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AERO MODELLER

MAP HOBBY MAGAZINE

August 1964

VOLUME XXIX No. 343

Editorial Director

D. J. Laidlaw-Dickson

EDITOR

R. G. MOULTON

contents

cover

Al Masters of Rocky River, Ohio, and his enormous Caudron C-460 Racer with 10 channel F & M radio control, incorporating spit flaps. The K & B 45 engine only just reaches the top of the vast cooling intake in the nose! Further details of Al Masters' model and first ever accurate scale plans of the full-size aircraft, produced after long research by Harry Robinson will be found on pages 402-405 of this issue.

next month . . .

Enthusiasts who have longed for a free flight **Hawker Hurricane** will find the best free flight scale plan yet in September issue when we introduce Dick Meixell's 1/12th scale (40 in.) detailed design complete with most authentic markings for the "Last of the Many". John Barker's "Let's Go Flying" series brings his contest placing A/1 class glider **Downbeat**, a 44 in. up to the minute yet simple model to suit novice or expert. For the full size plans we have 23 in. **Shimshek** by I. Turner, a model that has already proved its worth with 1.5 c.c. engines and will be very popular. Add to these, G. Duval's super drawings of the famous **Douglas DC-3, C-47 Dakota** and a host of good articles covering new engines, kits and silencers, and you'll get your full money's worth on August 21st when September "Aeromodeller" appears.

other modelling angles . . .

August edition of **Model Maker** introduces a scientifically designed boat (by yacht expert John Lewis) for straight running events, called "Joker", it is steam powered. Also a new attractive tug for electric or small diesel "Ikwerre" —plus a full size plan for a simple yet clever amphibious model, rare Russian Yacht drawings, a period ship model, the "Ark Royal" Aircraft Carrier and a replica gun model are supported by all the regular features.

In August **Radio Control Models & Electronics"** full size plans for "Sleek Streak", a 30 in. span low wing practical design for small engines and pulsed rudder control is the main attraction. Photo and data report on R/C at the Nats, conversion of a Veron "Robot" to multi-channel, "Instant Radio" in a glass fibre boat hull, gadgets, making a servo and views on proportional control make up an interesting issue.

Number 6 of **Model Cars**, out August 7th, has a bright cover picture of the Vollstedt-Offenhauser Indianapolis racer plus prototype plans within. A visit to the Newport circuit, working racer based on the 1920 Hillman Speed model, a K3, MG Magnette and hosts of other gen packed in for tracksters and dragsters.

Editorial and Advertisement offices

38 Clarendon Road, Watford, Herts

Telephone : **Watford 32351** (Mon.-Fri.)

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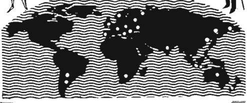

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Heard at the Hangar Doors

The Shuttleworth Collection Blackburn (1912) Monoplane with 50 h.p. Gnome rotary rests between filming sessions in front of "Brooklands" hangars erected by 20th Century Fox films at Booker. This and the 1910 Deperduss—in from Old Warden are joined by specially built flying replicas plus many other static novelties for the film, "Those Magnificent Men and their Flying Machines".

Aircraft in Films

To obtain realism in making "633 *Squadron*", the Mirisch Corporation gathered together the last surviving De Havilland Mosquitoes and based at R.A.F. Bovingdon, Herts, produced some of the finest aircraft colour films yet to be screened. The plot of the film, vaguely reminiscent of "The Dam Busters", concerns destruction by a fictitious R.A.F. Squadron of a rocket fuel plant in a Norwegian Fjord. Critics in the National Press have done their best to slate the script and some of the artists, but for our money this is an air film very well worth seeing. One can forgive the unreal cockpit dialogue and control column actions when interspersed with such really fine ground to air, and air to air photography. In particular the crash landing and undercarriage failure, which we know was performed with stunning realism as far as the stunt pilot was concerned, comes over especially well. To make this film, many large scale solid balsa scale models were constructed by the studio with electric motors to turn the airscrews and explosive charges placed within the components to simulate crash effects. If any technical criticism were to be levelled it should be in connection with these models, for had they been constructed more lightly and after the manner of the full-size, then they would have broken up in more realistic manner instead of bursting apart in solid chunks. The film will do much to perpetuate the history of the Mosquito and will be enjoyed by those who prefer the aeroplanes to the story. Playing the leading character of Wing Commander Roy Grant, is Cliff Robertson, who joined us in radio control flying sessions at Bovingdon and proved to be most knowledgeable. Insurance requirements kept him on the ground during the making of this film. Perhaps that is the reason why he purchased a real live Spitfire Mark 9 soon after the last reel was taken and can now enjoy the sound of his very own Rolls-Royce Merlin in California.

Pinewood Studios are having tremendous aviation activity with two films coming through, the more appealing of which will be, "*Those Magnificent Men and their Flying Machines*", screened in Todd-A-O. To make this film 20th Century Fox leased the entire airfield at R.A.F. Booker, reconstructed a duplicate of Brookland Aerodrome complete with race track banking and replica hangars and set the wheels in motion for re-construction of many early aircraft, each in duplicate. The Bristol Boxkite, Bleriot, Billing, Antoinette, Demoiselle and Avro IV Triplane are among a bevy of highly unusual stick and string subjects which have been hopping over the grass at Booker in the merry months of May and June. Seventy vintage cars have provided realistic background, including many famous racers specially withdrawn from museums and Trust collections. The effort in making this film will probably exceed any other single aviation film subject. All those concerned in the re-construction of early machines (with modern engines) have entered into the fun with unbounded enthusiasm, so that when eventually completed, this should by rights be the masterpiece of re-construction.

In the studios *Unknown Battle* by J. Arthur Rank, concerns yet another Norwegian action with a paratroop raid using the Armstrong-Whitworth Whitley. Since the Company were unable to locate an actual aircraft, this will have to be an entirely model reconstruction to remind us of those initial Bomber Command raids of 1940/41 before the arrival of the more substantial four engined types.

Radio Frequencies

Further progress in its campaign to establish more satisfactory frequencies for model control follows a meeting by the Academy of Model Aeronautics in the U.S.A. with top staff members of the Federal Communications Commission on May 15th.

The A.M.A. is petitioning for frequencies in the 30-50, 72-76 and 150-160 Mc/s. bands, following the interference many modellers have suffered through the use of the Citizens band around 27 Mc/s. The A.M.A. representatives, supported by their appointed Council, received sympathetic attention and it would appear that only the usual time delay prior to official

consideration of any petition by the F.C.C. is in the way of a major change in American radio control.

It remains to be seen whether or not such a change in the U.S.A. would be followed by other Nations. Citizens band transceivers are illegally used in this country and were claimed to have caused a crash on June 14th at the Woburn meeting. These transceivers are in widespread use throughout the Continent of Europe, causing untold strife among the radio control modellers to the extent that a Monitor has become a piece of essential modelling equipment on the field.

World Championships cancelled

Since only three Nations, Finland, the United States of America and Great Britain have indicated their wish to participate in the World Championships for Indoor models scheduled to be held at R.A.F. Cardington in September, it is regretted that this event is now cancelled for 1964. An F.A.I. regulation requires a minimum of five Nations for World Championships.

Turn up for the Book

A second volume from Karl Ries, Jnr., to supplement his work on *Camouflage Systems of Luftwaffe Aircraft* (reviewed in our issue for January this year) has been published by Verlag Dieter Hoffmann of Finthen bei Mainz, West Germany. It carries the title *Dora Kurfurst und rote* 13, which is no doubt topical for Germans; but unfamiliar to English speaking readers and is a 176 page hard bound book measuring 7 x 9½ in., which sells in the United Kingdom at 43/6d. plus 1/3d. post through Graham K. Scott, 2 The Broadway, Friern Barnet, London, N.11, who was good enough to let us see our first copy.

This is indeed a true collector's item with 170 of its pages filled with an average of three photographs each, not one of which is likely to have been published before. Here is the evidence in camera to prove the markings drawn in colour in the previous volume. Ranging from insignia on pre-war trainers to that of captured and impressed aircraft, it includes many a rare bird. Squadron insignia, victory markings and emblems of rank are all substantiated with this fine selection of photographs, the majority of which concern the Messerschmitt Bf 109 and the Focke Wulf Fw. 190.

We are quite used to having pilots contact us to tell us they have been flying the actual aircraft we have chosen for our various 3-view drawings and through correspondence we have learned the ultimate fate of several of our aircraft subjects. However, a new twist to the situation is provided by Karl Ries on page 62 of *Dora Kurfurst und rote* 13. Here we find three photographs, two of which are reproduced below, showing what happened to the Group Adjutant of III/JG 2 after an apparent port leg tyre burst. The markings of this machine are identical to those on the Fw. 190 A-3, which was inadvertently landed at R.A.F. Pembry on June 23rd, 1942, and was subsequently given R.A.F. markings as MP 499. Details of this machine were included in our full description of the Fw. 190 in December 1962 but Karl Ries' close-up of the Squadron Cockerel's head emblem now enables us to make minor corrections which are incorporated in our 1/24th scale drawing, issued with plan pack 2761.

Checking with Karl Ries we find that the machines are not the same. Faber's was Werk Nr. 313 and most definitely an A-3, whereas the one in the new book is Werk Nr. 1167 and an A-4. The photographs below were taken in August or September 1942, two to three months after the accidental surrender of the original machine and quite obviously this was the replacement aircraft, which appears to be similarly blessed with misfortune and probably accounts for the glum expressions on the pilots' faces! The student of aircraft camouflage and markings will find *Dora Kurfurst und rote* 13 indispensable. It helps to confirm that unlike British aircraft, there did not appear to be a standard camouflage pattern for the toning of the upper surfaces.

Bearing in mind the family relationship between our Fw. 190 drawing and the picture below taken from the book, we wonder if Her Majesty's Government could be coerced into producing a similar work, showing the markings of shot down and force landed machines, which remain otherwise hidden in the Imperial War Museum archives?

This, we know would be too much to ask but what a dream task for the aerophile it would make in linking many of Karl Ries's subjects in their "before" state with the I.W.M.'s "after"!

Imperial War Museum Photo MH 4190 above shows surrendered FW190 at Pembrey just before being lamp blacked to cover markings. Replacement aircraft for the Luftwaffe Squadron suffered wheel failure as below, two photographs from the new German book of wartime pictures as reviewed above.

Stallion and Wolverene

Semi-scale stunters for 2.5 - 6 c.c.

by H. C. Quek

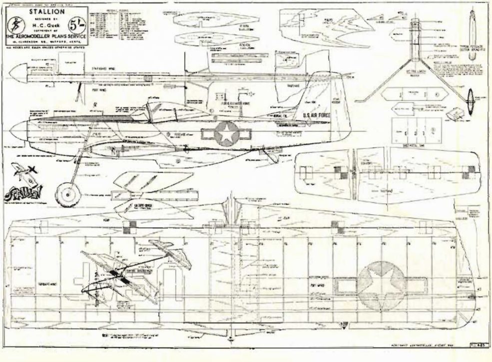
When we introduced two semi-scale 40 in. wingspan stunters by the same designer in our issue for July last year, we anticipated that "Red Dragon" and "Flying Tiger", based upon the Japanese *Zero* and American *Tomahawk* fighters, would be a popular pair for mock combat. The many hundreds of aeromodellers who have subsequently enjoyed building from those plans (selling as CL.842 and 843 at 5/6d. each, including post) will undoubtedly be keen to see this latest pair from H. C. Quek.

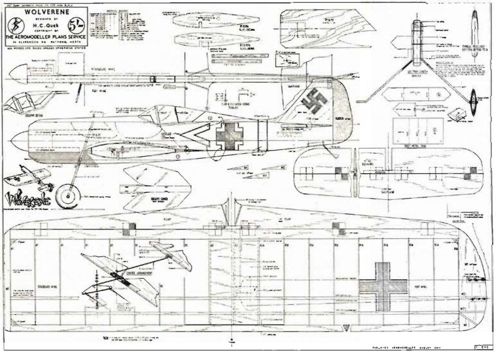
Based upon the *P-51 Mustang* and *Focke Wulf Fw. 190*, "Stallion" and "Wolverene" are each identical in proportion to their predecessors.

There is one subtle distinction in that whereas the original pair were flown with 2.5 and 3.5 c.c. engines, the designer and his friends have tested the new fighters on 62 ft. lines with .35 cu. in. engines without any structional failure.

So the work capacity of all four seems to be considerably broadened in aspect and one could really say that they will take anything from 2.5 to 6 c.c., with appropriate line length adjustment.

Structually, Stallion and Wolverene also follow the same method of building and finishing as for Flying Tiger and Red Dragon, except that on Stallion, a commercial canopy can be used instead of painted wood and on Wolverene, metal flap and elevator horns have been tried to replace the previous wire





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horns. For those not familiar with the previous models, construction begins with the *wing*, using a ply template to cut the ribs, not forgetting the holes for the left hand wing panel where the lead-out wires pass through the wing. Shape the leading and trailing edges, cement the ply strengthener to the L.E. and notch grooves to take the ribs. Then build the wing directly over the plan, using the mainspar to align the parts. Add gussets, bellcrank mount and control mechanism, then prepare the wing tips and flaps, etc. The fuselage is shaped from pieces of $\frac{1}{2}$ in. sheet balsa, pre-cemented before final assembly with the hardwood engine bearers. The space between the two bearers depends upon the type of engine you choose to use. The plywood doublers are superimposed on either side of the nose to add strength and an optional balsa fairing can be applied as well. The tail surfaces are solid sheet and are best prepared for doping before assembly, with the edges radiused. Bend the undercarriage to the true shape and pin firmly to the fuselage, then assemble the entire model prior to covering the wing with strong tissue or silk or nylon. After preparing the surface with clear dope and sanding sealer, decorate to a semi-scale colour scheme.

The December 1962 and May 1963 issue of AEROMODELLER offer colour schemes for both these models. The original Stallion was actually decorated to H. C. Quek's choice and was painted silver with red trimmings aft of the fuselage beyond the belly scoop,

Heading views show Stallion fitted with an A.M. 3.5 c.c. diesel and an Oliver Tiger 2.5 powered Wolverene each in semi scale markings based on Aeromodeller Aircraft Described subjects, the Mustang and FW 190. Below left is the Stallion again, with an Oliver Tiger diesel and above, Wolverene looking scalish with the profile fuselage hiding the engine. See 'Heard at the Hangar Doors' for an odd coincidence concerning the markings of this particular "FW 190". Either model will fly with up to .35 cu. in. power.

including the whole of the tail unit. Wing tips and a $\frac{1}{8}$ in. wide band around the intake were also red. Dummy exhaust stacks can be fitted and painted dull red over a black base and if you like, a caricature profile pilot, adds a little realism.

Flying these models will present no problem to anyone of even moderate experience as they are very stable in the air and yet capable of all the manoeuvres in the stunt schedule, thus they combine excellent stunting with easy construction, plus the attraction of semi-scale combat.

Why not encourage your clubmates to build one and do "battle" in the circuit? All four of these semi-scales in one circle would be quite a sight!


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BRITISH NATIONALS

PICTURE - SPREAD

(1) Dennis Bryant of Bromley used this Merco 49 and F & M equipped Miles Sparrowhawk of 60 in. span to place 2nd in R/C scale. (2) F.A.I. Team race finalists flying cleanly, Messrs. Laurie, Davy and Kirton with his model above Laurie's head. (3) I. Archbold of Leicester launches Rivers 3.5 powered 1/6th scale Nieuport 28 prototype, weighing 4½ lbs—it landed on another scale model, a Sopwith Pup! (4) Blackburn 1912 Monoplane by T. Manley with Mills .75—see "Hangar Doors" this issue. (5) Keen combat group from Luton D.M.A.S. in Black/White uniform. (6) Dennis Allen, A.M. diesel and Merco glow plug engine manufacturer starts Merco 61. (7) Stearman PT—17 to ⅕ scale weighing 7 lbs for Merco 35 by D. Nelson of Derby. (8) Harold Krier Great Lakes "Special" with noisy Yulon 49 by H. J. Carter of Tamworth for control-line. (9) Dave Wiseman of York was third in the mass fly-off for glider. (10) Semi-Scale Stunt control-line Piper Comanche by P. Lucas of Crawley has a "Nobler" wing and Merco 35 weighs 51 oz. (11) In melee before glider fly-off, Barry Halford of Norwich displays his neat 84 in. "Gannymede"—placed 5th. (12) Another Nieuport 28, for control-line by I. Birch of Leicester. (13) M. Billinton's class 5 speed entry has Dooling 61 angled to clear ground, alluminium surfaces, vee tail, single line control and weighs 28½ oz. (14) Bristol Club Ling-Temco — Vought "Crusader" with Dynajet and pneumatic retract gear.


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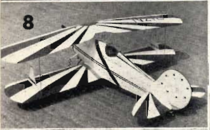
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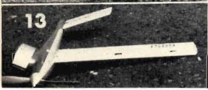
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(15) J. Moseley of Baildon had high thrustline Eta 29 design for Open Power. (16) J. E. D. Mackie's super detailed night fighter Sopwith Camel. Won C/L scale. (17) Peter Dunham of Orpington and 6 lb. Sopwith Pup with Taplin Twin diesel. Has Mahogany struts and 20 in. x 6 in. prop. Was crashed upon by the Nieuport in pic. 3. (18) Seeing double ! Maurice Bodey and J. G. Hockey with M. Jackson of Heswall & Gravesend compare their H.P.42 models. (19) Eric Clutton's "Grasshopper" took some beating for ingenuity. (20) PT-17 by C. P. G. Weldon of Blackheath & Halesowen is 28 in. span for AM 15 diesel weighs 15 oz. (21) A 72 in. stunter with Super Tigre 56 by M. Birch of Feltham has adjustments for flap-elevator linkage. (22) On Tony Young's glider from St. Albans, was 14th in fly-off. (23) G. Bradley placed 2nd in Multi-channel R/C with his "Scorpio II" using Super Tigre 56, twin nose wheels and F & M gear. (24) Second place ½A team racer by Turner/Humphries of Cambridge and Wharfedale has Oliver Tiger Cub, 5½ in. x 9½ in. prop, spans 28 in., weighs 16 oz., managed five miles heat in 3:57. (25) Harold Dowbekin's semi-Mustang weighs 3 lbs for Fox 35, has 56 in., 600 sq. in. wing. (26) A. C. Day of Handsworth had Auster-Beagle Airedale with Fox 35 and Johnson Automix throttle plus silencer brakes, telescopic gear, opening doors and interior furnishings all to 1/8th scale. (27) "Gaucho" designer Neville Willis was in power fly-off with PAW 1.49 original. (28) Ivannikov jet unit with assymetric wing and monoline control is only 26 in. span, by Ralph Gould.

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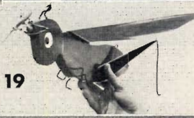

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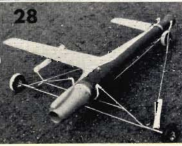

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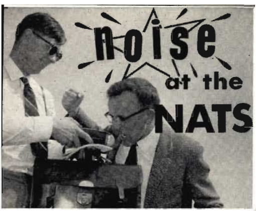


a survey by Dr. M. F. Hawkins, M.B., B.S.

THE RECENT INTEREST in the subject of noise from model aircraft and the introduction of a rule making silencers compulsory for all model engines has suggested the need for an investigation into just how much noise different types of models are making. This article describes the result of measurements made at the Nationals this year. It compares noise levels of different categories of model flying.

The measurement of sound is a complicated technical procedure with several different units to describe the physical characteristics of the sound such as Sound Intensity and Sound Pressure Level in decibels, and the sensation of loudness produced in the listener in phons and sones. (*Reference* 1.) The decibel is a measure of the relative power of two sounds and it only becomes a unit of measurement when an arbitrary reference point is taken. As the loudest sound that we are likely to meet consists of several billion times the energy of the softest, a logarithmic scale is used. This approximates nearer to the response of the human ear than a linear scale. The Overall Sound Pressure Level in decibels is given by the formula:

$$\text{O.S.P.L. dB} = 20 \text{ Log}_{10} \frac{P}{P_0}$$

Where P = measured sound pressure level and P_0 = .0002 dynes/cm². The reference sound pressure.

In practical terms sound meters are built to read directly in decibels and an increase of 6 dB indicates a doubling of the measured sound pressure level.

TABLE 1 gives a rough idea of common sounds in decibels:

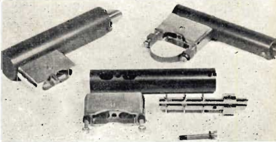
Bird song on a quiet summer evening	40 dB
Normal conversation	60 dB
Underground train	90 dB
Jet airliner take off from outside Control Tower	120 dB

This is by no means the whole picture, however, as sounds occurring in nature are made up of a mixture of frequencies, though one may predominate to give a recognisable "note" to the sound. To measure the sound fully the dB reading for each octave band should be recorded to show how the sound is made up of high and low frequency components. The ear is less sensitive to sounds at either end of the audible range, very roughly, below 100 c.p.s. or above 5,500 c.p.s.

Having now measured the physical characteristics of a noise we are faced with the problem that no two people will hear it exactly the same and that their reaction to it will depend on many different factors. Just two examples quoted in the Wilson Report (*Reference* 2) will show this. A number of people, asked to judge in a controlled experiment, when a motor vehicle was "very noisy" selected 92 dB as the level, but in a similar experiment for aircraft passing overhead up to 115 dB was accepted before it became "very noisy". The baby next door crying at night may produce no more than 40 dB in your home but the annoyance caused is out of all proportion to the volume of the sound.

A Scott Sound Pressure Level Meter was used recording on the C Scale (unweighted) and giving the Overall Sound Pressure Level in decibels. Measurements were made at a distance of "one Standard Piece of String" (1 S.P.S. = 5 paces) in line with the engine exhaust, but at 45 deg. out of line with the pulse jet as I did not dare to stand directly behind it.

Dr. Hawkins allows anti-silencer F./Lt. Noel Falconer to have his say at the Scott Meter in heading. Below are three of many different D.A.C. Silencers showing "Spinaflo" centre core, adaptor blocks and fixing strap.



Results

1. Noise from control line flying decreases steadily with distance from the circle, and with stunt models particularly it was noticed at a distance that noise was less when the model was low.
2. Noise from radio flying averaged 70 dB on the ground over about 1 square mile and was much harder to get away from than with control line.
3. "Multis" produce little, if any, more dB than a "single" of the same engine type. The apparently anomalous result of a twin being quieter with both engines running was due to loss of power on warming up.
4. Speed models are usually run rich on the ground and the noise level can be expected to increase in the air. It was not possible to measure this increase with the equipment available.
5. For a given engine type, noise, as might be expected, increases with an increase of engine speed. The R/C engines seemed noticeably quieter than their C/L equivalent versions.
6. In September 1950 the AEROMODELLER reported on the Yulon 49 as unusually noisy. Apart from the Dooling and the pulse jet this still stands.

The dB as measured are no direct measure of potential annoyance. Frequency analysis would have helped as narrow band high frequency noise is more annoying than low frequency noise. However, it is reasonable to expect that, as with full size aircraft, maximum energy is in the frequency band covered by the motor speed in cycles per second, i.e., Stunt 200 c.p.s. and Speed 400 c.p.s. (*Reference* 3).

It seems probable that silencers reduce high frequency noise more than low frequency so that their effectiveness may be even better than suggested by the figures.

The reaction of people to noise is very complex and depends on duration, frequency of exposure and normal background noise as well as the character and sound pressure level of the noise itself. It is worth remembering that old people are more upset by any disturbance than young, and that what may sound like a mild buzz to a young man may be genuinely intolerable to an old lady.

In the Wilson report it was stated that in one year 72 Local Authorities received 2,350 complaints of noise of which the commonest were Domestic, Motor Vehicles, Factories, Advertisements and others in that order. Aeromodelling was not mentioned.

Noise as a nuisance can be mitigated by:

1 *Control at source. Silencers and/or limited flying hours.*
2 *Screening. This does not help with aeromodelling.*
3 *Keeping it at a distance. It is only common sense to fly well away from houses.*
4 **Prohibition.**

Damage to the ear by permanent loss of hearing can result from exposure to loud noises. Pulse jets produce noise of this level but the exposure of the ground crew is usually remarkably short. However, if ground running of more than four minutes in any one day is contemplated, then some sort of ear protection should be worn. To summarise:

1 Sufficient noise is produced by most forms of model engine to cause a public nuisance and unless action is taken to mitigate the noise, complaints, and therefore loss of flying grounds will increase in the future.
2 Efficient silencers greatly reduce the O.S.P.L. and the anoying character of the noise, but they do not eliminate it altogether and annoyance could still be caused by some forms of "silenced" model.
3 There seems to be little point in fitting a silencer to a "sports" engine of under 1 c.c. as their noise level is well below that of a silenced .35.
4 To quote again from the Wilson Report: "A noise problem must involve people and their feelings and its assessment is a matter rather of human values and environments than precise physical measurement."

REFERENCES

1 *Parrack, H. O. "Effects of Acoustic Energy" in Aerospace Medicine. Ed. Armstrong.* 284-323. *Balliere Tyndall and Cox.* 1961.
2 *Final Report of Committee on Noise. Ed. Wilson H.M.S.O.* 1963.
3 *Gasaway, D. C. "Noise Associated with Operation of Military Aircraft". J. Aerospace Medicine.* 35.327. 1964.

Tests with silencers

Engine	*Type of Silencer*	*Noise Silenced*	*Noise Unsilenced*
Merco 35	Fox	90	94
Merco 35	D.A.C.	80	94
Merco 35	Higgs home-made	80	94 (Estimated)
Merco 35	O.S. Jetstream	82	94 (Estimated)
Johnson 35	O.S. Jetstream	81	94 (Estimated)
Taplin Twin	Manufacturers	80	—

Nationals recordings

All readings in dB. at standard distance from exhaust.

1—**Stunt**
Merco 35 — 96, 94
Fox 35 — 91
Super Tigre 35 — 86
Oliver Tiger — 84
O.S. Max I. 35 — 97
O.S. Max III 35 — 95

2—**Radio**
Merco 49 — 93, 95

3—**Scale** (Radio)
Merco 35 — 88
Super Tigre 56 — 96
Enya 35 TV — 86
Merco 49 — 92
Frog 500 — 82 (Inside cowl)
Enya 29 — 94 (Inside Cowl)
Rivers 2.5 — 85
A.M. 1.5 — 80 (76 with cowl)
McCoy 60 — 98
Torp 19 x 4 — 88 (All running)

(Control line)
Yulon 49 — 97
E.D. 3.46 x 2 — 82 (83 one running)

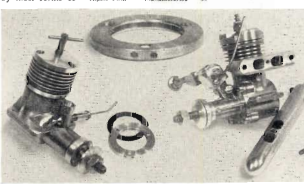
(Free flight)
Mills .75 — 76
Mills 1.3 — 70 (Very large prop)
A.M. 2.5 — 84
A.M. 1.5 — 80

4—**Free Flight Power**
Torp 19 — 92
Enya 19 — 90
Cox T.D. 15 — 94, 94
Cox T.D. .049 — 89

5—**Team Race**
Eta 29 — 94
Oliver Tiger 1.5 — 82, 84

6—**Combat**
Oliver Tiger 2.5 — 82, 86, 86

7—**Speed**
McCoy 60 — 98
Super Tigre 29 — 96
Johnson 29R — 97
Dooling 61 — 111
O.S. Pulse Jet — 120



Composite picture above illustrates the P.A.W. Muffler ring as fitted at a P.A.W. .19 BR. Loose muffler beside it is for size comparison while at top is a close up of the muffler. Note exhaust holes. At right is the D.A.C. Spinaflo in small size for the Enya .09 with the new streamlined bullet nose. "Aeromodeller" has had several of the stock test engines so equipped and the results have been excellent. Enya normally turns an 8 x 4 at 8,600 r.p.m., reducing to a still useful 7,700 with full silencer effect. Below is the Scott Meter as used for this article, with two of Geoff Higgs' units on either side.

Let's go FLYING

—with John Barker

Author John Barker launches an A.P.S. 'Shorty' A/2 glider at right.

Part 4 of this series describes why and how models fly

THE PHRASE IS OFTEN USED THAT: "Man has conquered the air". This is completely untrue; man has co-operated with the air to make flight possible. Nature has yielded nothing. The aircraft designer has had to learn the rules of nature and we must learn them too if we are to have an appreciation of why our models fly.

We could have called this article "Aerodynamics" or "The Theory of Flight" but why make it look difficult? Still, now we have used the word "theory" let's just think about it for a moment. A theory is a view which is held to try and explain certain observed facts. The usual course of scientific enquiry is to put forward a theory and then to carry out experiments to see if the theory is valid. If the experiments are satisfactory the theory then becomes "practice", i.e., the established method of doing the job. What follows in this article is well tried practice.

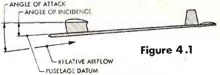


Figure 4.1

Theory should not be confused with calculations. In the present state of model aerodynamics, calculations can be useful to indicate trends but can very rarely be used to give quantitative answers. We have very little basic data on which to work and in any case at model sizes the smallest error in building can cause large changes in performance.

In this article we shall deal mainly with the stability and trim aspects which are the most important to the beginner. And we must be excused by the more knowledgeable for what they may consider to be over simplification of some points. It is necessary here to list a few definitions on which to build our ideas.

Definitions

Centre of Gravity (C.G.)—This is the point at which the whole weight of the model may be assumed to act. It is probably easier to think of it as the balance point, i.e., the point where you could suspend the model so that it would hang level.

Lift—This is the force on the model produced by the air at right angles to the airflow. Note that it is not necessarily at right angles to the ground.

Drag—This is the force on the model produced by the air parallel to the airflow.

Angle of Incidence (Fig. 4.1)—Is the angle at which the wing or tail is set relative to the fuselage datum line. The angle is positive if the leading edge is highest and negative if the trailing edge is highest.

Angle of Attack (Fig. 4.1)—Is the angle at which the wing meets the airflow. These two terms, angle of incidence and angle of attack should not be confused. A wing may be set on a fuselage at an angle of incidence of say, 3 deg.; but in the air the model may fly with its fuselage inclined to the airflow by another 3 deg. The angle of attack would then be 6 deg.

Longitudinal Dihedral (Fig. 4.2)—Is the difference of angle of incidence between the wing and tailplane. For instance; if the wing was set at 5 deg. positive and the tail at 2 deg. positive, the longitudinal dihedral would be 3 deg. and, similarly, if the wing was at 3 deg. positive and the tail at 2 deg. negative, the longitudinal dihedral would be a total of 5 deg.

Longitudinal dihedral is sometimes referred to as

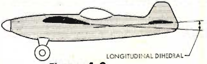


Figure 4.2

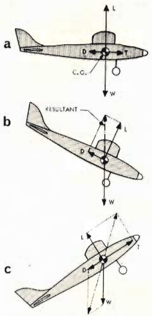


Figure 4.3

decalage but as the term decalage formerly meant the difference in incidence between the wings of a bi-plane, it seems better to reserve it for that use.

When a model is flying it tends to pivot about its centre of gravity. For the model to be in equilibrium all the forces acting upon it must be in balance and all the moments of these forces about the c.g. must be in balance. To fully understand what follows you will need to know that the resultant of two forces can be found by completing a parallelogram and drawing the diagonal. The diagonal is the resultant and has exactly the same effect as the original two forces.

Longitudinal Stability

This is the stability in pitch, i.e., the model moving its nose up and down. Consider figure 4.3. At **(a)** the aircraft is shown in level flight where the lift (L) equals the weight (W) and the thrust (T) equals the drag (D). The arrows show the direction of the forces and the length of an arrow represents the size of the force. Assume now that the thrust is removed. There will now be no force to balance the drag and so the aircraft must take up a new position to restore equilibrium. It does this by putting its nose down and gliding as shown in **(b)**. The resultant of the lift and drag is now balanced by the weight. If on the other hand the thrust increases over that required for level flight the plane will nose up into a climb as at **(c)**. It is important to notice that as the thrust is now supporting some of the weight the lift must be *less* than it was for level flight for the forces to balance. Here the resultant of Lift and Thrust equals resultant of Weight and Drag.

Figure 4.3 shows particular aeroplanes where all the forces passed through the centre of gravity. This very rarely occurs in practice and we must now look at cases as shown in *figure* 4.4. In **(a)** the drag is assumed to pass above the C.G. which would tend to rotate the nose of the model upwards. To counteract this, the thrust line may be inclined to also pass above the C.G. giving a balancing, nosedown, force. In **(b)** the wing lift is acting in front of the C.G. which would cause the model to nose up but the tailplane is set to give an upwards lift which will restore the balance. These are but two examples, there are many other ways in which the forces may be arranged to give a balance. (In *figure* 4.4 the arrows only indicate the direction of the forces and not their magnitude).

It is necessary that the forces on a model should be in equilibrium as shown in *figures* 4.3 and 4.4 but this does not automatically ensure stability. A body may be in unstable equilibrium or in stable equilibrium. If a body is in unstable equilibrium, when disturbed it will move further from its original position. If a body is in stable equilibrium it will try to return to its original position after a disturbance. Unstable equilibrium is usually referred to as "instability" and stable equilibrium as "stability". A cone gives a good example of the two cases. If a cone is balanced on its point a slight disturbance will cause it to fall over. It is unstable. If, however, the cone rests on its base, after a small disturbance it will return to its original position. It is then stable.

Before going further with this matter of stability it would be as well to consider the action of the wing alone. A wing develops lift by deflecting air downwards. This follows from Newtons law that every action has an equal and opposite reaction. Considering a normal cambered aerofoil, at some slight negative angle of attack the air will flow smoothly around the aerofoil without experiencing any deflection. There is therefore no lift and this is known as the zero lift angle. As we increase the angle of attack from this point the lift increases until the air can no longer flow smoothly over the top surface of the wing. The airflow breaks up into turbulence, the lift drops off, and we say the wing is stalled.

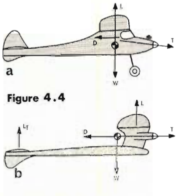


Figure 4.4

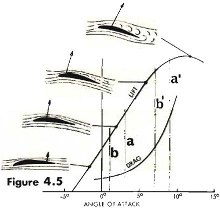


Figure 4.5

The way this happens for any particular aerofoil is usually shown on a graph. A typical graph would look something like *figure* 4.5. Here we have appended some drawings to give an idea of the appearance of the airflow at certain points. Note particularly on these drawings the arrows which show roughly the direction and size of the resultant force on the aerofoil at the different angles. You will see from this that a wing on its own is unstable for if the angle of attack increases' the resultant force moves forward and tries to increase the angle of attack still more.

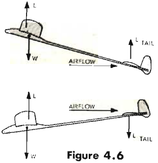


Figure 4.6

We are now in a position to return to the question of stability. If a model is disturbed from its normal flight path the wing lift acts to make it deviate still further. To counteract this we fit the model with a tailplane. It will be seen, *figure* 4.6, that if the model noses upwards not only does the wing angle of attack increase, the tailplane angle increases also. This gives an increase of tailplane lift which, as it acts a long way from the C.G., will be able to overcome the destabilising effect of the wing and restore the model to a state of balance. You will see that the opposite state of affairs occurs when the model is disturbed nose down.

A balanced model is something like a see-saw. The C.G. is equivalent to the pivot and the wing and tail lifts like people on either end. *Figure* 4.7. If a big person, representing the wing lift, sits near the pivot, quite a small child can move the other end of the see-saw. On the other hand, if the large person sits well away from the pivot, a much larger child will be required to maintain balance. So it is with a model; if the centre of gravity is near the centre of lift a small tailplane a short distance from the C.G. can be used, but if the wing lift and C.G. are further apart, a larger tailplane or a greater distance from tailplane to C.G. must be used.

You will appreciate from what has gone before that the further back the C.G. the less will be the longitudinal dihedral. In other words if the C.G. is a long way back the tailplane has more work to do and its incidence will approach the wing incidence. In general, the larger the longitudinal dihedral the better the static stability and in fact it can be proved mathematically that *some* longitudinal dihedral is always necessary to give a stable aeroplane.

The obvious question that now comes to mind is; Why do we sometimes use a rearward C.G. when stability is more easily achieved with the C.G. right forward under the wing lift? The fact is that we can, and usually do, use a forward position for the C.G. on gliders and low powered models but on high powered models it is very difficult to control the climb unless the C.G. is moved rearwards. You will remember that when talking about *figure* 4.3 we said that the lift must be reduced when a model is in a climb. This is done by trimming the model to fly at a reduced angle of attack. The effect of all the different forces acting on the climb is very complicated, but we can state roughly that the high static stability of a forward C.G. would act to prevent the trim forces reducing the angle of attack.

Directional Stability

This is also called "weathercock stability" and is the easiest to understand. It is the stability which prevents yawing, i.e., it helps the model to keep a straight, or steady curved course without swinging its nose from side to side. Directional stability is usually achieved by fitting a fin of the correct size which then acts similarly to the feathers of an arrow.

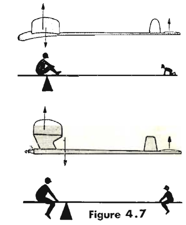


Figure 4.7

Lateral Stability

This is the type of stability which corrects the aircraft if it rolls so that one wing is lower than the other. It is easily understood by reference to *figure* 4.8. When an aircraft rolls it tends to slip towards the lower wing. The airflow then strikes the model partly from the side. In the figure there is a plan view of the model showing the direction of the airflow when the model is slipping sideways. The other view shows what the airflow will "see" as it approaches the model. It will be apparent that the air will approach the nearest wing from the underside and the other wing from the upper side. In other words the nearest wing will have an increase in angle of attack and the other wing a reduction. These changes in angle of attack will cause corresponding lift changes on the two wing halves which will roll the aircraft back to an upright position.

Spiral Stability

We have now dealt with what is required to keep an aircraft stable when it encounters the three principal disturbances of pitching, rolling, and yawing. You will realise, however, that when an aircraft is actually in flight these disturbances need not occur separately. One combined disturbance which is of particular interest to the modeller is that which is encountered in a spiral dive. A consideration of all the forces acting in a spiral dive would be most complicated so here we will only deal with the major ones. When a model is circling, the outer wing is travelling faster than the inner wing and will therefore develop more lift. This extra lift tends to roll the model so that the wing on the inside of the turn is lower. The model will now side-slip towards the lower wing and, and as we have seen when considering lateral stability, the dihedral will generate a force tending to roll the model out of the turn. However, look again at *figure* 4.8 and you will notice that not only will the wind act on the dihedral it will also act on the fin and the force developed by the fin is such as to make the model turn more tightly. If the turn does tighten, the lift will be reduced and the nose of the model will drop. The speed will then increase and the whole process will continue until . . . splat!

You will see that the dihedral and fin area must be carefully balanced against each other. Too large a fin and the model will be prone to spiral dive into the ground. Too small a fin and the model will not turn smoothly.

Gliding Angle and Sinking Speed

It will be apparent from a study of *figure* 4.3 **(b)** that an aircraft will glide at its flattest angle when the ratio of lift to drag is a maximum. (Remember that the resultant must always be vertical over the weight.) This condition, however, does not give the minimum sinking speed. It can be proved that the minimum sinking speed will occur when the Lift cubed divided by the Drag squared is a maximum. For most normal wing sections this condition is just below the angle of attack at which the wing stalls. This is the justification for the usual method of trimming whereby we adjust the model until a stall starts to appear and then go back a little to just remove the stall.

With this trim the model will glide at a steeper angle than it would if trimmed for flattest gliding angle but the forward speed will be much slower and that is why the actual sinking speed will be less.

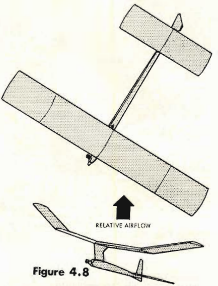


Figure 4.8

Warps, Wash-in and Wash-out

If a wing is warped such that the angle of incidence increases from root to tip the warp is known as wash-in. If the angle reduces from root to tip it is known as wash-out.

Some models are warped by accident and some by design. The accidental warps usually cause trouble unless you are lucky; the intentional warps are often the very thing that makes one model out-perform all the others. Many of the troubles and the benefits of warps arise from the same cause. This is the fact that warps often change their effect with flying speed. To appreciate this it will be necessary to refer to *figure* 4.5. When a model flies fast it will be at a low angle of attack and when it flies slowly it will be at a high angle of attack. Now, consider a model where the right wing is warped to have 2 deg. more angle of incidence than the left. If the model flies fast the right wing could be at 3 deg. angle of attack and the left wing at 1 deg. as shown by lines **(a)** and **(b)**. You will see that the right wing has considerably more lift than the left but the drag of both wings is very similar. The difference in lift will cause the model to roll to the left.

If the model flies slowly the angles of attack could be 9 deg. and 7 deg. as shown by lines **(a)** and **(b)**. The right wing still has more lift, although the difference is not so great, but it now has much more drag than the left wing. This difference in drag will cause the model to yaw to the right.

Think of trying to tow a glider with a warped wing; it will alternatively roll and yaw depending on the towing speed and could be difficult to handle. This is an example of the type of warp which is a nuisance. On the other hand many power models will turn too tightly under power and here wash-in is often used to give a corrective roll during the fast, powered, part of the flight. After the motor cuts, the yaw caused by the warp helps a natural turn.

ENGINE ANALYSIS

No. 125. By R. H. Warring

McCOY "35 RC"
RADIO CONTROLLED
RED HEAD STUNT ENGINE

THE McCOY 35 R/C is a straightforward throttled adaption of the standard "Red Head" stunt engine (see AEROMODELLER Test Report, May 1960) with some additional modifications. These include a new head with the plug offset to the right (exhaust side) and slightly forward of centre, scalloped cuts on the crankshaft web to provide more counterbalance, and a modified cylinder unit with a shorter skirt section. The crankcase casting has also changed with a thicker central pillar in the stub exhaust to mount the exhaust flap on.

The throttle is a conventional barrel unit which plugs directly into a shortened stub intake on the casting and is secured in position with a small screw on each side. The throttle housing is fabricated in light alloy, with an aluminium barrel and conventional brass spraybar running through the centre. Throttle and spraybar turn as one, thus calling for a flexible fuel feed pipe connection to take the twist resulting from throttle movement. Throttle movement is linked to a conventional exhaust flap. Low speed adjustment is provided by a screw in the front of the throttle housing limiting the forward movement of the barrel. The circular barrel opening is relieved to provide a fairly generous air passage in the closed throttle position and maintains a far from excessively rich mixture.

Handling characteristics are extremely good. The 35 R/C is really easy starting, requiring just an exhaust prime, needle valve well open and usually just a single flick. Consistent running was obtained up to 12,000 r.p.m. plus on propeller loads using non-nitrated fuel, the only limitation experienced being that the engine was somewhat fussy on fuel tank position. There appears to be a fair amount of leakage around the barrel unit and the engine tends to die when leaned right out working against a high suction lift. With the tank more or less level with the bottom of the spraybar no further trouble was experienced in this respect. Mounting the tank close to the back of the engine would appear desirable in an aerobatic model subject to considerable changes in attitude, again to maintain a reasonably low suction lift at all times. Gravity feed appeared quite acceptable, once the engine was running.

Performance is only slightly down on the unthrottled version previously tested and, whilst not outstanding for an engine of this size, should certainly be more than adequate for a radio control model of reasonable size and weight. The relatively low engine weight—7⅜ oz.—would also make it suitable for accommodating in a medium-size model (e.g., a Tauri), where it would give power to spare and could be operated at reduced throttle for much of the flight.

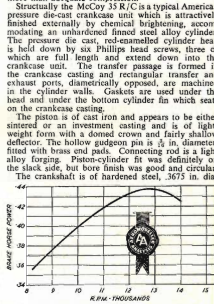
Throttle response is excellent but, whilst progressive, does not give a fully flexible speed range. A low speed setting of about 2,500 to 3,000 r.p.m. can be maintained with rapid pick-up. Intermediate speeds are a little indeterminate, but one can readily find a nominal 'half' and 'three-quarter' throttle position. The whole throttle movement operates very smoothly with very low friction and thus represents a minimum load on the actuator.

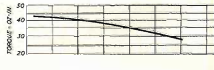
Another useful feature for a R/C engine is that little or no running-in is required to establish consistent throttle response, the engine in fact being set up very much on the slack side although having more than adequate compression.

Structually the McCoy 35 R/C is a typical American pressure die-cast crankcase unit which is attractively finished externally by chemical brightening, accommodating an unhardened finned steel alloy cylinder. The pressure die cast, red-enamelled cylinder head is held down by six Phillips head screws, three of which are full length and extend down into the crankcase unit. The transfer passage is formed in the crankcase casting and rectangular transfer and exhaust ports, diametrically opposed, are machined in the cylinder walls. Gaskets are used under the head and under the bottom cylinder fin which seats on the crankcase casting.

The piston is of cast iron and appears to be either sintered or an investment casting and is of lightweight form with a domed crown and fairly shallow deflector. The hollow gudgeon pin is $\frac{3}{16}$ in. diameter, fitted with brass end pads. Connecting rod is a light alloy forging. Piston-cylinder fit was definitely on the slack side, but bore finish was good and circular.

The crankshaft is of hardened steel, .3675 in. dia-





Propeller — R.P.M. Figures

Tornado nylon	11 x 4	10,900
Tornado nylon	10 x 6	11,200
Frog nylon	10 x 6	10,800
Trucut wood	11 x 4	10,000
Top Flite nylon	11 x 4	10,700
Top Flite nylon	10 x 6	10,900
Top Flite nylon	9 x 6	11,500

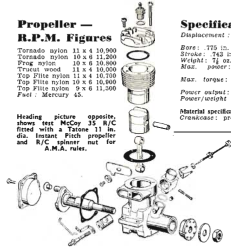
Fuel : Mercury 45.

Heading picture opposite, shows test McCoy 35 R/C fitted with a Tatone 11 in. dia. Instant Pitch propeller and R/C spinner nut for A.M.A. rules.

Specification

Displacement : 5.362 c.c. (.327 cu.in.)
Bore : .775 in.
Stroke : .743 in.
Weight : 7½ oz.
Max. power : .438 B.H.P. at 12,700 r.p.m.
Max. torque : 44 oz.-in. at 8,400 r.p.m.
Power output : .082 B.H.P. per c.c.
Power/weight ratio : .056 B.H.P. per oz.

Material specification
Crankcase : pressure die cast light alloy.
Cylinder : leaded steel (unhardened) with integral fins.
Cylinder head : light alloy pressure die casting (stove enamelled red)
Piston : lightweight cast iron.
Connecting rod : light alloy forging.
Main bearing : cast iron bush.
Crankshaft : hardened steel.
Gudgeon pin : silver steel.
Prop. driver : light alloy pressure die casting.
Crankcase backplate : light alloy pressure die casting.
Throttle body : aluminium.
Throttle barrel : aluminium.
Spraybar assembly : brass with steel needle and steel ratchet.

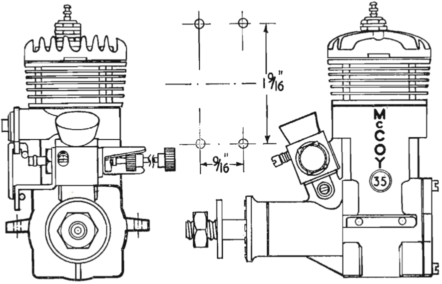


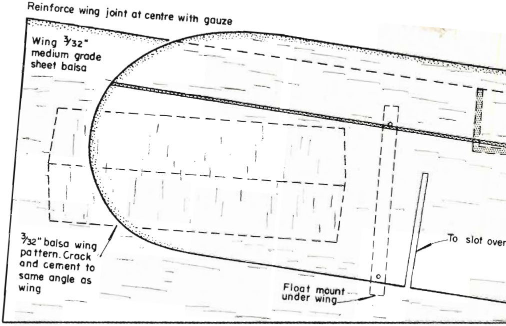
meter over the journal length stepping down to a ¼ in. diameter threaded length. The induction port is nearly ⅜ in. square, opening into a .300 in. diameter central hole. The propeller driver is a light alloy pressure die casting and located on a short tapered length of the shaft immediately in front of the bearing. The main bearing is a cast iron bush pressed into the crankcase casting and apparently broached to final size with little other finishing. The journal length of the shaft and the crankpin are finished by grinding.

The steel needle valve is extended in the form of a thin flexible shaft which makes for easy manipulation and, unlike some flexible extension of more generous proportions, particularly 'kink-free'. Positive locking is provided by a double ratchet spring. Besides being easy to adjust, needle valve settings are essentially non-critical and virtually the only time the motor will cut over the whole range of adjustment is if the mixture is leaned out too much. When bench running, opening of the needle also tends to rotate the throttle to the closed position since the ratchet spring is locked to the barrel assembly, but this would be no problem in a model when the throttle arm is attached to actuator linkage.

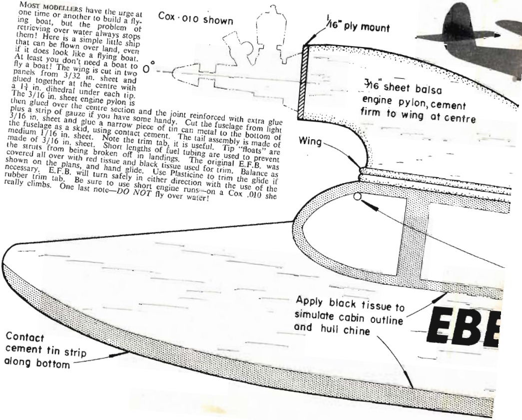
Peak power is developed around 12,000 r.p.m. and a 11 x 4 propeller would appear to be about the right size for radio models—or possibly a 12 x 3 wooden propeller for maximum thrust. A larger propeller—e.g., a 12 x 4 pulls the revs. down a little too much, although the engine runs quite sweetly on such a load.

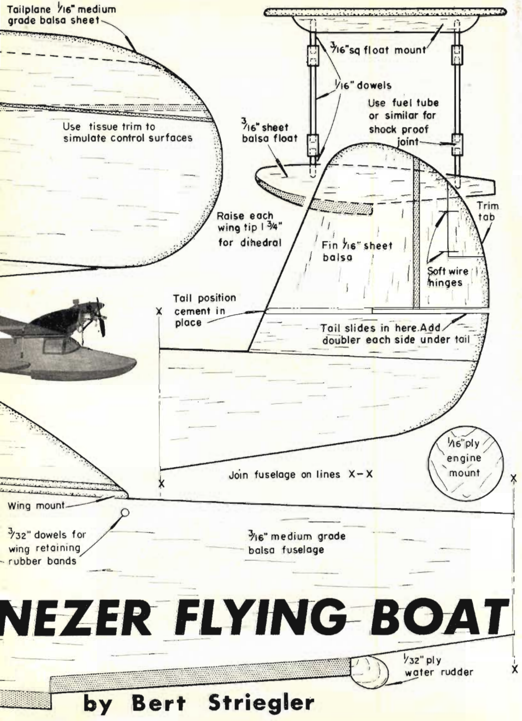
As is to be expected with a low cost mass produced engine, fits and tolerances are on the generous side, and possibly the working life is suspect. Performance available, however, is well up to expected standards with extremely pleasant handling characteristics. The McCoy 35 R/C, in fact, would appear to be one of the best value for money R/C engines on the market today and suitable for models in the 4 ft. to 6 ft. span range.





MOST MODELLERS have the urge at one time or another to build a flying boat, but the problem of retrieving over water always stops them! Here is a simple little ship that can be flown over land, even if it does look like a flying boat. At least you don't need a boat to fly a boat! The wing is cut in two panels from 3/32 in. sheet and glued together at the centre with a 1¼ in. dihedral under each tip. The 3/16 in. sheet engine pylon is then glued over the centre section and the joint reinforced with extra glue plus a strip of gauze if you have some handy. Cut the fuselage from light 3/16 in. sheet and glue a narrow piece of tin can metal to the bottom of the fuselage as a skid, using contact cement. The tail assembly is made of medium 1/16 in. sheet. Note the trim tab, it is useful. Tip "floats" are made of 3/16 in. sheet. Short lengths of fuel tubing are used to prevent the struts from being broken off in landings. The original E.F.B. was covered all over with red tissue and black tissue used for trim. Balance as shown on the plans, and hand glide. Use Plasticine to trim the glide if necessary. E.F.B. will turn safely in either direction with the use of the rubber trim tab. Be sure to use short engine runs—on a Cox .010 she really climbs. One last note—*DO NOT* fly over water!





NEZER FLYING BOAT

by Bert Striegler

MANY ARE THE VARIATIONS that have been tried for reliable dethermaliser releases over the past few years. The opening gadget this month shown in **A** is the well proved Canadian Tam Thompson system as described by Ernie Avory in the *Vancouver G.M.A.C. Newsletter*. Ernie uses this system in his Thermal-Nose glider which came second in the 1963 World Championships by a mere nine seconds short of perfect time. A standard timer has an automatic on-off switch by the following method. The "on-off" arm is tensioned in the "on" position by an elastic band fitted on to the nose end of the fuselage and the end of the arm. Then another band over tensions it to the "off" position. This band is fitted to a 16 s.w.g. pin that is let into the fuselage and linked to the tow line. When the model is released from tow, the tow ring slips off the tow hook, then the 16 s.w.g. pin pulls out, this releases the tension on the band from the timer switch to the pin, so the band to the nose now pulls the switch to the "on" position. The pin must be a loose fit in the fuselage tube to drop out. Ernie says to connect the bands to the timer switch tie a circle of nylon cord around it.

GADGET REVIEW

Have you ever wondered what to do with those aluminium collar studs that the laundry send back with the clean shirts? A. J. Barrett of St. Albans has three ideas shown in **B**, **C** and **D**. They were first used as elastic band retainers in a 40 in. span shoulder wing R/C model. They look very neat and are perfect if anchored well. **B** shows the way to anchor them in a R/C model with dowel rod pressing the flanges tightly into the sheet fuselage sides. **C** is an alternative method for where it is not possible to use a dowel rod. The flange is sunk into the balsa and a simple sheet patch cemented over it. With the heads sawn off and drilled out the studs make very good wheel washers as shown in **D**, for holding the wheel hubs away from the radius in the undercarriage leg.

From A. James of Worksop, Notts, comes the brush jar idea in **E**. To prevent the brush bending up at the end, cut a ⅜ in. hole in an old dope jar lid and slide the brush in. To suspend it, cut a ¾ in. length of ½ in. O.D. neoprene tubing and slip it over the handle to act as a stop ring against the lid. By sliding this neoprene ring up and down, the amount of the brush in the solvent can be controlled.

Most aeromodellers these days seem to have cars or cycles so here is a suggestion from R. A. Scott of Bury St. Edmunds, Suffolk. To stop those little B.A. spanners getting lost in pockets, tins, etc., obtain a length of old inner tube and cut slots as shown in **F** on one side only to hold the tools. This is very easily rolled up and secured with an elastic band. It could even have press studs fitted as a luxury. If one is missing it is soon spotted with them all being laid out like this.

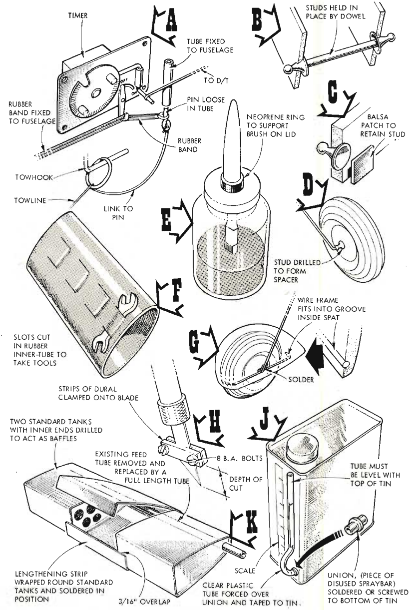
An easy and practical way to fit wheel spats on scale jobs, etc., comes from T. Hamilton of Epperstone, Notts, and is shown in **G**. Using soft wire such as paper clips, solder ⅛ in. of two pieces to the undercarriage leg, one each side. Then bend the wires so they run from front to rear in the shape of the wheel spat required. Groove out the wheel spats at the position of the wire, then insert the wire and cement a piece of silk or gauze over it. This gives accurate alignment.

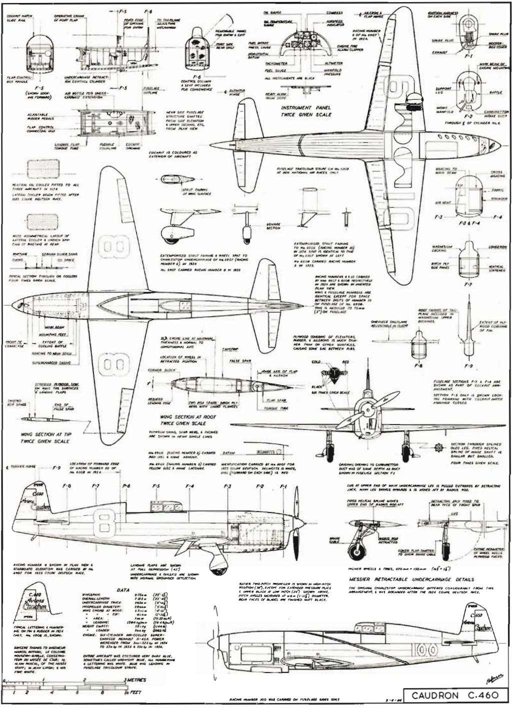
How to cut accurate depth slots in sheet for team race leadouts is the subject in **H** from J. Franklin of South Woodford, London. After many years of cutting too deep so that when the wing is sanded down the cut became exposed on the other side he made this depth restrictor. Cut two pieces of ⅛ in. dural and drill to clear 8 B.A. bolts, slide up knife blade to required depth and then lock with the two clamping screws as shown. Always run the dural block along a steel rule or the wood will get very easily scored and cut, and do not forget to allow for the thickness of the ruler when setting the depth.

An instant "know how much there is" fuel can comes from R. Jenkins of Lee, London. This works exactly the same as a sight glass on a boiler and the fuel can be seen in an instant without using a dipstick as in **J**. A small hole is drilled near the base of the can and a union made from a broken spray bar is bolted or soldered into it. A length of neoprene tubing is then fixed to the outside of the union and held up the side of the can, right to the top. When fuel is put into the can it will automatically run up the neoprene tubing to the same height. By putting measured amounts in, a scale can be derived and marked beside the tube as shown. To prevent leakage when the can is lying flat, a screw must be put into the top end of the neoprene tubing, but to take a reading it must be taken out again.

To make a *large* stunt tank from two spare small ones H. C. Quek from London suggests in **K** that holes are drilled in opposite ends of each tank and they are joined together with a wrap around tin plate strap. The existing feed pipes and air vents should be removed and new ones inserted. The number of holes in the tank ends that have now become baffles will vary with the tank size, i.e., the smaller the tank the fewer the holes. For most purposes about five in each baffle should be satisfactory.

"I see you're still not wanting to wear your glasses in public"


A
TIMER
TUBE FIXED TO FUSELAGE
TO D/T
RUBBER BAND FIXED TO FUSELAGE
PIN LOOSE IN TUBE
RUBBER BAND
TOWHOOK
TOWLINE
LINK TO PIN
B
STUDS HELD IN PLACE BY DOWEL
C
BALSA PATCH TO RETAIN STUD
NEOPRENE RING TO SUPPORT BRUSH ON LID
E
D
STUD DRILLED TO FORM SPACER
F
SLOTS CUT IN RUBBER INNER-TUBE TO TAKE TOOLS
WIRE FRAME FITS INTO GROOVE INSIDE SPAT
G
SOLDER
STRIPS OF DURAL CLAMPED ONTO BLADE
H
J
8 B.A. BOLTS
DEPTH OF CUT
TWO STANDARD TANKS WITH INNER ENDS DRILLED TO ACT AS BAFFLES
EXISTING FEED TUBE REMOVED AND REPLACED BY A FULL LENGTH TUBE
TUBE MUST BE LEVEL WITH TOP OF TIN
K
LENGTHENING STRIP WRAPPED ROUND STANDARD TANKS AND SOLDERED IN POSITION
3/16" OVERLAP
SCALE
CLEAR PLASTIC TUBE FORCED OVER UNION AND TAPED TO TIN.
UNION, (PIECE OF DISUSED SPRAYBAR) SOLDERED OR SCREWED TO BOTTOM OF TIN


INSTRUMENT PANEL
TWICE GIVEN SCALE
WING SECTION AT ROOT
TWICE GIVEN SCALE
WING SECTION AT TIP
TWICE GIVEN SCALE
MESSIER RETRACTABLE UNDERCARRIAGE DETAILS
THE ORIGINAL CHARLESTOP UNDERCARRIAGE DIFFERED CONSIDERABLY FROM THIS ARRANGEMENT, & WAS DISCARDED AFTER THE 1934 COUPE DEUTSCH RACE.
DATA
ENGINE: SIX-CYLINDER AIR-COOLED SUPERCHARGED RENAULT R-456. POWER INCREASED FROM 300-325 hp IN 1934 TO 330 hp IN 1935 & 350 hp IN 1936.
ENTIRE AIRCRAFT WAS COLOURED VERY DARK BLUE, SOMETIMES CALLED MIDNIGHT BLUE. ALL NUMBERING & LETTERING WAS WHITE. BLUE WAS LEADING IN FUSELAGE TRICOLOUR STRIPE.
METRES
FEET
CAUDRON C.460

Aircraft Described

Number 134

By J. H. Robinson

C.450, Nr 6910 displayed at 1934 Paris Aero Show with achievements listed on cowling.

That outstanding French racer of the '30s

CAUDRON C.460

IN 1933/34 Ingenieur Marcel Riffard designed a racing aeroplane whose performance still remains unequalled by modern aircraft. The Caudron C.460 was an extensive refinement of Mr. Riffard's C.362 which had placed second in the 1933 Coupe Deutsch de la Meurthe Race. This international race for engines not exceeding eight litres required ability to take off and land within 550 metres (600 yards), and was flown in two sections of 1,000 kilometres (621.370 miles) around a 100 kilometre triangular course, with an hour and a half rest period between.

Chief structural materials of the C.460 were limbo (a type of walnut), birch plywood, and spruce. Upper and lower fuselage beams were of limbo and joined by plywood side panels with limbo stiffeners and spruce stringers. Magnesium upper deckings were supported by limbo frames, as were the stringers fairing the underside. Side panels and underside were fabric covered. The lines of the narrow sliding cockpit canopy continued aft and faired smoothly into the tall tapered fin. With the canopy forward a rectangular panel on the port side became removable to allow entry and exit.

Side panels of the magnesium engine cowling were readily removable, with access for engine starting on the port side. Engine mounting beams were rectangular-section steel tubes connected to the upper fuselage longerons and braced to the lower longerons by triangular light alloy trusses. A surface-type oil cooler covered much of the cowling underside.

The sharply tapered one-piece wing was built about two tapered box spars, each with limbo flanges and plywood webs. The symmetrical airfoil was maintained by plywood ribs with spruce capstrips and corner blocks. A plywood faced false spar carried ailerons and landing flaps. All surfaces were of similar construction to the wing, with similar stressed-skin plywood covering. Plywood webs facing the perimeter of the wheel wells maintained the stiffness of the centre-section, and the wing was bolted to four fuselage fittings with an X-shaped duralumin strap on its underside to distribute flying loads. Rudder, elevators, and ailerons were cable operated, while the split flaps were torque-tube actuated from a manually operated gearbox through which tailplane trim was synchronised with flap movement, to cancel unstable forces resulting from lowering the flaps.

Two-pitch propellor

The eight litre aircooled engine was the six-cylinder, moderately supercharged Renault 456, producing 300 h.p. at 2,900 r.p.m., and 325 h.p. at 3,250 r.p.m. for short periods. A development of the four-cylinder Renault "Bengali", the engine was suspended by flexible mountings from the main beams, and turned a Ratier two-pitch Series 1261 propeller. Low pitch for take-off was achieved by increasing air pressure in the control system: at approximately 150 km./hr. (93 m.p.h.) airflow against the central pressure plate allowed the blades to move into high pitch.

At left, Nr 6907 as raced with the modified fixed undercarriage in 1934 after retracting Charlestop gear proved inadequate. Note down elevator to bring tail up and port rudder to offset torque. At top, a photo that captures the atmosphere of the U.S. National Air Races as the famous "100" is towed into position with cockpit closed and air intakes blocked to keep out dust. Dimpled side radiator is a prominent characteristic often mistaken as an outlet grid. Reprints of this article and 1/24 scale dye-line prints from the original are available as plan pack JH2782 from A.P.S.

Caudron C.460 (Continued)

This mechanism was fully described in *L'Aéronautique*, also in *Aircraft Engineering* for October 1934. Similar propellers were used on the De Havilland "Comet" and Chester "Goon".

Retracting undercarriage

Three C.460's fitted with Charlestop retractable undercarriages were completed for the 1933 Coupe Deutsch, also a single C.450, identical except for its fixed and spatted undercarriage. When the Charlestop mechanism proved insufficiently powerful, rigid struts were hastily substituted for the retracting jacks, and wheel and strut fairings fitted to two aircraft before the race. Of the three aircraft to complete the race, the C.450 flown by Maurice Arnoux won at 389 km./hr. (241.713 m.p.h.), and the C.460 flown by Albert Monville was third at 337.2 km./hr. (209.562 m.p.h.). Raymond Delmotte flew the other aircraft with extemporised fairings at maximum revolutions, only to force land some three minutes from the finish. His fastest lap was 393.4 km./hr. (244.447 m.p.h.) compared to the 400.4 km./hr. (248.797 m.p.h.) of the best lap of the C.450 with its engine running at only 2,900 r.p.m.

Late in 1934 Delmotte's aircraft was fitted with the 9.5 litre Renault 428 engine of 370 h.p., and on December 25 established a landplane record of 505.848 km./hr. (314.319 m.p.h.) at Istres. By this time the Charlestop undercarriage had been replaced by Messier hydraulic/pneumatic units. Oil pressure from an engine-driven pump operated the retracting jacks and raised the wheels, also charging an air bottle to supply energy for lowering them. An auxiliary air bottle in the cockpit assured completion of this operation, and automatic valves locked the undercarriage in extended and retracted positions.

The three C.460's and the C.450 qualified for the 1935 Coupe Deutsch. Engine power was increased to 330 h.p. and propellers with thinner blades fitted. Delmotte, flying the same C.460 as in 1934, completed the 2,000 km. in 4 hours 30 mins. 72/5 secs, at an average 443.965 km./hr. (275.855 m.p.h.), and set a new 1,000 km. record of 447.361 km./hr. (277.977 m.p.h.). Lacombe was second at 424.203 km./hr. (263.587 m.p.h.), and Monville in the C.450 was third at 348.685 km./hr. (216.663 m.p.h.). Arnoux broke the 100 km. record in his seventh lap at 469.361 km./hr. (291.646 m.p.h.) before retiring with lubrication difficulties.

In August 1935 the 8-litre C.460 set further records from Istres. On the 10th Arnoux recorded 476.316 km./hr. (296.057 m.p.h.) over 100 km. and on the 24th Delmotte in No. 6907 covered 500 km. at 451.200 km./hr. (280.362 m.p.h.) and 1,000 km. at 450.371 km./hr. (279.848 m.p.h.). For these flights a lateral oil cooler had been added to the port cowling side.

At Los Angeles for the 1936 National Air Races No. 6909 also carried the second oil cooler, and its 8-litre Renault 456 engine, fitted for all its events at the Races, was boosted to 350 h.p. Michel Détroyat, premier aerobatic pilot and chief test pilot for Morane-Saulnier, agreed to fly the C.460 in the Greve Trophy Race for engines up to 550 cu. in and the unlimited Thompson Trophy Race.

"Le Grand Michel" and the C.460 qualified for the Greve Race at 273.473 m.p.h., were first in the air for the race and first around the scattering pylon, to win by over two minutes at 247.3 m.p.h. Also recording the fastest qualifying speed for the Thompson Race, the Caudron with its two-pitch propeller was again first around the scattering pylon. Making sharp close turns, Détroyat completed his second lap at 301 m.p.h. (a speed not equalled until after World War II) and his third lap at 293 m.p.h., then throttled back to 3,100 r.p.m. and about 330 h.p. His average for the 150 miles was 264.261 m.p.h., and the C.460 was the first to better the speed of the 1932 Gee Bee R-1. Earl Ortman in the 700 h.p. Rider R-3 was second at 248.042 m.p.h.

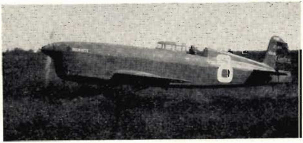
A factory entry

Contrary to rumours broadcast by chagrined American pilots, the C.460 was not a million dollar government financed project. All capital for the C.460/450 aircraft was provided by the Société Caudron-Renault, and winnings from the 1934 and '35 Coupe Deutsch Races would not have covered the readying of nine aircraft for two 1,240 mile races.

Back at Istres, No. 6909 was lost on December 19, 1936, after twice going out of control during an attempt on the women's absolute speed record. Maryse Hilsz was rescued from Lake l'Estorac after descending by parachute. Nos. 6907 and 6908 were much revised with new fuselage outlines and semi-circular fins for the 1936 Coupe Deutsch, and with new serial numbers flew as C.461's.

No modern aircraft of comparable weight or power has equalled the C.460's 100, 500, and 1,000 km. records of August 1935. Twice its power was needed to increase Delmotte's absolute speed of September 1934. These results over vastly differing distances clearly demonstrate the unparalleled excellence of Ing. Marcel Riffard's beautiful Caudron C.460.

Long grass was no handicap for the 1935 Coupe Deutsch winner flown by Delmotte. No. 6907 was later revised in 1936 with semi-circular fin and flown as a C.461. The lateral oil cooler was not used at this time. All Caudron racers were in standard factory finish of very dark blue.



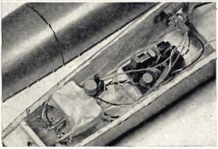
CAUDRON C.460 MODELS

Interesting projects in the U.S.A.

EVER SINCE ITS IMPACT on the American racing scene, the Caudron C.460 has been a popular modelling subject in the U.S.A. Our cover this month shows perhaps the most adventurous version, designed and constructed by Al Masters of Rocky River, Ohio. This is the second of his multi channel radio control models, made to the scale of $2\frac{3}{4}$ in. = 1 ft. The first of these 61 in. models was made to determine whether the type would control reasonably well. Al sells copies of the plan and from our examination of one, it is obvious why he had initial doubts for the $64\frac{1}{2}$ in. fuselage seems enormous. It takes 4 Bonner servos side by side across the fuselage with ease, is approximately 10 in. deep and simply dwarfs the Veco 35 used in the original and K & B 45 used in the second version. Encouraged by the results with the first model, Al's cover subject uses mechanically coupled rudder and aileron, flap control with up to 60° deflection and trim as well as normal elevator movement, the latter being absolutely essential when the flaps are employed. As an Air Force pilot in World War II, with considerable experience of flying over the hump from India and Burma to China, Al has a personal appreciation of the need for stability and a good lift factor and the results with his Caudron seem to be most pleasing. He says that the model is most stable in flight and has sent some photographs, too small for reproduction, to prove the point. (*Other views at top right*).

Dick Stouffer has produced a miniature, 24 in. all sheet balsa version for single channel. First proved with a profile free flight model, using Cox .020, it had a good climb with fast, flat glide, and served to estimate that 6° right thrust would be needed on the .049 radio version. A Kraft K3VK receiver and C & S Mark 5 Septalette magnetic pulse actuator are used with proportional control from a C & S "Pulsitran" transmitter and as the photographs show, the entire installation is extraordinarily simple. A coat of glass fibre and resin is given to the interior of the engine cowling and wing centre section, together with a hardwood leading edge to stand up to high speed landings. (*Photos at right*).

In the semi-scale field, we must reflect upon the magnificent finish of the model flown in the 1962 World Championships at Kiev, U.S.S.R., by Dick Williams of the U.S.A. team. The rich blue of the Caudron certainly made its mark and caused a lot Williams of the U.S.A. team. The deep blue of the famous aircraft before. (*See photo bottom left*).



team race developments

a survey by J. Franklin

HAVING BECOME a top attraction event at nearly all major contests team racing seems to be changing in character slightly these days. Here in G.B. **Class B** is on the wane, **half-A** seems to be holding its own and **F.A.I.** increasing, as far as entry numbers go. In F.A.I. or Class A as we know it, the engine, tank and most other parts can be purchased over the model shop counter, just as the experts use. All the talk of the top men using very special engines made one off by the manufacturer is usually just talk, and no more. If any mods are made to the engine it is usually done by the owner to his own whim.

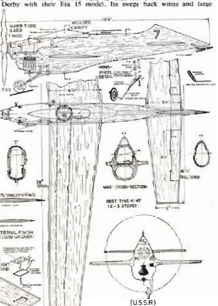
Due to keenness of international class flying, excellent rules, and good engines available, most of the new developments have taken place in the F.A.I. class. Also very helpful in spreading the word around are club newsletters. One of the very best for all control-line international class work is 'F.A.I. Team Race News'. This newsletter is all T/R and speed, and is produced by Pete Soule and Pete Brandt in California, U.S.A. Both the Petes are active T/R flyers so their news is always very up to date. Subscription price is two dollars to Peter W. Soule, 26622, Fond Du Lac, Palos Verdes Peninsu'a 90274, California, U.S.A. The next issue is due for mid August timed to include Budapest details.

F.A.I. T/R Approaches

The approach to team racing by different nationalities makes interesting comparison. In **Great Britain** the main thought seems to be functional first with little concern for the semi scale rule. One of the nicest models seen for a long while is Ken Long's latest Eta 15 powered 'Tigress' with vee tail and faired in cockpit. The most unusual style is that of Crofts/Atkinson from Derby with their Eta 15 model. Its swept back wings and large vee tailplane make a refreshing change, and fast with it too.

In the **U.S.A.** F.A.I. remains comparatively new as a National event. Heat times are very fast and we feel sure the U.S.A. will soon be on equal terms with anyone in F.A.I. team racing. So far they do not seem to have any retracting undercarriages in action as are being widely used on the continent. As an example of a typical Californian racer here are some details of their number one team model as raced by Pete Brandt and Pete Soule who averaged 4:49 at the U.S. team trials. It spans 36 in. with 8 per cent symmetrical section, weighs 20 oz. with Pomadi pan, and the engine is an Eta 15 Mk. II with Edmonds backplate. Fuel is 2 per cent Nitrobenzine, 2 per cent Amyl Nitrate, 20 per cent Castor Oil, 30 per cent Ether, and 46 per cent Paraffin. On a 7 x 8 Rev-Up propeller they usually make 5:00 with two stops. Model does 91-94 m.p.h. for 50 plus laps when on form.

In **Soviet Russia** in particular the accent is on very streamlined lightweight models to obtain fast times. With a model that has a light wing loading the acceleration from a pit stop is much quicker, and the time lapse from when the motor cuts to landing is also quicker, i.e., the deceleration. Zolotoverch/Kobets and Babitchev/Radchenko, first and second respectively at the 1963 Criterium of Aces were both flying models with the very low weight of 14½ oz. including some 6 oz. of modified Super Tigre G.20. Other hitherto unknown details are as follows. Both teams were using a 7½ in. x 8½ in. pitch hand carved propeller turning at 13,500 r.p.m. and 14,000 r.p.m. respectively. Fuel was 42 per cent Paraffin, 31.5 per cent Ether, 6 per cent Castor Oil, 17 per cent T.V.O. (tractor vapourising oil), 1.2 per cent Amyl Nitrite, and 2 per cent Nitro Benzine, leaving 0.3 per cent of the formula unknown. This gave Zolotoverch 27-34 laps at 104 m.p.h., starting troubles kept their time down to 5:46 in one heat, but they made up for this in their second heat at 4:47. Each uses a different fuel for priming at the start. *See drawing.*



(U.S.S.R.)
1963 CRITERIUM WINNER
BY ZOLOTOVERCH & KOBETS

The second place Czech team Trnka/Drazek who used an M.V.V.S. 2.5 T/R engine in a beautifully clear finished ultra streamlined model were turning 14,000 r.p.m. static on a 7 x 9¼ hand carved multi-laminate propeller. Rather heavy at 21.9 oz. by comparison with the two Russian models it was flying at approx 100 m.p.h. Fuel used was 42 per cent Paraffin, 33 per cent Ether, 20 per cent Mineral Oil, 1 per cent Nitro Benzine, 1 per cent Nitro Ethane, and 3 per cent Amyl Nitrate.

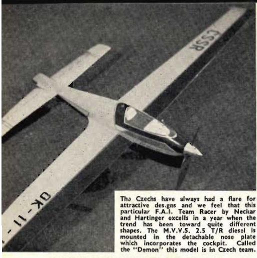
In France, team race is well to the fore with some very fast times being put in. Louis Fabre flying at the Saint Etienne Criterium on May 17-18th put in a fantastic 4:05 heat time. Using an Eta 15 his very clean glass fibre model called "Super Chou-Chou", with home made Reguflo type tank, and retractable undercarriage working on the Rosenlund principle flies at 100 m.p.h. for 60 to 80 laps per tank! The undercarriage leg has part of the fuselage cover attached to it, to act as an air brake for pit stops and to help push the leg up again on take off. At any contest it is reported he can be expected to make 4:20-4:25. At the same contest Magne and the Bador brothers were second and third respectively. Both had retractable undercarriages though Magne did not use his. Using a racing Micron engine Bador gets 103 m.p.h. for a rather marginal 47-53 laps. The "Cyrano" as Bador's model is called is a very clean design and has a long nose and fairly short moment arm. At present he flies five racers almost indifferently plus a few other ("spares", he says) in flying order! Retractable undercarriages are all the rage in France with six models sporting them in the Paris area. The team of Leclercq/Revel have developed one that has overall dimensions of 1½ in. x 1½ in. x ¼ in. with a self locking steel leg to stop accidental closing in a bad landing.

Teams for Budapest

News has been seeping through via newsletters about the various team trials for the 1964 World Championships to be held at Budaors near Budapest on July 28-August 2nd. The standard is even higher this year. Comparison of the G.B. results with those of other countries will undoubtedly make many teams sit up at home. Starting with our own team Place/Howarth were fastest at 4:36.6 using an Eta 15. Second place team Turner/Humphries also used an Eta 15 to make 5:14 and third place Nixon/Ellis made 5:35.5 again with Eta 15. Our fastest team of Place/Howarth also made 4:23 at the S.M.A.E. meeting May 31st.

In Holland their team trials were flown on the 9th and 10th of May, with the team as follows. 1 Bervaets/Kesteren 4:21.8 and 4:38 with an Eta 15. 2 Merkemeyer brothers 4:58.4 and 5:00 using an Oliver Tiger and they have only been doing team racing for three weeks! 3 Maartense/Koninashoven at 4:54.8 and 5:13.8 with an Eta 15.

The **U.S.** trials results were as follows with Stockton and Ichlick omitted, not as mentioned in last month's "World News" in first place. 1 Brandt/Soule 4:38 and 4:51. 2 Burke/Jones 4:53 and 4:55. 3 Lecrone/Mobley averaged 4:57. The home of F.A.I. team racing in the U.S.A. was on the East coast but this seems now to have moved to California with the first two teams from there and the third from Alabama. The Burke/Jones model had a two wheel undercarriage and Edmonds carburettor.



The Czechs have always had a flare for attractive designs and we feel that this particular F.A.I. Team Racer by Neckar and Hartinger excells in a year when the trend has been toward quite different shapes. The M.V.V.S. 2.5 T/R diesel is mounted in the detachable nose plate which incorporates the cockpit. Called the "Demon" this model is in Czech team.

The **Swedish** trials had more fast times. 1 Mario Pinotti 4:23. 2 Kjell Rosenlund 4:38, 3 Goran Alseby 4:39. All very close and making for a steady team.

News from **France** says the team will be Fabre, Magne, and Bador. No precise times are known for their trials, but Guy Revel another well known French team race man, says their combined average will be about 4:45.

The **Czechs** have been rumoured as using a new engine, as their results may indicate. Run over the double distance of 200 laps as in G.B. class A T/R their team is as follows, 1 Trnka/Drazek 8:59. 2 Klemm/Gurtler 9:44. 3 Neckar/Hartinger 9:56. For the purpose of comparison if we take 15 seconds off for the extra pit stop and divide by two this gives 4:22, 4:45.5, and 4:50.5. Best time by Trnka/Klemm this year is 4:17.

After some changes in **Belgium** Grondal, Macon, and Bernard and other previous champions will not be representing Belgium this year. Their main hope in team race is Vanderryke—Van der Beke who made 4:38 at the trials for first place. 2 Patriarche/Challe. 3 Nenin/Creola.

A comparison of average team times, i.e., 'average' of all three teams representing their country produces the following order. 1 Sweden 4:32.2. 2 Czechoslovakia 4:39.3. Equal 3rd France and Holland 4:45. 5 U.S.A. 4:53.6. 6 G.B. 5:08.7. We wonder how near this will be to the final team positions at Budaors and just how well the U.S.S.R. and Hungary—or Italy will fare?

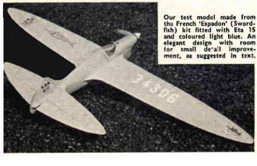
Espadon F.A.I. T/R Kit

Now having logged many flights our test model of the 'Precisia Kit Espadon' team racer as flown by the Magne/Malfait team from France is now going very well. Performance with an Eta 15 Mk. II is just 90 m.p.h. for 50-53 laps. Since the last flight the Reguflo tank has been examined and a small hole found, so that laps can probably be improved. The model liked a thinned and balanced 7 x 8 Top Flite power propeller best, the Tornado Plasticote and Record being slower. The kit was full of top quality parts and is fully pre-fabricated. The only faults we found were as follows: The bellcrank made from aluminium (should be stainless steel for long life). The wheel was too small (barely 1 in. dia.) and Leadouts too thin (20 s.w.g.). All parts just an annoyingly small amount over or under size.

Rather extensive modifications had to be made to the pan to fit an Eta 15, as it is cast for a Micron 2.5. A home made spinner was fitted to fair the pan in but this is usually removed for flight as the C of G shown on the plan produced an over stable model. Finished with one coat of clear dope, and two of blue Polyurethane, our model weighed in at exactly 24 oz. as specified. Summarising, a very nice model, the best team racer kit to date, but not a model for the inexperienced.

Class 'B' (5 c.c.) Team Race

After the very poor standard of class B team racing at this year's National Championships, one question in all T/R teams minds is, how long can it go on like this before it is removed from the programme? With 28 entries, not a very good figure to start with, only eight managed to complete a race and record a time. This is only a mere 29 per cent of the entry. Surely this poor standard must change. All the big names of the past few seasons were absent including such stalwarts as Ron Lucas, Chas Taylor, McNess, Long, etc., so why weren't they there? We think it is lack of competition, and as everyone knows we must have the also rans to make a race. It may have been that lots of teams are losing interest in the senior class of team race, we hope this is not the case, as it really is the cleanest flying event at any C/L meeting, and the sound of three 5 c.c. glow motors on peak should inspire even the most inactive teams to have a go.



Our test model made from the French 'Espadon' (Swordfish) kit fitted with Eta 15 and coloured light blue. An elegant design with room for small detail improvement, as suggested in text.

Class B is also losing interest in the U.S.A., and when one looks at their rules the reason is plain, they are much too complex. As Gus Johnson of the F.A.S.T.E. club commented when in England, with the G.B. rules in the U.S.A., "B" racing would be one of their most popular events.

The oversize diesel engine is coming more into the picture these days with the ex-Allen/Cooper team holding quite a string of places in "B" races. Their engine is an Eta 15 Mk. II bored out to 2.65 c.c. Ken Bedford, the Eta designer/manufacturer, will supply these oversize engines to special order, but there may be a waiting list. By reading back results it will be seen that the "oversized ones" never seem to make first place, they are alright to knock off 70 laps at 100 m.p.h., but the classic 5 c.c. glow usually overhauls them in the 140 lap final. At the South African Nationals Fred Turner used a Rivers 3.5 c.c. for second place doing 85 laps per tank. He also used the new Oliver Tiger Major getting 93 m.p.h. for 140 laps. So with technique on the spray bar size a B final could be completed in one run, at an average speed of 90 plus. In Sweden class B T/R is gaining popularity, as Hans Svedling used a Super Tigre G.21 glow to make 140 laps (10 miles) in 6:32, the Super Tigre making 60 laps to a tank at 112 m.p.h.

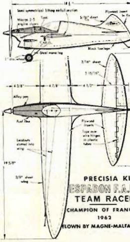
Javelin F.A.I. T/R Kit

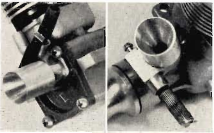
Manufactured in the U.S.A. by Elimination Model Co., and imported by E.M.P. the Javelin is a very easy to build F.A.I. racer. All parts are die cut and of good quality. Plenty of hardwood is used in its construction. The eliptical wing is in three parts with optional bass wood leading edge. The full span hardwood spar is 1 in. x 5/16 in. section so it should be a very tough wing. Tailplane is hardwood as also the ½ in. crutch. Designed around the Eta 15 and a Reguflo tank this makes an excellent first team racer. Reduced size plan has many perspective drawings so construction should be foolproof. Cost is £3 5s. including wheel, bellcrank, etc., or £4 with Pomadi universal pan tailored to fit the model.

Edmonds Carburettors

Edmonds Model Products have now added to their range of speciality team race products a modified Eta 15 Mk. II and carburettors for the Eta 15 and Oliver Tiger. We air tested the Eta 15 backplate which is a standard 15 backplate with the venturi machined off and the remaining stub tapped out. The new venturi screws in and uses a Cox TD 15 collector ring and needle. The rear disc is also modified by chamfering the leading

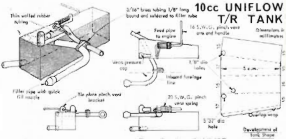
Pertinent details of the 'Espadon' at right show the attractive profiles. Cabin is Araldited to the engine pan which is designed for the Micron 2.5 engine. A disadvantage is that the tank is mounted independently in the fuselage so complicating assembly with the fuel line and engine. Plywood inserts in surface edges add strength and protection and are premachined.





Prototype Edmonds carburettor is fitted at left to Eta 15, and at right to an Oliver Tiger, details of tests are given below.

10cc UNIFLOW T/R TANK

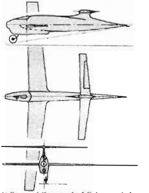


By D. L. BURKE

and trailing edge of the timing cut out. The venturi are being marketed graded as numbers 1, 2, and 3. Number 1 tested in our model with a Uniflow tank gave 93 m.p.h. for 55 laps, an increase of 15 laps with only a slight reduction in speed as claimed. Number 2 was not tested but an increase of 5 to 8 laps is claimed with no loss of speed. Number 3 gave another 5 m.p.h. with a slight reduction in laps, giving 100-102 m.p.h. for 35 laps. Number 3 is also recommended for combat and they are all interchangeable with the standard Oliver Tiger venturii. The complete modified backplate costs £2 16s. 6d., but all parts are available separately for those wanting to cut the cost down. Coming soon from E.M.P. is a 6 c.c. ½A team race tank, a 30 c.c. class B tank and a 4 oz stunt tank.

Uniflow Tank

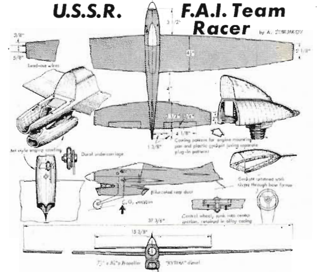
Designed by Don Burke and reproduced from "F.A.I. Team Race Newsletter" this is a 10 c.c. F.A.I. tank working on the Reguflo principle, but very much simplified. The valve is a piece of thin walled rubber tubing that is connected to a Veco pressure cap soldered on to the top inside corner of the tank. The rubber is pinched flat by a spring loaded clip, the handle end extending through the cowl. The filler pipe carries a 3/16 in. brass tubing guide for the overflow. Note the quick fill end on the filler pipe. Very consistent runs are easy to get with this tank as we found with our test version in an own-design racer.



Italian modellers rarely fall into a design rut and these examples show evidence of their thought. Above, and below right, is Pagani's streamlined airframe using a high mounted tail surface and extended fuselage. Mechanism for controls must be fairly involved but otherwise there is much to recommend raising the tail above the wing wash. Below left are Roberto Pennisi and Aldo Zoma who were winners of the Ambrosiane contest in Milan with a model that would give wing area processors a mighty headache !

U.S.S.R. F.A.I. Team Racer

by A. ZEBRJAKOV



Designed and flown by A. Zebrjakov this jet style Russian racer has many novel features. Whether they are functional or not is a point for discussion. The most unusual point is the jet style cowling and bifurcated rear duct. The bellcrank is of a circular form as always used in Soviet models, with flexible leadouts. This is bolted into an alloy turning which is sunk into the wing centre section. The engine is a Rythm 2.5 diesel, and we hope a more powerful version than we tested last year.

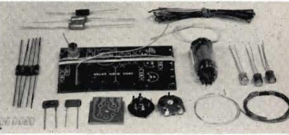
Summarising, team racing is becoming much more specialised but this is somewhat offset by the number of special team race products and plans now on the market. To the beginner we would recommend team race as an excellent event on a basis of enjoyment for cash outlay, and as all the experts will tell you the satisfaction is in the team flying with the natural human instinct for the chase and not just the winnings. If you enter an event with the intention of winning, give up, for you will never get any enjoyment from it.

Getting started in

Radio Control

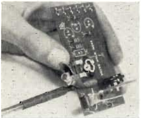
Part Four of a series for the R/C Novice

by E. F. BRYANT



Assembling a kit

THE POSSIBILITY of the beginner building his own transmitter and receiver has been mentioned earlier in this series, and, because there is no doubt that this is the least expensive way of acquiring the necessary gear, there will be many who will want to do it.



MacGregor Transistorised Carrier Rx parts displayed above as supplied with full instructions, stage 11 of which is seen left. Capacitor C-4 is being soldered to printed circuit, with Croc: clip as heat shunt. Only error we found in instructions is that this part is called C-5.

Happily, there are several kits on the British market, all of good quality and reputation, which make the job that much easier, and all of which have been expressly designed for the chap who is not an electronics expert.

Stage 12 in assembly is very important. Silicon Transistor has to be correctly identified and positioned into appropriate "e, b & c" holes, all clearly marked on the printed panel.

These kits are relatively simple to assemble, no special tools or jigs being required, and, *provided the instructions are properly carried out,* will give completely satisfactory service.

Probably the simplest of them all, from the point of view of the home constructor, is the carrier wave set, and, because of this, an example of this type has been selected for illustrating this article.

The vital Silicon Transistor Vt.1. is now being soldered to the printed circuit on the panel underside using the Crocodile clip as a heat shunt and a 15 watt iron in this case. Overheating can be disastrous.

Naturally, whatever type of equipment is being assembled by the amateur, certain basic rules apply, and, if these are adhered to, success is almost certain.

Perhaps the very first of these rules is that the would-be builder *must* read the instructions supplied by the manufacturers. These have been carefully compiled, and set out in an easily understandable style, dealing with the various steps in their correct order, but it is strongly urged that the builder reads them over *several times* before attempting anything else, in order that he can get the general gist of things from the very first.

Having done this, the next job is to sort out the various components, one by one, identifying each as it is selected, and laying them on a clean surface in the order in which they are to be used. This may take a little time and patience, but it does mean that components are handled as little as possible, and obviates, to a great degree, the possibility of confusing one part with another. To make doubly sure, the pieces should be re-checked when they are finally picked up for assembly.

The importance of good soldering cannot be over emphasised, and, although there have been many words written on the subject, and each set of building instructions contain at least some hints and tips about it, there are still a number of radio users who experience troubles and failures simply and solely through bad or ineffective soldered joints. The rules are short and simple for this type of job, and it is no good trying to get away with anything that falls short of first class standards. Voltages and currents are often critical in this type of equipment, and extra resistances set up in badly joined circuits will not be tolerated, almost always resulting in complete radio failure, or intermittent operation, both of which may be fatal to that carefully built model.

Never try to solder with a too-cool iron—it will over-heat the component, and result in a 'dry' joint.

Never try to solder with a dirty iron, the solder will not 'run' properly, and cannot be adequately controlled.

Never, for radio circuits, solder with a corrosive flux or liquid, the joint will come to pieces just when you don't want it to. Use "Multicore" or similar.

Always, where possible, use an electric iron and copper bit, to ensure consistent heat. Do not exceed 25 watt and preferably use a 10 or 15 watt iron.

Always be sure that components to be soldered are clean and free of grease.

Always, when soldering transistors and similar components, use the wires full length, soldering where required and cutting off the surplus wire afterwards. The extra wire will act as a heat shunt, and serve as something to hold while soldering. A crocodile clip also serves as a useful heat shunt.

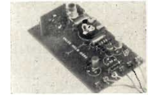
Always check the circuit for correct connections, and for accidental solder 'runs' before switching any current through.

The assembly itself needs no extra words since the makers' instructions are completely adequate, so any further problems that arise will be in the wiring up of batteries, checking and tuning. The same rules apply when wiring batteries, as for any other soldering, except that it is important to see that soldered wire ends are properly supported. This can usually be done by knotting the end around the tag to which it is soldered, or, failing that, by passing the wire through an extra hole, of the correct diameter, drilled in the circuit board. This will overcome fatigue breaks, caused by vibration.

The batteries themselves must be securely connected to the appropriate wires. The most certain way of ensuring good connections is by soldering, but care must be taken not to over-heat the battery in the process as this will set up internal resistances and result in uneven power output. A really hot iron must be used, the battery terminal clean and bright, and both it and the wire end well tinned. A stronger joint will result if the wire end is formed into a small loop after tinning and laid on to the terminal with the hot iron. If any form of battery-box is used, connections must be positive and clean to guarantee good results.

Finally there is the tuning. All tuning of this sort of gear should really be done with the aid of a meter, this being the one sure method of getting things correctly set up. Meters for this purpose are not expensive and can easily be obtained, the small outlay in cash being well worth the extra security of a properly tuned unit, a 0/5 m/a panel meter being ideal. The position of the meter in the circuit is clearly shown on the instructions allowance being made for insertions at different points, for the checking of different parts of the circuit. Permanent positions can be made at these points, the wires ending in small two-pin sockets for insertion of the meter, and the socket holes being joined by a two-pin plug (with pins connected together), when the meter is not required.

Meter readings should be made *as indicated by the makers* of the kit, adjustments to the tuning being



Now up to stage 13 with all three Transistors added and the coloured wiring to the six end tags added with safety knotting to prevent any stress on the joints. The wires are best wound into a "rope" to a six pin plug.

carried out by the rotation of a tuning 'slug' included in the circuit. Points to remember when tuning are that the slug should be turned only with a tool of non-conductive material, e.g., the "Ripmax" tuning wand, and *not* a metal screw-driver, hands should be kept well away from the aerial wire during the operation to avoid false readings, and the transmitter

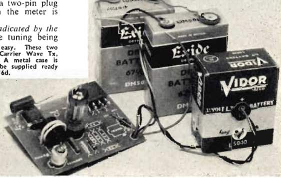
Receiver now complete, with valve fitted and retained with a Systoflex covered strap soldered at its ends to the printed circuit on the underside.

should be a reasonable distance away, say about 6 ft., to avoid swamping and other effects of close range transmitting.

When all else has been done, the equipment checked, tuned and tested, then, and then only, is it

Underside view shows how all the joints have been made through the holes provided into the printed circuit lands, so making for a neat job, easy to pack in foam rubber or a plastic case for model installation. Kit costs 70/-.

time to think about putting it into that new model, and, finally, should radio failure occur, remember that the *first* thing to check is the power supply, and the *second* your soldered connections.



Making a Transmitter from a kit is just as easy. These two views show the companion MacGregor Basic Carrier Wave Tx, connected to batteries for size comparison. A metal case is also available and of course both units can be supplied ready made. Transmitter kit costs 59/6d.

Club and Contest News

Beaulieu new Southern Site

Southampton M.A.C.'s inter club A/I glider contest resulted in a win for John Dumble who had a bad tow on one flight and then maxed out for 8:27. In second place the club secretary had 6:39. Third place went to schoolmaster E. Thorne with 6:23. His model was a simple all sheet Jedelsky wing A.I., designed to teach his pupils the basic principles of model flying. The club now has full use of Beaulieu as a flying ground, after negotiations by the S.M.A.E. with the New Forest authorities.

N.W. Gala Cancelled

Owing to unforeseen difficulties in airfield administration, the North Western Area two day meeting to have been held on August 2-3rd has now been cancelled. A pity this, as the N. West Area were prime movers in the Weekend event scheme.

Above right; Proof of the pudding! Peter Tribe of Northwood and the "Razor Blade '64" after winning at Hayes circuit in a Class "A" Combat event. Oliver Tiger used. Note spare elastic bands for emergencies, around wings. Left, Third at Wanstead and Northwood rally were K. Goddard and E. Gillespie of Apsley MAC using Tigress based design and Eta 15 with Reguflo tank.

Models take the Show at Sunderland

Fifteen thousand people provided five times the anticipated crowd at the opening of Sunderland's new Flying Club Airport at Usworth on June 28th and of all the flying events the model show proved to be the great attraction. Peter Rawson of Newcastle M.A.C. stunned the crowd with multi-channel acrobatics and "Marley" Wallace had them gasping at his C/L stunts with a twin engined model. Static display and fellow modellers visiting from Carlisle and Darlington really made it quite a day in superb weather.

18 Years of Work Rewarded

Five Towns M.A.C. have now received permission from the local council to use Meir Aerodrome in the summer months. This has taken 18 years of asking the Council, so they are considering the early use of silencers to help keep this prized flying site.

Finchley Sextuplet Rats

Held on May 31st at Glebe Land, Finchley, Class A combat and Stunt were late starting due to delayed arrivals. At 4 p.m. fate struck with torrential rain and a thunderstorm. The Rat-Race final was 'six' up, and proved very exciting with the Bumstead/Holland team from Northwood winning. They were flying an Eta 29 A.P.S. "Dalesman". Rain postponed the 'A' combat final this being flown off at the Wanstead and Northwood meeting a week later. Results:— Class A Stunt. 1 R. Blake. 2 R. Carvosso—(Wanstead Warhawks). Class B Stunt. 1 D. Platt—(Wanstead Warhawks). Class A Rat Race. 1 D. Balch—(Hayes). Class B Rat Race. 1 Bumstead/Holland—(Northwood). Class ½A Combat. 1 A. Dell—(Feltham). Class A Combat. 1 P. Tribe—(Northwood).

NO NOISE ANNOYANCE

Tudhoe D.M.F.C. from Co. Durham now have a new club room in Bishop Auckland, this is some distance away but the advantage of being able to run engines during a meeting, without any noise complaints more than offsets any disadvantages. Locals interested in joining the club should 'phone K. Linsley at Spenny Moor 2175.

Bailey's Welsh Rally

Held at Swansea Airport, Fairwood, on May 31st they had ideal weather conditions with F/F upwind of the runway where joy rides were in progress. It was organised by Pete Waters and his wife, who donated a trophy and then won it back again in the radio spot landing event! Local clubs were well represented. Results: 'Combat' (10 entries). 1 K. Selby—Rhondda. 'Rat Race' (8 entries). 1 J. Bailey—Bristol West 10:15. 2 K. Selby—Rhondda. 'Glider' (12 entries). 1 J. Bailey—Bristol & West 7:14. 2 Williams—Bristol West 7:10. 'Power' (3 entries). 1 J. Bailey—Bristol West. 'Radio (1 entry). 1 J. Bailey—Bristol West. 'Radio Spot Landing' (8 entries). 1 P. Waters. 2 R. Toms—Cardiff. 'Best junior'. K. Selby—Rhondda.

Wanstead and Northwood

F.A.I. Rally

The first of the All F.A.I. Rallies was held on June 14th at the mud-bound Hayes flying site, London. F.A.I. combat attracted 32 entries, the majority of whom only had a vague idea of the rules, especially as regards undercarriages. It was eventually agreed that the model must be capable of resting on its undercarriage in take off position for a minimum of 10 seconds. Lino or hardboard take off strips were transported by the pit crew as an answer to the rule requirements over grass. Lack of experience with the call for two level laps before combat and the use of a centre circle led to warnings. One real advantage of the F.A.I. rules to the judges, is that a reserve model can be flown in a heat, i.e., there is no question of a re-fly after a mid air collision until the spare model is also in collision and damaged. In general, the rules were accepted as being quite practical, but more contests are needed to familiarise competitors with them. The next two meetings at Hayes will be flown more strictly to the rules.

Apart from the rules aspect, combat got under way in rather muddy conditions and many engines were choked and unstartable after a prang. The winner "Moggs" Morris from Northwood, used a Stoo Holland type tailplane model in the first round, and a brand new, unflown '64 'Razorblade' later after a mid air collision in the quarter finals. M. Smith of Handsworth M.A.C. was 2nd.

F.A.I. Team Racing started in a downpour at 12:00 with 17 entries. Several teams had to be disqualified through rule infringements. Fastest heat time went to the Allen/Bedford team at 4:56.5. Ken Bedford, the Eta engine designer/manufacturer, made some good pit stops in his first race for many years. The final was rather slow with the Dell/Balch team from Feltham taking first place at 10:45:9. Second Allen/Bedford 11:14. Third place went to a new name in team race, E. Gillespie from Apsley M.A.C. with 12:25. The finalists all used Eta 15's.

Scottish Gala winners. Above left, Ron Firth of Sheffield S.A. with 10 years old rubber job after full maximum score. Above is the team race winner in the FAI class, J. Reid of Dumbarton who uses Oliver Tiger. Model averages 45 laps at 95 m.p.h., using own carved propeller. Left, farthest travelled at the Scottish Gala was Dick Godden from Cambridge with Lucifer influenced 75 in. span glider.

Wharfedale Rally

The Wharfedale Rally held on June 7th at R.A.F. Rufforth started with pouring rain but later ideal flying conditions prevailed. Only two flew in ½A team race and four in rat race, ½A was won by R. Dalton and the Hampson/Yates team won Rat-Race after P. Massey's model ran in on take off. These two composed the final as K. Morrisey had pranged his model and R. Ashbey's ETA powered model had consumed all his plugs. In the adjoining circle close times were put in by the F.A.I. boys with the Atkinson/Crofts & Bell/Robinson teams having to have an extra flight to decide who went into the final after 0.8 sec. separated their heat times. The final comprised Peart/Kirton, Wallace/Laurie and Atkinson/Crofts and they finished in this order with Atkinson/Crofts totalizing their model when a line broke. The Derby pair Saddler & Gibbard came through combat to finish first and second respectively with their Oliver Tiger powered stabilator wings. Stunt was a narrow win for Mannal over D. Day with Stone coming 3rd. Mannal flew a standard Crusader whilst Day had to use his veteran Nolber after damaging his first model. Wharfedale M.A.C. would like to express their gratitude to those members of the Model trade who so generously donated to their prize list.

'Results' :—½A Team Race (8 entries). 1 R. Dalton—Sutton-in-Ashfield 11:23.0. 2 G. M. Whiteley—Sheffield 11:52.8. F.A.I. Team Race (10 entries). 1 Pert/Kirton—Novocastria 11:26:1. 2 Wallace/Laurie—Novocastria 13:30.1. 3 Atkinson/Crofts—Derby 143 laps. Rat Race (9 entries). 1 Hampson/Yates—Leigh 6:32.6. 2 P. Massey—Sharston 38 laps. Combat (16 entries). 1 B. Saddler—Derby. 2 R. Gibbard—Derby. Stunt. 1 Mannal—Lincoln 887.2. 2 D. Day—Wolverhampton 873.

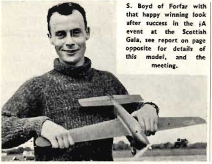
Scottish Events

Held at Abbotsinch on May 31st **Glasgow Barnstormers Rally** had cold, windy and wet flying conditions to contend with, even bad enough to halt combat for a while. The only notable time was in F.A.I. team race. For the final J. Reid of Dumbarton (who we forecast will become a well-known name soon), was doing 102 m.p.h. for over 50 laps with a tuned Oliver Tiger and a home carved propeller. Results: 'Power', T. Clark—(G.S.A.) 6:28. 'Rubber', F. Ballardie—(Scotmac) 6:25. 'Glider', D. Petrie—(Montrose) 5:21. F.A.I. Team Race. J. Reid—(Dumbarton) 9:44. '½A Team Race', McAlpine—(Hamilton) 13:25. B Team Race. D. Gordon—(Glasgow Hornets). 'Combat', I. Carson—(Glasgow Hornets).

S.M.A.E. Scottish Gala attracts few Scots for liberal cash prizes

Held on June 21st at Abbotsinch, this year's **Scottish Gala** was poorly supported by comparison with past years. Weather conditions were near perfect, very warm, clear sky, and very little drift. F/F entrants found plenty of holes as well as some fantastic thermals eight minute flights being common but not in the contest flights. Even in a strong thermal with an eight minute flight most models landed within the airfield perimeter. The calm averted disaster since the airfield was bisected for full size gliding. Visiting S.M.A.E. entries up from the south started events for themselves until local officials arrived. In rubber, motor breakages were commonplace. H. Tubbs from Baildon had two max's and with a few minutes to the 6 o'clock closure time, broke two motors, before getting away at last for a stalled low score. The winner, Ron Firth up from Sheffield S.A. made three max's with his 10-year-old "Phantom" using a 22 x 28 propeller with 48 in.—12 strand Pirelli motor. J. Clements went to launch and had the embarrassment of the motor coming off the prop and the model crumbling in his hand! Power was rather a flop with poor scores all round, Dave Wiseman up from York winning with a Cox 15 in a "Dixielander" influenced model. Glider winner R. Godden who travelled from Cambridge some 400 miles distant flew a very nice O/D model span 72 in. with "Lucifer" shape and construction. Baildon clubster J. Moseley third in Power also had a whopper of a glider, 9 ft. span for a weight of 20 oz. —that's light building! and no wonder he calls it "Running Shoes". The control line circles had more action than free flight, but rule infringements marred the day. Class A team race was the first event under way and one would have thought it a rat race. Walking into the circle, pilots wandering, plus whipping were evident rule-breaches. The judge turned a rather blind eye to these happenings, but all the same everyone enjoyed themselves. Of 11 entries only 7 flew. Winner J. Reid from Dumbarton flew a very fast model with Oliver Tiger power and Regu-flo tank. Light blue in colour the racer was circulating at 95 m.p.h. for 45 laps. In second place came a lone Englishman F. Hampson from Leigh, with an Oliver Tiger. Class B team race was marred by whipping and was more like an easy Sunday afternoon's practice flying than a big gala race. With only five entries, one of which retired, they had a semi final and then a final. In the final the Yates/Hampson team from Leigh came in first with a fast 7:6. Their smart green and white racer with Eta 29 was doing well over 110 m.p.h., as was second place D. Gordon's, also with Eta 29. Of five ½A Team race entries only three flew in a "final". Winner S. Boyd of Forfar completed the 10 miles in 9:38 with a standard Oliver Tiger Cub and 7 x 7 Keil Kraft nylon propeller in a 36 in. span model weighing 13 oz. Third place A. McIntyre of Glasgow Hornets broke his single blade propeller during the race for a delayed time of 13:32. Combat was better supported with 12 entries though of poor standard. As usual the finals were an anti-climax. Winner I. G. Coutts from Larkhall Orbiters flew a Rivers 3.5 powered "Peacemaker" eliminating L. Scurfield from Tynemouth flying one of the club designed "Jupiter" eliptical wings, with Oliver Tiger. This year the C.M.D. Trophy was awarded for Rubber and the K.L.M. for Power. On reflection it seems strange that nearly all the F/F entries should be English and C/L, Scottish. Total entries were 74 in all events, from considerably less than that number of individuals. They shared £25 of the £30 allocated by the S.M.A.E. for prizes, so making this meeting one of the most financially rewarding of the year.

Results. 'Rubber', 1 R. Firth—(Sheffield S.A.) 9:00. 2 H. Tubbs—(Baildon) 8:52. 3 J. O'Donnell—(Whitefield) 8:41. 'Glider'. 1 R. Godden—(Cambridge) 9:00. 2 D. Wiseman—(York) 8:34. 3 R. Firth—(Sheffield S.A.) 7:30. 'Power'. 1 D. Wiseman—(York) 7:45. 2 W. Lee—(Teeside) 7:43. 3 J. Moseley—(Baildon) 7:27. 'Combat'. 1 I. G. Coutts—(Larkhall Orbiters). 2 L. Scurfield—(Tynemouth). '½A T/R'. 1 S. Boyd—(Forfar) 9:38. 2 G. Low—(Forfar) 10:10. 3 A. McIntyre—(Glasgow Hornets) 13:32. 'F.A.I. T/R'. 1 J. Reid—(Dumbarton) 9:39. 2 F. Hampson—(Leigh) 11:37. 3 K. Crozier—(Hamilton) 118 laps. 'B T/R'. 1 Yates/Hampson. (Leigh) 7:06 2 D. Gordon—(Glasgow Hornets) 8:00. 3 Lorimer—(T.R.E.O.) 9:43.



S. Boyd of Forfar with that happy winning look after success in the ½A event at the Scottish Gala, see report on page opposite for details of this model, and the meeting.

Overseas R.A.F. News

With the onset of the hot season in Aden (average temp. 95 deg. F.), the R.A.F. Steamer Point M.A.C. membership has dropped from a regular 15, to the three founder members, namely S.A.C. John McKay, Sig./Man. Jim Hall (Royal Sigs) and S.A.C. Eric Schofield. After months of inactivity, the club was re-organised in March 1963, and membership grew until regular trips to Sheik Othman Airfield were organised. At this time the main interest was in F/F, but as Aden thermals are real beauties many models disappeared into the South Arabian blue. The club record was held by an AM 10 powered Graupner "Kadett" at 20 mins. O.O.S. on a 10 sec. motor run. The monotony of losing F/F jobs was broken by Eric Schofield's S/Tigre .56 Smog Hog with R.C.S. 6 radio and C & L Musclemite servos. This has put in a lot of good flights, often in temperatures over 100 deg. F. At the present time whilst waiting for new members the three stalwarts have taken to C/L flying on the "maidan" sports area. Regular combat jousts are well received by a large crowd of spectators. One drawback, is the flying site which, being hard sun baked sand, is as tough as concrete.

The club makes an appeal to all R.A.F.M.A.A. modellers who are due for posting to Steamer Point to contact the club on arrival, with a view to keeping it alive, as all three members are tour expired before November this year.

The clubroom is situated under barrack block 220, opposite the transit block. The P.R.O. is 1935837 S.A.C. Schofield, E., c/o P.S.C.O., 114 M.V., Royal Air Force, Steamer Point, B.F.P.O. 69, Aden.

The Longest Day

East Anglian Area Open Gala held at R.A.F., Molesworth, Hunts, on June 21st usurped the good weather date which Northern Heights have enjoyed for countless years on the Sunday nearest the longest day. (N.H. Gala takes place on September 13th this year—it will 'of course' be a brilliant day—it's the last day of the S.B.A.C. show at Farnborough too!) Fly-off times indicate the support for the F/F events and ideal conditions, all the following made perfect 9:00 scores, and times are from fly-off.

'Open Glider' (36 entries). 1 J. C. Wright—(Hornchurch) 2:15. 2 M. J. Woodhouse—(Norwich) 2:02. 3 A. Wisher—(Croydon) 1:43. 'Open Rubber' (17 entries). 1 R. Pavely—(Hornchurch) 6:36. 2 D. White—(York). 3 N. Elliott—(Croydon) 5:38. 4 T. Payne—(Northants) 4:41. 5 R. C. Pollard—(Tynemouth) ——. 6 A. Wells—(Hornchurrch) 4:25. 7 D. Poole—(Birmingham) 4:04. 8 Dyke—(St. Albans) 3:57. 9 P. Putnam—(St. Albans) 2.57. 'Open Power' (31 entries). 1 G. French—(Essex) 5:39. 2 T. Payne—(Northants) 5:40. 3 R. Salmon—(York) 4:03. 4 M. Garter—(Surbiton) 3:54. 5 D. Posner—(Surbiton) 3:52. 6 Emery—(Lincoln) 3:22. 7 V. Jays—(Surbiton) 3:30. 'F.A.I. Combined Event'. 1 D. Morley—(Lincoln) 14:58. 2 Dixon—(Leamington) 14:47. 3 G. Lefever—(Norwich) 14:29. All flying Wakefield class. There were nine Wakes, 11 A/2 gliders and four Power entries.

S.M.A.E. Contest Programme

July 26th "Aeromodeller" Trophy. *R.A.F. Upwood Hunts.* Multi Radio Control.

August 16th *Area Events.* Astral Trophy—F.A.I. Power, Weston Cup—F.A.I. Rubber, Model Engineer Team Glider.

August 9th *North East (Scottish) Gala.* Buddon, Nr. Monifieth in Angus. R/G/P and pre-1950 vintage event. Details from C. M. Christie, Bankmead Farm, Bucksdown, Aberdeen.

August 9th *Hayes Gala.* Chobham Common. R/G/P, ½A Power and A/1 Glider.

Contest Calendar

July 26th *R.A.F.M.A.A. Postal Contest.* Open Power and Glider (double event).

July 26th *East Grinstead Gala,* Ashdown Forest. R/G/P, ½A Power and Chuck Glider. Entry fee 2/- Seniors, 1/- Juniors. One re-entry only in each class.

August 9th *Leinster C/L Championships,* Baldonnell. T/R Classes, ½A, A and B, Combat and Stunt.

August 9th 2nd *Wanstead & Northwood. All F.A.I. Rally.* Hayes C/L Circuit, Charville Lane, Hayes. F.A.I. T/R and F.A.I. Combat. Pre-entry 2/6d. by 2.8.64 to J. Franklin, 82 Grove Hill, South Woodford, London, E.18.

P. E. Norman

As we go to press we learn to our very great regret that P. E. Norman died on July 5th following a collapse on the evening of Saturday, July 4th while preparing his models for flight on Epsom Downs. We know that such a mode of passing would have been dear to "P.E's" own wishes, for he devoted himself entirely to the hobby of aeromodelling and this in turn provided the therapy for his remarkable recovery from two previous strokes. Aged 52, "P.E." became World Famous for his ducted fan radio controlled models and his reputation will remain a legend. We know that all readers join us in extending sympathies to his wife, son Marcus and daughters Elizabeth and Virginia, in their sad bereavement.

Also seen at the Scottish Gala outside the contests were Andrew McCartney's 127 in. PBY Catalina as featured in February issue. Ailerons were not large enough to save a dodgy left turn, result as here, with two OS 49's thankful for high position. Right is a control line XB-47D by M. Irvine weighing 9 lbs. with one Fox 35 and a Johnson 29. Uses doubled lines of heavyweight Laystrate, for safety.

A WEEK IN THE LIFE OF ROBERT PARKER

Could this be the life for you? Read and find out

Robert Parker, 21, comes from Hammersmith and is Co-pilot of a Victor 2 serving with 139 Squadron stationed at Wittering, near Peterborough. He is a typical R.A.F. officer. This is a typical week in his life.

MONDAY

A.T.C. Cadets visiting station this week, spend day showing them round. Introduce to Group Captain, take on 4-hour conducted tour: hangars, control tower, runways, rifle range, etc. High spot for all concerned—flying cadets in Chipmunk: cadets can look down on whole area of station, get feeling of aircraft, see how controls work, come down feeling 10 ft. tall. (Remember own A.T.C. days with 336 Squadron). Like all visitors, cadets surprised at size and complexity of station, and fact that peacetime R.A.F. so busy.

TUESDAY

Flying exercise today. 0900 hours, get together with rest of crew (5 all told: captain is Squadron Leader, 30), receive brief. Plan is 5-hour flying and navigational point-to-point, to include practice bombing runs over three "targets". As Co-pilot do take-off calculations, make fuel plans. Pre-flight omelette (mushroom) in aircrew buffet, change into flying suit, check oxygen equipment and pressure jerkin, crew-coach to aeroplane. Pre-take-off checks, line-up, then airborne: For first 1,500 miles assume radar not working, astro-navigate by sun. Share flying 50/50 with captain; at end of trip bring aeroplane down from operational height to below cloud, hand back to captain for landing. Deliberate overshoot, on to circuit for 1 hour, practise 4 landings altogether, 2 each. On landing, spend 20 mins. chewing over technicalities with Ground Crew, then to de-briefing and pick up bombing score—not bad. 1830 hours, back to Mess for long relaxing bath, followed by leisurely dinner.

WEDNESDAY

Motor to Squadron offices to be on call with rest of crew for Q.R.A.—Quick Reaction Alert (on all V-force airfields, some aircraft always armed and ready, crews on standby). Chance to catch up on some desk-work—logging flying hours, writing to Schools about cadet visits, generally paper-working. Only possible comment, to think some chaps have to do this all the time!

THURSDAY

Crew still on standby, decide to get on with target study, when CLANG, bell rings, Tannoy speaks, whole crew leap into Q.R.A. car and out across airfield, bells pealing, lights flashing. Into cockpit, start engines, complete pre-take-off check. Armed aircraft now ready to go. . . . Then on telescramble from Bomber Command comes word to stand down. Do so. Lunch, braised chicken. P.m., lecture on Air Force law.

FRIDAY

Morning in simulator (mock-up cockpit on ground can reproduce Victor 2 in all possible flight situations, test and develop reactions, give effect of whole sortie in quarter of actual time). Afternoon planning for Western Ranger flight (taking aeroplane 'out on its own' to Goose Bay, Labrador and Omaha). Check up on runway lengths at possible diversion airfields. Look forward to seeing new people, new places.

SATURDAY

Usually go to London for weekend—visit parents, go on town with girl friend, fly club Tiger Moth at Redhill, etc. This time, have long standing engagement to lunch old schoolfriend in Leicester. Afternoon, visit local stately home. Evening, dinner out with Jarvis's (brother-officer and wife), live it up a little. Why not? Feel entitled.

SUNDAY

After church service, which was attended by most of the Squadron, went to married quarters where some of crew live, for coffee, and for some vigorous games with the children (Phew!) Then to Mess bar, for beer before lunch. Read papers after lunch, then squash. Lose ignominiously, even in the R.A.F. you can't have everything. But seriously: who would swop a life like this?

Robert Parker went to St Clement Dane's Grammar School and joined the R.A.F. at 17½ on a commission initially to 38. Then he hopes to be invited to stay in until he's 55. Meanwhile, at 21, he gets more than £1,000 a year, he lives extremely well in the Mess, he has six weeks' paid holidays; and a job well worth doing.

ING OFFICER, ROYAL AIR FORCE

ROBERT PARKER IS A TYPICAL R.A.F. OFFICER

Think about the way he lives. And ask yourself: what other profession could give you such interest, such variety, such high standards of living?

The Royal Air Force

WHAT ABOUT YOU?

You may be leaving school this year. You may be in your twenties, with a job that hasn't turned out quite as you hoped. If you are between 17 and 26, with 5 acceptable 'O' levels including English language and mathematics, and can satisfy a Selection Board that you have the right qualities of intelligence, aptitude and leadership potential . . . think: you could be in the R.A.F., starting a whole new way of life, *this year*.

FILL IN THIS COUPON AND POST IT TODAY!

To Group Captain J. W. Allan, D.S.O., D.F.C., A.F.C., R.A.F., Adastral House (AM135), London, W.C.1. *Please send me details of flying commissions in the Royal Air Force and a free copy of the booklet 'Flying and You'.*

NAME

ADDRESS

DATE OF BIRTH

Please attach a separate sheet of paper giving details of the educational qualifications you hold or expect to gain.

AM135

CLASSIFIED ADVERTISEMENTS

PRESS DATE for issue September, 1964, July 20th, 1964
ADVERTISEMENT RATES:
Private Minimum 18 words 6/- and 4d. per extra word.
Trade Minimum 18 words 12/- and 8d. per extra word.
Box Numbers to count as six words when costing.
Box replies to be sent care of Advertisement Departmnt, Model Aeronautical Press Ltd., 38 Clarendon Road, Watford. Copy received after first post on the 20th will be held over until the next issue, unless cancelled in writing before 10th of following month.

FOR SALE

Orbit 10 with superhet Rx and valve Tx with H.T. convertor and accumulator. £57.10.0d. R.E.P. Octone with relays, perfect order, brand new, £30. R.E.P. Dekatone, brand new, perfect order, relayless Rx, £35. O.S. silencers to fit most 29, 35, and 49 motors, 30/6d. each in stock. Brand new Franklin 12, cost £108 with six Transmites, total value £171, offered at £120. Henry J. Nicholls Ltd., 308 Holloway Road, London, N.7. Tel: North 4272.

Rivers Silver Streak unused. Cox Warhawk controlliner — offers. A.M. 3.5 c.c., 25/-. E.D. Black Arrow Rx, Prince Tx, batteries servo, £10. Also Wavemaster boat, 12 v, electric motor, accumulators—offers. Hogg, Maristowe, Kent Road, Halesowen, Birmingham.

Emco Ace Rx and Tx, Climax Unimite servo, Elmic Conquest escapement, Gruner relay, Bongo inboard/outboard, all batteries, perfect, four months old, half price. Bartle, St. Day, Redruth, Cornwall.

D.C. Rapier, F.R. escapement, miniservo, Tommytone, U.K. Rx, both with batteries, £10 the lot, will separate. 2 Havard Road, Llanelly, Carms.

Selling up. Gremlin Lancer, Veco 19 with throttle, Metz 3 relayless, Mecatronic servos, Deac and charger well built, unflown, all as new, £40 or will separate. Merco 29 R/C, not fully run in, £4. A.M. 10, 25/-; O.S. Pet in Mercury Marvin, unflown, 45/-; test stand, 5/-; 2 volt accumulator, 7/6d.; all as new, most in original boxes, accessories, etc. T. Foster, 9 Marlborough Road, Atherton, Lancs.

U.K. Rx working order, £2.15.0d. E.D. 2.46, very good, £2. M.E. Heron, 30/-. 83 Newtown Road, Woolston, Southampton.

K.B. 15R, £6; T.D. 049, £3; both with untapped speed pans. P.A.W. 1.49, two hours running, £3. E.D. Racer, 30/-. Cox 0.49, less glowhead, 15/-. E.D. Baby, 10/-. Harper, 144 Fronks Road, Dovercourt, Essex.

S.A.E. for details of seven old/new engines, low prices. Woods, 33 Maple Ave., St. Albans, Herts.

Three good F/F contest power models T.D. 15, Enya 29 III and Fox Combat Special. Offers. S.A.E. details. Baguley, 29 Adelphi Crescent, Hayes, Middx. VIK 5253.

Enya 19, 45/-; Cox Thermal Hopper, 25/-; Terrytone Mk. II Rx, 85/-, Froggatt, 51 Chiswick High Road, W.4.

Selling, studies: Mini-Reptone with matching F.R. Compound in Veron Robot, hardly used, perfect order. £11.10.0d. o.n.o. Gascoigne, 29 Parkfield Road, Coleshill, nr. Birmingham.

Peacemaker plus PAW 2.5, 'B' Racer plus Max II 29, 50 in. stunt wing plus Max II 29, £3 each. Tomboy plus Merlin, 30/- OSI 29, £1. McGee, 15 Roker Ave., Anson Est., Longsight, Manchester.

ETA 15 Mk. 1 plus rangebar, 55/-; Super Tigre G20 diesel, externally modified, 50/-. Pridgeon, 80 Woodford Road, Bramhall, Cheshire.

Oliver Tiger Cub, perfect condition. £4.10.0d. Apply D. Coop, 115 Meltham Rd., Lockwood, Huddersfield, Yorks.

Taplin Twin 8 c.c., £7 o.n.o.; O.S. Max 35, £5 o.n.o. Bench run only, immaculate condition. P. Bainbridge, 9 St. Nicholas Drive, Shepperton, Middx.

Cox TD .049, £2. Cox TD .09, £3. A. F. Wisher, 5 Bancroft Court, Lansdowne Green, London, S.W.8.

Tiger Cub II, just run in, 3 T/R models, 90/-. TD .09, unrun, speed model, 70/-. B. Seale, Spot's Farm Cottages, Smallhythe, Tenterden, Kent.

Aeromodeller Annuals, complete set: 1948-63, excellent condition. Aeromodeller 1949, Zaic Year Books: 1938, 51, 53, 55, 57, 59. Offers. Amor, 6 Inglemire Lane, Cottingham, East Yorks.

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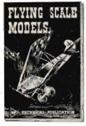

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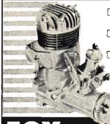

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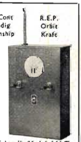

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