AERO MODELLER

FEBRUARY 1955

Special Folland Midge feature

1/6

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This issue magazine after the initial original scanning, has been digitally processing for better results and lower capacity Pdf file from me.

The plans and the articles that exist within, you can find published at full dimensions to build a model at the following websites.

All Plans and Articles can be found here:

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http://www.rcgroups.com/forums/member.php?u=107085

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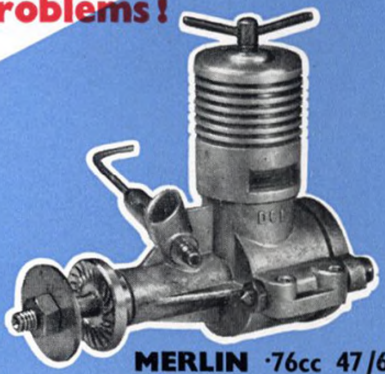
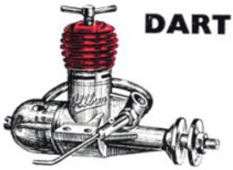
By offering a complete service for the power flier. Our extensive range of engines is backed by a comprehensive spares and accessories service, all of which are available at your local model shop. Any modeller or retailer who has the slightest difficulty in obtaining our products should contact the manufacturers immediately.

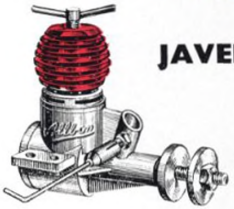
BAMBI ·15cc 108/11



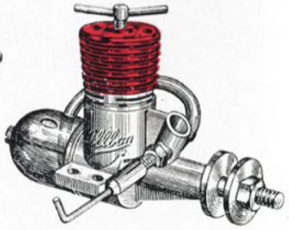
MERLIN ·76cc 47/6



DART ·5cc 64/2



JAVELIN 1·49cc 65/4



SPITFIRE 1·0cc 64/2

Give Your Motor a treat by using . . .
Allbon SUPER FUEL

ACCESSORIES There are now **PROPELLERS** for each of our engines, both control-line and free flight. Other useful accessories include:—**RADIAL MOUNTS : EXTENDED NEEDLE VALVES** and **COMPRESSION SCREWS : ANGLED JET ASSEMBLIES : COMBINED JET** and **CUT-OUT : FLYWHEELS : EXHAUST STACKS : SILENCERS : WATER JACKETS** and the ever useful **UNIVERSAL TEST STAND.** Full details with prices are given in our latest catalogue which is available at your Local Model Shop.

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DAVIES CHARLTON LTD Barnoldswick via Colne Lancs

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Mercury's newest class "A" Team Racer. A kit of exceptional value 15/- (2/6)

MERCURY

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Jnr. Monitor	19/9 (2/9)
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Matador 50"	21/5 (3/7)
Jnr. Mallard	15/- (2/6)
Mallard	18/3 (3/1)
Marauder A/2	14/6 (2/9)
Grebe Glider	12/3 (3/1)

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Jasco Tutor	4/3 (9d.)
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For 0.5–0.75 diesels

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ALSO FULL RANGES OF

Rubber Flying Scale, each	3/- (6d.)
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Amco 3.5 B.B.	78/8 (14/9)
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A limited number available also for the home market.

WINNER 15	70/-
MACH 1, 2.46 B.B. de-luxe	90/-

PICCOLO .8

A de-luxe job. Weighs 1¼ oz. 0.075 h.p. at 14,000 r.p.m. (Export only) 55/-

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ALL E.D. and E.C.C. EQUIPMENT including :

E.D. Boomerang including Escapement ready wired transmitter and receiver	£10/-/- (39/6)
E.D. Boomerang Rx only	89/- (16/-)
E.D. Mk. II 3-valve, complete trans. and revr.	£14/17/6 (54/-)
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E.C.C. 1061 Transmitter	70/- (13/2)
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E.D. Mk. III Escapement	18/6 (3/3)
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AEROMODELLER ANNUAL 10/- (6d. postage)

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6 x 4 1/3⅛ (2¼d.); 8 x 5, 8 x 6 2/4¼ (4¼d.); 8 x 8, 9 x 6, 10 x 6 2/10 (5d.). Frog Plastics also stocked.

"DROME" AIRWHEELS

2", ⅞ oz. 8/2; 2½", 1¼ oz. 9/11; 3½", 2¾ oz. 11/8 per pair.

CELSPRAY GUN

Model No. 3. guaranteed 5 yrs. 8/6

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New size kit 5/- (11d.)

SOLARBO, TISSUE, FUELS DOPES, CEMENTS, etc., etc'

Specially recommended

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The finest in the world. Full range of complete models and spares carried, including: Mercedes Benz; Bugatti; 1½ litre Alta; "E" Type E.R.A.; 159 Alfa Romeo; Aerodynamic H.R.G.; each kit 12/9d. (2/2d.) A6. G.C.S. Maserati 13/9 (2/4)

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The world's finest tools for modelling.

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KITS WHICH WILL BE THE ENVY OF ALL YOUR FRIENDS!

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KIT PRICE (Incl. P.T.) **26/3**

SKY-SKOOTER

An attractive little cabin job, especially designed to suit the new ultra-light R.K.61 Radio Control systems. For small Diesel and Glow Plug motors of 1.0 to 1.5 c.c. capacity, and will carry a Radio system weighing up to 12 oz. It's a really super kit. Span 48 in. Wing area (N.A.C.A. 4415) 310 sq. in. Rugged and stable in flight at all times. Winner of many Radio Control Contests both National and International

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Flying weather is on the way! . . . Now is the time to build your model for the new season and you cannot do better than to choose VERON for quality, value, realism, and performance . . . THERE'S A KIT FOR EVERYONE!

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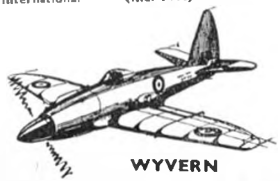
18-in. Span super quality kit of the well-known swept-wing Jet now in service with United Nations Countries. Kit includes perfectly laid-out plan together with all materials (for "Jetex 50"). KIT PRICE **6/5** (Incl. P.T.)

"CARDINAL"

Simple to build and ideal for a start in powered flight. Suitable for small Diesel or Glow Plug motors up to and including 1 c.c. KIT PRICE (Incl. P.T.) **16/11**



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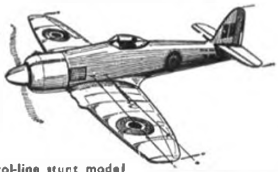
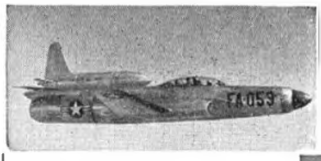
25½-in. span Control-line replica of the Navy's turbo-prop-jet. Combined flap and elevator control gives extra manoeuvrability.
KIT PRICE (Incl. P.T.) **27/5**



SEA FURY X

An aircraft which has proved its worth in service with the Fleet Air Arm.

25½-in. Span control-line stunt model with combined flap and elevator control giving exceptional manoeuvrability at high speed. For motors of 1.3 to 5.0 c.c. KIT PRICE **27/5** (Incl. P.T.)



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A range of 24 Solids—this gives you a chance to choose your favourites from world famous aircraft.

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Supersonic Fighters — Modern Jet Bombers and at prices ranging from as little as 2/5 to 7/2 (incl. P.T.)

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IN AUGUST, 1954

JERMAKOV of the Ukraino was 2nd

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BOTH COMPETITORS USED

E.D. 2.46 c.c. "RACERS"

The outstanding successes gained by E.D. Diesels in open competition all over the world have made them the first choice of enthusiastic modellers. Designed and manufactured by skilled aircraft engineers, they are checked individually for accuracy and reliability to a standard that ensures the highest possible speed and performance for your models.

The mere fact that we have succeeded in introducing E.D. Products into Russia is News indeed, but to achieve success in open competition in Moscow deserves a SPECIAL EDITION. If further proof of the high qualities of E.D. Products were needed, then this "curtain raiser" certainly supplies it.

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It's wonderful news ! about a wonderful engine .

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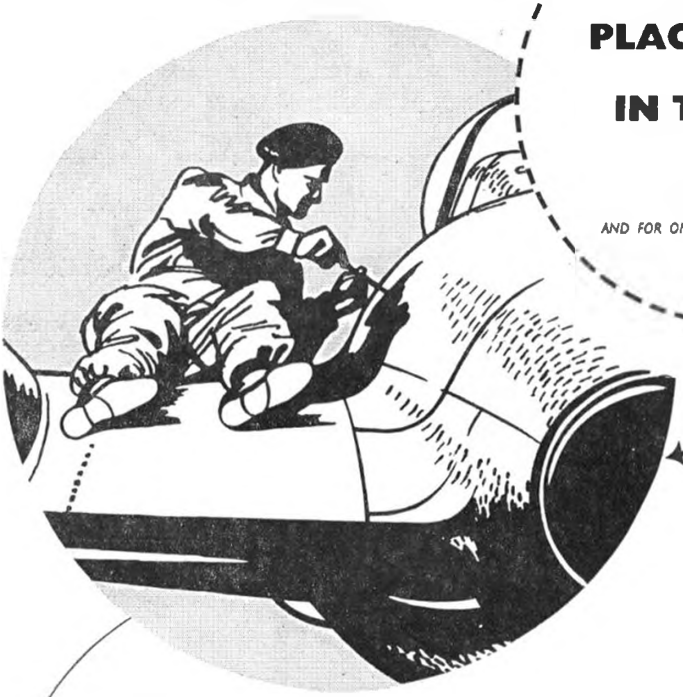
Why wait to be called up for National Service?

THERE'S A PLACE FOR YOU IN THE R.A.F. AT 17½

AND FOR ONLY A SHORT ENGAGEMENT*



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You earn a Regular's higher rate of pay from the day you join.

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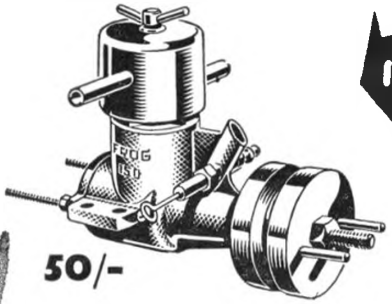
★ (*Applicants from British Isles only*) ★

THE MARINE "150" by FROG

TRADE MARK

ITS NEW

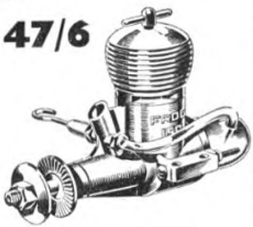


50/-

Available now for all boat modellers is this new FROG marine diesel. A faithful follower in the FROG tradition of reliability and power, this model can be relied on to satisfy the enthusiast requiring the best. The Marine **"150"** is water-cooled with special cylinder head, and has a balanced, turned brass flywheel. A star performer which can be guaranteed to be a credit to the FROG range of models.

Capacity **1.49** c.c. Weight **6** ozs.

47/6



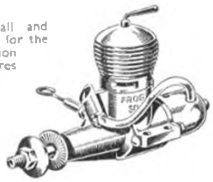
FROG '150' Mk II

With a speed range of 2,000 to 15,000 r.p.m, this Frog "150" Mk. II is a contest winner of world repute. An unbeatable motor in its class—and now, in Mk. II form, even more powerful. Capacity 1.49 c.c. Weight 3.125 ozs.

FROG '50' Mk II

Powerful yet compact, small and light, the "50" Mk. II is ideal for the smaller model. This new version incorporates several new features for greater power and easier starting. Capacity .49 c.c. Weight 1.47 ozs.

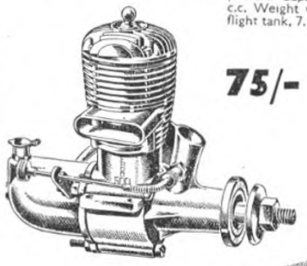
45/-



FROG '500' RED GLOW

A high-speed performer with plenty of punch. Designed for long life and easy starting, this model has acquired a world-wide reputation for reliability and power. Capacity 4.92 c.c. Weight with free-flight tank, 7.75 ozs.

75/-



FROG AIRSCREWS

These airscrews are available in plastic and nylon the nylon ones being 100% increased in strength with 20% saving in weight.

Size	Plastic	Nylon
8 in. dia. x 5 in. pitch	1/3	2/11
8 in. dia. x 6 in. pitch	1/3	2/11
8 in. dia. x 8 in. pitch	1/6	3/6
10 in. dia. x 6 in. pitch	1/6	3/6
9 in. dia. x 6 in. pitch	1/6	3/6
6 in. dia. x 4 in. pitch	9d.	1/6

SUPER POWER FUELS

A power-plus fuel for all diesels. Tins fitted with retractable spouts.

2/6 RED GLOW

Fuel to satisfy the most demanding enthusiast. Ideal for all glow plus ignition motors.

POWA—MIX

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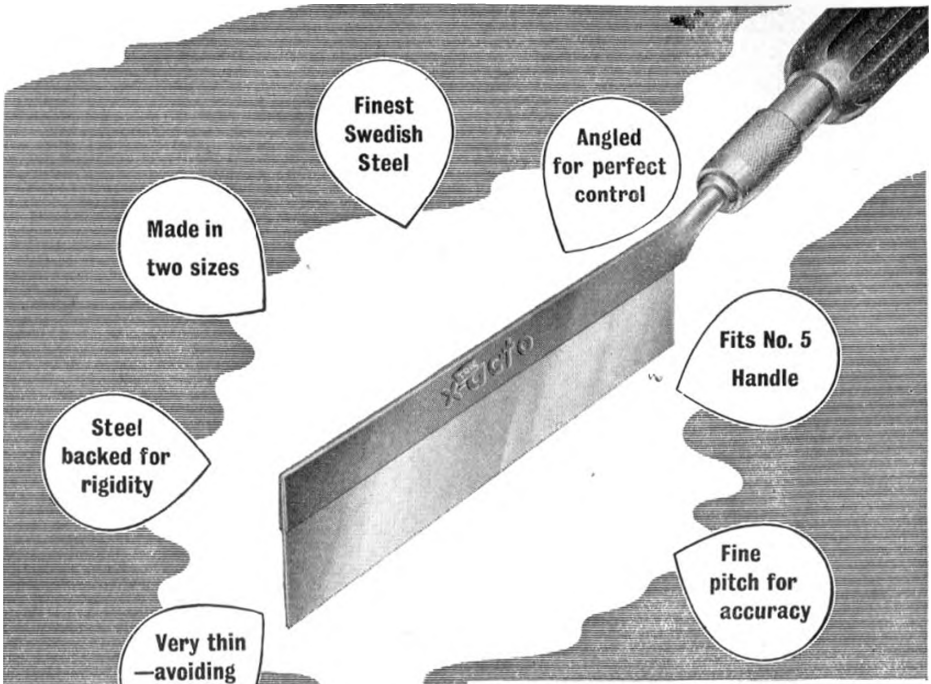
PRODUCTS OF THE LINE BROTHERS GROUP OF COMPANIES



Still more skill at your fingertips

Here's a new X-acto tool for the craftsman, a tool for those sawing jobs requiring the utmost precision. Made of special steel it cuts wood, metal, bone, ivory cleanly and accurately with the minimum of waste. It is quickly fitted to the No. 5 Handle and, like all X-acto blades, is held in a vice-like grip. The perfect tool for perfect work.

X-acto RAZOR SAW

Made in two sizes, No. 34, ½" deep 4½" long **2/-**
No. 35, 1" deep 4½" long **2/6** *No. 53, Razor Saw Set —No. 5 handle and the two blades* **10/6**

TRIX
X-acto
HOBBY KNIVES & TOOLS

See it at your X-acto Agents.

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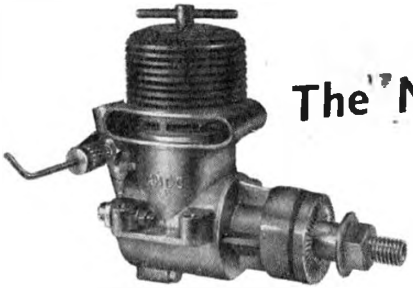


The NEW AMCO BB Mk II

93/5 Including Tax

All the original design features which have made this famous engine so popular are retained, with the addition of a **New and improved Crankcase,** and a **removable Exhaust Stack.** Twin ball races, giving smooth friction free running, make this the most powerful 3.5 c.c. engine on the market.

Try Our ENGINE EXCHANGE SERVICE

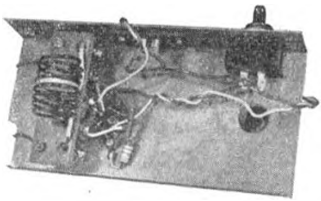
We offer this service DIRECT to modellers who can exchange any existing B. B. Engine, providing it is complete, for a factory reconditioned unit incorporating the Mk. II improvements. *SEND YOUR MOTOR WITH 33/- DIRECT TO THE MANUFACTURERS WHO WILL DESPATCH WITHIN 48 HOURS*

AMCO ATOMIC DIESEL FUEL

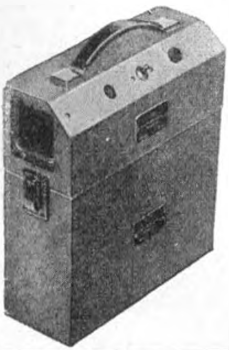
Guaranteed to increase the output of any engine, this new fuel is ready mixed for immediate use. Give your engine a treat and try a bottle today!

Price per Bottle 3/3

AMCO AVIONIC REMOTE CONTROL



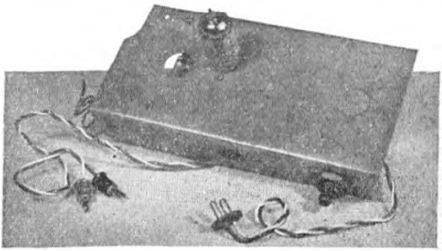
TRANSMITTER CASE Price 30/-



Save time and money by purchasing the famous **Avionic Transmitter Unit** and **Case** as separate items. The Case is undoubtedly the most practical and handsome unit available, being in two parts, the upper for housing the transmitter unit, and the lower for batteries or power supply. The aerial fitting is provided, and assembly is child's play. The Unit is wired complete with plugs, and is accurately set to the correct frequency before despatch; all you have to do is fit it in the case.

TRANSMITTER UNIT

Unit as illustrated is complete with valve and plugs, and ready for immediate use. Price 54/8



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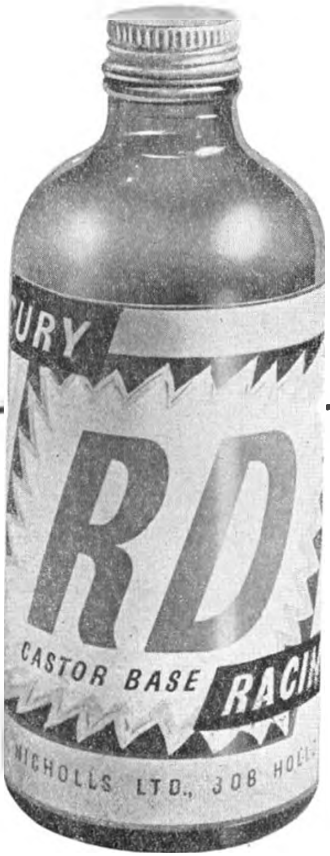

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AERO MODELLER

"Covers the world of Aeromodelling"

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Managing Editor - - C. S. RUSHBROOKE
Editor - - - - - H. G. HUNDLEBY
Assistant Editor - - - R. G. MOULTON

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In this issue

Special features

★

Regular features

★

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SOLID IMPROVEMENT

DURING THE intensive model building programme of the last World War, the production of "solid" models was more prolific than ever before, and in no small measure due to the abundant provision of kits and drawings.

With the end of hostilities, this type of aeromodelling "took a nosedive" and manufacturers were left with considerable unsaleable stocks on their shelves—and a sizeable hole in their profits as a result. The causes were not hard to find; sudden cessation in interest in aircraft spotting; the facilities to once again put models into the air instead of on the mantleshelf; and last, but by no means least, the return to other hobbies of people who had taken up the art of "balsa bashing" as a means of passing away time during the war years.

The return of interest in solid modelling, is however, the most prominent factor in aeromodelling trends today, though the reasons for this are not easy to discover. From our own experience the sale of our world renowned three-view scale drawings have almost doubled within the last twelve months, and the demand is steadily increasing. In addition, more and more manufacturers are including well designed solid model kits in their ranges.

We trust we may be excused a little trumpet blast on our own account on this subject, for the "AEROMODELLER" was the first to publish authentic scale drawings to satisfy those seekers after accuracy, and during the war years sold many hundreds of thousands of drawings of both modern and ancient aircraft. Since those days, our range has greatly increased, and we can today offer the most comprehensive range of scale drawings in the world. Accuracy coupled with good draughtsmanship has been our aim, and the success of this policy is evident from the many expressions of appreciation we receive.

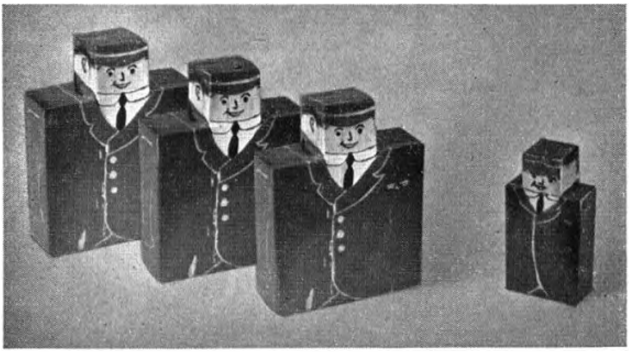
The well known adage that "imitation is the sincerest form of flattery" is never so true as in this connection, for more and more aviation papers are introducing the three-view scale drawing into their editorial pages, in many cases an almost line-for-line copy of designs that have appeared in our pages!

This spate of imitation has gone further than just drawings recently, for we are in receipt of an increasing number of foreign modelling magazines, some of which have copied our layout and designs most faithfully, and at least two, our title—or at least, the native equivalent of it.

We are flattered . . . . for surely this is an admission that where we lead, others follow!

On the Cover

Most outstanding aircraft of the year 1953 was undoubtedly W. E. W. Petter's Midge, by Folland Aircraft Ltd. Received with great acclaim by the aeronautical press at home and abroad, its diminutive span and amazing performance have given it extra special appeal for all aeromodellers, who will undoubtedly appreciate the accurate detail plans by John Enoch on page 79.



Heard at the Hanger Doors

Bigger PAA loads in the U.S.A.

George Gardner, Educational Director of Pan American World Airways and prime mover of the PAA contests today, sent us a draft of PAA-load rules for 1955 that incorporated many changes. Dallas Sherman, known as the PAA-load PAAppy in the U.S., suggested that the rules were becoming over-easy as a result of model development. The result is that whereas there were ½A, A and B classes in the States, they will now have only ½A "America" class (up to .8 c.c.) and a new "International" class for up to 2.5 c.c.

Dummy size to be standardised at the 3 × 3 × 1 body with 1 in. square head but the weight to be reduced for this size from 8 to 5 ounces. Thus the small class would be carrying a larger, and 1 ounce heavier dummy, and the new "International" class would have to carry *three* such dummies (yes . . . 15 ounces total!). As the heading picture shows, the little man was to be left out in the cold and the bigger but five-ounce dummies took up three-in-a-row position.

But all PAA-loaders with existing designs for the smaller dummy or single seater may breathe a sigh of relief, for as we go to press an unofficial report reads that the above suggestions are now to be changed. The small dummy will still be used for the "America" at 4-ounces-plus 1 ounce of cargo, or if a 1 c.c. engine is used (a nice International thought on their part) it must carry a 2-ounce cargo, making a total of 6-ounces. For the F.A.I. class, we keep the 8-ounce single seater and carry in addition, 8-ounces of cargo, making a total of 16 ounces. So PAA-loaders are to be even heavier than before!

Immediate effect will be to limit flight times by no mean margin, and the further adoption of the International five flights of 3 min. maximum system, will certainly call for more competitor effort. As George Gardner states, "The changes are aimed at putting the premium upon skill in construction and flying and minimising the possibility of catching a lucky thermal."

Scottish Festival of Model Aviation

A. T. Doughton, Scottish Sales' Manager for Pan American World Airways, has asked the West of Scotland Aeromodelling Clubs to organise a large two day Rally in the West of Scotland during 1955. A Committee has been formed with Mrs. Shirt as Festival Manager, and Mr. Meechan as Contest Secretary.

There has long been need for such an event in Scotland, and the Committee look forward to the support of all aeromodellers, particularly those in the North. Everything will be done to make the event a success, as it may become an annual affair.

Below is listed the Committee's proposed Contest Programme, and they would like to hear from Clubs and Individuals' constructive criticism and suggestions for any other classes.

PROPOSED CONTEST PROGRAMME:—

1. F/F Unrestricted GLIDER.
2. F/F Unrestricted RUBBER.
3. F/F Unrestricted POWER.
4. P.A.A. Load POWER, 1¼ c.c.
5. P.A.A. Load POWER, 2½ c.c.
6. P.A.A. Load RUBBER.
7. F/F SCALE EVENT.
8. TEAM RACE CLASS "A"
9. TEAM RACE CLASS "B"
10. C/L STUNT.
11. COMBAT CLASS "A"
12. COMBAT CLASS "B"
13. C/L SPEED ALL CLASSES.
14. RADIO CONTROL.
15. CONCOURS. ALL CLASSES.
16. JETEX.

The Festival is scheduled to take place on Saturday and Sunday, September the 10th and 11th, 1955, and at the present moment negotiations are in hand for the use of Heathfield Aerodrome, Ayrshire. There will be a very handsome prize list.

All enquiries and suggestions with reference to the Contest Programme, Accommodation and Travelling Arrangements should be addressed to the Festival Contest Secretary. All General enquiries, (and those for Accommodation and Travel from enquirers NOT living in Scotland) should be addressed to the Festival Manager.

Festival Manager	Contest Secretary
Mrs. Freda Shirt,	Mr. W. Meechan,
13 Patmore Road,	110 Banner Road,
Sheffield 5.	Glasgow, W.3.

Red letter day for aeromodellers

Latest Hungarian stamps—produced as much for stamp collectors as for normal postal use—feature aviation from A to Z. Lowest value of 40 fillers shows the young aeromodeller at work on most ambitious glider: next value (50 f) shows him flying it, though it looks much smaller now it's covered. Then follows air progress, value by value, through learning gliding (60 f) to fly in Zlin 26 Trainer (80 f) parachuting (1 forint), fruit spraying in Bucker Jngmann (1.20 f) and finally civil flying with a Yak 16 and military flying with a Mig 15. Unused sets are available from most good stamp dealers at about 6/- complete.

Apart from a Russian Pioneer issue, this is the only occasion when we can trace aeromodelling as the direct subject of a postage stamp, though stamps have been used for aeromodelling fund raising, as in the Swiss Pro Aero series. Dare we suggest to the Postmaster General that here is a grand opportunity of collecting for that Wakefield Fund, while anything over could always buy the R.A.F. a Folland Midge or so!

F.A.I. Gen.

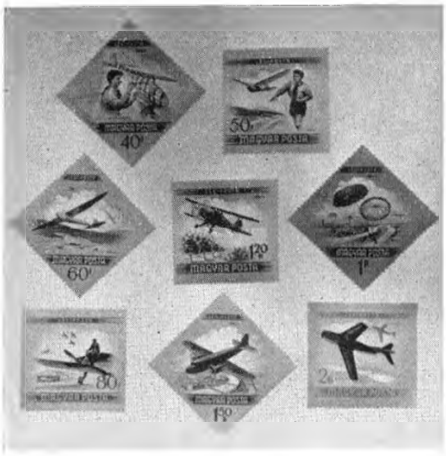
Though a meeting of the F.A.I. Models Commission was held at the beginning of December, we have little news of what transpired as we go to press. One item however, will exercise the minds of those responsible for International aeromodelling affairs, and that is the vexed question of who will stage the 1955 Wakefield Trophy contest.

The original rules for the Wakefield state that the contest will be staged by the country winning the previous year, the Trophy being credited to the individual with the top score. F.A.I. regulations state that the country with the option for future running of the event is that which provides the winning team. Australia has applied for the contest in 1955, and America 1954 team winners have also made a bid for the event, and it will be interesting to see how this problem is resolved.

Personally, we favour the contest going to Australia—even though this may be contra to the current rules—for they together with New Zealanders have for many years supported the Wakefield by proxy, and it seems only fair when they have at long last made a successful entry that they should have their chance at staging this famed International affair. Granted, it will mean that the majority of the entry will have to be proxy, but it is only fair to have the positions reversed once in a while. We understand the Aussies have a suitable venue at Benalla, an old R.A.A.F. aerodrome approximately 100 miles north of Melbourne.

Are you indexed?

A stamped and addressed envelope of normal 3½ in. × 6 in. proportions is all you need send to "Index" department, "AEROMODELLER" offices at 38 Clarendon Road, Watford, Herts, to obtain your copy of the comprehensive cross-indexed reference sheet for volume 19 of "AEROMODELLER" for 1953. This is yet another A/M service to readers as an aid to more and better aeromodelling.



How are you as a designer?

Good sport model and first-class scale designs are wanted for publication in "AEROMODELLER". It is essential that flying scale models are accurate, and both types required should be for motors ranging from ·5 c.c. to 2½ c.c.

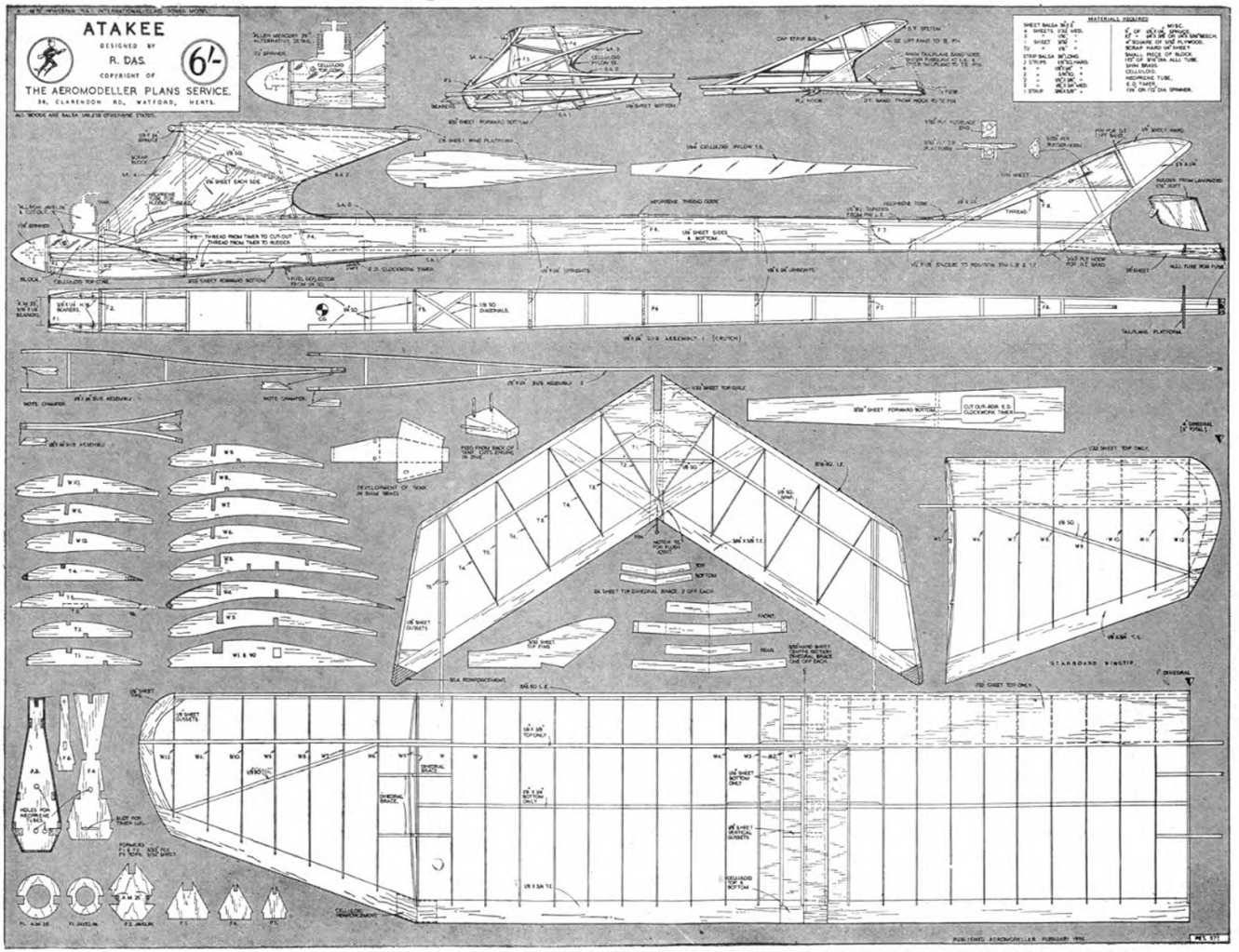
Readers should not let the fact that they are not professional draughtsmen prevent them submitting designs. We prefer to receive *working* drawings, rather than a design re-drawn for our especial benefit. Good clear photographs of the model are also required. We like black and white glossy prints at least 6 × 4 in., but where the supply of these is difficult, we are quite happy to receive the negatives.

All designs accepted are paid for at handsome rates, and those modellers who think they have something worth offering, should send photographs only in the first instance, with one or two brief details of the model to put us well and truly in the picture.

D/C and PRE-ENTRY

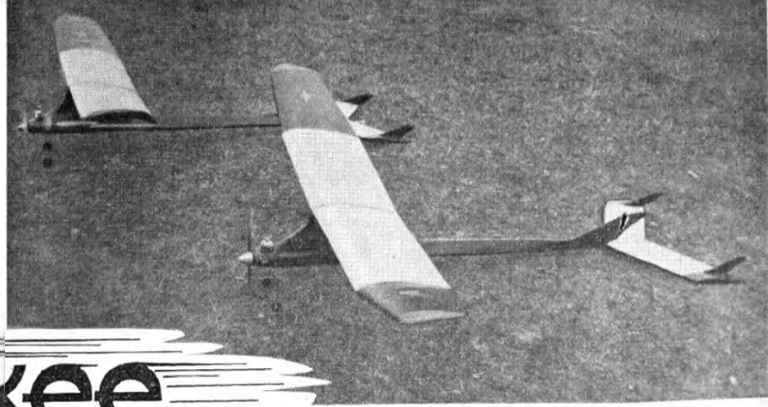
A recent approach to the S.M.A.E. to discontinue de-centralised contests was not approved, it being the opinion of Council that—though not supported to the extent they should be—nevertheless such contests form a vital link with those clubs who still wish to stage events at other than Area or Centralised level. However, in future pre-entry will be required for all National contests, thus ensuring that the prevalent practice of only sending the top club time of a dozen competitors is discounted.

Associate Society members will be interested to learn that it is proposed to award a National contest to them, entry being restricted to this class of membership only, thus producing—we hope—an experts barred event.



FULL-SIZE COPIES OF THIS 1/5th SCALE REPRODUCTION OF THE A.P.S. DRAWING CAN BE OBTAINED, PRICE 6s. POST FREE FROM THE *AEROMODELLER* PLANS SERVICE.

1954 DUTCH POWER CHAMP RUDOLPH DAS presents . . .



Atakee

Pronounced "Ah-tah-kay", Atakee is a slang term from the French Attaquer . . . to attack. It is used as a war cry when one is very enthusiastic and was chosen for this model because the side elevation gives the impression of being aggressive.

THE DAS TWINS, from Haarlem in Holland, are internationally renowned for their artistry in producing wonderful cutaway drawings of full-size aircraft. Technical drawing is their business, and aeromodelling their hobby. The two facts combine to give us a model of striking lines and an enviable contest record.

Radolf Das designed the first of the Atakee series for his Elfin 1.8 diesel in 1953. He had been impressed by the Mexican "Battiri" design with its long nose, long fuselage and slim pylon, and so he decided to use a cowled engine blending into a swept pylon for similar effect. Tests were good. A vertical climb without use of any offset on the engine, and regular ratios of 11 : 1 led to a number of high contest placings and a demand for plans from fellow club members. Re-designed for easier construction in later '53, five new models were made by the Haarlemse Club during the winter, two with Elfins, one with a Frog 150, and two with Webra 1.5 Records. Test flights showed an average of 3 : 15 from 15 secs. engine run in good conditions. Both VTO and normal take-off can be used, and at the close of the '54 season the contest record included four 1st, one 2nd, and three 3rd places plus five team wins for the Haarlemse club.

Design points of this F.A.I. formula model are: (1) Long nose with low thrustline and swept pylon, giving an enlarged loop radius and no requirement for downthrust. (2) Thick tailplane with swept planform for directional stability, VTO points, and keeping more of the tail in the slipstream area. (3) Span less than length for good rolling characteristics, large wing chord for good glide without affecting the climb.

Suitable engines are: Webra 1.5, Elfin 1.5 P.B., Allbon Javelin, Frog 150, Torpedo 15, Allen Mercury 25, Elfin 2.49, or other similar front rotary intake engines. Suitable props range from 7 x 4 to 8 x 6, according to engine power.

British engines shown on the plan are the Allbon Javelin Mk. II and the new Allen Mercury 25, each of which is admirably suitable for Atakee as a contest model. With the AM 25, performance is outstanding but it should be remembered that for F.A.I. regulations, all up weight of this version must be more than 17½ ounces.

Fleet of Atakees at right belongs to the successful Haarlemse club and serves to demonstrate the popularity of this proven design among Dutch modellers. "Swept" lines are apparent in top view showing Webra 15 versions.

Wing.—Start with centre-section spars and build wing on plan. Finish wing tips before joining the centre-section. As a result of the wash-out of the tips the trailing edge must be fitted after the tip is removed from the plan, the diagonal spar is fitted later. Cover with light Modelspan.

Fuselage.—Cut out all formers. Construct SA (Sub Assembly)-1 to SA-4 on plan. When set, mount F2 and F3 in SA-1; fit SA-3 in F3 and glue it on SA-1. Mark the correct position of F4 on SA-3, and glue F4 in SA-2. Fit F4 with SA-2 in SA-1 and SA-3, and cement SA-2 to SA-3. Fit F5—F8 and sheet fuselage bottom to F.5. Fit spruce in F3 and F4, cut out wing platform and glue in place, fit SA-4, engine bearers, F.1 and bottom planking of 3/32-in. Mount engine, tank, neoprene tubing and clockwork timer.

Start the **Fin** with l.e. and t.e. When dry, fit 1/4 x 1/8 cross member by glueing it to l.e. and through t.e. Check the correct position on the plan. Now cut out fin-tip and cement in place, as with the 1/8 sq. contour-members. Mount fin on SA-1, fit fuselage struts and sheet fuselage. Cut cowling-top from thin celluloid to suit engine. Cover fuselage with light Modelspan tissue.

Tailplane.—Prepare t.e. by cutting out for lap joint. Pin down t.e. and l.e. on plan. Fit even-numbered ribs, then fit the other ribs between. Mount auxiliary-fins after covering the stabiliser with light Modelspan.

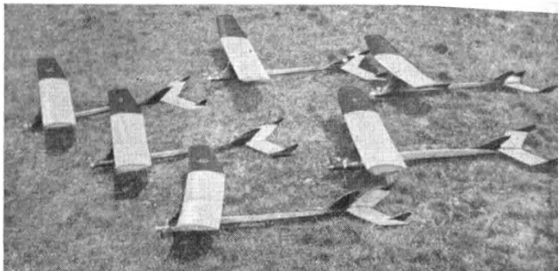
Finish the model in a dark colour for better visibility. Original colour scheme is black and white.

Trimming.—The right flight path at half power is a 20-30 degree climb, straight or in a right turn. A left turn must counteracted.

At full power, climb must be fast in a tightening right spiral path of 80-90 degrees. Should the climb ratio fall back after a good start fit a prop with *more* pitch.

The right glide-angle can be obtained by observing the amount of stall and the recovery after engine-cut without the auto-rudder operating. The stall recovery must show one turn of fairly large radius (about 20 yards) without any further stalls.

With the auto-rudder practically no stall should be observed. Always use more than 10 sec. engine run when the auto-rudder is not functioning. When properly trimmed the Atakee should have a ratio of 12 : 1 to 14 : 1—and don't forget—always use the d.t.!



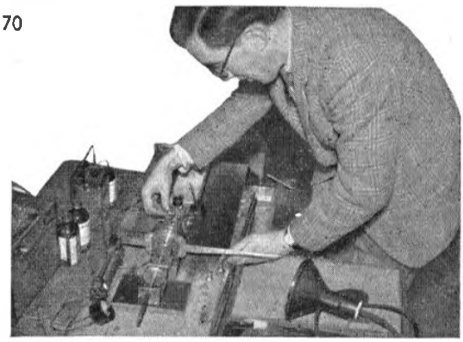
A theory on ENGINE TESTS

by Ron Warring

As readers are well aware one of the talking points of the year has been the development of new engine testing gear by THE AEROMODELLER *which has thrown doubts on the validity of previous engine test data. In fact, such new data would appear to exemplify exactly, comments by Sir Harry Ricardo, F.R.S., on the subject of engine testing, from which we quote Ref.*[1].

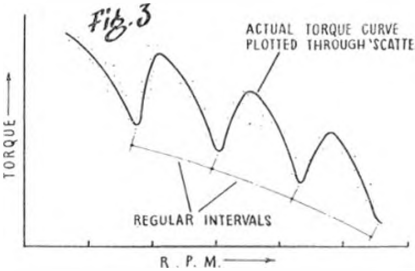
"The testing of internal combustion engines is by no means the simple problem it appears . . . We place an engine on a test-bed, couple it to a dynamometer . . . and start it up, it makes an unconscionable noise and seems inordinately busy. The dynamometer and speed indicator tell us, more or less, the power it is giving—usually an acute disappointment . . ."

The fact that different authorities concerned with model aero-engine testing have produced such different results may not, therefore, be so surprising. However, somewhere or other there must be a reason *for such differences and so as a further talking-point—and perhaps a glimpse of the complete picture—the following theory is presented as a possible explanation. It is not a theory dreamed up by "armchair analysis" but is based largely on a detailed study of* all test results which have shown inconsistencies or marked differences. *It is by no means the final word on the subject, but could supply the answer to a question which nobody has yet attempted to solve—other than bluntly state that "so-and-so's tests are wrong". It seems in fact that both "so-and-so" and the other fellow could both be "right" within the broad meaning*



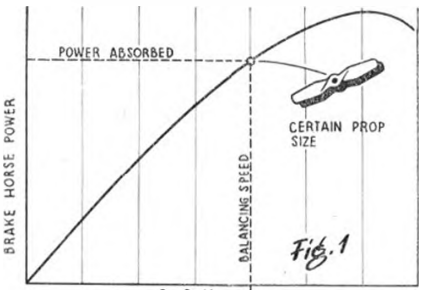
that a single engine could in fact yield test results differing by as much as 25-30 per cent. with all normal errors or losses accounted for. The implication that a model engine may give entirely different power outputs under different operating conditions raises the pertinent question of which "level" of performance is, in fact, the one to accept as standard. Some detailed comments on this very subject form the bulk of the theory.

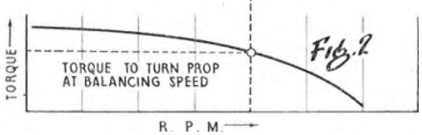
Since brake horse power is a derived value it is more convenient to talk of engine power in terms of torque output which is the actual turning effect produced at the crankshaft. Other authorities prefer



to talk of brake mean effective pressure rather than torque although the two are essentially the same. All forms of reaction cradles and dynamometers actually measure *torque*. To find brake mean effective pressure (B.M.E.P.) it is still first necessary to find *torque* which is then factored by a constant quantity to yield B.M.E.P. In simple terms brake horse power equals torque x r.p.m. x a constant. B.M.E.P. is that proportion of the actual gas pressure within the cylinder available to do external work—hence again brake horse power equals B.M.E.P. x r.p.m. x a different constant. Also, B.M.E.P. is in effect, "torque per unit capacity". Plotted on a graph, both the torque and B.M.E.P. curves are identical, although in different units. For all practical purposes they mean the same thing.

When any size of propeller is fitted to an engine it represents a fixed load. Hence, logically, the engine will speed up until the power absorbed by that load is equal to the power output of the engine at that particular speed (*Fig.* 1). Different propellers will yield different fixed points on the curve *i.e.* different operating speeds depending on their power





absorption characteristics. For any given "family" of propellers the latter should be directly relatable to diameter and pitch.

Thinking now in terms of torque that same propeller will be absorbing a certain torque at its "fixed" speed. With the torque curve fixed as a characteristic of that particular engine's performance it should always turn that propeller at the same speed, for given adjustment and the same fuel (*Fig.* 2).

Measurements were taken on a torque reaction

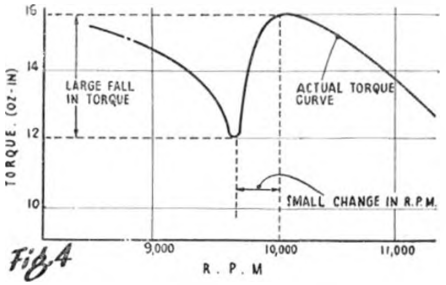


Fig. 4

rig where r.p.m. relative to propeller sizes can be established along with the corresponding torque reaction (*i.e.*, torque absorbed). It was intended that these tests should form the basis for propeller calibration data and also enable a direct comparison to be made between the torque curve so derived (using a whole range of different propellers) and a similar torque curve for the same engine obtained on the eddy current dynamometer. Such differences would have given a good indication of the modifying effect of slip stream, which is one of the incalculable losses on a reaction rig. (Blanking off the slipstream with a shield, or using reverse pitch propellers which produce no rotational inflow over the engine is now known to be unsatisfactory since this produces unrealistic working conditions, such as lack of cooling.)

Apart from the fact that certain propeller sizes seemed very "bad" for certain engines (yielding excessive vibration even when the propeller itself was statically balanced), the really hard-to-explain feature was that with certain propellers *torque readings differing by as much as* 25 *to* 30 *per cent. were obtained at the same speed* (r.p.m.). In other words, a 9 x 4 propeller, say, gave 10,000 r.p.m. and yielded a torque reading of 16 ounce-inches. On a check run the same propeller again gave 10,000 r.p.m., but the torque reading was now only 12 ounce-inches! Sometimes this change would occur on a single run.

A chat with N. K. Walker of the L.S.A.R.A. on the subject of discrepancies in engine test data yielded a clue as to the likely reason. An extensive series of runs on an Arden test rig in America had been condemned as unreliable owing to the high "scatter" until someone discovered that the bulk of the results could, in fact, be plotted on a wave-like

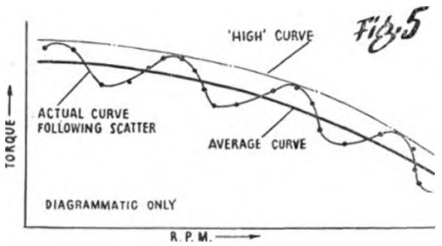


Fig. 5

curve of the form shown (*Fig.* 3). The "valleys" occurred at regular intervals and were subsequently traceable to excessive vibration building up—each valley, in fact, representing a harmonic vibration period either of the whole rig or some major part of it. Taking just one section of such a curve (*Fig.* 4) it is now easy to see how, with just a small decrease in r.p.m., a very considerable reduction in *torque* reading can result.

Normal practice with scattered test data is, of course, to plot an "average" curve (*Fig.* 5). Here both peaks and valleys are eliminated to produce a smooth curve. On first sight, the *true* curve would appear to be one drawn through all the high points, *i.e.*, joining the "peaks" since any lower readings are almost certainly losses caused through vibration.

However, it is an inescapable fact that a single cylinder two-stroke engine is a vibration producer. Due to its nature it cannot be dynamically balanced and so vibration is an inherent feature of its operation. Also its degree of vibration will depend enormously on both its method of mounting and the nature of the load it is driving.

Considering now its operation under conditions of different degrees of vibration, but such degree of vibration consistent (*i.e.*, no resonant effects) we can say that torque output is represented by a band of smooth curves, as in *Fig.* 6, the top curve representing the ideal condition of absolute minimum vibrational losses and the lower a practical maximum of vibration where the conditions of running are so bad that no test data would be taken to be reliable; or in a practical installation, steps would be taken to cut down vibration such as by balancing the load, revising the method of mounting, etc.

In practice, harmonic effects would be superimposed somewhat to affect the actual torque curve

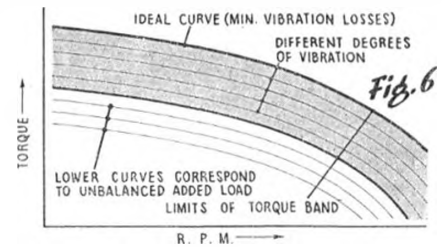
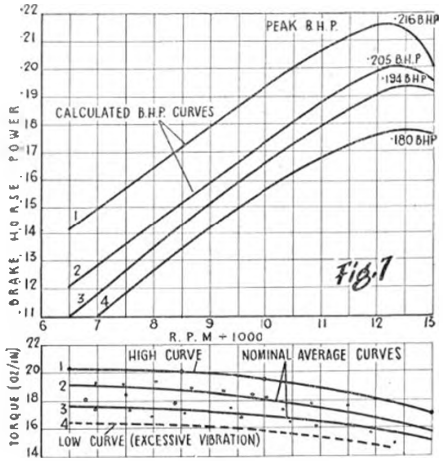


Fig. 6



obtained over a wide range of r.p.m. depending on both the type of load and method of mounting. Such effects need not be excessive, however, nor do they modify the conception of a *torque band* rather than a *torque curve* as characteristic of a model engine's mechanical performance.

The interpretation of readings obtained within the band can, of course, vary enormously. A large number of actual test readings are shown in *Fig.* 7 (reaction cradle rig), from which one could draw either a "high" or several nominal "average" torque curves. The resulting difference as affecting derived brake horse power curves is well illustrated.

Mechanically the engine mounting on this particular rig is more rigid than an average model aircraft installation, also the suspension is reasonably vibrationless. The "high" points probably represent the practical ideal operating conditions-non-resonant operating r.p.m. for the whole rig and perfectly *dynamically* balanced propeller loads. Lower points probably approximate closely to normal working conditions. The very low points to bad unbalance of the test propellers or unfortunate combinations of propeller unbalance and inherent engine vibration.

Using dynamically balanced loads throughout a series of test runs would not automatically guarantee more consistent, high results. Inherent engine vibration is the over-riding factor and this, in turn, depends to a large extent on the way it is mounted. Clamp it down to a rigid mount and the inherent vibration has got to go somewhere—into the independently balanced load, or the coupling connecting it to a separately mounted rigidly fixed, balanced load. In the latter case, running may be exceptionally smooth, but the torque output *may be low due to excessive internal friction within the engine* which is literally battering itself to destruction.

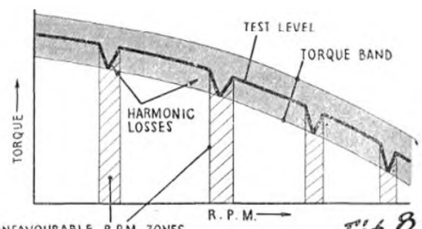
Adopting the conception of a torque band, therefore, it is very difficult to say which torque *level* is the one of most practical significance. It would seem necessary to test engines mounted in a similar manner to that in which they will be used—quite possibly leading to the interesting result that model engines tested on race-car type installations could show better performances than the same engines on model aircraft mounts! Perhaps, even, for a particular rig, different engines may test out at different levels due to inherent differences in balance. Thus not only may there be differences between *different* types of rig, but the *same* rig may operate at different band heights with different engines.

Much of this is still conjecture and will need considerable further research to prove or disprove. But the probable existence of a torque band somewhat narrows the field of research, which is to be welcomed. Almost certainly, however, with any practical installation there will be r.p.m. zones to be avoided because of harmonic vibration effects and resulting dropping out of the torque to a lower band level. These will not be indicated by a performance curve which has been smoothed out and will vary with the particular model installation involved.

Another thing fairly certain, too, is that a large number of previous brake horse power tests have been based on too limited a number of spot readings. Curves established on perhaps only four or five spot readings may appear to join up smoothly, whereas they may, in fact, represent a hypothetical curve traversing the torque band, rather than a consistent level curve.

Full-size engine testers do not have the same vibrational problems inherent with single-cylinder two-strokes nor do they have to consider testing in regions in excess of 10,000 r.p.m. and at torque figures where the use of conventional tachometers is not possible without introducing either serious power losses or other inaccuracies. To end by quoting Sir Harry Ricardo again, speaking about these more docile large engines.

"An engine may be regarded as a creature of infinite and dogged cussedness, but entirely lacking in a sense of humour—a very fit subject for the practical joke, and the art of testing consists really in keeping our patience and inventing new practical jokes to play upon it."—*Ref.*[2].



Ref. 1 *and* 2.—*Forecord to "The Testing of Internal Combustion Engines", by Young and Pryer. Pub. English Universities Press.*

Double-action Timer

Jim Fullarton describes his

AFTER the twin perils of the loop and spiral dive have been successfully overcome, perhaps the biggest unsolved problem confronting the average free-flight enthusiast is the stall when the motor cuts out. The worst aspect of this problem is that it penalises the really good, fast climbing model more than the mediocre performer, and is certainly most aggravating to see your model throw away much of its valuable altitude in a series of futile stalls before settling into the glide.

As mentioned in my previous article (December, 1951) the writer is a staunch advocate of the timer-rudder system of trimming, in which the timer arm is connected to both fuel cut-off and the rudder, so that the same movement that stops the motor also pulls the rudder to give a turn on the glide. Quite early in these experiments I realised that if some way could be found to let the motor run for a short time *after the rudder had come over*, then the stall problem would be solved, but for lack of a practical way of doing this the idea went into cold storage for the time. At that time I was using a plunger type cut-off which stops the motor instantaneously. The final inspiration came via an "AEROMODELLER" gadget review, which showed an AIR-BLEED type of cut off fitted to a fuel tank. This is the type fitted to some diesels, in which the opening of an air hole permits air to enter the line and prevents any more fuel from being drawn from the tank.

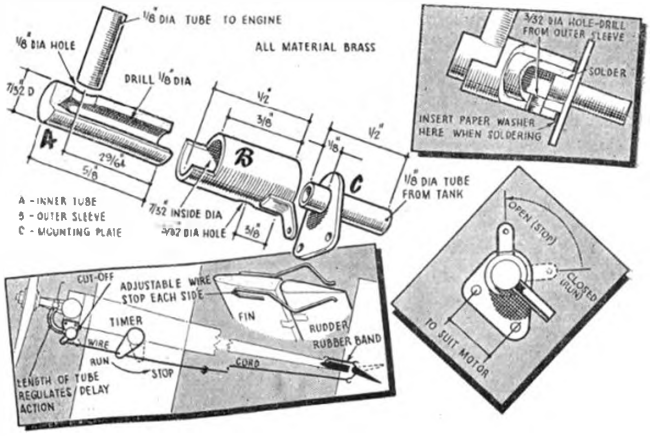
This was just what I had been looking for, as the admission of air into the line meant that the motor would continue to run on fuel lying between the cut-off and the needle-valve, and by regulating the length of this piece of fuel line I could control the duration of the motor run after the rudder had moved over. A period of experimentation followed, which, needless to say, was not without some unforeseen and at times amusing incidents. The device has now been fitted to three different models with successful results, and I feel confident in recommending it to any modeller who is having stall trouble.

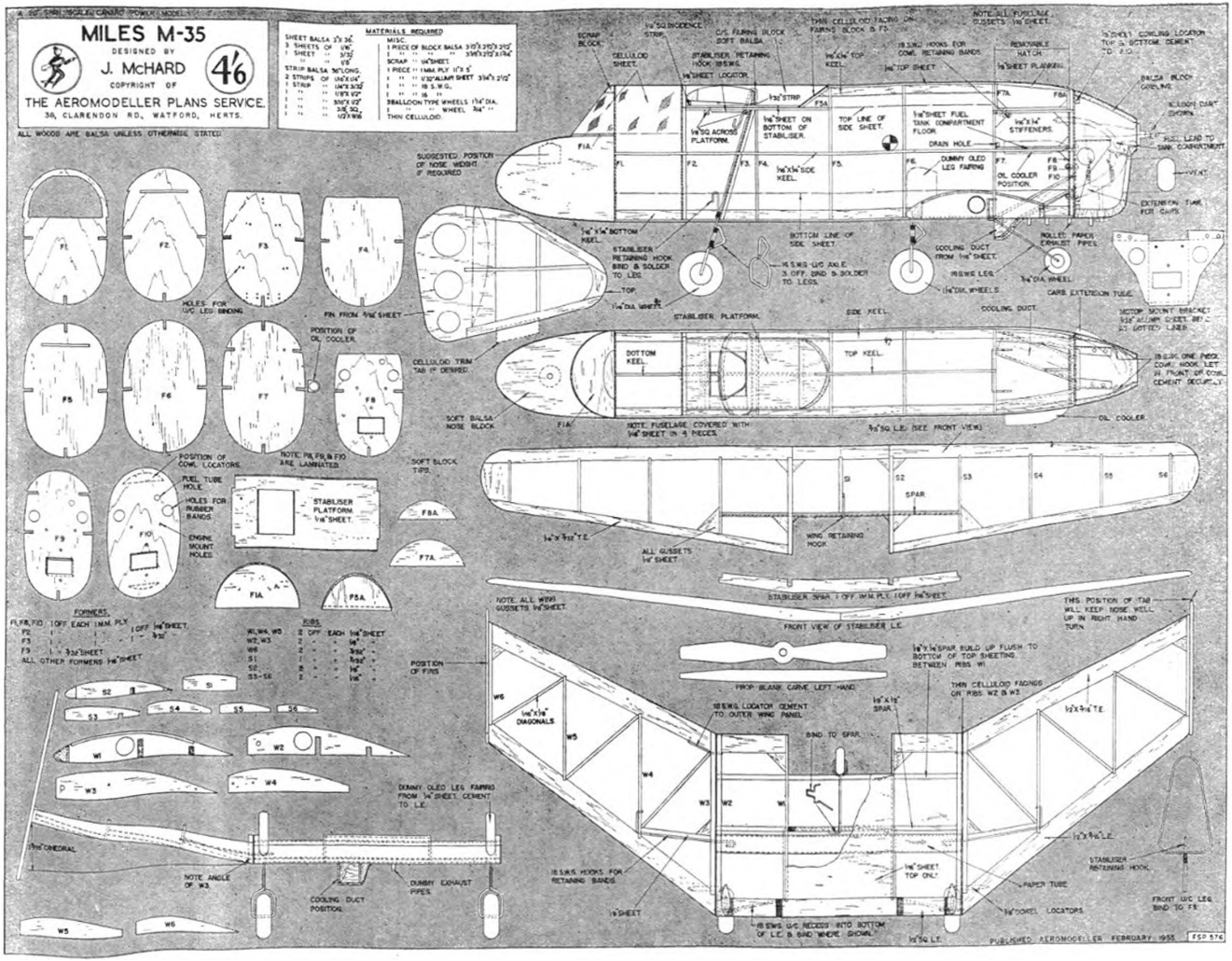
It is not hard to visualise the action of the cut-off; the model is in a steep climbing attitude when the timer operates the rudder. As the motor continues to run, the model banks over into what is really the start of a spiral dive, but before this can develop, the motor cuts leaving the machine in the correct gliding attitude, with no loss of height. Some experiment may be necessary to find the correct amount of delay for each particular model; as a guide, the writer has found that a $\frac{3}{4}$-in. length of $\frac{1}{4}$-in. inside diameter plastic tube does the job nicely on a 1.5 c.c. motor. When testing, it would be safer to err on the short side.

The construction of the cut-off is shown in the sketch, and should give no trouble to anyone with a little knowledge of fitting. The outer sleeve is cut away at the top to act as a stop in both open and closed positions. To ensure correct alignment of the air holes the outer sleeve is drilled first, then, locating this hard against the stop in the open position, the drill is run through into the inner cylinder. The final operation is to solder on the lower tube and base plate and, to prevent the solder from going where it is not wanted during this operation, a temporary paper washer is fitted under the outer sleeve, to be torn free when the job is completed. The cut-off shown is intended for crankshaft valve motors, and has holes to pick up the holding down bolts. With back plate induction motors, such as the E.D. 2.46, it should be possible to get a much neater installation by soldering the cut-off directly into the top of the tank.

The model shown in the close-up has an Elmic diesel timer completely enclosed in the pylon in an inverted position. With this timer rudder system it is most desirable to have the fin and rudder built permanently on to the fuselage, which means that they need to be placed either forward of the tailplane, or, as on my latest model, underneath the fuselage. The trim used by the writer was for a right turn on both climb and glide, using right thrust on the motor, slight left rudder on the climb, changing to right rudder on the glide. This system would also appear to be particularly suitable for models trimmed to climb straight, a method which appears to be favoured by many of your leading free flight men.

Australian Jim Fullarton uses a native "Sabre" 1.5 diesel on model in heading to demonstrate use of this delayed action trim scheme.





FULL-SIZE COPIES OF THIS ¼ SCALE PLAN CAN BE OBTAINED, PRICE 4s. 6d. POST FREE FROM *AEROMODELLER* PLANS SERVICE.

Miles M.35 Libellula

AN UNORTHODOX 20 IN. SPAN TANDEM WING SCALE DESIGN BY **J. D. McHARD**

IN THE 1952 AEROMODELLER ANNUAL, we made the mistake of quoting the Miles Libellula as an unsuitable subject for a flying scale model.

To Sgt. John McHard, the king of the unorthodox among R.A.F.M.A.A. members, this was a challenge not to be passed. "Max" looked up the APS 1/48th scale drawings for the single engined pusher canard M.35, reached for his Allbon Dart, and decided to prove us wrong.

The model was finished in double-quick time and soon R.A.F. Station, Wellesbourne Mountford, became used to the novel sight of a diminutive 20 in. span tandem wing model, flitting off the runways like the dragonfly family after which it was named. Repeated flight tests showed an inherent stability better than many another scale type.

If you like the unusual, want something to give you plenty of amusement per flying minute, and that is robust enough to stand the rigours of small field flying, then the M.35 Libellula should be first choice.

Fuselage is started by making up the laminated bulkheads (3 and 8-10) and attaching nosewheel and engine mount. F.2 is also laminated and the band hooks fixed in F.7. Cut out the stabiliser platform and add stiffeners. Then assemble all formers on side keels, add top keel, platform, stiffeners and lower keel in that order.

Select straight grained medium weight 1/16th for fuselage covering, and since the cross-section is constant, a wide sheet can be wrapped around the formers, in four panels. To simplify this wrapping, moisten the outer surface of the sheet, and should the curvature between F7 and F8 present any difficulty, a coat of shrinking dope on the inner surface helps. To make sure that a fairly large planking area is continued through the fuselage length on either side to transmit engine loads, add the side panels first.

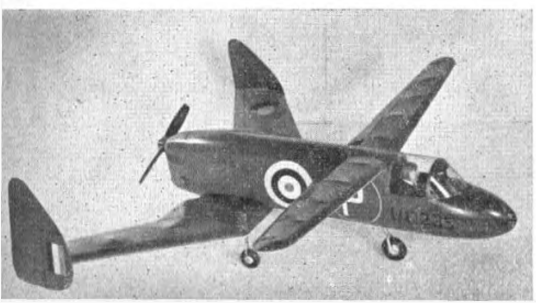
Before fitting top and bottom panels, switch to the **Mainplane** centre section which is made up complete with undercarriage, sheeted between ribs R1 and firmly cemented by the l.e. and main-spar to F6 and F7. Fit the rear wheel and the engine cooling duct. Then complete the fuselage planking.

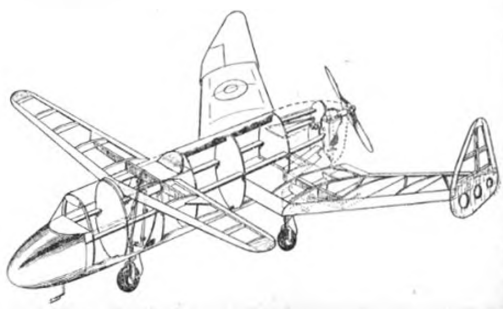
Add a noseblock "blank" cut to side and plan views, onto F1 and fix the windscreen former, then curve to shape. Make rear access hatch, engine cowl around mounted engine, fit a tank and arrange a neoprene tube carburettor extension.

Wing **outer panels, stabiliser** and **fins** are next completed, only points that need special attention are the wire fittings for band hooks and incidence setting of the mainplane.

Cover whole airframe with lightweight Modelspan, give two coats of clear, then colour dark earth and green camouflaged upper surfaces and duck egg blue undersides. The prototype "P" is in yellow like its surrounding circle, and the pusher airscrew would be black with yellow tips.

When colouring is completed, balance at the indicated c.g. by adding nose weight. (On the original, a heavy pilot did the trick.) Now test glide over long grass, and if anywhere near to being flat and straight, you are ready to start low power take-off attempts. These show up any violent turning tendencies which are corrected by off-setting the engine. A small celluloid trim tab on the port rudder will effectively trim the Libellula to any desired flight pattern, and be quite invisible in the air. Turns to the right are to be preferred, and providing the stabiliser and mainplane settings are exactly as per plan, no incidence alterations should be necessary.





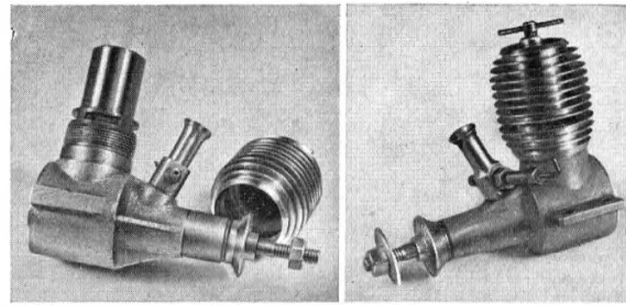
Making your own ENGINE

Part three.

Tools and their use

described by

Dave Sugden



Two of Dave Sugden's 2.5 c.c. diesels, one at left shows how the cylinder is retained on the crankcase.

SINCE MOST of the work is turning, lathe tools will be dealt with first. *Fig.* 1 shows the various types for general work. Each turner has his own pet way of sharpening tools and those shown will merely serve as a guide. A few general rules apply to all lathe tools. Overhang from the tool post must be reduced to a minimum to prevent chatter. Top side and front clearance angles of no less than 3 degrees should be allowed between the finished surface and the tool, so that swarf cannot jam between the tool and the work, thus spoiling the finish. It has been found best to set up a tool at centre height despite what some people may say to the contrary. It is advisable to touch up the tool tip prior to taking a final cut, especially on ferrous metals.

Turning High Tensile Steel.—(A) The cutting angle should be made fairly large to strengthen the cutting edge and reduce its wear. Because H.T.S. work hardens rapidly the tool must not be allowed to rub and is best operated with a coarse feed at 200 to 400 r.p.m. with as big a depth of cut as allowed by the motor power. Soluble oil and water is a suitable coolant if the work and tool overheat.

Cast Iron.—Although C.I. crumbles off when machined, it requires similar treatment to H.T.S. On no account should a cutting fluid be used as this will cause the tool to rub.

Aluminium.—This is easy to machine and any combination of feed, cut and r.p.m. can be used, though for a good finish high r.p.m. is best. Larger rake and clearance angles may be used and, indeed, are essential for some of the softer alloys which tend to build up on the tool tip. Paraffin used as a cutting oil cures this trouble.

Brass.—Being such a soft metal, brass is so easily cut that a tool as shown at **(B)** with no rake angle plus side angle to prevent digging-in must be used. No lubricant is required. Any combination of feed, r.p.m., and depth of cut is permissible.

Phosphor Bronze.—Although a fairly soft metal, it is very tough and quickly work hardens. It should at all times be treated with respect. A sharp ordinarily-shaped tool will be satisfactory. If difficulty is experienced, cutting fluid may be used to good effect. Any speed with moderate feed and cut is suitable.

Special Tools

Knife Tool.—This tool **(C)** is for cleaning out square corners. It is made either left or right handed with more rake angle than usual. The point is not robust and will not stand heavy wear. It may be used on any of the various metals above with cutting fluid if necessary, and in general the r.p.m. should be somewhat lower than that used with the ordinary tool.

Parting Tool.—(D): Cutting takes place on the front edge and corners which should therefore be ground true and square to prevent the tool from wandering. A small clearance angle is given to the sides, but adequate metal must be left at the root to take the cutting loads which can be heavy. Even on a good lathe a parting tool tends to chatter and a low speed is often used together with a *coarse* feed. To stop chatter the feed must be increased. If this does not do the trick, the speed has to be lowered; 200 r.p.m. is easily possible on dural and also on H.T.S. if the tool is good. Always use cutting fluid to prevent the chips from jamming.

Screw Cutting.—A screw cutting tool is ground to the profile of the thread as shown **(E)**. It may be fed in either perpendicularly or at an angle of 27½ degrees and is set up with the aid of a special template. A 5-thou. depth of cut is suitable and r.p.m. are governed by chatter and the skill of the operator; bottom speed is best for a start. Choose a thread pitch which divides evenly into the pitch of the lead screw so that the "nut" can be engaged at any position. A screw-cutting dial eases this problem. Having set up the gears, and with a suitable cut, make a run, disengage the "nut" when the tool has run into the groove which should be provided at the end of the thread. Wind out the tool, return it to the beginning, and reset to a new cut. Should anything go wrong, don't panic. Stop the lathe and wind out the tool instantly. Cutting fluid is often useful, as is also a touch of emery cloth to ease the tops of tight threads.

Boring.—(F) A boring tool should possess properties similar to an ordinary turning tool. The overhang which tends to make the tool chatter should be kept as small as possible. This reduces the whip which makes boring to an accurate parallel diameter a little difficult. Provided that a good finish is obtained the tool may be mounted above centre height so that it does not foul the hole. In general the r.p.m. will be slightly lower than that used for plain turning.

Milling.—The chief difficulty here comes in putting up the job. It is fairly easy to grip it in a machine vice bolted on to a vertical slide which permits 3D motion, but it is considerably more tedious to clamp it on to the cross slide. A vee block with lots of packing including paper is most useful here. The cutter mounted in the chuck will be run at maximum speed and often completes the operation in a couple of minutes. Cutting fluid is useful in preventing clogging.

An end milling cutter will be found to be the most useful for surfacing, cutting transfer passages, lightening pistons, etc. Its size will probably be governed by the radius of the curves. For milling exhaust ports a fly cutter is most convenient. This is similar to a boring tool, with the tip ground like a parting tool, mounted in the

chuck. The bar part of a Nulok tool with a bit as shown in (**G**); is admirable.

Grinding.—Means of avoiding grinding and the construction of a small internal grinder were described in Part I (December issue). Should you be lucky enough to have a friend who can do grinding for you the following hints may be helpful. Grinding is often done between centres and if at all possible the part should be made with centres for this reason. It will be necessary to leave about 5 thou. on the diameter for grinding. If centres cannot be made and the grinding has to be done in a chuck, a boss suitable for gripping in the jaws must be arranged, and from 10 to 20 thou. left on the diameter to allow for eccentricity of the chuck and setting up. An extra 5 thou. should be allowed for distortion if heat treatment is being carried out prior to grinding on parts which are not robust.

Lapping.—This is the process by which the accurate finish and fit of the piston and cylinder is obtained. The principle is that of impregnating the surface of a piece of metal with rubbing compound which is then used to "wear" the part down to the required dimensions. The rate of cutting is dependent on the amount of compound charged into the lap, the coarseness of the grit, and the fit of the lap to the part. A softer material than that being worked upon is used for the lap, so that it will absorb the compound. C.I., copper, aluminium, and brass are the usual materials. Because the lap is made of a soft metal it tends to wear rather rapidly, and if the rate of cut and accuracy of finish are to be maintained the lap must be expandable. For 1-off jobs where little lapping is needed the extra complication of expanding laps is not justified, but on parts which are at all distorted, probably due to heat treatment, they are essential. (**H**) and the accompanying photograph (*below*) show the usual types.

A corkscrew type of motion is applied to the part held by hand with the r.p.m. at about 600. Medium grade valve grinding paste has been found to be most suitable; it then only takes a few minutes to lap out a cylinder from the reamered finish. The surface obtained is fairly smooth, but is rough enough to enable it to run in easily. A dry lap with little paste gives the best finish. As always, to remove metal quickly power must be used, and on one occasion when lapping out a case-hardened cylinder which had distorted 5-thou. out of round, a cast iron lap tightly expanded with a liberal amount of paste, employing paraffin for cooling and lubrication, trued the bore track in half an hour. The part was not held by hand as is usual as the torque and temperature were too great. A hone as marketed by Delapina is far superior if your pocket will stand it.

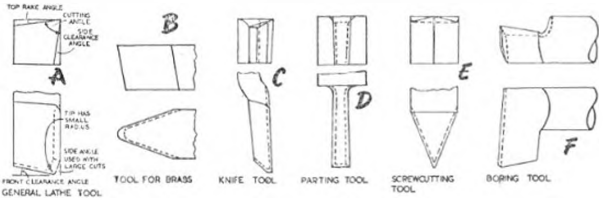
Taps and Dies.—Taps are made usually in three forms: taper, second, and plug taps which are used to make the initial through to the final cuts. After each half turn the tap should be rotated backwards far enough to free the chips, which on soft metals tend to clog. Cutting oil should always be used except on brass and C.I. It is a good idea to withdraw the tap completely several times to clear the swarf. Large taps are manipulated with a wrench and frequently have a centre hole in the shank which when located by a centre greatly assists a true perpendicular feed. Small taps are best gripped in a drill chuck.

A died thread should always be made after the tapped one since the die is adjustable. The swarf is freed and cutting oil applied as for taps.

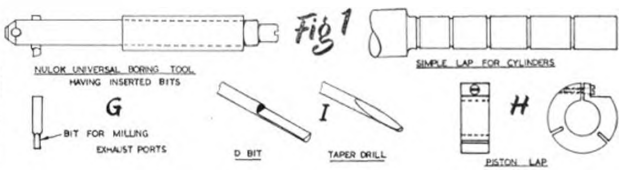
Drills.—Modellers should need little introduction here, though a few hints may be of use. It will be found easiest to drill most holes with at least 2 drills. The last drill then has a better chance of producing the hole to size since only a small portion of the cutting edges is being employed. It follows the hole already made by the first pilot drill which should therefore be in very good order, or new if possible, to ensure that the drill does not run off centre. Always start the hole with a centre drill or a good centre pop. Should the drill not be starting on centre before the lands enter the hole, it is possible to pull it back on centre by cutting a groove with a centre pop on the side of the conical depression to which you wish the drill to return. Use cutting fluid to assist swarf removal and cooling and don't use too high r.p.m. with large drills (about 300 r.p.m. for a ¼-in. drill in steel) otherwise they may burn out. For small sizes steel wire sharpened to a suitable point is often useful with soft metals.

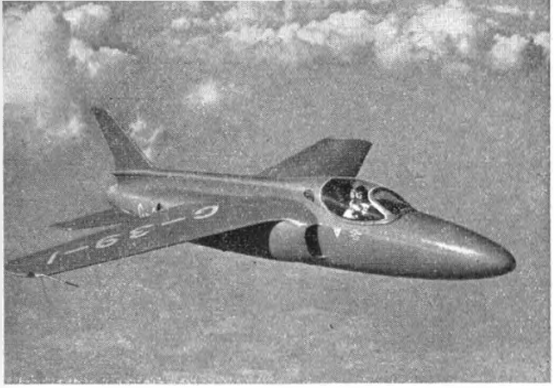
Reamers.—Reamers are made either to size or expandable. They possess a small taper for the first one-third of their length and so should be able to pass through the hole being finished. Lots of cutting oil and a fastish feed are combined with low r.p.m. to remove only 3 to 4 thou. of metal. A reamer will not produce a good finish if called upon to remove more than this and for sizes where drills increase by 1/64-in. the hole must be bored out to bring it to a size suitable for the reamer. If the hole cannot be bored and an expanding reamer is not to hand a badly ground drill might be used after a pilot drill to produce a sloppy hole which with luck might be acceptable to the reamer. An accurately ground drill having the corners rounded with an oil stone may be used with a fast feed in soft metal to replace the reamer for finishing the hole. In the smaller sizes, below about ¼-in., reamers can be replaced by D bits or taper drills (**I**) made from ground silver steel, hardened and tempered if necessary.

(Next month, in this popular series, we shall cover further important aspects of machining your own engine.)



Expanding lap showing grub screws for adjustment





AEROPLANES IN OUTLINE NO. 20

by J. R. ENOCH

FOLLAND AIRCRAFT MIDGE

FOR SOME TIME PAST, the trend of modern fighter design has resulted in large, heavy and complex aircraft. To call a halt to such tendencies, Folland Aircraft Ltd., under the guidance of Mr. W. E. W. Petter, C.B.E., B.A., F.R.Ae.S., the Managing Director and Chief Designer, began investigation into the numerous problems involved in the conception of a light fighter.

Meticulous study proved that certain components were required on a standard fighter only by virtue of its size. Such were discarded, and a substantial weight saving was effected by a reduction in size of essential items.

The weight saving thus achieved permitted a corresponding saving in structural weight. There then emerged the prospect that a light fighter with a performance equal to that of a standard fighter could be produced, with a weight no greater than that of a 1939 vintage fighter, subject to the availability of a suitable engine.

At that time, the Bristol Aeroplane Company were developing an engine, the Saturn, which had the necessary characteristics for the Folland Gnat (Makers No. FO.141) light fighter project, and consequently design work on the Gnat was commenced. A few months later, however, the development of the Saturn was terminated.

To avoid the grave delay that would have resulted in awaiting the design and construction of an alternative power unit, it was decided to build a low power prototype, utilising an existing engine. To avoid confusion with the ultimate Gnat, the name Midge was chosen for the prototype, manufacturers number being FO.139.

Work on the design of the Midge began in 1952, and on the 11th August, 1954, the first flight was made from Boscombe Down, piloted by Sqdn. Ldr. E. A. Tennant, D.F.C.

Structurally the Midge is very simple, being of all metal stressed skin construction. The wing, built in one piece, is attached to the fuselage by bolts at four main points, a system that readily permits quick assembly, and removal. Being small and of conventional construction, the wing has the required strength and stiffness for supersonic flight. With a thickness-chord ratio of approximately 8% the wing area is in the region of 123 sq. ft. Manually operated outboard ailerons with sealed aerodynamic balances are fitted. There are no flaps.

The long fuselage nose provides adequate space for the radio and radar required. V.H.F. radio with a standby set and Distance Measuring Equipment are carried. A cockpit canopy of unusual design is fitted, the gunsight windshield is fixed and the blown hood which affords excellent visibility embodies a light metal fairing at the forward end. Cockpit layout which conforms to a standard being considered by N.A.T.O. is simple, with all controls most conveniently placed. Air conditioned, and fully pressurised with provision for a Pressure (Anti-G) Suit, it contains a lightweight ejector seat developed by Folland from original S.A.A.B. design.

A novel feature of the design is the "dual purpose" tricycle under-carriage. The three units retract backwards into the fuselage; when the under-carriage is partially extended, the doors which are attached to them act as very efficient air brakes.

An Armstrong Siddeley Viper A.S.V.5 (long life) turbo-jet with take-off power of 1,640 lb. static thrust, powers the Midge, aspirated by the lateral air intakes. A small auxiliary intake is on the starboard side of the fuselage. Fuel is contained in three tanks which have a total capacity of approximately 140 imperial gallons.

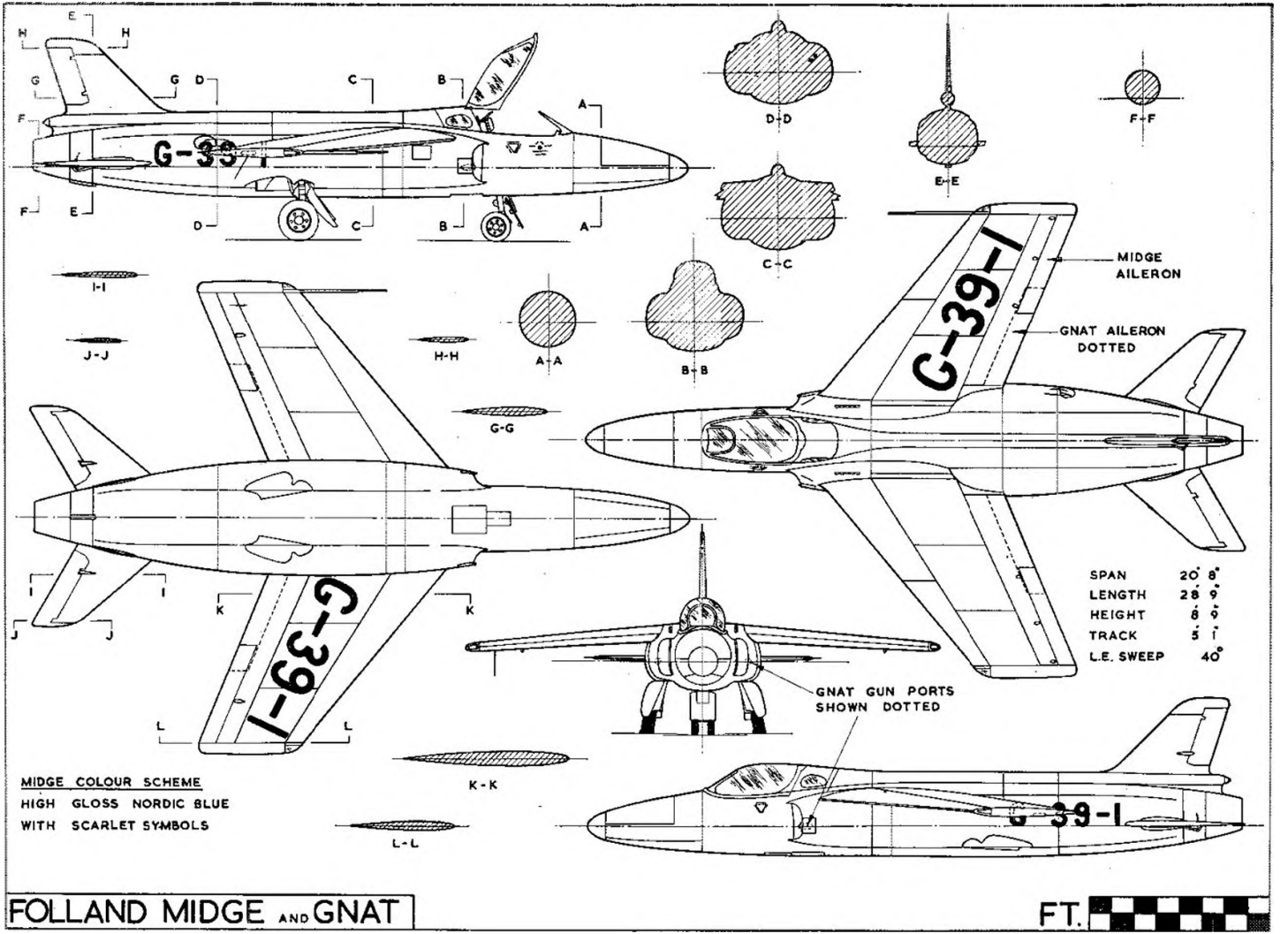
On the limited power available the performance of the Midge is indeed exceptional. Level speed is in excess of 600 m.p.h., and the aircraft has exceeded Mach 1·0 at 24,000 ft. in a dive from 37,000 ft. with no adverse effect.

Externally, the Gnat will differ very little from its admirable forebear, the essential difference being that it will be fitted with a Bristol Orpheus axial flow turbojet of approx. 5,000 lb. static thrust.

All control surfaces will be power operated, inboard ailerons being adopted which will allow a very rapid rate of roll and excellent control at supersonic speeds. Top speed and ceiling of 725 m.p.h. and 55,000 ft. respectively are expected.

In addition to the two 30 mm. cannon, provision is made for the Gnat, in a Fighter-Bomber role, to carry 2 x 500 lb. H.E. or Napalm bombs or 12 x 3 in. air to ground rockets. Wing tip fuel tanks and a braking parachute may also be fitted.

Compared with the standard fighter the Gnat has several very significant merits. Tooling time for production is halved, and 25 Gnats could be produced in the time taken to produce 5 standard fighters, and at a small fraction of the cost. It is readily mobile, being easily transported by land, sea or air, and pilots can be taught to fly it in less time because of simplicity.



FOLLAND MIDGE AND GNAT

FT.

"J" TYPE 1/72ND SCALE REPRINTS AND "A" TYPE 1/48TH SCALE DYE-LINE PRINTS OF THIS DRA—WING ARE AVAILABLE FROM A.P.S. PRICE 6D. AND 1/- RESPECTIVELY

MOTOR MART

LET'S GET a bit of sense into this argument about engine brake horse power performance. Our contemporary is repeatedly anxious to credit us with the statement that model engine performance does not exceed .05 B.H.P. per c.c. and as final "denunciation" quotes the new Eta "29" performance figures of .13 B.H.P. per c.c., arising from a peak B.H.P. of about .65 at 16,000 r.p.m.

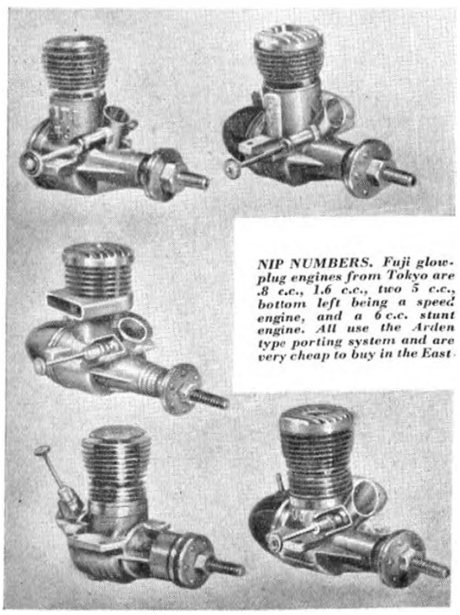
Now as we have tried to point out before, emphasis on peak B.H.P. can be a most misleading criterion. If, by modification to the design, you can continue increasing the range of operating r.p.m., you can continue to increase the peak B.H.P. Starting with a plain bearing engine, for example, modification to the timing and porting can advance maximum r.p.m. Add ball bearings to reduce frictional losses, and up goes the maximum r.p.m. figure again, with possibly still further modifications to the porting. Quite likely, in the meantime, torque output at moderate speeds has dropped.

Thus, considering only peak B.H.P. as a "performance" criterion, your "best" engine may be a very indifferent performer down in the range where a lot of people may want to employ it. On the other hand, to adopt an arbitrary level of speed (operating r.p.m.) at which all engines could be compared (say B.H.P. at 10,000 or 12,000 r.p.m.) would be unfair to the engines which do peak at high r.p.m.

Hence peak B.H.P. figures alone have no very great value, unless allied to the operating r.p.m. concerned *as a major factor of selection.*

Now as to specific power output, we still stand by our original statement that published performance figures have been exaggerated—at times grossly exaggerated. Comparisons on the basis of B.H.P. per c.c. are open to the same objections as above. Hence such generalisations can only be applied loosely. We have never said or implied that an output of .1 B.H.P. per c.c. is impossible. In fact, it is most certainly possible with good designs and good construction, particularly when peak power is developed at 15,000 r.p.m. or above. As far as "overall average" figures can be given, we think .075 B.H.P. per c.c. a good level for any normal production engine which peaks in the region of 11,000 r.p.m.

Unlike our contemporary, we have tried to find *reasons* why there should be such differences in quoted performance figures. Rather than elaborate on this particular theme we refer readers to the article on page 70.



NIP NUMBERS. Fuji glow-plug engines from Tokyo are .8 c.c., 1.6 c.c., two 5 c.c., bottom left being a speed engine, and a 6 c.c. stunt engine. All use the Arden type porting system and are very cheap to buy in the East.

The **Frog "150"** is shortly to be available as a water-cooled marine unit. Basically this will be a standard "150" motor with brass water jacket and turned brass flywheel, the latter of particularly generous proportions.

Some years ago the Low Speed Aerodynamic Research Association devised a turbo-prop adaptation for a standard **Jetex** unit, the idea being to turn jet thrust into shaft torque for driving a small airscrew. Overall efficiency is believed to have been relatively low, with power run, of course, limited to the duration of the Jetex charge. Wilmot Mansour are known to have done some further research on the project with a view to producing it in commercial form, but have so far released no additional information on the subject.

In the meantime a turbo-prop unit, operating on a slightly different principle, has been announced in America. In this unit the jet thrust (from a modified Jetex unit) is fed through tubes attached to the blades of a propeller. These tubes are curved to exhaust at right angles to the direction of rotation of the propeller at slightly over half radius.

Standard **Jetex** fuel is employed and the total weight of the whole unit is 1 ounce. Starting is by fuse, as with a normal Jetex, and thrust output is claimed as "comparable to ½A conventional engines" Price is roughly 28s.

Largest kit firm in the U.S.A., Berkely Models Inc., introduces the **PSST 50** a jet/rocket unit "for Jetex "50" and similar fuels" at one dollar each or $2.75 for three. Unit resembles the Jetex 50B with simple end cap. In New Zealand, Messrs. Bettair are marketing a similar **Velojet 50**—also to take Jetex fuel.

Back to the (American) manufacturing field comes **Orwick**, with a new "29" glow motor. "Orwick" was quite a name when the spark-ignition motor was in its heyday, the Orwick "64" being one of the outstanding performers in its class.

The new "Orwick 29" comes, virtually, in the individually-made class and consequently sells at a considerably higher figure than its contemporaries ($17.95). We understand, however, that it is an exceptional production job, on the lines of our own Oliver diesels.

Mercury-Allen 25's, coming into the shops now, have internal mods as mentioned in the October, 1954, analysis, and a larger diameter comp screw with much finer thread pitch to give more delicate compression adjustments. Another engine with mods incorporated is the **Amco 3.5 BB.** A new crankcase die casting, strengthened at places where experience has shown a need and a detachable exhaust stack, are among external distinguishing features, while a new hand at the wheel of production has brought about internal improvements. Exchange engines will be available for all BB owners, *see* advts.

Bringing the family right up to date, Davies Charlton announce a **Marine Merlin** is on its way, and knowing the popularity of this inexpensive point-eight for aircraft, we foresee a flood of Merlin boats in the future.

by Ray Monks

Ray Monks is one of Britain's best all-rounders, and currently in the top flight of indoor flying enthusiasts. Holds the British records for R.O.G. Stick, Tailless and Helicopter classes, and writes with a wealth of experience to back up his statements.

"SOAPBUBBLE" has been developed with the idea of providing beginners with a model of high performance, yet of simple enough construction to enable the production of a successful model with very little trouble. It should not be forgotten that the building of this specialised type of model aircraft brings about its own particular problems, paramount being the great importance of keeping weight down to a minimum. Nevertheless, one does not need to be put off on the assumption that one needs the slimness of a woman's hand to handle the delicate pieces of a "microfilmy", delicacy of touch and a little more patience than usual being all that is required to produce a model capable of 5 to 6 minute flights with consistency.

To construct the flying surfaces, spars are cut from sheet stock, having first "hollowed" the sheet as per sketch to automatically taper the spars in one dimension. Rectangular section spars are always placed with the greatest dimension vertical.

Ribs are sliced from quarter-grain sheet, using a ply or metal template. With a length of sheet cut to maximum chord dimension, make a cut around the template, then having shifted the template down the required depth, slice around template again, thus producing a thin profile which supports the very light covering. At the centre section (and at dihedral breaks on larger models) a base piece is used, connecting the nose and tail of the ribs, with a small vertical piece inserted to act as a compression member.

Full-size plans overleaf

With the spars ready formed around the sheet former as in sketch, ribs are placed and secured with the minimum of cement, varying rib lengths according to taper being met by cutting excess from the rear or trailing edge of the cut ribs.

Motor sticks are mostly constructed from 1/64 in. quarter-grain sheet stock, the larger model the bigger the tube diameter, but retaining the same thickness ratio. Circular section sticks are best, but are rather more difficult to construct than the tear-drop type. Cut the blank to size, and soak in hot water for 5 minutes. Then wrap around former using tissue strips to hold in position. Bake in an oven for 10-15 minutes until dry, then remove tissue and former and cement seam. Add end caps, prop bearing and rear hook to complete.

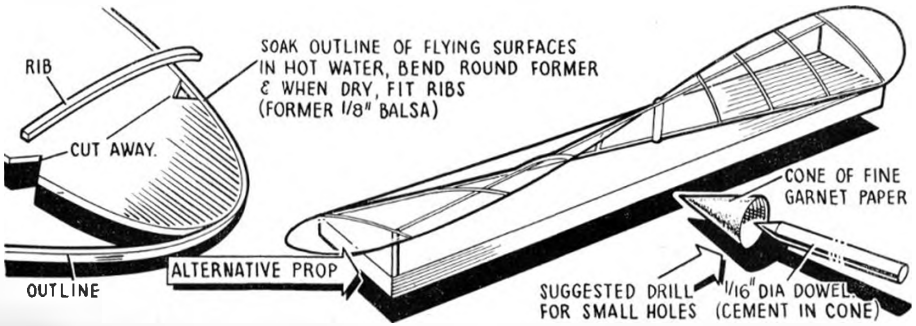
Paper tubes to carry wing mounts are made from tissue, and cemented into place. (A very useful drill for this delicate drilling can be made from sandpaper as indicated in the sketch.)

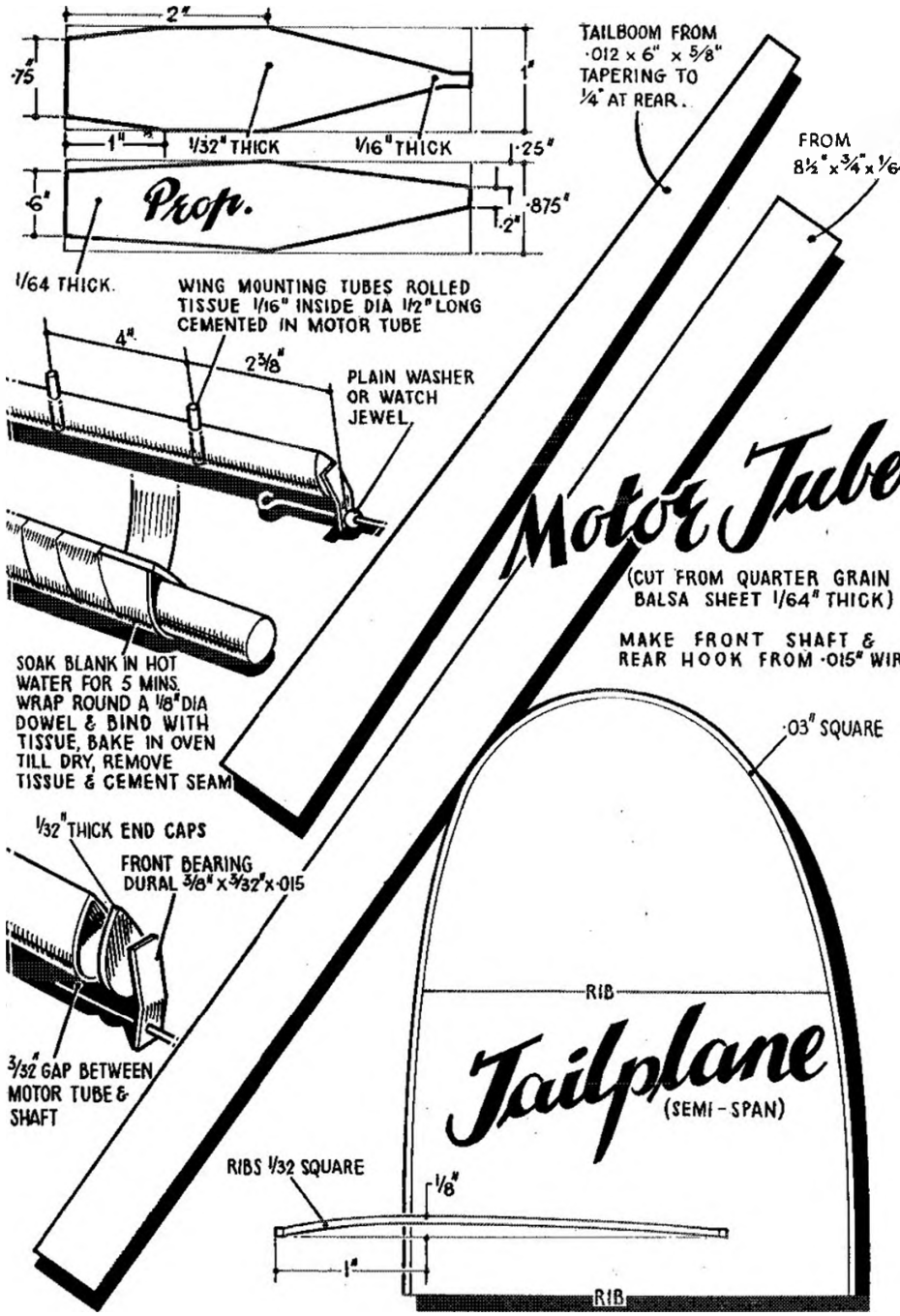
The tailboom is constructed in similar manner to the motor stick, but here quarter-grain sheet is not essential, and the former is tapered as shown.

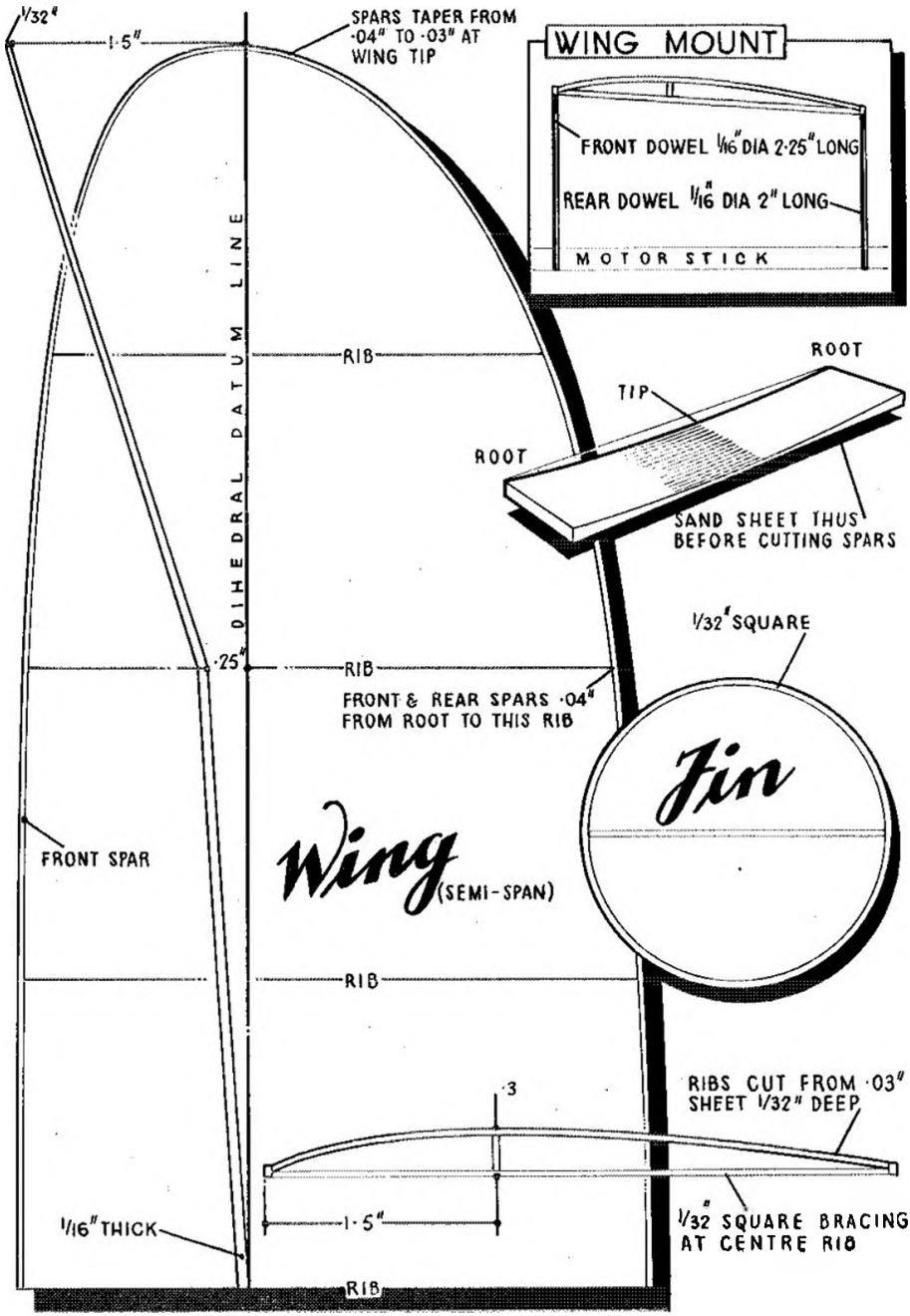
To produce a film for the covering of small models, which are really quite strong, ordinary clear dope to which a few drops of castor oil has been added is quite satisfactory. A teaspoonful of the mixture is poured on to the surface of water, and removed with the aid of a wire frame. Allow the film to age on the frames for a few days before use to get the best results. (A leaflet on the technique of "Making Microfilm" is available on receipt of a stamped, addressed envelope to the "AEROMODELLER" offices.) Apply the covering to framework, adhesion being obtained by first licking the outline, then trimming excess film by means of a hot wire or a brush dipped into solvent. Wrinkles, etc., can be removed by passing the component over a hot wire or light bulb, care being taken not to set light to the thing ! !

On a small model of this type, a built-up prop is not really worth the effort. Carve it in normal fashion, but much thinner than for outdoor models.

"Soapbubble" is ideal for low ceiling flying, and can give a great deal of fun in a fairly small space. Those who doubt their immediate ability to cope with microfilm may like to cover with very light tissue paper, but watch out for candid comment from those who wish to fly the more vulnerable film-covered article!




2"
·75"
1"
1/32" THICK
1/16" THICK
·25"
1"
·6"
Prop.
·875"
·2"
1/64 THICK.
WING MOUNTING TUBES ROLLED TISSUE 1/16" INSIDE DIA 1½" LONG CEMENTED IN MOTOR TUBE
4"
2⅜"
PLAIN WASHER OR WATCH JEWEL
SOAK BLANK IN HOT WATER FOR 5 MINS. WRAP ROUND A ⅛" DIA DOWEL & BIND WITH TISSUE, BAKE IN OVEN TILL DRY, REMOVE TISSUE & CEMENT SEAM
1/32" THICK END CAPS
FRONT BEARING DURAL ⅜" x ⅜2" x ·015
3/32" GAP BETWEEN MOTOR TUBE & SHAFT
TAILBOOM FROM ·012 x 6" x ⅝" TAPERING TO ¼" AT REAR.
FROM 8½" x ¾" x 1/64"
Motor Tube
(CUT FROM QUARTER GRAIN BALSA SHEET 1/64" THICK)
MAKE FRONT SHAFT & REAR HOOK FROM ·015" WIRE
·03" SQUARE
RIB
Tailplane
(SEMI-SPAN)
RIBS 1/32 SQUARE
⅛"
1"
RIB


1/32"
1·5"
SPARS TAPER FROM ·04" TO ·03" AT WING TIP
WING MOUNT
FRONT DOWEL 1/16" DIA 2·25" LONG
REAR DOWEL 1/16" DIA 2" LONG
MOTOR STICK
DIHEDRAL DATUM LINE
RIB
ROOT
TIP
ROOT
SAND SHEET THUS BEFORE CUTTING SPARS
1/32" SQUARE
·25"
RIB
FRONT & REAR SPARS ·04" FROM ROOT TO THIS RIB
Fin
FRONT SPAR
Wing (SEMI-SPAN)
RIB
·3
RIBS CUT FROM ·03" SHEET 1/32" DEEP
1/16" THICK
1·5"
1/32" SQUARE BRACING AT CENTRE RIB
RIB


Model of the Month
1
2
3
4
5
6

MODEL NEWS

FEW MODELS can boast a polished natural mahogany finish: but in the case of "Model of the Month" which is another of Captain Milani's superb scale controliners, the red grained veneer is true to life. This 1¼ in.—1 ft. S.V.A. is a replica of the aerobatic ace pilot Capt. N. Palli's own aircraft and is complete right down to the moving controls in the cockpit. An Ohlsson 60 Custom is completely hidden beneath the beaten and polished metal cowl, while scallop effect on the trailing edge is reproduced by using cotton instead of a wooden t.e. Nylon covering does the rest. Notes of interest are the use of dope bottle tops for wheel hubs and the accurate laminated mahogany prop.

A firm favourite in the A.P.S. glider plan range is the Temple Tribute—a model which demands a little extra patience but always rewards the builder with fine results. No. **1** picture shows £pl. Merry of R.A.F. Syerston with his Tribute which placed first in the Concours d'Elegance event at the R.A.F. Training Command Championships. In complete contrast, a model which sacrifices appearance for the acme of performance, picture **2** shows John O'Donnell's "Haddock" Jetex contest model. The fact that this model collected the I.C.I. Challenge trophy plus a useful £20 cheque speaks enough for the performance. Note the forward fin and small thrust rudder in the jet slipstream, which is used for power trimming. The Unit is a Jetex 350, and John always allows the first charge to burn away before launching in a contest The second charge is more powerful. Lightweight construction unfortunately means a high fuselage mortality rate.

Back to elegance in **3** where photographer Ron Adams has demonstrated perfect use of daylight flash when taking this shot of his wife holding his Mercury Aeronca Sedan. Vivid scarlet and light blue finish is still not marred after many flights on Allbon Javelin power. Another scale model in **4** provides a variation on the A.P.S. Luton Minor which we featured in December 1952 as a full-size plan. Converted to control-line and fitted with a Craftsman Twin cylinder engine, this unusual Minor hails from Derek Wilson of the Malton Club in Yorkshire. The Luton Minor is now one of the most popular scale designs flying; we have seen twice size free-flight versions and from the U.S.A. hear of a half size "Bambi" powered miniature. The Bird Dog from this last December issue is now rivalling the Minor and we wonder just how long we shall have to wait before we hear of variations on this design.

An own design Biplane by D. R. Camps of Cambridge appears in **5** and displays attractive semi-scale lines for its 43 inch span. Coloured royal blue and chrome yellow (a scheme to be recommended), it weighs just under 13 ounces and has a Mills .75 engine. Why don't we see more free-lance sport designs of this calibre?

With the Webra 1.5 featured in Engine Analysis, and the Atakee design from Holland built around a "Record", it seems fitting that the contest power design in M.N. this month should have the same power unit. Ron Pollard is seen in **6** holding his F.A.I. formula model of 48 in. span and 303 sq. in. wing area. The 30% tailplane looks diminutive at this angle and this is accounted for by the long profile fuselage. Performance is in the region of four minutes off 15 secs. engine run.

Something quite out of the rut appears in **7** where we see M. A. Leadbeater's 7 ft. model which balances the scales at 6½ lb. An E.D. 3.46 up on the high thrustline provides ample power and a most impressive 30 yard take-off run: but the reaction of the model when the motor cuts (it tends to balloon up) has led to addition of another engine. This is a smaller diesel, mounted at the rear of the mainplane in tandem, and which gives continual power through the glide, and keeps the nose down into a normal glide angle. In the next picture, number **8** is a scale Swedish S.A.A.B. Safir 91 b. by Hoh Fang-chuin who is studying in that country. A Webra 2.5 Winner flies the model at over 60 m.p.h. on 44 ft. lines, the flying weight being just under 1 lb.

Only 2 ft. span yet fully detailed and a veteran of many flights with its Frog 50 engine, the scale Swordfish in **9** is held by chubby Brian Winters, son of the designer who comes from East Ham. At last year's R.A.F. Champs., this model attempted to emulate Icarus by folding its wings after take-off: but it survived to be repaired and fly again. Colouring detail came from an old cigarette card collection and shows an aircraft from H.M.S. Furious.

more

Armchair Aeronautics

reviews by Owen Thetford

As above

Aircraft Today, Edited by John W. R. Taylor. (Ian Allen Ltd., 9s. 6d.), 104 pages. Illustrated.

Editor John Taylor has collected in this review of modern aviation articles by such diverse authorities as Air Marshal Sir Robert Saundby, Sir Frederick Handley Page, James Hay Stevens and Mike Lithgow. There are articles on rockets and space travel, flying saucers, jet fighters, air power and sea power. Royalty and aviation, and flight refuelling. There are pages of rare photographs, such collector's pieces as an Armstrong-Whitworth Ape, a twin-tail Prentice, a Fairey 111F with a Napier Culverin engine and an Airspeed Horsa glider with a Comet windscreen.

It is the ideal present, either for the air-minded nephew or his uncle! In fact, it has something for everybody.

Encyclopedia Aeronautica

All About Aircraft, by D. M. Desoutter. (Faber and Faber, 25s.), 474 pages. Illustrated.

All About Aircraft is aptly named for there are, indeed, few questions one could pose about the science of aeronautics which could not be answered by consulting its index. Its scope and sweep is immense and speaks volumes for the industry of its author who is, incidentally, Assistant Editor of *Aeronautics*. Its illustrations and diagrams are clear and plentiful and it even includes a page on the Rolls-Royce "Flying Bedstead." Apart from masses of technical facts about turbojets and aerodynamics, there are sections on aviation records, all neatly tabulated, an aviation chronology and a chapter on careers. Most aircraft types flying to day are described and illustrated and all in all, the book is excellent value for money.

Spotter's Delight

The World's Fighting Planes, by William Green and Gerald Pollinger. (Macdonald, 12s. 6d.), 240 pages.

The Observer's Book of Aircraft, by William Green and Gerald Pollinger. (Frederick Warne, 5s.), 288 pages.

The World's Fighting Planes is, as it were, a pocket edition of the earlier *The Aircraft of the World*, covering merely military aircraft and brought completely up-to-date by the inclusion of such types as the English Electric P.1 and the Grumman F9F-9 Tiger. It is in every way a most admirable publication and the names of its authors guarantee its authenticity.

The Observer's Book of Aircraft, smaller in format, covers both civil and military aircraft of the world, but in this book the less important or older types receive less space and have no silhouette. For reliable, succinct information on the world's aircraft, this little book is quite unrivalled. Specially to be commended in this latest edition, which contains 150 brand new pictures, is a page giving a rapid classification of all types shown (with page references) under basic configurations for the benefits of amateur spotters.

Flat-Top Saga

Sea Flight, by Hugh Popham (William Kimber, 15s.), 200 pages. Illustrated.

This is a truly fascinating book. Very little has been written about the work of the Fleet Air Arm in the Second World War, so that Hugh Popham's story of the war as seen through the eyes of a carrier-borne fighter pilot has, apart from its intrinsic merits, all the advantages of novelty.

After learning to fly at Luton in the middle of the "blitz" of 1940 (with German bombers attacking the nearby Vauxhall Motor Factory), the author continued his training in Canada on Battle Trainers before returning to England, Fighter School at Yeovilton, and initiation into the ways of Sea Gladiators, Skuas, Fulmars, and Sea Hurricanes. First taste of aircraft-carrier operations came with a posting to No. 880 Squadron (Sea Hurricanes) aboard H.M.S. *Indomitable*.

Back in England, converting to Seafires, he is involved in a mid-air collision, bales out, breaks his back and finds himself in a lunatic asylum!

Surviving this bizarre experience. Popham flew Seafires of No. 894 Squadron in H.M.S. *Illustrious*, was present at the Salerno action, and afterwards transferred to Escort Carriers on routes to Russia.

Hugh Popham has an extremely readable style and handles with equal skill the vivid description of epic sea-air battles, pen-sketches of his fellow pilots and irascible C.O.s ("The Butcher" is a particularly memorable portrait of a former Walrus pilot turned martinet) and the humerous anecdotes of which the book is full. *Sea Flight* will surely take its place among the best accounts of wartime aviation.

Gladiators over Malta

Faith, Hope and Charity, by Kenneth Poolman. (William Kimber, 15s.), 200 pages. Illustrated.

This is a story which had to be told one day and Mr. Poolman has done it well. As the reader will have guessed, it is all about the epic fight of the three Sea Gladiators nicknamed, "Faith," "Hope" and "Charity," by the Maltese, which alone defended Malta against the might of the Italian Air Force in 1940. It is a tale of desperate courage and resolve by the ex-flying-boat pilots who flew them, and of almost incredible ingenuity and skill by the ground staff, led by the able Flying Officer Collins, who contrived somehow, anyhow, to keep these battle-scarred veterans in the air. Some interesting new facts emerge about how Mercury engines taken from Blenheims were modified to suit the Gladiators after the original engines have given up the ghost. One of the Gladiators, in an effort to gain more fire-power, had its original four guns supplemented by twin guns above the top wing in the manner of the 1914-18 Nieuports and S.E.5's. This version (not in the recognition charts) was dubbed "the Bloodiator."

An Old Friend in New Guise

Flight Handbook (Fifth Edition). (Iliffe and Sons Ltd., 15s.), 282 pages, Illustrated.

Compiled by the staff of *Flight* this invaluable text book on the theory and practice of aeronautics first made its appearance in 1938 and it has now been brought right up-to-date, its 200 odd photographs and drawings covering such types as the Hunter, Sabre, Stratojet and Fairey Rotodyne. Virtually a miniature encyclopaedia it provides basic information on every subject from theory of flight to ram-jets, aircraft structures to guided missiles, gliders to helicopters. Few questions could be posed about modern aviation which this classic reference book could not answer.

All About Rockets

Development of the Guided Missile, by Kenneth W. Gatland, F.R.A.S. (Iliffe and Sons Ltd., 15s.), 292 pages, Illustrated.

One marvels, reading this book, that such a wealth of information could be gathered on a subject so heavily cloaked in security as rockets and guided missiles. Yet the author, a world authority on his subject, has not only given us chapters on every aspect of rocket research and development, both for military and peaceful purposes, but also added an Appendix with data on 140 different types of rockets and missiles from eight different countries.

The Silent Service Grows Wings

Fleet Air Arm, by Lieut.-Comdr. P. K. Kemp. (Herbert Jenkins, 16s.), 232 pages. Illustrated.

It is difficult to imagine how such absurd errors could have found their way into this book—errors which nullify its claim to be a serious work of history. Written by the Admiralty Archivist, a Fellow of the Royal Historical Society into the bargain, it shows an ignorance of aircraft types beyond belief. There are such remarkable statements as that the Flycatcher was among the types in service with the Fleet Air Arm in 1939, a Swordfish is alleged to have a rotary engine (page 100) and a Wyvern torpedo-strike aircraft is captioned as a "naval interceptor." Fairey Aviation will be interested that their Barracuda was among the many American types of aircraft supplied to the Royal Navy during the war! The author does not appear to be aware that the Martlet and the Wildcat are the same aircraft or that, in the R.A.F., the Beaufort was designed as torpedo-bomber and not "adapted" for this work. Nor was the Beaufort known as the "Torbeau"—this was the torpedo version of the Beaufighter.

The chapter on "The Inter-War Machines" is a travesty of the facts. The Swordfish, we learn, was a replacement for the Ripon (there is no mention of the intervening Baffin or Shark). The Flycatcher was superseded, oddly enough, by the Sea Gladiator. There is not a word about the Hawker Nimrod which, in fact, linked the two types. Such types as the Fairey 111D, Avro Bison, Blackburn Dart, Blackburn Blackburn, Hawker Osprey and many others might just as well not have existed so far as this Alice-in-Wonderland history is concerned.

On the right track

Eagle Book of Balsa Models, by Bill Dean (Hulton Press Ltd., 6/-) 64 pages, illustrated.

Eighteen full-size drawings with stage-by-stage photography and numerous line sketches are compiled by Bill Dean in this excellent book for the beginner. Exploiting all the possibilities, from chuck glider to space ship, Jetex speed boat to box kite and sailing sloop to scale Britannia airliner, we find more use for sheet balsa within these pages than ever published before. It is up to date. Every word, line and photo can be understood, and for the beginner it represents a perfect course of iniation into balsa model making. Moreover, it also contains many an idea for the experienced man.

Right exposure

Camera-Tips for everyone, (Fountain Press 1/6d.), 32 pages, illustrated.

We know from the standard of photos submitted to AEROMODELLER for publication that the *average* man would profit from a small investment in this pocket size publication. Not dealing directly with model portraiture, it does nevertheless provide advice and examples of close-up photography that should be an education to all camera shutter-bugs.

Covering the hobby

Model Aeroplanes, by Norman G. Taylor (Cassell, 4/6d.), 78 pages, line drawings.

This work reminds us of a proverb, "Jack of all trades, master of ?." Glossing over the facets of our hobby, the author strives to cover all the popular branches of the hobby but many could do with more foliage. For the price, it gives the beginner an insight on construction with 57 illustrations.

A 32" SPAN RUBBER POWERED FLOAT PLANE

BIM-BAM

DESIGNED BY

R. J. COLES

3/-

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THE AEROMODELLER PLANS SERVICE

38, CLARENDON RD., WATFORD, HERTS

MATERIALS REQUIRED

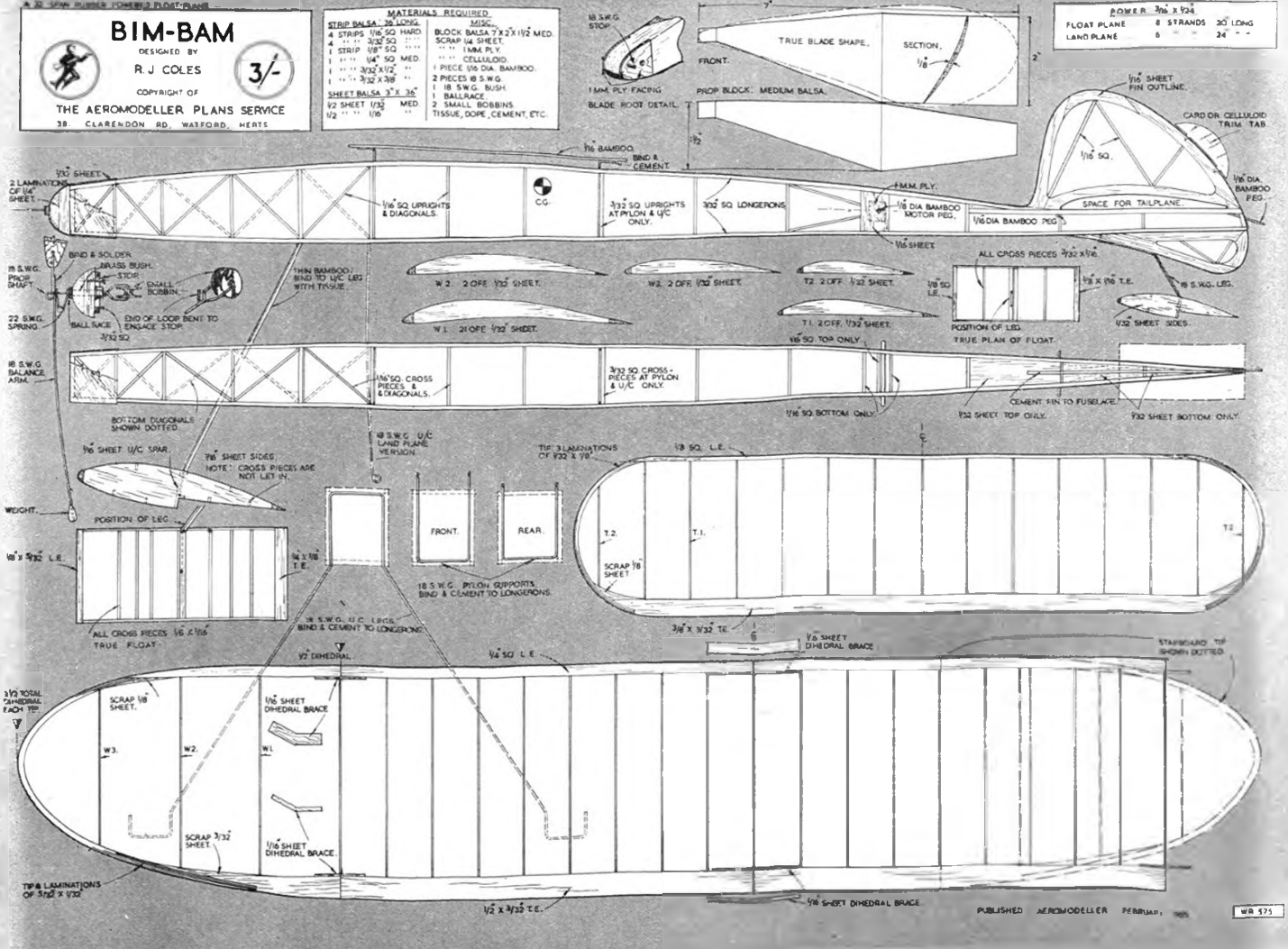
STRIP BALSA 36" LONG:	
4 STRIPS	1/16 SQ. HARD.
4 " "	3/32 SQ. " "
1 STRIP	1/8" SQ. " "
1 " "	1/4" SQ. MED.
1 " "	3/32 X 1/2" "
1 " "	3/32 X 3/8" "

SHEET BALSA 3" X 36"	
1/2 SHEET	1/32 MED.
1/2 " "	1/16 "

MISC.

BLOCK BALSA 7" X 2" X 1 1/2" MED.
SCRAP 1/4 SHEET.
" " " 1MM. PLY.
" " " CELLULOID.
1 PIECE 1/16 DIA. BAMBOO.
2 PIECES 18 S.W.G.
1 18 S.W.G. BUSH.
1 BALL RACE.
2 SMALL BOBBINS.
TISSUE, DOPE, CEMENT, ETC.

POWER 3/16" X 1/24"		
FLOAT PLANE	8 STRANDS	20" LONG
LAND PLANE	6 " "	24" "



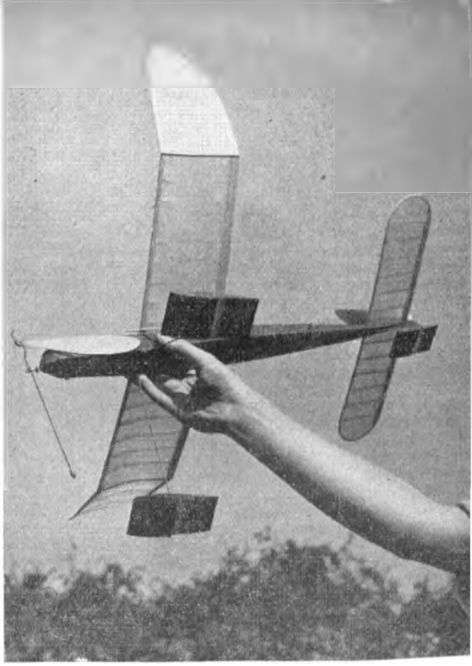
PUBLISHED AEROMODELLER FEBRUARY 1955

WR 575

High performance lightweight Float or Landplane

BIM-BAM

By R. J. COLES



Bim-Bam is Ideal for club "one-model" contests. Full-size copies of the 1/3rd scale plan opposite can be supplied by A.P.S.

ONE SQUARE FOOT for lightweight wing area is just enough to provide a good ratio of size against performance for a rubber powered model and this product by R. J. Coles fills the bill to perfection. With the three-minute flight maximum in vogue, Bim-Bam, a dual purpose float or landplane of only 32 inches span, can put up just as good a show as many a far bigger model. All up weight of 3¾ ounces as a floatplane and a half ounce less with a peg leg does not necessarily mean that it calls for the most expert construction. On the contrary, any modeller capable of butt joining two pieces of balsa, will find Mr. Cole's simple structure a very easy job which can be completed in a week of evenings.

The original model was built especially for the "Model Engineer Exhibition", (1951) with the intention of flying it afterwards as a landplane version. It won top junior award. (*Photograph in January*, 1953, *Aeromodeller*.)

The model also won the club's junior contest with a total time of 7 min. 15 secs. A few weeks later the Bim-Bam came third in a rally at Chobham, and a few days after this, flying on about 100 turns it hit colossal lift and went away for only 5·33—and by the way it was going up one might think it would never come down.

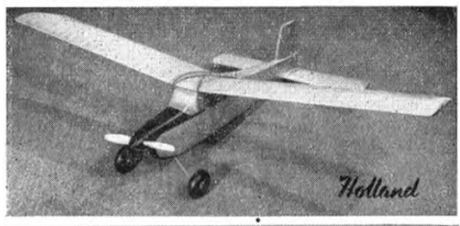
Fuselage. Start with the laying all longerons and fitting cross-members over the plan. Only point to watch is that the wire parasol does not distort the frame-work. A good fillet of cement should be adequate to hold it in place, but if you are of the type who would rather bind it in, do so, only to the longerons because if the model should get a knock following a "prang" and the parasol has reason to move, it will not pull half the cross-members out.

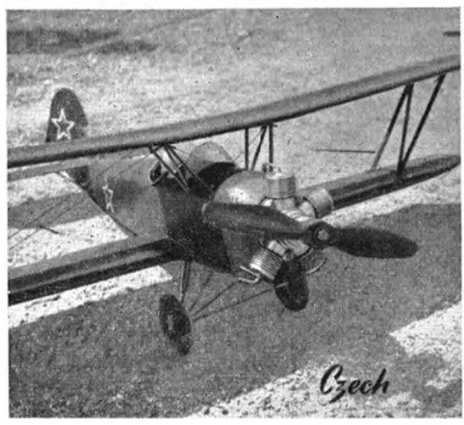
Make sure the floats are rigged at 10° and are 12 in. apart, (outside measurement) and 8 in. inside measurement.

Wings and tailplane—pin down leading and trailing edges and have all ribs fitting freely without any tendency to bend. All joints are butt joints leaving the leading and trailing edge "spars" free without slots to weaken them. Do not use too much cement per rib, as this also tends to bow them and the section becomes uneven. The tailplane is built on exactly the same principle as the wing.

Finishing. Cover fuselage and fin in lightweight Modelspan and wings and tailplane in Jap if possible. After water shrinking give wings and tailplane and fin one coat and fuselage two coats full strength dope and then finish by giving fin and fuselage one coat 50% thinners. Leave about 24 hours between coats. Floats should have one coat of dope and two of banana oil.

Trimming. Start on 100–150 turns after checking that the glide is shallow, and trim under power to the right and on the glide to the left. Trim for a slight stall in straight glide, but counteract this by applying the turn. The original model needed 3/32 in. side and ⅛ in. downthrust. On a maximum of about 800–850 turns (note the different power used for each version—see plan) the model should climb rapidly to about 400 ft. in either a straight fast climb or a series of Immelman rolls. The float-plane version is basically the same, but do first flying tests over long grass—water should be avoided at these early stages, as a ducking will stop flying until the model has been drained out. In the event of water getting in, a pin-prick in the covering, and only a pin-prick will allow the water to run out.





WORLD NEWS

INTERESTING TALE of the month is the story of setting a **New Zealand** National duration record for A/2 gliders. John Sheppard, whose *Karoro* seaplane joined the ranks of A.P.S. designs in January, 1953, decided it was about time the standing record was raised.

The date was decided (such weather confidence!) and time-keepers briefed. Little wind, overcast sky and stable air conditions blessed the day and John was set for the first flight. Apparently a five-flight average was the aim and the first launch was not exactly successful, resulting in only a minute from a poor release. Next flight, the A/2 caught a riser and a 22 min. 11/5th secs. time was recorded, the slight drift taking the model no further than a half-mile from the launch point. Two more poor releases with low times and a final 9 min. 6 secs. O.O.S. brought the figure to an average of 6 min. 50 secs. for the five flights. Incidentally, this last O.O.S. flight finished some six miles distant after a followed time of 38 minutes—the wind must have risen to British standards! We relate this tale to give some idea of flying conditions in this part of North Island, N.Z.—a factor which appears to be much in favour of aeromodellers. John Sheppard's flights took place 70 miles from Hamilton, which was to be the site for the Nationals, held over the New Year holidays.

There has been a complete change in the administration of the N.Z.M.A.A. and the new council, based on the Wellington area, is composed entirely of distinguished and active modellers. Trends are the adoption of the F.A.I. class as the principal power contest and the use of P.A.A.-load rules—though we wonder if they know of those mentioned in Hangar Doors. Radio Control is advanced in N.Z. and variations such as combat, racing and flying through "goal posts" are not figments of imagination but actual fact. An entirely new r/c design layout has emanated from the demands for better r/c flying, and next month will see first publication of full details of this model which is capable of, among other manoeuvres, a climbing roll!

The **Australian** Nats. were held over the new year break on R.A.A.F. Station Mallala in South Australia, which meant a round trip of anything up to 2,000 miles for the N.S.W. and Queensland modellers.

The Soviet zone of **Germany** had a Nationals last August we now learn, and three r/c models were in evidence, flying with great precision but rather handicapped by lack of reliable relays. Lightest relay showing any degree of reliability in

***EGYPT:** S.A.C. Payne with R.A.F. at Kasfareet and his 30-in. scale N.A. Savage. Built from an American kit, it flies at 65 m.p.h. on two Elfin 1.49's. HOLLAND: The "Impuls" R/C design by E. Kreulen of Rotterdam has won three contests and has a locally-made Typhoon 2.5 Racer diesel, own design radio, about 60-ft. span. SPAIN: Senorinas admire Jose Corgocena's 150 m.p.h. jet at the Spanish Nationals. CZECH: Scale PO-2 has a twin cylinder diesel with three dummy barrels making it a disc valve vee-twin of 5.6 c.c. capable of 9,000 r.p.m. with 10-in. prop. Model is 40-in. span, weighs 3lb.*

the east weighs 5·3 ounces. Diesels from behind the curtain include Schlosser 1 c.c. which won the zone championships and a new supercharger-cum-injection pump mini-diesel from which great things are expected. As in pre-war days, the German modellers in this zone are supplied with material free of cost by the State.

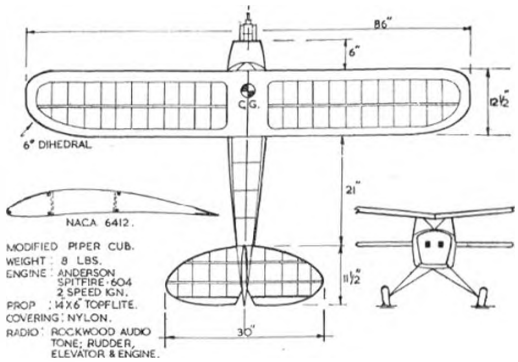
This side of the curtain, we learn of a German motion brought up at the December F.A.I. meeting to change the title of the F.N.A. cup to Coupe Alphonse Penaud in honour of the "inventor" of the rubber driven model. The M.F.K. has also decided to make definite Wakefield and Power entries in 1955, though it seems inevitable that models will have to be proxy flown.

We enquired of two aces in the **U.S.A.** what plans they were making for 1955, and the results are shown over at top right. Alex Schneider, the radio-control wizard shows his modified Piper Cub, winner of the 1951 and 1954 Nationals against great opposition. He reveals an airfoil choice that will surprise many who have seen the colour film of prolonged inverted and outside loops which are part of the Piper's repertoire World Power Champion Carl Wheeley was the other man, and he confesses that since the big event last year, he has hardly had time to touch a model. However, the new look will be as sketched, and to match the fin, Carl is at last going to have rounded wing and tail tips.

A new form of A/2 wing construction, based on Jedelsky's airfoil developments and the Austro-German use of ply trailing edges, comes from W. M. Schlosser in **Holland.** It follows many years study of bird flight and bird wing sections and at the same time introduces an easy method of obtaining the absolute in trailing edge fineness ratio. The leading edge is flat on the chordline, and the balsa part of the rib slopes up and back for approximately two-thirds of the chord. Two hardwood spars, also placed flat and approx $\frac{1}{8}$ thin. top sheeting complete the forward section, whilst an absolutely flat ·8 mm. ply sheet continues the airfoil to full chord.

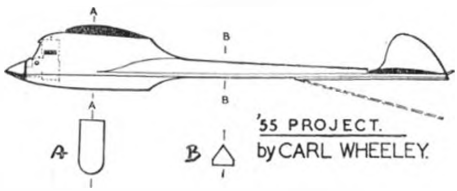
Mr. Schlosser has used this airfoil on one A/2 with excellent results in all conditions. A block tip helps to retain some rigidity in flight and we have no need to emphasise that this form of structure would be most robust. With some of the airfoil pundits calling for extra attention to the trailing edge of glider sections, this use of ply should be one answer to the problem of the knife edge t.e.

Last but not least—we hear that modellers crossing the State of Arizona, **U.S.A.** must put at least one frying pan in with their models in trailer boxes. Clubsters travelling to the Nationals last year were charged a fee for not carrying household goods aboard their trailers. Sounds like a perfect excuse for making a flying saucer!

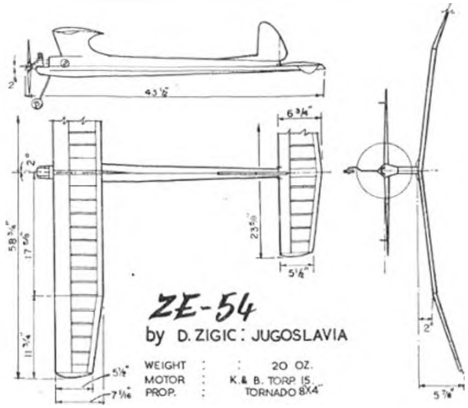


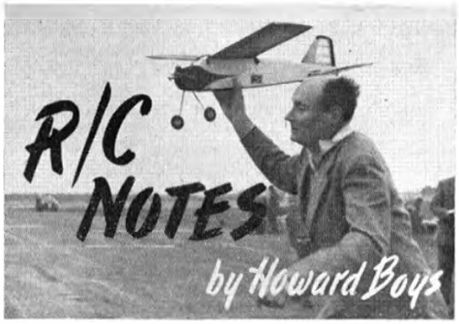
1954 U.S. NATIONALS R.C. WINNER
by ALEX SCHNEIDER

Above: Famous U.S. radio flier reveals how attractive a fully aerobatic radio model can be. Below: New look for the World Champion's next model.



Below: Small and fast is George Zigic's F.A.I. model from Yugoslavia for the K. and B. 15—a theory being followed by several prominent modellers in 1955.





AT AN I.R.C.M.S. meeting Mr. Peter Cummins who has about the best in radio-controlled boats, and is one of the best "electronic brains" in the movement, was talking of a friend who complained of lack of range with the radio equipment. Mr. Cummins pointed out that the trouble was due to tuning the receiver to too strong a signal from the transmitter. The usual super-regenerative receiver tunes much too broadly for finding the correct spot with anything but a weak signal. The writer had personal experience of this at Cranfield when to avoid taking up too much time, the receiver was tuned at no more than 50 yards, and the model flew out of range at two or three hundred yards down wind, yet when tuned on the home flying field, the receiver had given full current drop at over half a mile. Normally the equipment is tuned on the home ground a week or so before a meeting and left at that, but in this case the receiver had been tuned to a different transmitter only a few days before. Mr. Cummins whose friend was using 465 mc/s equipment, suggested on the spur of the moment that the transmitter be put in a dust bin to reduce the signal strength. That is all right for 465 mc/s equipment, but will not be practical with 27 mc/s due to the aerial length. It is no use removing the aerial because that will most likely alter the transmitter frequency. One of the best methods that will avoid a long walk for tuning is to use a crystal controlled transmitter, and then use the crystal in a low power oscillator for the tuning. A method used very successfully by the writer during the last year has been to use a transmitter that has been carefully tuned to a receiver that had already been tuned to a crystal controlled oscillator, and the crystal oscillator was then always used to check the receiver tuning. At the 1954 Nationals Mr. Gerald Eastell checked the transmitter with a high-class frequency meter and measured it at 27·14 mc/s which was only ·02 mc/s different from what had been tried for. This proves that it is possible to tune a transmitter to a super-regen receiver, providing it is done with care. Mr. Sommerhoff has been criticised for suggesting such a method, in one of his books, but perhaps the critic had not actually tried this method. Due to the broad tuning it is by no means ideal, but it can be satisfactory.

The crystal oscillator referred to was suggested by Mr. F. G. Birden over three years ago, and the circuit is shown in *Fig.* 1. Almost any "mains" type valve will do, triode, or pentode connected as a triode. The writer uses an ex-government E.F.50, and it is arranged to plug into the power supply of the transmitter. The range is about five or ten yards according to the receiver used. A battery valve can be used, such as the 3S4 or 3D6, or any similar type, with the circuit shown in *Fig.* 2. The range then may not be more than a yard or two, but it is still satisfactory. The component values are:—

C1	20 pf.	R1	50 k ohms.
C2	·005 mfd. mica	R2	50 k ohms.
C3	20 pf.	R3	1 k ohms.
C4	·05 mfd.		
C5	·001 mfd. mica		

The aerial can be a piece of wire a foot or two long. The crystal frequency should be between 6·74 and 6·82 or 8·99 and 9·09 mc/s. (This crystal can then be used in a transmitter circuit such as *Fig.* 1 given in the September, 1954, Radio Control Notes.)

Please note that if an attempt is made to tune a transmitter to a pretuned receiver, they should be some distance apart. Mr. Sommerhoff recommends not less than 50 yards. For this an assistant is needed to wave his arm in sympathy with the meter needle on the Rx.

With an oscillator like *Figs.* 1 and 2 there is no tuning coil to fiddle about with, and oscillations will occur at the crystal frequency and its harmonics. It will be necessary to pick the correct harmonic, and this is easily found if the main transmitter is already tuned correctly. The receiver is tuned to the transmitter, and should then respond to the crystal oscillator at very close range. The receiver is then moved further away for final tuning. If the trans-

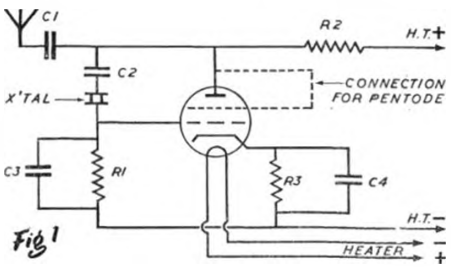


Fig 1

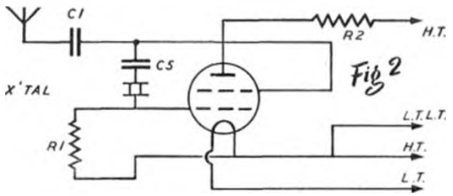


Fig 2

mitter is incorrect, then it may be necessary to borrow a correctly tuned one to start with. One point though is that most receivers will not normally tune satisfactorily to other than the correct harmonic of the crystals mentioned.

When experimenting with *Fig.* 2, a 3D6 valve was used, and with 90 volts H.T. the anode current was about 2 milliamps. Altering R1 to 100,000 ohms. lowered the current to 1 m.a. and the range increased from 1 to 2 yards. Decreasing R2 from 50,000 ohms. to 10,000 ohms., the anode current rose to 3 m.a. and the range did not alter to any extent. Throughout these measurements the receiver used was an Ivy type.

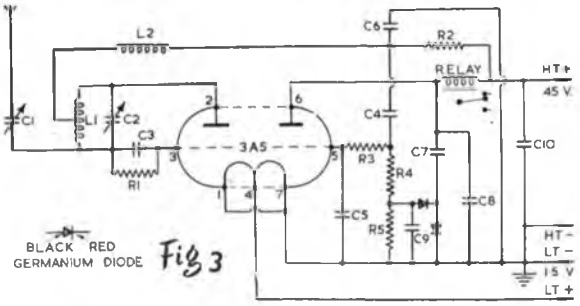


Fig 3

It seems to the writer that it should be possible to have a low power oscillator of the above type available at contests and meetings where R/C modellers get together so that people experiencing trouble could go a few yards away to sort it out.

Mr. Sinfield of Luton has sent along a few notes about his popular 3/1 receiver which was described in these "Notes" in January, 1953. He says several factors have emerged concerning its components and sensitivity, and the circuit is given in *Fig.* 3.

A few receivers have had low sensitivity due to leaky fixed condensers. All these (except C10 of ·1 mfd. which can be paper) should be mica or ceramic types. The condensers C4 and C7 of ·01 mfd. each must be of extremely low leakage, and should be tested accordingly. Leakage through C4 causes grid current to flow and this cuts down the audio input to the valve very considerably with corresponding decrease in sensitivity. Leakage through C7 upsets proper operation of the crystal diodes. For best operation it is essential that these diodes have a very high back resistance. Cheap germanium diodes such as are commonly available for use in crystal sets must NOT be used.

There are three possible conditions in the receiver.

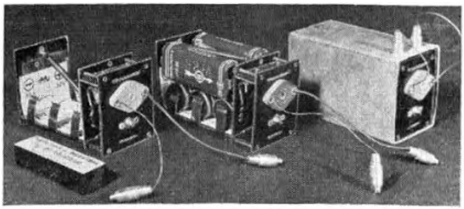
1. Carrier only.—This reduces circuit noise in the receiver; giving minimum input to the audio section, so that bias is minimum and anode current maximum.
2. No carrier.—The circuit noise provides slight biassing and less anode current than in condition 1.
3. Modulated carrier.—Modulation provides maximum input to the audio section, maximum bias, and minimum anode current.

The maximum sensitivity will therefore occur with carrier on and by keying the modulation only. Although the original transmitter gave adequate change by switching from 2 to 3, a slight modification to switch to conditions 1 and 3 would give better range.

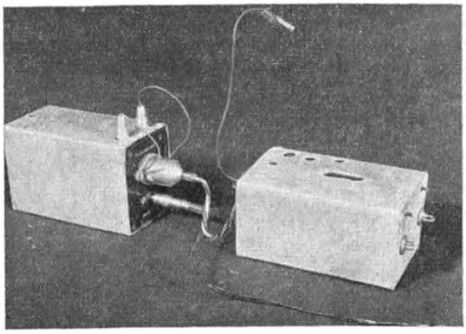
It is probably possible to work a reed unit with the receiver by substituting a high resistance unit for the relay, and omitting the rectifier section (diodes, and C7 and C9). C8 should then be selected to tune the reed unit to the middle of the modulation range. However this has not been tried in practice and should be much less sensitive than for the correct method of operation, as one stage of effective amplification is omitted (D.C. amplifier).

The transmitter can easily be modified for reed operation, and this, as carried out by Mr. Verney was described in these "Notes" in April, 1954.

Heading opposite shows H. Boys Launching Ted Sills' clipped Sparky

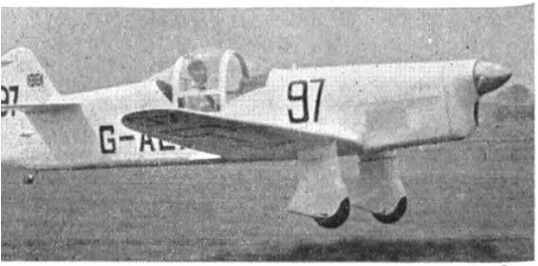


German r/c equipment, known as OMU showing battery box in 3 assembly stages above, and coupled to 105E receiver below. Production is in full swing at right, all-in price being DM 260



AIRCRAFT DESCRIBED No. 66
by G. A. CULL

The Percival
MEW GULL



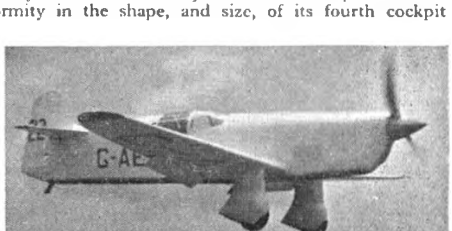
Top Left: The only Mew Gull still flying, seen at Wolverhampton in May, 1953. (Photo by G. A. Cull.) Below: Same machine wearing the latest in cockpit hoods at Shoreham in August last year. ("Flight" photo.)

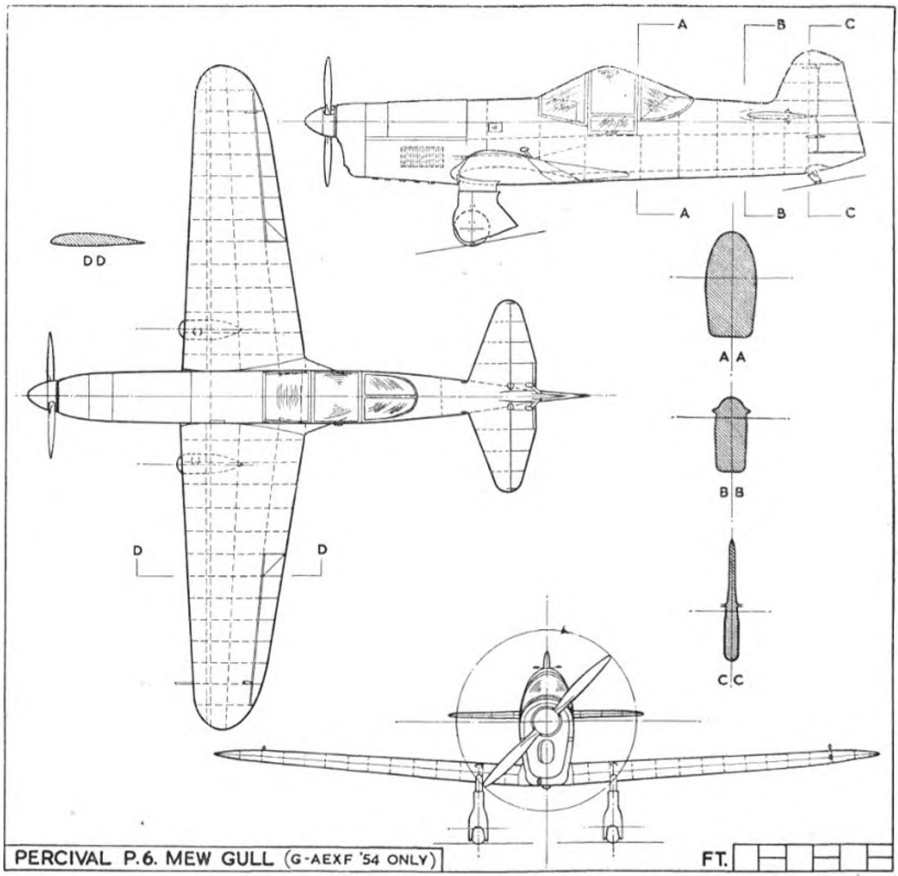
THE MEW GULL was described in the November, 1945, "AEROMODELLER" and since then one of the breed has re-appeared and its history is by no means over yet. This is G-AEXF, the most famous of a design which was a consistent winner from its first appearance in 1934. 'CND, the prototype, first flew, ostensibly to test a wing section, with a Napier Javelin engine. This P.2 had its faults and was drastically rebuilt into the P.6 with a Regnier engine, later changed for a D.H. Gipsy Six I to become standard. Three more P.6s were built and all were entered for the Schlesinger Race from Portsmouth to Johannesburg in September, 1936. G-AEKL did not start for it had a taxi-ing accident with a Hart, the prop of which killed its pilot, the great Campbell-Black. Numbers 1 and 2 were Mew Gulls ZS-AHM and ZS-AHO (ex- G-AEMO), their South African registrations appropriate to the nationality of their pilots, respectively A. M. Milne and S. S. Halse. Only the winning Vega Gull completed the course and 'AHM, named "The Golden City" on the port side of the nose and, in Afrikaans, "Die Goadstad" on the other, retired at Belgrade with fuel feed trouble.

ZS-AHM became G-AEXF and passed into the capable hands of Alex Henshaw who got off to a good start by winning the 1937 Folkestone Trophy at 210 m.p.h. The King's Cup brought three Mew Gulls to the line—the repaired 'EKL, their creator's (Capt. Percival) own new P.6a with Gipsy Six "R", and 'EXF. Henshaw dropped out with water in the fuel, but C. E. Gardner won on 'EKL at 234 m.p.h., and, as in 1934, 1935 and 1936, Capt. Percival plus Mew Gull clocked fastest speed, 239 m.p.h. this time. Preparatory to next season, 'XF returned to Gravesend for serious "hotting-up"; the main alterations being the fitting of one of the Gipsy Six "R" engines built for the D.H. Comets, complete with Ratier v.p. prop, and new Dunlop wheels in close-fitting pointed spats. After placing 2nd in the Hatfield-Isle of Man race and 3rd in the Manx Air Derby, both at 247.5 m.p.h., Henshaw was out to win the 1938 King's Cup and 'XF was the fastest-looking machine at the start with a D.H. prop which had needed a lot of engineering on the front end of the "R" engine, of which an outward sign was the raked and lengthened intake cowling. There was a long spinner and a low canopy and all this proved its worth for 'XF won at 236 m.p.h.—to this day the fastest ever winning speed! An attack on the Cape record was planned and 'XF returned to Essex Aero Ltd. for preparations. A 205 h.p. Gipsy Six Series II was fitted, tankage increased to 87 gallons and navigation lights were some of the modifications and various records were set up during practice flights over Europe.

On February 5th, 1939, 'XF left Gravesend and after 39½ hrs. reached Capetown, averaging 154 m.p.h. for the 6,030 odd miles. The return trip took 9 mins. longer at 153 m.p.h. and with the record in the bag, Henshaw received a hero's welcome at Gravesend, when the magnitude of the attainment was realised. Henshaw was lifted from the tiny cockpit suffering from malaria, his head cut by bumping against the roof and he had flown through three nights. Not only was this a great feat of technical achievement, but also of human endurance.

After this 'XF placed 2nd at 217 m.p.h. in the Hatfield—I.O.M. race and was sold in France in July,'39, fitted with a Gipsy Six from Vega Gull 'FEA, (also still with us!). Stored dismantled in a stable during the war, 'XF was reassembled after the war by D. Bianchi, flown back to Blackbushe and overhauled for the 1951 King's Cup. This was rained-out and before the S. Coast race, 'XF had shed her engine through running into a ditch at Shoreham. The noseless Mew Gull stood on its l.e. at White Waltham for many months until Bianchi again put her on her undercarriage, for 'Nat' Somers. For today's short-leg races with Pylon turns 'XF's cockpit was a disadvantage, so a new canopy was fitted ready for the 1953 Goodyear Trophy at Wolverhampton. Somers made a spectacular climbing turn from take-off but was handicapped out of a chance and came in 18th at 199.5 m.p.h. Next airing was in the Kemsley Trophy where a harsh handicap again put 'XF well back in 9th place at 202.5 m.p.h. In 1954 'XF joined F. Dunkerley's stable and acquired a deformity in the shape, and size, of its fourth cockpit





"J" TYPE 1/72ND SCALE REPRINTS AND "A" TYPE 1/48TH SCALE DYE-LINE PRINTS OF THIS DRAWING ARE AVAILABLE FROM A.P.S PRICE 6d. AND 1/- RESPECTIVELY

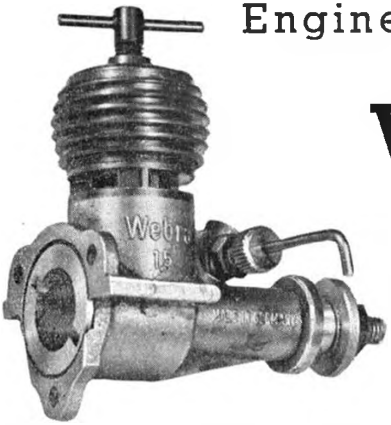
canopy. This is very practical for fast pylon turns but ruins the lines of this most famous racer, and it is thought that the wash from it may be affecting rudder control. In this, its present, form, 'XF was 11th in the 1954 Goodyear Trophy at Shoreham at the close of the season. Now, the same Mew Gull which was the star of the pre-war racing field is still the fastest piston-engined racer on the scene and it is hoped that better handicapping this year will bring forth some wins in the style of Alex Henshaw.

Specification: Span 24 ft. 9 in.; Length 20 ft. 9¼ in.; Max. Wt. 1,850 lbs.; Empty Wt. 1,240 lbs.; Max Speed (Gipsy Six "R") 256 m.p.h. at sea level. Cruising speed (Gipsy Six series II) 225 m.p.h.

Construction: Conventional all-wood construction. Fuselage has basic box frame with four spruce longerons. Whole airframe is covered with ply (stressed) except controls, which have fabric covering. Two-part split flaps are manually operated. Main tanks in wings, extra tank fitted in luggage locker for long range.

Colour: 1951, glossy white overall with dark green lettering and black racing No. 97 above and below wingtips, both sides of cowling, fin and rudder. '53-'54, letters changed to deepest blue and racing numbers altered in size and position except on wings. Spinner and prop have natural dural finish.

***Bottom Left:** is seen G-AEXF, alias ZS-AHM, with the original cockpit cover, ready for the Jo'burg race in 1936. (Photo by A. C. Palmer). Right, is XF in her fastest form in which she won the '38 King's Cup. Note the spinner, nose and cockpit. ("Flight" photo.)*
Right:** Here, the pre-war and first post-war cockpits are compared. In the upper photo 'XF wears green letters for 1951 King's Cup, and in lower 1953 picture, the Bianchi cockpit, Somers' T.B.U. badge and flag are added. (Photos by G. A. Cull)



Engine Analysis Number 8

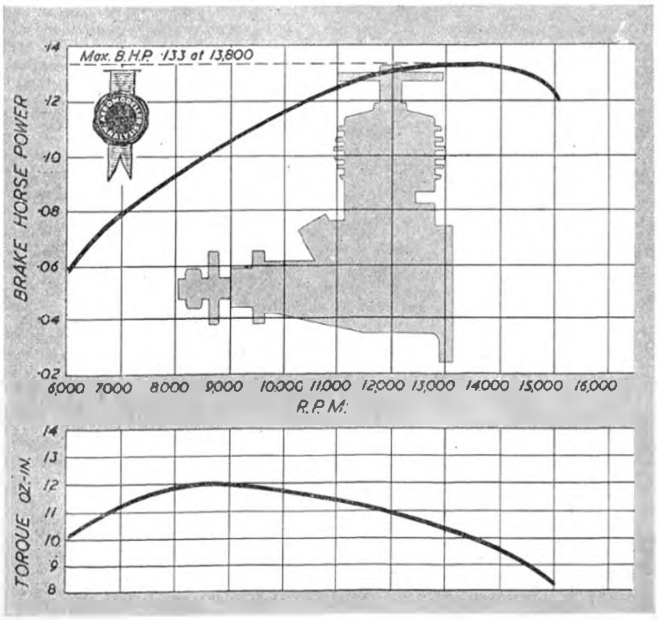
WEBRA 1.48

"RECORD"

Reviewed by
Ron Warring

THIS MONTH'S test engine has the somewhat unique distinction of having "starred" on television. It was one of the engines used by Harry Hundleby in his T-V Sparky, which was the centre-piece of a feature film on the construction and flying of a radio-controlled model aeroplane, shown on the Children's Television programme in October last. Although of only 1·5 c.c. capacity, power output had already proved more than adequate for handling a 4 ft. span 2½ lb. model. The makers, in fact, claim that the Webra 1·5 is the most powerful engine of its size in the world.

It was pretty obvious that by the time this particular engine reached the test shop that it had already been well run in. The performance "life" of an engine follows a typical pattern—the running-in period, during which moving surfaces are bedded down and performance progressively improves (due to a reduction in internal friction); a period of life during which the engine is operating at the



SPECIFICATION

Displacement: 1.48 c.c. (.09 cu. in.)
Bore: .51 in.
Stroke: .45 in.
Bore/Stroke ratio: 1.13
Bare weight: 3 ounces
Max. B.H.P.: .133 at 13,800
Max. torque: 12 ounce-inches at 8,600
Power rating: .09 B.H.P. per c.c.
Power/Weight ratio: .044 B.H.P./oz.

Material Specification:

Crankcase: Pressure die-cast Light Alloy
Cylinder: Steel
Cylinder jacket: Dural (anodised red)
Contra-piston: Steel
Connecting rod: Dural
Crankshaft: Steel
Crankshaft bearing: Plain

Manufacturers:

Fein-und Modelltechnik, 5 Genestrasse Berlin-Schoneberg, Germany.

British agent: Arthur Mullet, 16 Meetinghouse Lane, Brighton, Sussex.

Retail price in Germany DM 33 (Marine version DM 40.50).

Retail price in U.K. for export only 65/-

peak of its performance and should be particularly consistent in power output; followed by a slow but continuous decline in performance as wear becomes apparent. The change from the second to the final stage may only be noticeable in such specialised applications as speed models.

Condition of the Webra on its receipt almost certainly coincided with the "best" period of its life. It proved particularly easy to handle with a considerable degree of flexibility as regards control. With most sizes of propeller loads tried it could be "throttled back" quite effectively by reducing the compression—in some cases more than a whole turn without the engine stopping. Response to needle valve adjustment was far less marked. Peak r.p.m. with any given load required adjustment of both settings, starting with the needle valve a bit rich and then increasing compression, as necessary, for maximum speed. A further increase in speed could then be obtained by turning down the needle valve slightly and re-adjusting the compression again (increasing). We found, however, that there was a tendency for revs. to be lost as the engine warmed up—a feature common to all the fuels tried. For all the measured test runs, R-M fuel was used as this mixture has been found to suit all the Webra series engines particularly well.

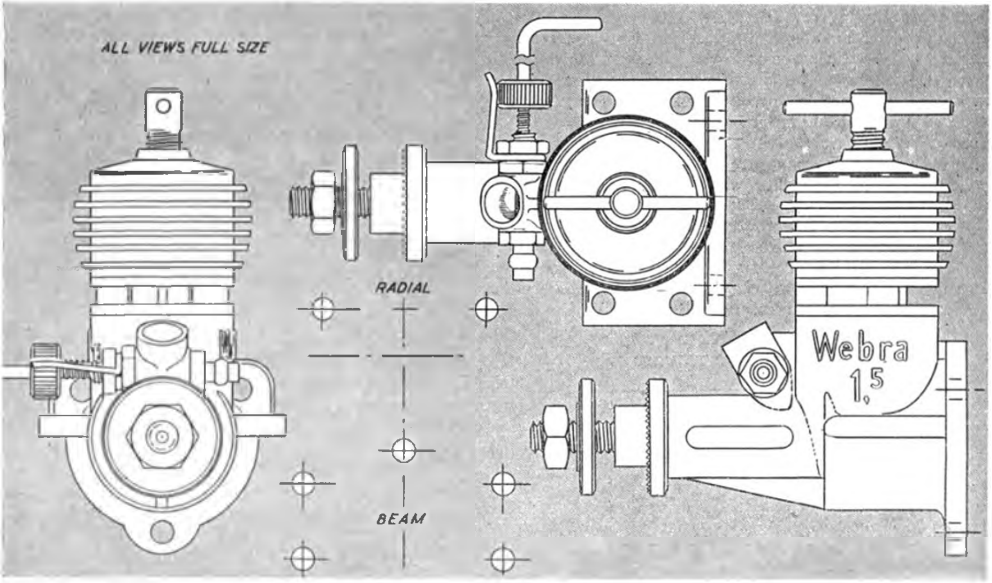
There are several possible sources of power losses which need checking in operation. The steel cylinder is screwed into the crankcase without a gasket and must be tightened right up to avoid leakage. Similarly, the crankcase backplate has only a very short threaded length and can quite easily work loose under vibration. As the engine gets quite hot when running, a final tightening right down, after an initial run, *i.e.* whilst the engine is still hot would appear advisable before mounting in a model. After an initial familiarisation run in a bench stand, for instance, we found that cylinder, cylinder jacket and crankcase cover could all be unscrewed by hand.

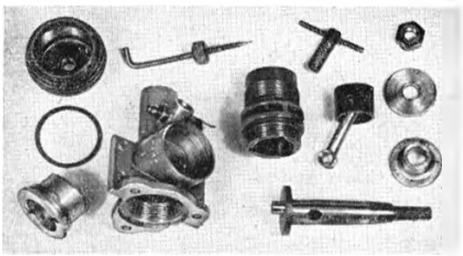
Starting seems to present no problems at all. It is not necessary to prime through the ports, although this technique can be used, if preferred. Provided the fuel line is first filled, one or two finger chokes will induce enough charge into the cylinder for starting, which should then be accomplished in a couple of flicks. Re-starts can be made in a similar manner without touching the controls. If preferred, compression can be slackened off and re-adjusted when the engine is running.

For positive starting, the propeller needs flicking over quite rapidly, particularly when a small diameter size is used. The Webra tends to be a little bit vicious if handled too gently with a small propeller. With propeller loads corresponding to an operating r.p.m. of 10,000 and below, it is a most docile engine.

The Webra 1·5 is a fairly generous "vibration producer", due in no small measure to the quite heavy piston. We did notice at some speeds in the region of 13,000 r.p.m. a tendency for the compression adjusting screw to vibrate off. The needle valve lock, on the other hand, is completely positive and of the simple spring ratchet type so popular years ago, but which now appears largely to have fallen into disfavour.

Constructionally the Webra 1·5 is an exceptionally robust unit, yet total weight is only 3 ounces—a good average for European designs of this size.





The Webra Record dismantles to reveal conservative intake and transfer port areas with a generous exhaust timing. Stroke is short and crankshaft commendably large, resulting in a small flange for the crank web. Note combination radial and beam mount on involved crankcase casting

Most of the weight is accounted for by the strong steel cylinder ($\frac{7}{8}$ oz.) and the crankshaft ($\frac{5}{8}$ oz.). The crankshaft is a sturdy $\frac{5}{16}$ in. diameter, tapering at the foreward end to a $\frac{3}{16}$ in. diameter threaded length, onto which fits the propeller backplate with a $\frac{3}{8}$ in. diameter spigot facing forwards—necessitating propeller hub holes to be drilled out to this size. Locking of the backplate is by the orthodox method of forcing it back onto the taper length of the crankshaft, as the propeller is clamped in place.

Crankcase volume is quite small. Transfer ports are semi-circular in section, three in number, milled into the sides of the steel cylinder and conservative in volume. These terminate abruptly in right-angled entries (to the cylinder). Exhaust ports are unusually deep for a cylinder of this size and there is an appreciable overlap between the two. This has meant locating the transfer passages in triangular section "pillars" which, in effect, block off about half of the 360 degree exhaust port "ring".

The deepening of the exhaust ports means that opening is extended upwards, *i.e.* the exhaust opens earlier in the power stroke, which is particularly beneficial for high speed operation but generally results in loss of torque at lower speeds. This does, in fact, appear to be confirmed by the test data which show the engine to be quite an average performer up to 10,000 r.p.m. or so, but from then on to give a high and sustained torque. In fact, operating this engine below this figure is to waste its potential value, and so propeller sizes must be selected accordingly.

Manufacturer's recommendations are a 7 × 4 or 8 × 4 propeller for free flight. To achieve the required operating r.p.m. with standard British commercial propellers of these sizes some reworking of the blades would undoubtedly be necessary—thinning down and, in particular, paying attention to the aerofoil section. Our own impression is that a 3 in. pitch propeller would probably be better—either 7 or 8 in. diameter, according to blade form. A 6 × 4 propeller would give the revs. but would not be so efficient.

The Webra 1·5 makes no bones about swinging high pitch propellers at high speeds, provided the diameter is reasonably low, of course. The manufacturers recommend a 6 × 8 for speed control line work and although we had no opportunity to try a comparable size, with proper attention to blade shape and section we feel this could be a very happy choice. For stunt work 6 in. pitch propellers are recommended by the makers, either 8 or 7 in. diameter.

With regard to possible team racer application, once again the point must be stressed that the Webra is a high speed engine. Attempting to run it at any "economic" speed will mean, first, the loss of any power advantage the engine may have to give you and, second, the virtual certainty that fuel consumption will not be "economic" even at reduced r.p.m. With the wide opening exhaust a fair proportion of mixture is sacrificed in the interests of better scavenging and the lower the operating speed the greater this loss is likely to be.

Summarising, in fact, we can say that it is the high speed characteristics of the Webra 1·5 which are the most interesting feature. Whilst retaining orthodox design and construction practice, the makers have succeeded in getting something better than average from a plain bearing engine—and of course, by so doing have awarded the complexity, increased weight and increased cost of a ball bearing job. As such, therefore, the Webra 1·5 appears to show considerable promise as a contest engine.

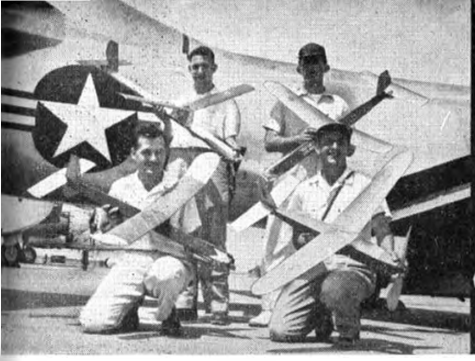
The main features we would criticise are: small flaws apparent in the crankcase casting (although these have no effect on running performance); needle valve too near the propeller disc for comfort; and lack of mating screw thread length on the crankcase back cover. But, it should be noted, none of these can be called *faults*.

In its original form the Webra 1·5 was produced with a radial mount, *e.g.* a generous flange cast in with the crankcase unit. In the later model tested the crankcase die has been modified, so that, whilst the flange mounting is retained, additional beam mounts are also cast-in. To use the beam mounts it is necessary to cut away a certain amount of the flange metal to clear the bearers. This can be done with confidence since it will not affect the strength of the casting. If radial mounting is used, then we would suggest that the beam mount lugs are retained instead of trimming off (filed to a triangular shape for neatness, if you prefer).

PROPELLER TEST FIGURES

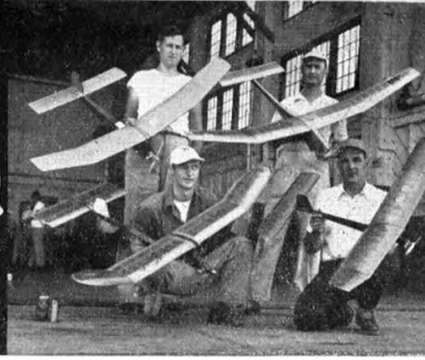
PROPELLER	r.p.m.
dia. pitch	
6 × 6 (Stant)	13,000
7 × 6 (Stant)	11,400
7 × 6 (K-K)	10,200
8 × 4 (Stant)	10,000
8 × 6 (Tricut)	8,600
9 × 4 (K-K)	7,900

Fuel used: R.M. diesel



The Proxy Situation

By ED. DOLBY



Sidelights on organisation of the '54 International contests

BY VIRTUE of their 1954 double team win, the U.S.A. (under F.A.I. regulations) would again be allowed to stage the International Finals in 1955. The ever increasing talk of having these important events staged in predetermined countries is meeting with much favour, but the possibility of this happening by 1955 is so slim it looks like this year there will be a big list of proxy models being sent.

1954 saw a drop off in entries, and this is not what any of us want to see. In the following paragraphs I explain how we went about this proxy situation, and from it we hope that those of you around the world who were eligible to compete, and didn't—by proxy or otherwise—will take note, and from it gain a surer conviction that, by having your models flown proxy under existing rules and conditions, is almost as good as being there yourself.

First may I say that if Australia could have had 4 models in attendance, they could very well have won the Team prize. As it was, with only two men, they needed only 10 : 42 to win, so one can see the necessity of having full teams.

Proxy fliers accounted for three out of the first five places, and placed Great Britain 2nd. in the Wakefield team results. Actually, Britain could have won if it were not for an extremely bad piece of luck. On his last proxy flight for Hugh O'Donnell, Cliff Montplaisir, U.S.A. Wakefield team member for the last two years, was disqualified on take-off. Needless to say, the flight was a maximum—to the bitter disappointment of the rest of the proxy team. This was the first "assist" ever called on Cliff, and he says it was either that or the model pranging from a bad gust of wind as he let go of the ship. If this had not happened, proxy fliers would have accounted for four out of the first five Wakefield places, and Britain would have won the Team Cup.

Although the U.S.A. is a long way for most people, it must be remembered that we have an abundance of really good qualified fliers, who are—and were—much interested in making this event a success. One proxy flier, Manny Andrade, came 3,000 miles, Carl Hermes 2,000 from Texas, and still another 1,900 miles. All this way by car just to fly someone else's aeroplane has to show intense interest!

Proxies were not picked at random. First selections were made from those who had been former U.S.A. team members and still active and had entered the '54 eliminators. *All proxy men paid their own way to the meet.* The rest of the fliers were picked from those men who competed in the final team, selections held over here on a de-centralised basis, (4 semi-finals, each to pick one man for each event).

Almost to a man, these fellows wanted to come, and we picked those with a wide range of experience; some with free-wheel experience; some with gear experience; and those that were serious and had the right attitude. In all, 23 Wakefield men were selected as this was the number of models expected to require proxy flying, but only 11 aeroplanes were flown, so the "best of the best" flew. Other picked fliers acted as team captains, and in other official capacities.

(In Great Britain in both 1949 *and* 1953, *proxy fliers were selected from the results of the selection Trials. Top men formed the British Teams, and proxies delegated from the top of the list downwards until the required number of men had been appointed. Such proxies therefore had earned their appointment by virtue of two Eliminators staged on a district basis, followed by the Trials, where all competed under the same conditions. The nett result is thus virtually the same as that achieved by our American cousins, i.e. only tried and tested men are entrusted with the extremely important task of proxy flying.—Editor.)*

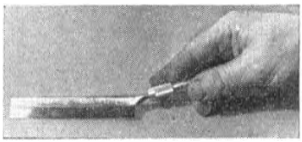
(*continued on page* 101)

British proxies at top are, left: Dick Quermann (Rockell). Carl Hermes (Jackson), Cliff Montplaisir (O'Donnell), Jerry Kolb (Dubery) and right: Frank Parmenter (Upton), Joe Elgin (Moulton), Fran Hager (Buskell) and Bill Dean (Gorham).

Bottom, left: Manny Andrade winding his proxy model of Australia's Joan. Centre: Lee Renaud with Guatemala's Pellicer's model, was twice a major repair. Right: Bill Dean from the U.S.A. and John Gorham's Ver Tig O which he flew so well.

TRADE NOTES

CUTTING balsa is our hobby no matter what branch of aeromodelling we follow, yet how few of us bother to use the best available tools for doing this simple job. A stiff-backed single edge razor blade will cut through sheet up to $\frac{1}{8}$ in. if reasonably sharp and for thicker sheet there are many commercial balsa knives with a variety of available blade profiles. But what does the average modeller use to cut up a piece of block balsa? We've seen everything from a broken hacksaw blade to a crosscut saw used for this purpose, and the amount of waste, not to mention the inaccuracy of the cut is enough to make any carpenter of repute go berserk. Now all of this is happily solved by the latest additon to the



New Razor Saw by X-acto

X-acto range. Known as the razor saw, it is the simplest way to an accurate and professional cut we have yet seen, and all for the small charge of 2/- or 2/6 according to size. Made of Swedish steel, backed for rigidity and ultra thin with beautifully fine teeth, the razor saw is well-named and fits the X-acto Number 5 handle.

Old favourites in new boxes with revamped contents are the **Bateman WW II Solids** including Hurricane, Spitfire, Mustang and Kittyhawk at 2/9 inc. tax. Extending the range to modern Jets, the Hunter, Swift,

Batemans solids of WWII fighters

Editorial congestion at recent tour of Lines Bros. works, includes C. S. Rushbrooke, Ron Warring, D. J. Laidlaw Dickson, E. Westbury, J. R. Vanderbeck, veteran modeller and advertisement manager Lines Bros, H. G. Hundleby with E. H. F. Cook in the chair

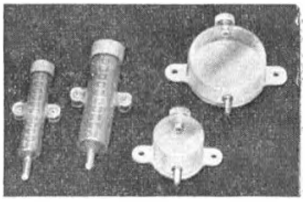
Javelin and Vampire are among the 1/72nd scale series, while the D.H. Comet to 1/144th will satisfy those who want a modern airliner. We like the Bateman range, it makes no pretence of infallible accuracy, provides a clear drawing for a true semblance of the aircraft and gives just the right kind of cleanly cut blank material for producing a good table top model.

The **Model Shop** (Newcastle-on-Tyne) range of plastic tanks costing from 2/2 to 4/1 according to size and shape, are indispensable for the sport flier. Each is fitted with moulded lugs for mounting on either the fuselage side or a bulkhead, and a novel arrangement we spotted on the flying field, was simply to have the tank inside the fuselage with just the top of the filler protruding through a cowling hole. The effect was most realistic.

If you missed out on that **Wolf Cub** outfit you were hoping to get for Christmas, a new savings scheme introduced by the makers will ease your pocket, if you have to buy for yourself. Wolf accredited dealers throughout the country can issue a special savings card which enables the customer to build up his "Wolf" account and purchase against the amount he deposits. See your dealer for details.

Humber Oil Co., to whom we paid a visit in last month's special feature, have sent us a list of their dope range that reveals quite a number of items many a local model shop does not carry in stock. The old fallacy that the shop proprietor should only repeat order items that *he* considers popular, is shown by the number of queries we answer from "AEROMODELLER" on the point of "Please where can we buy camouflage dopes?" Britfix dopes include all the prominent service colours in matt—plus a long list of gloss finishes from French Blue to Dark Admiralty Grey. Carrying the lesser-known tones on the shelf is good business Mr. Dealer—why not try it—the modellers will appreciate your stock.

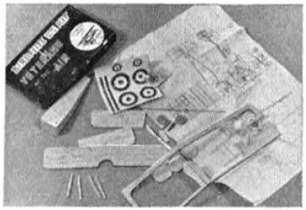
Two control line kits by **Jasco**



M.S. Tanks for all free-flighters

have recently passed through our workshops in double quick time, and they are the 'Trojan trainer and 'Tracer full stunter. The 'Trojan with an Allbon Dart has been the subject of considerable prangery yet still survives to tell the tale and with two newly trained pilots to its credit. It is a little toughie, ideal for the young c/l beginner and for 10/- "You can't go wrong with it" as they say in the advt. The Tracer is a lightweight stunter for bigger

New Jasco Tracer is full-stunt



'14-'18 Fighters in Birdflite kits

engines and ours had the Yugoslav Oskar 150.

Flight tests showed a need for much more tip weight than specified. We would advise about 1 to 1½ ounces in the Starboard tip for best line tension and then the Tracer will go through any manouevre you care to mention. Fuselage construction is unique—in two halves fore and aft of the wing and the price is reasonable at 20/9d.

A new range of 1/48th scale solids with 14-18 ft. warplanes as the subject for the series is introduced by **Birdflite Ltd.**, and distributed by E. Law and Sons. Known as the Veterans of the Air, the sample sent us for review was a Sopwith Camel and in the kit were moulded plastic wheels, metal guns and a silver backing sheet for the engine cylinder. Lifting surfaces are accurately die-cut from sheet, also the propeller and struts while the fuselage is cut to plan and side elevations. A plan with copious detail enables an accurate solid to be made and there are printed roundels for decoration. A pity these could not be centred better in the printing stage—we would rather have transfers for this job in any case. Price is 3/6d.

Travelling for the **Mercury** kit and accessory range is that experienced and jovial modeller, Alex McDonald. Known for his r/c activity in the London Area, Alex can answer the retailers with any question they care to put on the subject of the model market. Many will be asking about the Mac and Monarch kits which are about to make their mark. When Henry J. was about to shut shop and go out with Bill Morley to test the prototype Monarch (Allen Mercury 25) who should come along but Henri Stouffs, the reigning c/l World Champ. in stunt. So Henri met Henry and the Monarch went through more paces than ever intended by the Holloway Road establishment. After a thrilling display of complete confidence in the model's second-ever and his first-ever flight of the Monarch, Henri Stouffs passed the Monarch and the AM 25 as a perfect stunting pair.

Reference to our recent classified advts. will show an address under the heading of Duplicating. We decided to give the good ladies who run the speedy duplicating service, a try, and sent along our own local club bulletin. Just rough pencilled copy and all names clearly printed for the sake of spelling. As advertised, the copies came back by 24 hour service, intelligently laid out, clearly printed—no smudges at all and with a smart stencilled heading. Charges for these services are 7/- per 50 foolscap size or 100 quarto for 8/6d. See classifieds.

Jetex Skyrocket kit is superb in detail; a true "flying solid"

Making your own engine—the series by Dave Sugden—is most popular and many non-engineering readers tell us they like to learn about the mechanical process even though they cannot hope to make their own—at least not yetawhile. If you have a yen to follow in Dave Sugden's footsteps, a note requesting literature from **Myford's**, Beeston, Notts, will give you information of the 3½ in. lathe as used to make those engines described in the "AEROMODELLER."

The Proxy situation *(continued)*.

Most of the proxy men arrived by the Friday in order to test fly and become familiar with the models, and, if necessary, to repair damage done in transit. No major damage was found, due to good packing in strong boxes.

Team captains played an important role in seeing that all went well, making sure that the little details were taken care of, and setting up a flying order. Also important was ensuring that retrievers were present to chase, and when models got lost—as in the case of Upson's power model, to see that it was returned—although this particular task was no small order! Frank Parmenter, Upton's proxy flier, lost the model on test during the Saturday evening through the failure of a d/t. Darkness and an approaching thunderstorm made the problem worse. Team Manager Dave Call hurried to the hangar and rounded up—with some difficulty—enough men (after a ra-ra pep talk about "being a good sport, and what if it might rain!"). After an hour's search in drenching wet, the search crew returned victorious.

The Gas boys could not do much, with the exception of Johnny Gorham's proxy Bill Dean, of Massachusetts, who would have secured a higher place had it not been for a faulty timer, which gave one 5 second engine run for a flight time of only 64 seconds. V.T.O. launching of this model gave Bill some grey hairs, until he found that sending it off down-wind was the best way to get it off safely.

Quite a few things need bringing to attention so that future team qualifiers can benefit from past experience. First, *DO NOT* place much (declared) value on the aeroplanes if they are to be sent. Customs duty is high, and depends on the value declared; British models were valued at $800 : 00 and a lot of time and money could have been saved if the value had been declared at $10 : 00 for the lot!

Please see that enough rubber motors are sent, made up, pre-wound, or if not state the condition of the motors. Include lube with the models, or state what should be used—if it can be obtained by your proxy! Please state whether your model is adjusted for wind or calm, and what can be expected of the model under both conditions. Power men should remember to include plenty of the correct props., and details of the fuel shut-off system.

Now that we can look forward to a large proxy entry, I am certain we can all expect a proxy-flown winner in 1955.

Club News

A NOTICEABLE trend recently is the growth of postal inter-club contacts, and very good fun they can be too. Our November issue saw the **HASTINGS M.A.C.** of New Zealand issuing an invitation; in January a Czechoslavakian group issued a challenge. Both these clubs have quickly been taken up, the Czech one by several British clubs. In October we published under "New Clubs" the **ALLERTON M.A.C.**, who tell us that since then they have received quite a few letters from different parts in and out of this country (including one from the **AIR BLAZERS** club of New York) all wanting to swap plans, accessories, gen, etc. This getting in touch with other fellows, whether to compete or merely swap ideas, etc., is the next best thing to travel for broadening the outlook and, of course, improving your aeromodelling. Our pages are always available to help you make such connections; why not take a leaf from the excellent Rotary International scheme and establish permanent "contact clubs"?

Cheltenham M.A.C. built this 32 ft. Carrier for their local town hobbies exhibition.

Western

What could be the first carrier built for C/L work in this country was exhibited by **CHELTENHAM M.A.C.** at a recent town hobbies show. 32-ft. long by 4-ft. wide, the carrier is suitable for models up to 42-in. span flying on lines of 30-55 ft. and was built by club-members out of club funds. Cost was a fraction over £5. The carrier is just coming into use and is causing quite a bit of amusement. Landing is, of course, the tricky bit, the idea being to stall on and hook the cable, when sandbags apply the anchor.

Reorganisation in **SOUTH BRISTOL M.A.C.** follows the recent A.G.M. and commences with a popular move—reducing the subscription! Indoor rubber team racing is on the go, and a flying field involving a shorter journey than the six miles to Lulsgate is in the offing. Meetings are held on the first Friday in each month (that makes the next one February 4) in St. Mary Redcliffe Church Hall; new members very welcome.

South Midland

Greetings for 1955 are extended to all old members by **OXFORD METEOR A.C.** A new lease of life is being felt by the club, which now numbers 50 and meets, through a kind citizen's generosity, three nights a week in premises in Hurst Street. Radio is the main club activity, and embraces a model shipping section as well as the aircraft side.

Club championship for 1954 in the **WEST HERTS GROUP** went to John Lamble, whose final spurt in the eliminators gave him a clear lead over runner-up A. Weston. Ron Moulton and wife Betty placed 3rd and 4th on the list. All round, the club had a very promising season; current performances augur well for an even better one in 1955.

Sport fliers occupied much of **READING D.M.A.C.'s** A.G.M., but no decision could be reached on how to cater for them in contests. Chief objection to most types of events suitable was the deterring effect of the complex rules required. (The best type of event we've experienced for such modellers is the simple "three flights to total 3 minutes" contest where the nearest to the total time, over or under, wins.) One hundred members and friends enjoyed the annual dinner and dance, but the first of the newly-instituted winter contests saw more spectators than entrants.

East Anglian

A large number of intact models is one result of 1954's appalling weather, reports **NORWICH M.A.C.**, but this appears to cause little check in the spate of new building. Fifteen-year-old D. Mickleborough has chalked one up by building an entire R/C outfit (including actuator) with great success. Among interesting models are several *Super Brigadiers* for R/C, lots of scale stuff, chiefly from A.P.S., a Bilgri style Wake, and C. Sparrow's unorthodox effort which defies brief description! C/L fans are getting organised for lots of racing. New members, especially seniors, are invited to drop in at the club room in the "Spread Eagle", Sussex Street, Norwich.

With the triumphs and despairs of 1954 behind them, **CHELMSFORD M.A.C.** are getting all set for a bumper 1955. Preparations are already in hand for a Whitsun exhibition, in which all East Anglian clubs are invited to participate. A floodlight tattoo in which the club gave a C/L display is one of last year's fond memories—lines shortened to 40 ft. to clear the arena lights and 3.5 stunters on the end—some fun! Latest buzz in the club is that E. Summerfield is actually believed to be building an A2 to replace his veteran *Jader* 60, which during a somewhat chequered career has even been used as a cricket bat (they build 'em strong in Essex!). Two other veterans, *Thermalists* belonging to Messrs. Peek and Kemp, are still giving good service in more normal spheres!

Northern

Collectors of the 1954 silverware in **BRADFORD M.A.C.** are: Power and Brown-Muff (Senior Champion) Trophies, S. Lanfranchi; Silvio Cup (Gliders), J. Oxley; Coultas Trophy, C. P. Miller; Adcock (Junior Champion) Trophy, J. B. Creak. The club enjoyed a successful year except in the seven domestic competitions, which were badly hit by weather and reduced membership. This season a link-up with Leeds club is probable, which, while keeping both clubs' identities, would result in pooling trophies, etc.

Regular crowds of spectators witness Sunday flying by **THORNABY PATHFINDERS M.F.C.** and a special turn was put on by K. MacDermot who dropped the handle when his *Ambassador's* motor cut and rushed out and caught the model! Stocks of C/L jobs are being built in anticipation of several proposed displays and exhibitions. Combat is the chief winter flying activity. Greetings and good wishes for 1955 are offered to all modellers.

All two entries in **LEEDS M.F.C.'s** December scale contest pranged, so the event was declared a draw between D. Perkin's Fox 59 *Ryan* and R. Walton's *Mustang*. Perkins had better luck to win open stunt. Other C/L news is F. Gudgeon's Mac 29 racer, which is currently knocking out 44 laps at 95 on an 8 x 8. One member is producing very smart plastic badges at 1s. 6d. a go, which is extremely good value. B. Eggleston's *Creep Mk. 12* is down to 7 oz. less Oliver Tiger, while G. Thorp has produced a really contemporary glider with turbulated and end-plated wing, 14 per cent. tail, mixed balsa and alloy structure, and heat-reflecting colour patterns.

New twist on the postal contest business by **HUDDERSFIELD D.M.A.C.**, who were one club to accept the invitation for Hastings, N.Z., is the swapping of results by short wave radio! A local ham is obliging at this end, and presumably a similar set-up is arranged down under. The event has attracted considerable interest locally, and the boys are putting some new models together in the hope that better performances than were returned in their own winter contests will be turned in!

South Eastern

1954 individual champion in the Area proved to be Reg Boxall of **BRIGHTON D.M.A.C.**, and this club proved top dog in the club list, its team of Boxall, Boxall, and Giggle aggregating 121 : 43 in the six eliminators held in 1954, against runner-up Southern Cross with 56 : 51 and Eastbourne, third, with 52 : 18.

The Area P.R.O. announces in S.E.A. D.O.G., the Area news-sheet, his resignation from the post as from the A.G.M., due to lack of support. This isn't the only case of this type and certainly Area P.R.O.s plough a pretty hard furrow. If clubs want a news-sheet, surely it isn't too much to ask that they occasionally send in a spot of news for it? There is certainly too much "Let Jack do it" in this direction.

Three tough and misogynistic **EASTBOURNE M.F.C.** members have been discovered taking dancing lessons; merely, so the story goes, to make their controllining more graceful and entertaining in the future. Hrrmph? Plans for a coach for the Nationals are already in hand.

SOUTHERN CROSS A.C. report steadily increasing membership following the recent publicity drive; the number of members has, in fact, almost doubled compared with twelve months ago. Subscriptions for members in the 16-20 age group have been dropped from 15s. to 10s. per annum. 1954 champion was R. H. C. Smith, with F. C. Smith in second place. A stage-by-stage construction, finish, and flying competition for juniors is in hand through the winter, and should keep enthusiasm high.

North Western

Also "chocker" is the N.W. Area P.R.O., who has also resigned. At the Area A.G.M. the treasurer also resigned and everyone put forward for either job found an excuse to evade it. The Area Chairman then made a few points on the subject and John O'Donnell offered to take the treasurer's post. D. Fletcher of Timperley M.A.C. took over the unenviable task of P.R.O. The retiring P.R.O. gives the impression that his opinion of work-shy modellers is decidedly poor—they're willing enough to benefit from the results of committee work, but loth to accept the smallest share of responsibility or loss of a few minutes' spare time. The A.G.M. later repaired to the "Swan with Two Necks" for a nice line in hotpot and an enjoyable film show given by Eliot Horwich. Particularly well received were shots in which the film speed was juggled, and sequences showing old so-and-so piling up his power job! Incidentally, the funniest films we've seen were shots of H.L.C/L jobs, run in reverse . . . . .

A home win by **SHARSTON D.M.S.** against **CHEADLE** kicked off the club's indoor team-racing season. Best time was 40 laps in 1 : 03 by A. Sedgbeer. Most interesting model in the winter building programme is an o.d. pusher flying boat (Mills .75) by G. Crichton.

Masochism is the only word we can think of for the one hour scramble organised by **WHITEFIELD M.A.C.** Mud, water, and barbed wire all came into it, leaving the entrants strictly on their knees. R. Howarth and G. Smith aggregated just over 10 min. to win.

An open night to show parents and relatives something of the club's activities is being arranged by **WAVERTREE M.F.C.**—a very good scheme. The open night will include an exhibition of models and a short film show. Several scaplanes are being built (this type now suits the local flying field!), but A2 still remains favourite. A one-design contest has been decided upon, using *Rubberdub* (full size in Christmas AERO-MODELLER). A. Carter has acquired a Torp and has started in on a *Swiss Miss* for it.

Indoor flying in **BLACKPOOL** and **FYLDE M.A.S.** isn't quite up to Cardington standard, but in the space available (20 ft. wide and 20 ft. high) some interesting flights are being made. Top time so far is M. Thomas' 2 : 50 with a 24 in. model which is at a disadvantage in the confined space. A. Bailey holds the "up to 18 in." class record with 1 : 49, and "up to 12 in." holder is Cliff Davey with a torrid 2 : 24. Junior P. Moss is showing that juniors can do it too.

Southern

New club is the **DE HAVILLAND S.S.C.M.E.** formed to cater for all branches of model engineering. At present about 75 per cent. of the thirty members are aircraft fans, which probably suits the chairman, who is our old friend Rip. Clubroom facilities are in the offing, and the apprentices comprising this club are rarin' to get at contests.

Scheme for a glider league on an inter-club basis is dreamed up by **WHITCHURCH D.M.C.** Now just over a year old, the club is firmly established and energetically pursuing all branches, including R/C (turn—better touch wood!). Clubs in the neighbourhood are invited to contact T. Dunlop, 46 Fairfield Estate, Whitchurch, Hants, to see if the glider league idea can be adopted.

A New Year exhibition by **FARNBOROUGH M.A.C.** has the boys all worried—they're trying to work out ways of manoeuvring feather mattresses under their models to keep enough intact for a good show!

The last round of the **BOURNEMOUTH M.A.S.** *versus* **WEST HANTS A.A.** challenge match was flown off in conditions even rougher than those which originally caused the postponement. With a tie on the two previous rounds, competition was sharp, and the contest was decidedly up and down. B.M.A.S. took 1, 2, 6, 7, 8, and 12th against W.H.A.A.'s 3, 4, 9, 10, and 13th, giving a clear win for Bournemouth.

North Eastern

A winter programme of talks and practica nights is in hand at **SEAHAM D.M.C.**'s clubroom at Rock House, Seaham Harbour, each Friday. Visitors and new members are extended a cordial invitation. The club's facilities include a meeting room, store room, workshop (for engine tuning, etc.), a concrete C/L and T/R pitch and an excellent flying field. A window display is hoped to attract new members, and a heavier contest programme is planned. Two T/R events (at Croft and Sherburn) were entered last year, and cold logic, heated argument, mockery, or sarcasm, fail to stop the team from saying that they'd have won both if they hadn't pranged in the first lap of each!

Worrying the **NOVOCASTRIA M.A.S.** is the query "Did Silvio's Wakefield fly?" Less of a worry is the club position, since finances are sound and membership on the upgrade. The "Novocastria News" is one of the wittiest club mags. we receive—we always have a good chuckle—and they certainly don't pull any punches.

Midland

Consolation for an ignominious defeat by Northampton M.A.C. has been sought by **WELLINGBOROUGH M.A.C.** member in hard work, re-decorating the newly-acquired clubroom. Building benches are being erected for members' use. C. Longstaff, 16 Link Road, Rushton, Northants, will give you all the gen. if you'd like to be in.

London

Building, with C/L top of the list, is rampant in **FULHAM M.A.C.** 1954 was rather disappointing from the flying point of view, but better things are hoped for in 1955. Two AEROMODELLER receivers have been installed in *Wavemasters* for use as floating test beds; boats can certainly provide good R/C training.

The use of water pistols in T/R circles has been banned in **SIDCUP A.S.**—it has gone too far. Hear, hear. The 51 club members are busy building for the coming contests and exhibitions.

Bed and aspirin followed the S.M.A.E. dinner for a dozen **BUSHY PARK M.F.C.** members who went along to help Sid Allen and George Redlich home with the pots!

Scotland

List of events for the big P.A.A. meeting north of the border on September 10 and 11, has now reached sixteen. These will be, roughly, open power, rubber, and glider, 1½ and 2½ Paaload, rubber Paaload, F/F scale, T/R A and B, stunt, combat A and B, all classes of speed, R/C, all classes concours, and Jetex. Phew!

THE AEROMODELLER 1 c.c. Paaload class proved popular in the **ANGUS D.A.L.**, and will be repeated this year. Montrose collected the Strathmore Trophy as leading club and W. Guild, of Dundee, was individual champion, thus being the first to win the new Angus Cup.

At **ARBROATH** public outcry was raised over the engine noise of C/L fliers: all is smoothed over now, provided smaller and less disruptive motors are used. A recent film show was well supported.

Vultans and *Paageboys* are favoured in the **CARNOUSTIE** club, who share a flying ground with scale fans **DUNDEE M.A.C.** Heartery (and hope!) is "Has anyone ever heard of a C/L type asphyxiated by engine fumes after lengthy indoor sessions?" Well, we know other clubs suffering from that!

C/L is favourite in new league members **KIRRIEMUIR.** F/F enthusiasts are more numerous in **MONTROSE A.C.** and itching to get at the "big show over on the West side" in September. These boys are recognisable, apparently, by the slide rules in their sporrans!

with acknowledgements to "Housewife" Magazine

Correspondent is sought by 28-year-old scale fiend Bob Evans of the U.S.A. who is strictly scale only. Goes to a meet, flies a little by himself, and spends the rest of the time "pickin' my nose and throwing rocks at the U-control boys and damnit I'm lonesome!" Well, now there'll be lots who'd like to write, but let's have your address, Bob—we think it might be Minneapolis . . . From Canada comes F/F man Peter Mitchell, 293 Glen Road, Toronto, Ontario, who would like a 16-year-old of similar interests to write.

Lastly—what, you've guessed it? A green *Magna*, Dart powered, found on Hounslow Heath, November 14. Owner collect from B. Kenchington, 47 Gloucester Road, Kew, Surrey. What about charging a charity fee for this AEROMODELLER recovery service?

Cheers.

THE CLUBMAN.

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R. J. Pearson, 4 Stamfordham Place Liverpool, 19.

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J. S. Eckersley, 65 Calverley Moor Avenue, Thornbury, Bradford.

BRISTOL AND WEST M.A.C.
D. C. L. Francis, 7 Fremantle Square, Cotham, Bristol, 6.

FULHAM M.A.C.
H. Young, 84a Lillie Road, Fulham.

SOUTH BRISTOL M.A.C.
J. Sullivan, 30 Devon Road, Whitchall, Bristol, 5.

OLDHAM D.M.A.C.
R. Johnson, 3 No. 4 Court, off Hobson Street, Oldham, Lancs.

SIDCUP A.S.
A. A. Houlding, 87 Longlands Road, Sidcup, Kent.

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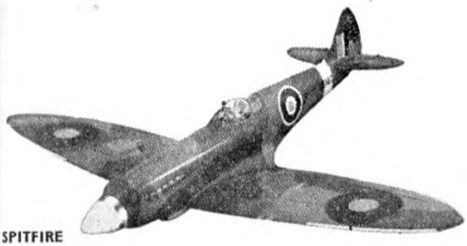

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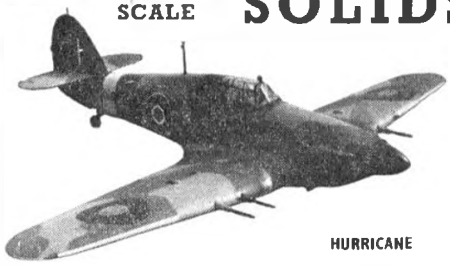

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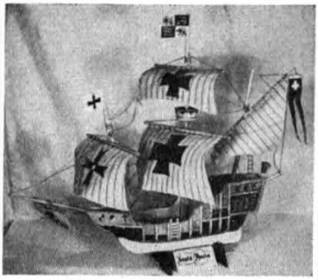

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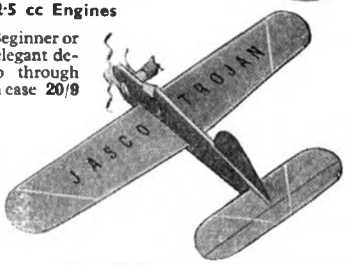

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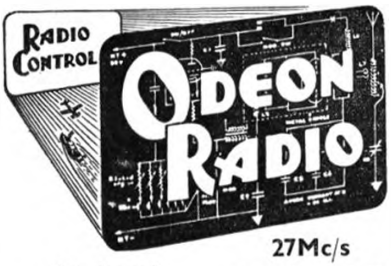

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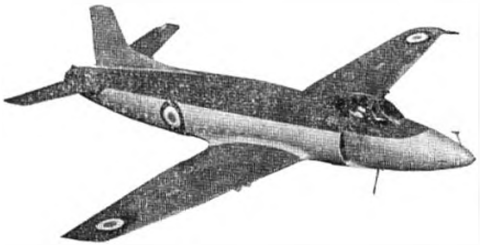

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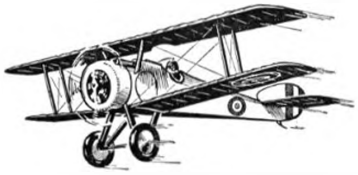

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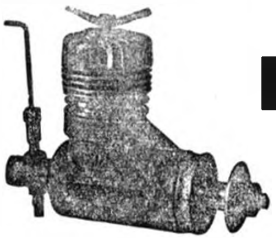

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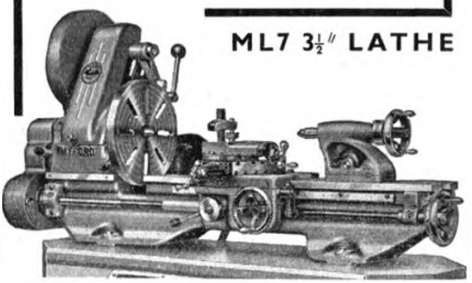

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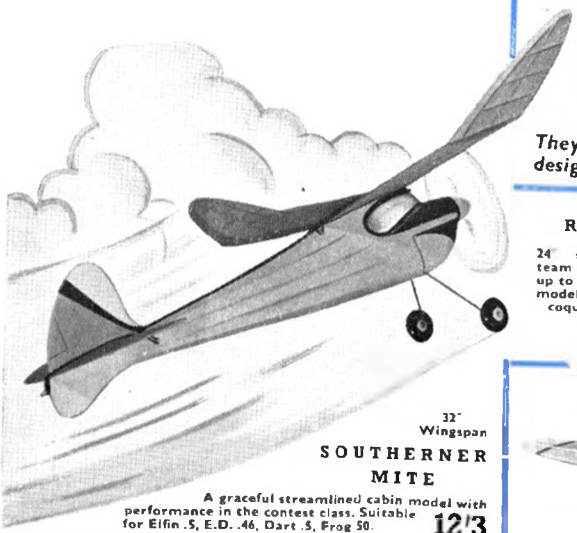

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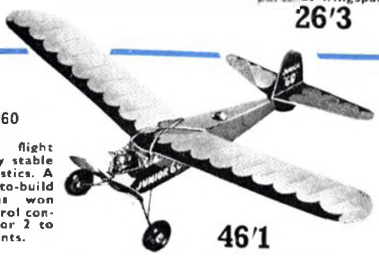

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