeon pin itself.

Construction throughout is of excellent quality. Retail selling price in Italy, incidentally, is 4,800 Lire—about £2 15s.—which compares very favourably with the prices of other, simpler 1 c.c. designs.

Specification

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

Swept Volume: 0.9525 c.c. (0.058 cu. in.).

Bore: 10.5 mm. (0.4134 in.).
Stroke: 11 mm. (0.4331 in.).

Stroke/Bore Ratio: 1.048 : 1.

Weight: 2.95 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase with integral rear bearing (bronze-bushed) and carburettor intake. Pressure die-cast aluminium alloy webbed front bearing housing, with one 5 × 16 mm. ball journal bearing and one 5 mm. i.d. iron bush, and secured to crankcase with four screws. Hardened nickel-chromium steel crankshaft with disc web, machined-in crescent balance weight and 3.5 mm. crankpin. Valve rotor of hardened alloy steel, driven by spigot on crankpin. Valve bearing sealed by synthetic rubber cap over rear end of housing. Hardened alloy steel cylinder liner with bore relieved below port level. Closely fitted machined duralumin cooling barrel, anodised red and secured to crankcase with four screws. Mechanite piston with solid 3.5 mm. gudgeon-pin retained by special circlip in piston skirt. Machined duralumin connecting rod. Alloy prop-drive hub on crankshaft taper. Machined alloy spinner nut. Brass spray-bar type needle-valve assembly. Beam mounting lugs.

Test Engine Data

Running time prior to test: 1½ hr.
Fuel used: Keilkraft Nitrated.

Performance

The G.32 likes to be quite wet for starting. The best method is to open up the needle-valve a turn or two beyond the normal running setting, suck-in in the usual manner and supplement this by priming through one of the exhaust ports. Another method—more applicable when the engine is warm—is to keep flicking the prop with the intake completely choked (sufficient air reaches the engine via sub-piston induction) until the engine actually fires. Our test G.32 was not, in fact, a particularly quick-starter, but this is not to say that it was actually difficult to start. Quite a few preliminary flicks of the prop were necessary, each time, before the engine would commence running, but provided one appreciates that this Super-Tigre requires rather more generous priming than is usual with diesels, no difficulty is experienced. The engine shows little tendency to flood or "hydraulic" unless priming is carried to an excessive degree.

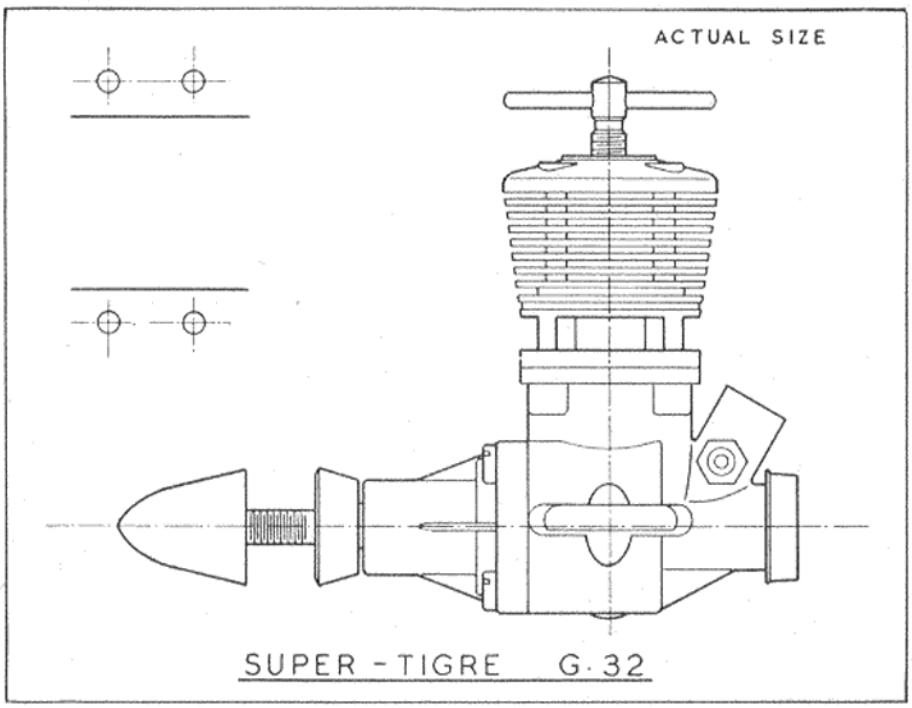
General handling characteristics were otherwise excellent and there is little or no tendency to "bite" on props right down to 6/3. The compression adjustment is excellent, being comfortable to operate via the large tommy-bar and with no tendency for the contra-piston to stick when hot, or run back. The needle-valve, placed at the rear of the engine, is easy to operate and ideal for the beginner in that it is well back from the prop and not too close to the exhaust.

On test, the maximum torque was reached at 8,000 r.p.m., a figure of 7.8 oz. in. being recorded. This is equal to a b.m.e.p. of approximately 53 lb./sq. in. which is well up to accepted levels for engines of this size. Beyond 8,000 r.p.m. torque declined quite steadily and resulted in the peak of the power curve being realised at 13,000 r.p.m., when an output of 0.079 b.h.p. was registered.

As regards props, we would suggest 8/4 and 7/3 (corresponding to an r.p.m. range of 8,500-11,000) as maximum and minimum sizes for general F/F work, with about 1 in. less diameter and 1 in. more pitch for average C/L use.

Power/Weight Ratio (as tested): 0.43 b.h.p./lb.

Specific Output (as tested): 83 b.h.p./litre.



LETTERS
to the Editor

A trimming technique

DEAR SIR,—Having read the article "Your first flight" by Len Ranson, published in the September, 1958, issue of MODEL AIRCRAFT, I would like to present some different ideas on this important subject—in fact, present, in condensed form, the test flying procedure as recommended by the technical committee of the Royal Netherlands Aero Club.

The methods of flight testing a new model aeroplane have always been the subject of study in order to arrive at a standard procedure to be applied by the beginner. By this reasoning, it is advisable that the beginner starts aeromodelling by building a glider, and gains experience in flying and testing it. When his knowledge has reached a

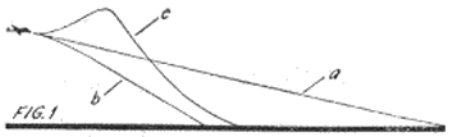


FIG. 1

sufficient level, he can pass on to rubber or power models. His only worry will then be trying out the power flight, as he will have learnt how to deal with the glide problems.

Reading the above-mentioned article I found that when test flying the glider, changing both c.g. position and incidence are recommended for initial tests. However, if the model has been built from a plan (and usually a beginner does this) the c.g. position is indicated on the drawing. As this c.g. position is the result of flight testing the prototype(s), you have to balance the model until the c.g. position corresponds with that of the drawing, *and you have to leave it there*. The only corrections for initial test flying have to be done by adjusting the incidence.

This being so, test flying can now take place according to the following schedule:

Hand launch glider and observe flight path. There are three typical flight paths the model can follow (see Fig. 1):

a. Model shows desired glide. Then you are lucky and the model is O.K. But repeat hand launching to check that the initial conclusion is correct. If so, no further action has to be taken.

b. Model dives to the ground. There are two possible causes :

1. Model has been launched with too low a speed. Try again with higher speed. If unsuccessful:—

2. Incidence difference between wing and tailplane is too small.

Remedy: Increase incidence difference by lifting the trailing edge of the tailplane.

c. Model stalls after which it dives into the ground. There are again two possibles causes:

1. Model launched with too high speed. Try again with lower speed. If unsuccessful:—

2. Incidence difference too large. Decrease incidence difference by lifting the tailplane leading edge.

Note: No corrections have been made by shifting the c.g. !

After the hand launch glide has been trimmed satisfactorily, try a tow line launch. Do this in fairly calm weather, but not "still air." We assume that the launch itself does not give trouble and that the model can be towed overhead easily. As the hand launch glide has been trimmed correctly, the model should show a smooth glide after leaving the tow line. However, the model is now exposed to gusts, which try to disturb its flight path, and the effect of which cannot be judged during hand launching. If hit by a gust, the model should be so stable that it resumes its original flight path as soon as possible, with a minimum of height lost.

Observing the flight path of the model, after being struck by a gust, there are again three alternatives (see Fig. 2):

1. The model resumes its original

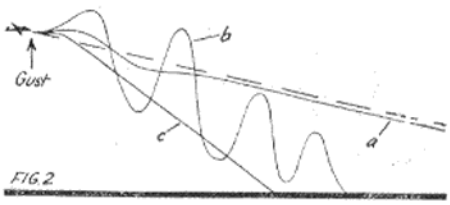


FIG. 2

flight path after a waving path of two or three undulations. Then you are lucky again and the dynamic stability of the model is O.K., and needs no further corrections. But repeat two line launches to check that this first flight was not a fluke.

2. The model stalls, followed by a dive, then stalls again, etc., showing a "waving" path with increasing undulations, and finally striking the ground. In this case the dynamic stability of the model is insufficient, i.e., the c.g. is lying too far in front of the aerodynamic centre (neutral point) of the model.

This can be improved by moving the c.g. slightly aft (by *removing ballast from the nose*) and (as balance is now disturbed) *at the same time* decreasing the incidence difference between the wing and tailplane by lifting the tailplane *leading* edge.

As the effect of this correction may be very critical, the correcting steps should be kept very small. Now the flight path will show less violent stalls, decreasing in amplitude and increasing in length, until the optimum c.g. position and incidence have been reached, and the model shows a flight path as described in 1.

3. The model dives, going still faster without recovery. In this case the model is dynamically over-stable, i.e., the c.g. lies too near to the aerodynamic centre. This can be cured by moving the c.g. *forward* (so *adding* ballast to the *nose*) and simultaneously *increasing* the incidence difference between wing and tail plane by lifting the tailplane trailing edge. These corrections should also be made in small steps, until the model also shows a flight path as described in 1.

The above stated flight test procedure seems to be contradictory to well-known practice, but here in Holland, we have used it since 1948, with good results. Theory on which this procedure is based was derived from war-time German aerodynamic reports, and prepared for use in aeromodelling by Mr. J. Blom, Chief Aerodynamist of Fokkers.

Perhaps these remarks may assist modellers all over the world to obtain good results in test flying their models.

A. L. AARTS
Royal Netherlands Aero Club.

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

Beware of pylons !

DEAR SIR,—I read in a recent issue of the *Daily Telegraph* that a 19-year old American modeller received a 115,000 volt electric shock when the wires of his C/L model came into contact with overhead power cables.

I have seen people in this country flying in the proximity of power pylons, and as these look so innocuous, I, and obviously they, did not, at the time, realise the great potential danger they were in. Not only C/L fliers are concerned, for I have seen a glider flier release his model in a position where the line fell over power cables, fortunately it was a thread line—if it had been wire. . . .

I am sure you will wish to draw the attention of your readers to the great latent danger of flying near any type of overhead cable.

Yours faithfully,
J. S. WALKER
London, S.W.12.

We have pointed out this danger before, but are pleased to plug it again, and remember the lines need not actually touch—a spark will jump a gap of many feet!—Ed.

Aviation Bookshelf

OVER 250 photographs comprise **The Aeroplane Pictorial Review (No. 3),** and form a record of the types of aircraft and missiles that appeared throughout the world during 1958.

The photographs with their informative captions are grouped in sections for ease of comparison and reference, and altogether this book, for a modest 10s. 6d., is a worthy addition to any aerophile's bookshelf.

(TEMPLE PRESS, 10s. 6d.)

PROBABLY one of the most important books to be published during 1958 was **The Air Forces of the World** by William Green and John Fricker. We say important because nothing as comprehensive as this has ever before been published.

The collation of material such as is contained in this book must have been a staggering task for the two authors, both well known in aviation.

Primarily a work of reference, it gives very complete coverage on every known air force in the world ; information which includes the type of aircraft in current use, and a map of the country showing the principal airfields, or airfield. Yes, we found at least one country with only one airfield—that operated by Royal Khmer Aviation, whose H.Q. and airfield is at Pochentong, Phnom-Penh. The country? Cambodia, one of three states in the area previously known as French Indo-China, and they've had their air arm since 1954. It was not until we started browsing through this book that we even suspected the existence of Royal Khmer Aviation !

Admittedly it is not the sort of book to pick up and read from cover to cover, but it is certainly suitable for browsing, while as a source of reference it is unique. However, with previous William Green books in mind, we were disappointed with the rather uninspired selection of illustrations in an otherwise first rate production.

(MACDONALDS, 60s.)

WE in the model aircraft hobby, when we think of materials, naturally think of balsa, but there are (believe it or not) modellers active in other hobbies who do not appreciate the unique qualities of our basic material. However, Ron Warring has put matters right with **Modelling with Balsa,** an 8s. 6d. book full of "here's how to do it" type of material.

The first few chapters deal with the use of balsa as a modelling material, then follow sections on models, complete with drawings, ranging from a simple model glider to an engine shed for "TT" gauge model railways. Although aimed at the younger reader, there are one or two models which we would like to make ourselves—for junior, of course. . . .

(STANLEY PAUL, 8s. 6d.)

SOMETHING for everyone just about sums up the 1958-9 edition of the **Aeromodeller Annual.** The pot pourri of articles, drawings, etc., range over a wide field, and the lists of contest results are a useful source of reference. We liked the coloured cover, even though the pilot of the Fokker Triplane *does* seem to be scowling at the reader !

(MODEL AERONAUTICAL PRESS, 10s. 6d.)

INTENDED primarily for the young enthusiast, **Aircraft and Air Power** by F. G. Swanborough, provides most interesting reading. Starting with a brief history of the early applications of aircraft to war purposes, it deals more fully with modern uses, and even looks into the future. For illustration there are 28 line drawings and 25 very good photographs ranging from the W.W.1 Bristol *Braemar* to an *Atlas* missile.

(TEMPLE PRESS, 10s. 6d.)

ALTHOUGH not strictly a book for review, the catalogue issued by C. G. B. Stuart of Fairlight Hall, Hastings, Sussex, contains titles of many books that we would like to read, if not actually review ! Mr. Stuart specialises in aviation books, and his list certainly contains a large and varied selection.

---

and so to . . . RADIO

Continued from page 75

The Actuator

Provided this is accurately installed it should give reliable service over a very long period. The main thing is to ensure that the drive, right through from the front hook to the tail, is dead straight to prevent any possibility of binding. The tail bearing hole should also be slightly oversize for the same reason, and there must be a little play between the crank and the rudder loop. To prevent binding when the rudder moves to left or right, make the second bend in the crank about 100 deg., so that it follows the angle of the loop (see Fig. 5). The rubber motor should be one loop of $\frac{1}{8}$ in. flat rubber 25 per cent. longer than the distance between the two hooks, to prevent end-tension when wound up. Keep it well lubricated.

The actuator itself should need no attention if new, but the following points should be watched. (1) Use 6 v. instead of $4\frac{1}{2}$ v. (2) Keep the phosphor-bronze contact strip and the cross-arm clean to ensure good but LIGHT contact. (3) See that the return-spring tension is *just* sufficient to pull the pawl back to the stop when the signal ceases. (4) Ensure that there is a small but definite clearance (about 2 thou. in.) between the pawl and the magnet-pole when pulled in, to prevent metal-to-metal contact which could cause a stuck-on rudder. (5) Check that the cross-arm *just clears* each claw in turn, and keep the engaging faces square and free from "bevelling."

The foregoing provides the necessary basic guidance to enable a beginner to get the hang of simple R/C, but next month we shall give instructions for a bench test-bed to put our equipment to practical test, so that we gain confidence and ensure that all is working properly before installing it in the model. Installation will also be dealt with in detail.

CLUB NEWS

DAGENHAM M.A.C.

We wish, on behalf of junior member Pete Tindal, to claim an altitude record for a combat model. He was flying in a practice bout with another member, when both his lines were cut in the climbing position and the model continued to climb until it was almost o.o.s. When the motor cut, it came down in a spiral glide.

We intend to run a combat "do" on Easter Sunday with two classes up to 3.5 c.c. on 50 ft. lines, and up to 6 c.c. on 60 ft. lines.

WESTON CONTROLINERS

The club had a field day at a combat rally held by Bristol Aces M.A.C.—taking 1st and 2nd places. The rally was such a success that we plan to hold a return match at Weston.

The biggest (and most lethal) project at the moment is a *twin* O.S. jet job being built by W. Evans. We are laying in supplies of ear plugs and tin helmets for the stalwarts on the starting team! There is considerable speculation as to whether twin jet models are eligible for speed record attempts—there appears to be nothing in the S.M.A.E. rules book about it.

BRIXTON D.F.C.

The club has been expanding month by month and there is now a great interest in C/L speed, with plenty of the larger engines (Fox 29Rs) prominent. C/L is very popular, owing to the useful tarmac flying field available on Saturday afternoons.

We warmly welcome any modellers in our area along on Tuesdays and Thursdays, 7.30-9.30 p.m. at Rosendale Road School, Turney Road, Herne Hill, S.E.24, or for further details write: P.R.O., E. H. Wigley, 12, Milton Road, Herne Hill, London, S.E.24.

LIVERPOOL & D.M.A.S.

At the moment negotiations are in progress to obtain Bursco Aerodrome at Ormskirk, so, with Woodvale near Southport, this makes two dromes we can use. During the summer, Bursco has crops sown between the runways, and at Woodvale we can fly only after 4.30 p.m. when full-size flying ceases for the day, so we will now have one drome for summer and one for winter.

Any modellers who would like to take advantage of the fields will be welcome to join the club, and can obtain further information at Precision Model Eng. Co., Whitechapel.

We have gained a new member from Australia, Bernie Shinks (glad to have you, Bernie), who is a keen stunt man and should help to liven things up in the coming season.

LEIGH (LANCS.) & D.M.A.C.

We had a very enjoyable trip to the East Lancashire M.A.C. winter rally, Roy Yates taking first place in combat with a very fast Veco-19 powered *Gravedigger*, which is the Leigh club model. Yates also holds the club F/F and C/L trophies.

CHEADLE & D.M.A.S.

Since the committee sanctioned C/L flying on the club field this year, there has been a new surge of interest and combat contests are regularly held, mainly with irate housewives! The more sane members in the club are aware of the nuisance and feel that a noise level of 40 decibels would be desirable, but how? Rubber driven combat models? . . . any suggestions?

Aeromodelling is STILL practised in the Cheadle M.A.S. and club comps are held every month. A novel comp was held recently when the idea was to clock 3 min. in three attempts with a 1 : 20 max and no d/ts.

Results: 1st, L. Whalley, 3 min. ½ sec.; 2nd, B. Faulkner, 2 min. 59 sec.; 3rd, D. Brunt, 2 min. 55½ sec.

Meetings are held every Sunday at the Councillor Lane field, with indoor flying Tuesday evening at A.T.C., Bank Street, Cheadle—new members will be made welcome.

THE EAST LANCASHIRE M.A.C.

All members wish to thank everyone who supported the winter rally with a special word of thanks for our visitors from Lincoln, Prestatyn and Bristol.

There must be something in what D. Moreley of Lincoln had to say to the local Press who covered the rally, "I am not interested in the prizes, but the chance to talk to other modellers." Last, but not least, special praise to the weather gods—all present agreed that conditions were top class.

The combat final deserves a special notice, by the fact that it was ready to take place with one hour to spare. (Was that the combat judge or was it the cigar he was smoking making competitors want to leave the circle as soon as possible!)

The finalists were Yates of Leigh flying his own design, *Get Knotted* (Veco 19 powered), and Nunnerley of Sharston, with a tuned Amco B.B.-powered *Peacemaker*. They flew not just one final but also three fly-offs.

Combat

Winner—R. Yates, Leigh.
Runner-up—Nunnerley, Sharston.

Radio control

Winner—W. Neild, Cheadle.
Runner-up—J. Cope, Whitefield.

Glider

1. J. Chadwick	.. Ashton ..	..	8 : 41
2. D. Moreley	.. Lincoln ..	..	8 : 20
3. M. Turner	.. Cheadle ..	..	7 : 56

Power

1. D. Barber	.. Southport	..	12 : 00
2. B. Talbot	.. Wigan ..	..	11 : 44
3. J. T. Ellison	.. Whitefield	..	10 : 56

Rubber

1. J. O'Donnell	.. Whitefield	..	12 : 00
2. D. Moreley	.. Lincoln ..	..	10 : 54
3. G. Roberts	.. Lincoln ..	..	10 : 50

HIGH WYCOMBE M.A.C.

We will be holding our annual C/L rally on Sunday, April 26th, at R.A.F. Booker. Events include "A" and "B" T/R and combat to S.M.A.E. rules; remember that "A" T/R is now to F.A.I. rules. Also contestants must be covered by insurance.

This year all events will be pre-entry, and these should be sent to R. Avery, 11, Roundwood Road, High Wycombe, Bucks, at 2s. 6d. per event, by Friday, April 17th. Late entries *may* be taken on the day at extra charge.

HACKNEY MARSH'UNS A.M.C.

We have a club meeting at Homerton Row School every Wednesday night and discussions and modelling on C/L, radio, F/F, etc., is carried out. Anybody wishing to join please either come along to the school one night, or contact the secretary (see under new clubs), or our treasurer, G. Rogers, at Wilro's Model Shop, Clarence Road, E.5. New members will be welcomed.

BRIERLEY HILL AERONAUTS

This club was formed a few months ago around a nucleus of week-end sport fliers who

CONTEST CALENDAR

Mar. 1st	HALFAX TROPHY. U/R Power. GAMAGE CUP. U/R Rubber. PILCHER CUP. U/R Glider.
,, 8th	*K. & M.A.A. CUP. F.A.I. Glider Elim. Area. (F)GUTTERIDGE TROPHY. F.A.I. Rubber Elim.
,, 29th	*ASTRAL TROPHY. F.A.I. Power Elim. Area. (F)S.M.A.E. CUP. F.A.I. Glider Elim. WOMEN'S CUP. U/R Rubber/Glider. JETEX CHALLENGE CUP.
Apr. 19th	(F)POWER. F.A.I. Power Elim. Area. *WESTON CUP. F.A.I. Rubber Elim. †LADY SHELLEY CUP. Tailless. Centralised. (At South Midland Area event above.)
,, 26th	High Wycombe C/L Rally. R.A.F. Booker. T/R "A" and "B," Combat
May 3rd	Stockport Express Rally, Woodford Aerodrome, Cheshire.
,, 17th and 18th	**BRITISH NATIONALS** THURSTON CUP. U/R Glider. †GOLD TROPHY. C/L Aerobatic. KNOKKE TROPHY. C/L Scale. S.M.A.E. TROPHY. R/C. †DAVIES TROPHY "A." International Class T/R. SPEED. Classes 2 and 3. COMBAT. Prelim. Heats. SIR JOHN SHELLEY. U/R Power.
May 17th and 18th	SHORT CUP. Pay Load. MODEL AIRCRAFT TROPHY. U/R Rubber. SUPER SCALE TROPHY. F/F Scale. RIPMAX TROPHY. R/C. DAVIES TROPHY "B." †SPEED. International Class and Class I. COMBAT. Finals.
,, 30/31st	**WORLD CHAMPIONSHIP**
June 13th/14th	**TEAM SELECTION TRIALS.** Centralised.
,, 21st	Northern Heights Gala, Halton.
,, 28th	AREA CHAMPIONSHIPS. U/R Rubber, Glider, Power. Cent. †R/C. International Class.
July 12th	*MODEL ENGINEER CUP. Team Glider. Area. FLIGHT CUP. U/R Rubber.
Aug. 23rd or 24th	**U.K. CHALLENGE MATCH** (with Scottish Gala).
,, 23rd	**SCOTTISH GALA.** POWER. U/R Power. GLIDER. U/R Glider. RUBBER. U/R Rubber. TAPLIN TROPHY. R/C. TEAM RACING. Classes "A" and "B."
Sept. 6th	**NORTHERN GALA.** U/R Glider. HAMLEY TROPHY. U/R Power. CATON TROPHY. U/R Rubber. AEROMODELLER TROPHY. R/C.
Sept. 6th	TEAM RACING. Classes "A" and "B."
,, 20th	*KEIL TROPHY. Team Power. Area. *FARROW SHIELD. Team Rubber. FROG JUNIOR CUP. U/R Rubber/Glider.
,, 27th	"½A," "A" and "B." Team Racing. Area. May be run with Area event above if desired.
Oct. 11th	FROG SENIOR CUP. U/R Power. Decentralised. C.M.A. CUP. U/R Glider.

All S.M.A.E. competitions in capitals.
*Plugge Cup events.
†Events selected for basis of International Team selection.
(F) "Floating eliminators"—may be held on any date convenient to the Area, but results must reach Londonderry House by April 30th.

INTERNATIONAL CONTEST CALENDAR

Feb. 8th or 15th	Finland. F/F Power/Rubber/Glider.
May 17/18th	France/Belgium. All classes.
,, 17/18th	Monaco. Hydroplanes.
,, 17th or 24th	Hungary. Indoor meeting.
June 7th	Germany. International Flying Wing.
July 11/12th	Austria. Alpen Cup—Glider/Power.
,, 27/28th	Yugoslavia. Glider/T/R.
Aug. 10/11th	Yugoslavia. Hydroplanes, Rubber/Power.
mid-August	Germany. Slope Soaring.
Sept. 6th	Finland. C/L, all classes.
,, 26/27th	Belgium. 10th Criterium d'Europa.

have caught the competition bug. We now have 22 members and meet weekly in a community centre provided by the local council, who provide permanent use of a room for only 12s. a month.

Negotiations on behalf of the C/L section led to a meeting in a secluded corner of a park. This has now been set aside for line flying for an experimental period of six months. "If the boys behave," says the council, "it is yours. Later it may be fenced in for your exclusive use."

Lastly, the club believes that many aero-modelling clubs have fallen by the wayside because they have had too large a proportion of uncontrollable youngsters. We are admitting juniors only after six months' probation and then only in a ratio of two to one senior.

CAMBRIDGE M.A.C.

Seven members of the club visited Ivinghoe Beacon for yet another slope soaring rally. Dick Godden's special heavyweight, "anti-wind," R/C model and *Hoverking* were both damaged in the gale which lasted nearly all day, but Dick produced yet another R/C job and came second. The other members had an exhausting day flying F/F models on the Ivinghoe assault course, and succeeded in losing two of them.

The club had a rather unlucky, and very cold, day at the East Anglian winter gala. A *Lucifer* and an *Altair* were lost, another glider lost a wingtip on the runway, and Dusty Miller had a line break on each comp. flight. However, Dick Godden and Clive King put up some good times, though Clive nearly had a heart attack, when climbing an iron ladder in pursuit of his *Altair* which had landed on a hangar, he realised that the ladder was suspended from two rusty bolts. In future, any models landing on that hangar can stay there !

WALLASEY M.A.C.

The club ran a coach to the Colne winter rally in which we were joined by members of the Heswall and Liverpool clubs. Although no places were obtained by the club, all the times were very respectable. Mrs. Hannay had the distinction of being the sole woman competitor.

MANCUNIANS' M.A.C.

An ambitious club project is being built from a "Berkeley" kit. This is the Custom *Privateer* flying boat. The 9 ft. 6 in. span contains 1,440 sq. in. area with 9½ lb. weight and it is hoped that multi-channel radio can be fitted, while a one gallon fuel tank will feed an Enya 60.

NORTH KENT NOMADS

The club has had a very enjoyable winter season, thanks being largely due to the activities of our social committee. They have arranged several enjoyable and informative evenings for us—and what is more commendable, they have managed it at very low cost to the club.

Our scramble, whilst not being very well attended, proved to be a very energetic occasion for those who did partake. We are most grateful to our president, Col. H. J. Taplin, for his generosity in presenting the prizes, and also an annual cup for a junior event. Thanks also go to our chairman and secretary for the cups they have presented for junior events.

We look forward to the occasion of our social and prize-giving which is to be held on March 18th. Should any old associates of the club be interested in attending this function then a ring to our hon. secretary, Ray Parker, Erith 3170, will provide full details.

OUTLAWS (CANNOCK) M.A.C.

The second of our monthly practice combat comps. was held recently and was enlivened by the presence of three members of the Walsall club who entered into the fray. One of them, Eric Burke, then had the nerve to win !

It is now 12 months since it was decided that drastic action was necessary to prevent the club folding up. In that time the membership has increased four-fold and there is enough cash in hand to pay four months off *next* year's rent. Last year was spent in initiating the less experienced members into competition flying and the lads are quite confident that the coming year will see them up among the prize winners before very long.

In an effort to give C/L clubs an interest in the activities of the Midland area, we are sponsoring a series of C/L comps. to be run in conjunction with all area centralised F/F meetings. It is hoped that by the end of the season, these will enable us to determine area champions in the various C/L classes, and will also give the C/L types just as big an interest in area activities as the F/F boys. Any area with similar "one-sided" interests, or any Midland area club not "in the know," may obtain full details of this scheme from R. Lockley, 24, Horse Fair, Rugeley, Staffs.

BRISTOL ACES M.F.C.

Competition secretary, Gordon Bunney, again proved his worth by placing first in the Bristol Bulldogs' winter glider contest, which was held in calm but misty conditions.

George Ford appears to have at last shaken off his run of bad luck since he placed 2nd in combat at the Weston C/L rally with his Veco 19 powered *Peacemaker*.

HORNCHURCH M.A.C.

The club flying field—we have the exclusive use of Hornchurch aerodrome—is now peppered with industrious modellers of every description.

Occasionally, Messrs. Olsen and Uwins decorate the air with their fancy R/C manoeuvres, and Dave Platt and "Gadget" Gibbs have recently strengthened the ranks of C/L enthusiasts.

We are particularly strong in team race, but the most enthusiastic group are the cross country athletes (F/F) headed by Bob Wells.

Altogether we can field six R/C men and would like to hear from any others. For those in this over-housed part of the world we offer a large green and tarmaced paradise where noise won't worry the neighbours and free-flighters can run a mile. Subs are only 1s. 6d. a month (less for juniors), we have the use of a fine lathe and can offer real advice and happy-go-lucky comradeship. Contact Cliff Edwards, 197, Ardleigh Green Road, Hornchurch, Essex.

BRISTOL BULLDOGS M.A.C.

A most comprehensive contest calendar has been drawn up for 1959, with all S.M.A.E. decentralised and area contests also counting towards the club championship. It is hoped that this will give an added incentive for members to enter for the national contests.

The club have several contests of its own to run off as well, and it is a fact that there are no less than 26 contests in which it is possible to gain points for the club championship ! Thus, consistency will also be of paramount importance if any good positions are to be obtained.

ENFIELD & D.M.A.C.

Recently, Bob Page flew his F.A.I. speed model to shatter the present club record. He attained a speed of 119 m.p.h. using the MVVS 2.5 c.c. Glow. Bob thought he could improve on this still further, but unfortunately the model was pranged on a later attempt.

The club had the privilege of a talk on aerobatic flying by Bill Morley of the West Essex Club. This went down very well, and was appreciated by all members, including the F/F enthusiasts. Although we had hoped to have a similar talk on F/F power, it seems that there are no power flyers in the London area who consider themselves good enough to give it.

CHANGE OF SECRETARY

WANSTEAD A.C. L. Soanes, 2, Boscombe Avenue, Leyton, E.10.

CAMBRIDGE M.A.C. D. Firman, 4, May's Way, Cambridge.

NEW CLUBS

BRIERLEY HILL AERONAUTS. C. Webb, 117, Kingsley Road, Kingswinford, Brierley Hill, Staffs.

HACKNEY MARSH'UNS. J. Keon, 86, Lenthall Road, Hackney, E.8.

The First Fifty Years

Continued from page 72

and by the outbreak of war the present area scheme was in process of application. After the war a new constitution was fully implemented and the Society, for technical reasons, also became a limited company.

Perhaps the most notable factor in post-war aeromodelling has been the great resurgence of international activities. The F.A.I. Models Commission, under the presidency of Mr. Alex Houlberg, has initiated numerous world championships, and it is now almost commonplace for an international meeting to attract more than 20 countries. Undoubtedly the best known, and most attractive, venue of all is the College of Aeronautics, Cranfield, which the S.M.A.E. has been privileged to use for international contests in recent years.

Although the pre-television "peak" of aeromodelling activity has now passed, the strength and influence of the Society continues to increase. H.R.H. Prince Philip, Duke of Edinburgh, honoured the S.M.A.E. by becoming its Patron, and a Buckingham Palace spokesman recently stated that, although model aircraft building is not a regular hobby of the Duke, he has in fact built a number of models for the Prince of Wales. In recognition of his services to national and international model aeronautics, Alex Houlberg received a well-deserved award of the M.B.E. from H.M. the Queen, and D. A. Gordon, secretary of the S.M.A.E., for the greater part of the post-war years, received a Paul Tissandier Diploma from the F.A.I.

The S.M.A.E. now has around 7,500 active members, not counting the members of the R.A.F. Model Aircraft Association, all of whom are affiliated to the Society. Every member receives, without additional charge, Third Party insurance up to £25,000. There are so many contests that a common complaint is that there are not enough weeks in the year !

So ends the first 50 years. It would, perhaps, be out of place to make predictions for the next 50, but whatever kind of model space-rockets exist in 2009, it seems likely that the Society of Model *Astro*nautical Engineers will be around to run contests for them.

Acknowledgements

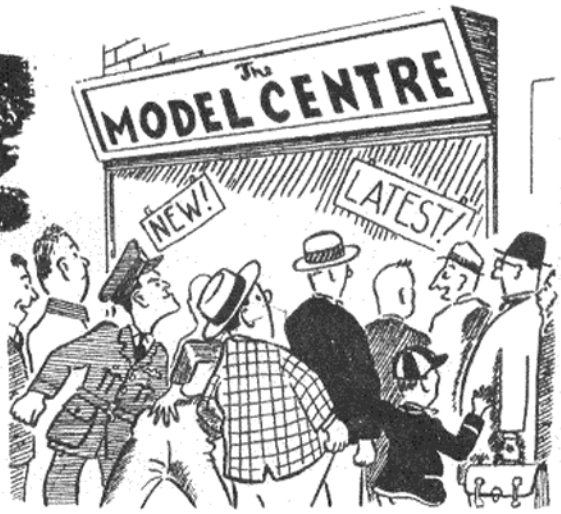
Private communication from Mr. G. Foden.

Flight and *Aeronautics* for 1909.

Model Aeronautical Digest, 1944.

S.M.A.E. Handbook, 1946.

YOUR BEST MODEL SHOPS



Readers
YOU CAN DEAL WITH THESE MODEL SHOPS WITH COMPLETE CONFIDENCE

Retailers
ADVERTISE ON THESE PAGES TO REACH THE LIVE MODELLERS IN YOUR TOWN

BIRMINGHAM — Tel.: Midland 0972

Hornton's

32, STEPHENSON STREET, BIRMINGHAM, 2
(Facing stage door Theatre Royal) and
1, NAVIGATION STREET, BIRMINGHAM, 2
(Adjoining Queens Hotel)
Stockists of Model Aircraft, Railways and Ships

BIRMINGHAM — Tel.: Northern 5569

The Model Mecca

204-206, WITTON ROAD, 6
A 100% Modelling Shop. Aircraft Kits, etc.
Trix "OO" L.M.S. Co. "O" gauge. 5 and 5a buses pass door
WRITE, PHONE or CALL

BIRMINGHAM — Tel.: Central 5483

Hobbies Ltd.

100a, DALE END, BIRMINGHAM, 4
The firm known to Modellers throughout the world. Ask our Mr. W. Starns for advice

BRIGHTON — Tel.: Brighton 27693

Arthur Mullett Ltd.

16, MEETING HOUSE LANE, BRIGHTON
Agent for all leading Model Manufacturers
World wide Mail Order Service

BRISTOL

The Model Airport

51, COLSTON STREET
Get your supplies from the leading M.A. shop in the town

CARDIFF — Tel.: 52906

Bud Morgan

THE MODEL AIRCRAFT SPECIALIST
22/22a, CASTLE ARCADE
SEND 4d. IN STAMPS FOR MY 1959 PRICE-LIST

COVENTRY

The "Enterprize" Variety Stores

19, FAR GOSFORD STREET — Tel.: 40707
21, BRIXHAM DRIVE, WYKEN
If it's advertised within it's obtainable from Coventry's No. 1 Hobby shops. . . . Full mail order service by return. S.A.E. for free lists. . . . "Plastics" our speciality. Also at 59, Long Street, Wigston, Leics.

DARTFORD

Modern Models

49-51, LOWFIELD STREET, DARTFORD, KENT
Whether you call or whether you post, we claim we've got more stock than most

EVERYWHERE — Tel.: Gerrard 8811

Model Aircraft

19-20, NOEL STREET, LONDON, W.1
This advertising space is available to all good retail Model Shops. Rates may be had on application.

GLASGOW — Tel.: Central 5042

Hobbies Ltd.

326, ARGYLE STREET
The firm known to Modellers throughout the world. Ask our Mr. J. Stewart for advice

YOUR BEST MODEL SHOPS—CONT'D.

MANCHESTER *Tel.: Blackfriars 3972*

The Model Shop

13, BOOTLE STREET, DEANSGATE

We have **EVERYTHING** *in stock for the aeromodeller: Kits, Engines and Accessories*

SOUTH AFRICA

Greenacres

WEST STREET, DURBAN

You can obtain all your Model Aircraft requirements from Natal's Hobby Centre

NEWCASTLE *ESTABLISHED* **1924**

The Model Shop

(NEWCASTLE UPON TYNE) LTD.
18 BLENHEIM STREET, Tel.: 22016
NEWCASTLE UPON TYNE, ENGLAND
Pioneers of modelling with 33 years' experience. . . .
Our Expert Staff are at your Service

ST. HELENS *Tel.: St. Helens 3972*

George Webster (St. Helens) Ltd.

THE MODELLERS' RENDEZVOUS, CORPORATION STREET, ST. HELENS

All leading makes of kits, engines, etc., in stock. Mail order by return. Aircraft List 6d., post free.

OXFORD *Tel.: 2407*

Howes Model Shop

LARGEST STOCK IN THE MIDLANDS
CALL, WRITE OR PHONE
9-10, BROAD STREET
Mail service by return

SUTTON *Tel.: Vigilant 8292*

E. L. S. Model Supplies

272, HIGH STREET, SUTTON, SURREY

Surrey's Hobby Centre. **By return Postal Service**
Complete stock of all M.A. requirements.

SHEFFIELD *Tel.: 26071*

Hobbies Ltd.

4, ST. PAUL'S PARADE

The firm known to Modellers throughout the world. Ask our Mr. C. Smith for advice

WATFORD *Tel.: Watford 3522*

H. G. Cramer Ltd.

172a, HIGH STREET, WATFORD

The leading stockist in the area

MODELSPAN COVERS THE WORLD!

AUSTRALIA · CANADA
NEW ZEALAND
AUSTRIA · GERMANY
DENMARK · NORWAY
SWEDEN · HOLLAND
FRANCE · BELGIUM
ITALY · SWITZERLAND
PORTUGAL
S. AFRICA
etc., etc.

THE NEW SUPER MODELSPAN COVERING TISSUE

MODEL AIRCRAFT CLASSIFIED ADVERTISEMENTS

Private 3d. per word; minimum 12 words. **Trade 6d.** per word; minimum 12 words. Use of Box No. **2s. 6d.** extra.

Displayed Classified Advertisements (including Situations Vacant): 35s. per single column inch (column width 2⅞ in.).

Advertisements, together with remittance, should be sent to Classified Advertisement Department, **MODEL AIRCRAFT,** 19-20, Noel Street, London, W.1, at the latest by the 25th of the month preceding publication date.

FOR SALE

McCoys For Sale. 29 Super Stunt, 55s. 35 R.H. almost new, 85s. 35 R.H. brand new, 100s.—BEARNE, 19, Woodgate Avenue, Rochdale.

Two E.D. Bees, fins slightly trimmed, 20s. each. Allbon Javelin, 35s. Dart, 40s. Both as new. Mills .75, 25s. Bee, 10s. All in working order. All o.n.o. —H. DAVIES, 102, Buckingham Road, Bicester, Oxon.

Radio Control Equipment for sale? Try advertising in the Classifieds when you will be read by all the *Model Aircraft* readers. For rates see the head of this column.

Altmaster Altimeter for Model Aircraft—Missiles, etc. Records maximum height attained, price 25s.
Varipitch Airscrew for Model Aircraft. Top Performance Blade section. All pitches obtainable. Spinner incorporated. Price 6s. 11d.
Obtainable direct from—CHARON ENGINEERING Co., 42, Queen Street, Hemel Hempstead, Herts. S.A.E. for pamphlets on above.

Valves For All Purposes, 5s. each. guaranteed. 12v. Rotary Transformers, 12s. 6d. each. Ball Races, 2s. each.—TAYLOR, 154, Hayeschase, West Wickham, Kent.

A Few New 1959 American and Japanese Motors for sale at below list prices. All sizes 2½ to 10 c.c. Also pulse-jets.—Box No. 111, MODEL AIRCRAFT Offices, 19-20, Noel Street, London, W.1.

For Equipment you wish to buy or sell, why not take space in these Classified Columns? Then you will be approaching each reader of *Model Aircraft*. For details see the head of this column.

Simplite single channel receiver for use with high resistance actuators of between 2k-4k ohms value. Study the following points: easy tuning—22½. H.T., 1.5v. L.T. Size 3 in. × 2 in. × 1 in. Weight 1¼ oz. **No Relay Incorporated,** therefore no fiddle, fluctuation or what have you. You do not have to be an electronic genius to operate this receiver. Order now direct from—CHARON ENG. Co., 42, Queen Street, Hemel Hempstead, Herts. Price £4 2s. 6d., plus 6d. postage in U.K.

1939/45 Squadron Insignia Transfers, 6 pairs assorted 1/72nd scale for 1s. 3d. Six pairs assorted flying scale 2s. 6d. S.A.E.—PHILLIPS TRANSFERS, Woodford Green, Essex.

Autoknips Clockwork Camera Timer. Absolute reliability. Easily modified for model use, £1 6s. inc post and packing.—LANCASTER & THORPE LTD., 12, Market Place, Long Eaton, Notts.

Speedmaster Air Speed Recorder for model aircraft, cars, etc. Records maximum speed attained during flight or run. Size 1⅞ in. × 1⅞ in. × 1 in. Weight 1¼ oz. Order now direct from—CHARON ENG. Co., 42, Queen Street, Hemel Hempstead, Herts. Price 32s. 6d., plus 6d. postage in U.K.

Gadget Gibbs is pleased to inform modellers that he is now with Cliff Edwards at 197, Ardleigh Green Road, Hornchurch, Essex, and will be happy to supply all ranges of kits and engines by post. Please send S.A.E. for lists and also state approximate requirements. All secondhand engines guaranteed. Anything from Silkspan to the biggest American kits and engines. Some articles naturally limited, but many in good supply. Speedpans at very reasonable prices.

Bench Run Only E.D. Hunter, 40s. Apply—13, Stourton View, Frome, Somerset.

WANTED

Experienced Model Makers—do you wish to earn money from your experience? If so, engineering firm is prepared to offer interesting development contracts. Guarantee of confidence would be required.—Box No. 110, MODEL AIRCRAFT Offices, 19-20, Noel Street, London, W.1.

Jobs—if you have a vacancy you can be sure that an announcement in *Model Aircraft* will be reaching a lively, youthful readership. For rates see the head of this page.

Used Engines Required by new model shop. Immediate cash or will part exchange for any goods. Please send to—GADGET GIBBS & Co., 197, Ardleigh Green Road, Hornchurch, Essex.

PUBLICATIONS

Magazines, books. If you wish to sell or acquire old or out-of-print issues, try *Model Aircraft* classifieds. Rates are given at the head of this page.

"Sailplane & Gliding"—the only British magazine devoted to the sport of gliding. Published every other month. Send stamped addressed envelope for descriptive leaflet; or 2s. 10d. for current copy; or 17s. for a year's subscription to—BRITISH GLIDING ASSOCIATION, Dept. M.A., 19, Park Lane, London, W.1.

World's Largest Stock of old Aviation Books (over 15,000). Catalogue free. Top prices paid for Jane's, any year. World War I and other aviation books.—STUART, Fairlight Hall, Hastings.

Printed in Great Britain for the Proprietors by ELECTRICAL PRESS LTD., Cordwallis Works, Maidenhead, Berks, and published by PERCIVAL MARSHALL & CO. LTD., 19-20, Noel Street, London, W.1.
Registered for transmission by Magazine Post to Canada including Newfoundland.

E D
TRADE MARK

The finest equipment for the model maker

DIESEL ENGINES

A range of 7 precision built engines that will make the most of your models, give them all the power they require and improve their all-round performance.
For high speeds, endurance flights, C/L or stunt flying, there is an E.D. Diesel specially designed for the job.
They are easy to fit, simple to operate and suitable for use in model planes, boats or cars. Air-cooled and Water-cooled models available.

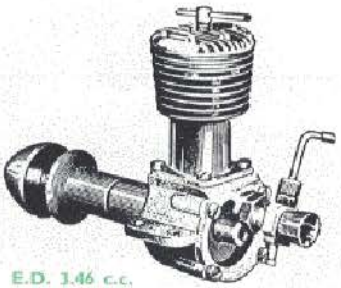
RADIO CONTROLS

Pioneers always in the field of Radio Controls, E.D. still lead the way. A comprehensive range of complete Radio Control Units is now produced which will meet the requirements of the most critical enthusiast.
They are light in weight, and combine accuracy and reliability with a simplicity of control never before achieved.
A complete range of Radio Control Equipment, including Relays, Escapements, Mechanisms, Reed Relays, Valves and Components, is always available.

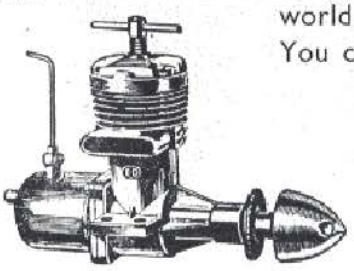
ACCESSORIES

Includes spare parts and all accessories for all E.D. Engines. E.D. 2 speed Carburettors, Test Vices, Power Driven Actuators, Polarised Relays, Standard Relays, Magnetos, Escapements, Clockwork Timers, Plastic Propellers, Speedicord Tyres and a full range of Marine Unit Accessories.
Write for our Illustrated Folders giving full details of all E.D. Productions.

Owing to popular demand, plans of the famous "RADIO QUEEN" are now available price (3 sheets), 15/-.

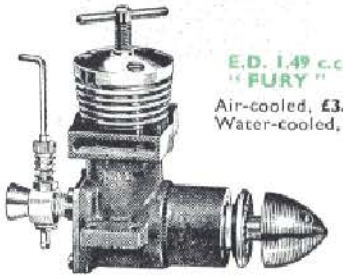


E.D. 3.46 c.c.
"HUNTER"
Air-cooled, £4.0.11.
Water-cooled, £5.7.1



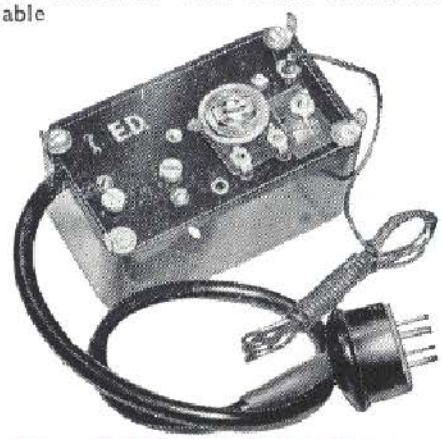
E.D. 1 c.c. "BEE"
Air-cooled, £2.14.9.
Water-cooled, £3.12.11.

The astonishing success of E.D. products during the past few years has proved their value and outstanding qualities beyond all doubt. Their precision workmanship and reliability has made them the first choice of the wiser modelling world.
You can rely always on E.D.



E.D. 1.49 c.c.
"FURY"
Air-cooled, £3.17.10.
Water-cooled, £5.2.3

Other models include:—
E.D. 0.46 "BABY"
E.D. 1.46 c.c. "HORNET"
E.D. 2.46 c.c. "RACER"
E.D. 2 c.c. "COMP. SPECIAL"
Air-cooled and Water-cooled Models Available

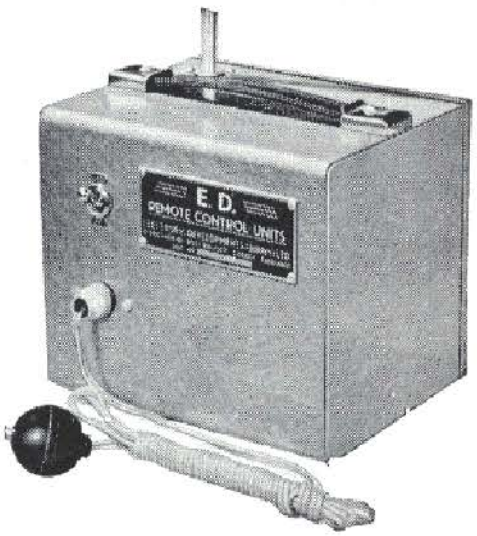


E.D. "AIRTROL"

The smallest receiver in the world!
The latest addition to the E.D. range of Remote Control Receivers, specially developed to meet the great demand for a transistor hard valve receiver with a specification producing the ultimate in Radio Control.
Size 2½ in. x 1½ in. x 1½ in. and weighs only 2½ oz.
Price **£7.5.0.**

E.D. "P.C.I." TRANSMITTER

A high-powered, super compact, lightweight, portable Radio Control Transmitter suitable for the operation of all carrier receivers. Engineered in every respect for maximum reliability.
Size 6½ in. x 5 in. x 5½ in. Weight with batteries 8 lb. Supplied complete with a four section collapsible aerial and keying lead.
Price less batteries, **£5.19.9.**



Other models include:—

E.D. BOOMERANG
Completely wired and ready for immediate use.

E.D. Mk. IV Radio Control Unit
Tuned Reed, 3 Channels.

E.D. EVEREST
Tuned Reed 6 Channels.

E.D. TRANSITROL
The first Commercial Transistor Receiver

All prices include Purchase Tax. *Order from your model shop.*

E.D. ELECTRONIC DEVELOPMENTS (SURREY) LTD
DEVELOPMENT ENGINEERS
PHONE: MOLESEY 6037-6038
ISLAND FARM RD, WEST MOLESEY, (SURREY) ENGLAND.
GRAMS: "EEDEE" EAST MOLESEY

FROG

TRADE MARK

Make your Airliner Fleet up-to-date with these superb Plastic Models

B.O.A.C. DH COMET 4
1/96 Scale. 14½ in. span.
A wonderful model of this outstanding new jet airliner. Complete kit includes full set of high-grade transfers, cement, paint, display stand and instructions. Now Price **12s. 6d.**

B.O.A.C. BOEING 707. 1/144 scale. 12 in. span.
This " new look " jetliner is accurately modelled on B.O.A.C. new fleet which should be in operation in the coming year.
Now Price **8s. 11d.**

KLM VISCOUNT 800
Also in B.E.A. marking ... ... **12s. 6d.**
SAS DC.7C (Also in B.O.A.C. markings) ... ... **12s. 6d.**
Ready soon—Air France " Caravelle " 1/96 scale **12s. 6d.**

" V " BOMBERS. 1/96 scale.
Moulded in white polystyrene. Kits include decal transfers, cement, display stand, instructions.
VICKERS " VALIANT " with retractable undercarriage and doors. (Illustrated).
AVRO " VULCAN " HANDLEY PAGE " VICTOR "
All **12s. 6d.** each.

See the full range of FROG Kits at your local dealer.
Made in England by:

INTERNATIONAL MODEL AIRCRAFT LTD.,
Merton, S.W.19.