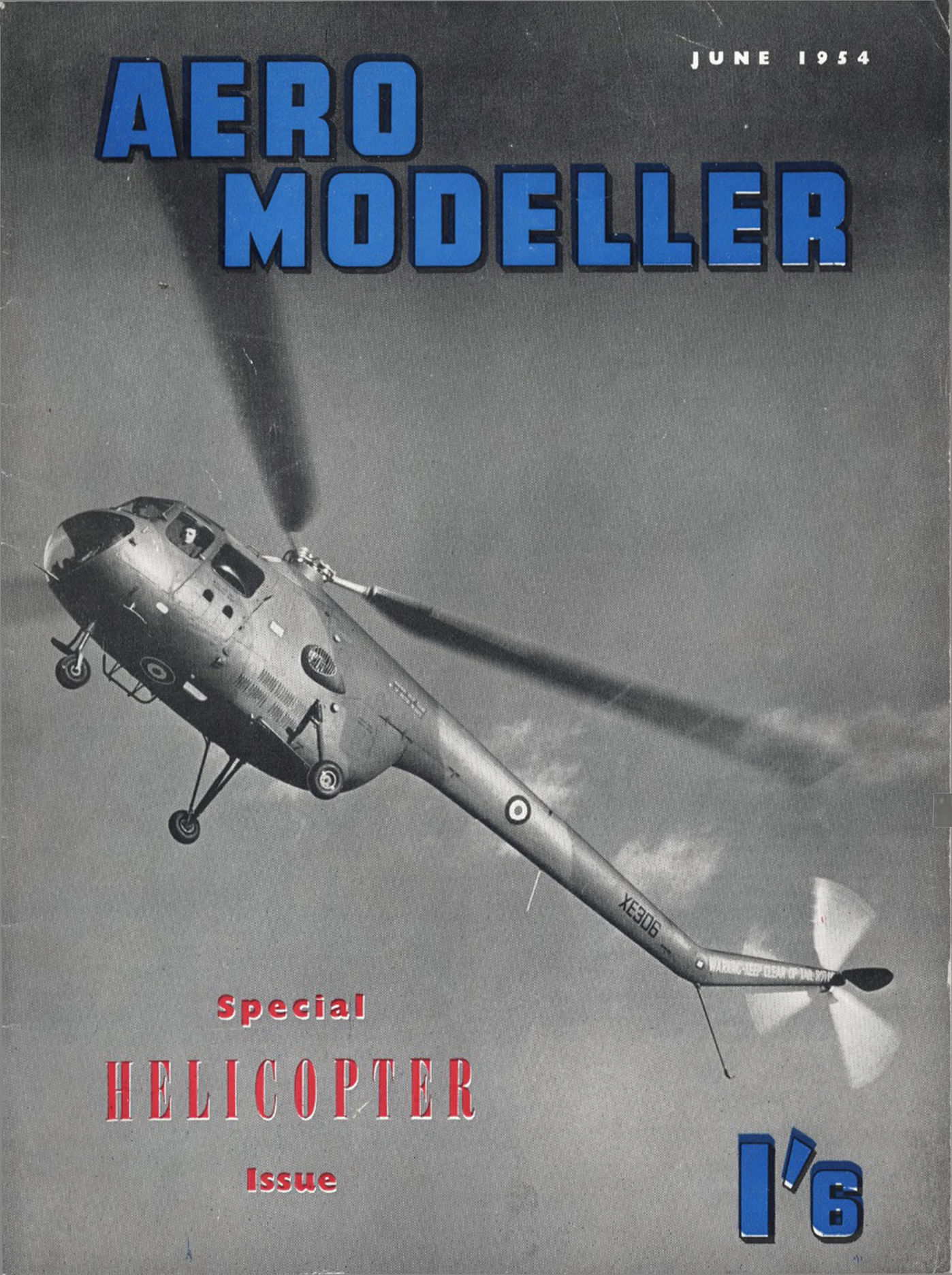
JUNE 1954

AERO MODELLER



Special

HELICOPTER

Issue

1'6

Digital Edition Magazines.

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:

Hlsat Blog Free Plans and Articles.

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

AeroFred Gallery Free Plans.

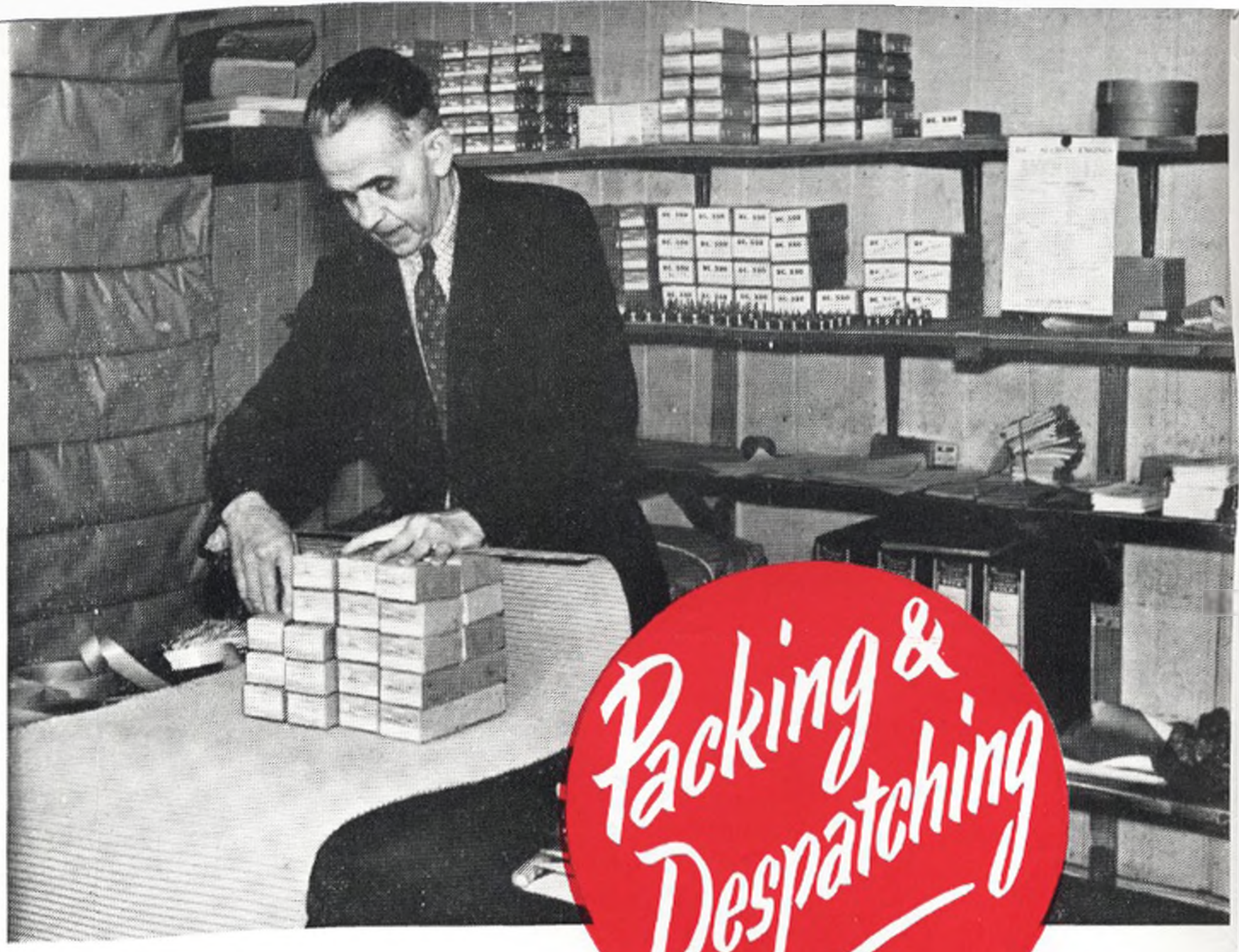
http://aerofred.com/index.php

Hip Pocket Aeronautics Gallery Free Plans.

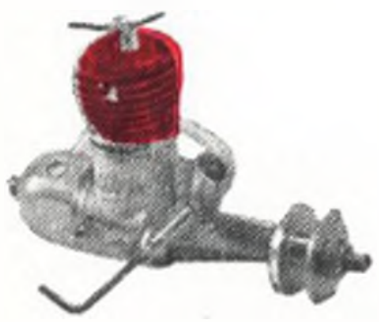
http://www.hippocketaeronautics.com/hpa_plans/index.php

Diligence Work by Hlsat.

Inside Your Engine No. 7



BAMBI 0·15 c.c.
108/11. Inc. Tax.



Mk. II DART
0·5 c.c. 64 2 Inc. tax

Mk. II JAVELIN
1·49 c.c. 65/4 Inc. tax

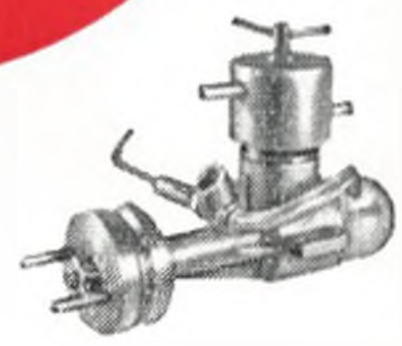
WITH all the care and skill that our works put into every Davies Charlton engine it is essential that it is delivered to you the customer, both in good time and in perfect condition. That is why the Despatch Department, although of little technical interest, is a vital part of our organisation.

It is a fact that we send engines to almost every country in the world, and if modellers saw the multitude of regulations that must be complied with, such as Consular Invoices, Certified Invoices, Certificates of Origin, Currency Declaration Forms, Sight Drafts, etc., etc., they would agree that our export revenue is well and truly earned! This year we are scheduled to deliver to the U.S A. alone some 8,000 engines, and quite a few overseas kit manufacturers produce kits especially for our products. All of which goes to prove that Allbon and D/C engines have an unequalled reputation for quality and performance throughout the modelling world.

Remember! Every engine in our range is guaranteed and readily available at your local model shop. Any modeller having the slightest difficulty over supplies in his district should contact us immediately.

All Export Enquiries to:
DAVIES CHARLTON LTD.
Barnoldswick via Colne, Lancs.

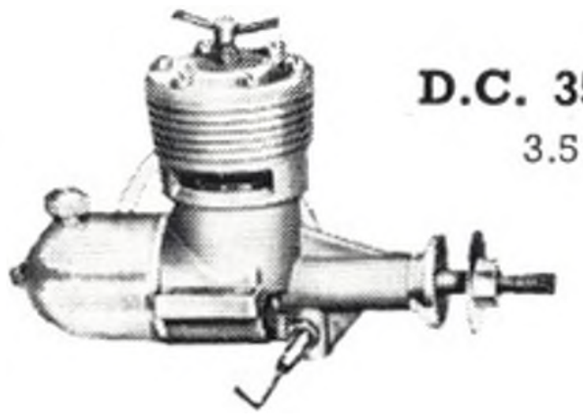
Home Trade Distributors:
E. KEIL & CO. LTD.
195 Hackney Road, London, E.2



MARINE DART
0·5 c.c. 83/10 Inc. tax

MARINE JAVELIN
1.49 c.c. 85/2 Inc. tax

SPITFIRE
1 c.c. 64/2 Inc. tax



D.C. 350 & D.C. 350 (G)
3.5 c.c. 78/5 Inc. tax

NORTH SOUTH
EAST WEST

GREGORY'S

Service is the Best

★ RADIO CONTROL ★

COMPLETE OUTFITS P.T.

*E.D. Boomerang ... 200/-+39/6
E.D. Mk. IV Tuned Reed, 3 channels unit, including control box.
Complete 400/-+75/-

TRANSMITTERS

E.D. Boomerang and aerial 92/6+16/6
E.D. IV control box and aerial 160/-+30/-
E.C.C. 1061 ... ... 68/-+11/4
E.C.C. International ... 150/-+25/-

RECEIVERS

*E.D. Boomerang Receiver Pack (incl. escapement) ... 109/6+17/2
*E.D. Boomerang Receiving Set only ... ... 89/-+16/-
E.C.C. 951A ... ... 68/-+11/4

*Boomerang Receiver can be supplied in hard or soft valve type.

COMPONENTS

E.D. escapement, compact and normal type ... ... 18/6+ 3/3
E.D. clockwork escapement. 47/6+ 9/6
E.C.C. 202 Escapement ... 14/-+ 2/4
E.D. polarized relay ... 30/-
E.C.C. 5A relay ... 25/-
E.D. Standard relay ... 22/6
E.D. Reed Unit (high or low frequency, state which) 60/-
Hivac Valve ... ... 15/-+ 2/6
Hivac Valve Holder ... 1/3
Milliameter, 0.5 M/A ... 12/6
E.D. IV Control Box ... 44/-+ 8/3
E.D. Rudder Mechanism 48/-+ 9/-

★ ★ NEW ★ ★

Amco, Avionic Receiver. Hard Valve, Slug Tuned. 2¼ oz. ... ... 65/-+12/-

Amco Avionic Transmitter 11 ft. x 11¾ x 4 in. 112/-+21/1

FENNER PIKE EQUIPMENT

Servo-Unit ... ... 58/9+ 9/9
Pulse-Box ... ... 58/9+ 9/9

Leaflet on request S.A.E.

★ DURATION KITS ★

FROG

	Price P.T.
Junior Series	3/-+ 6d.
Senior Series	4/3+ 8d.
Goblin 24"	4/6+ 9d.
Witch 36"	11/2+1/10
Minx 30"	7/3+ 1/3
Mamba 19"	6/5+ 1/1

VERON

Rascal 24"	5/6+11d.
Goblin 20"	3/9+7½d.
Sentinel 34"	10/6+ 1/9

KEIL KRAFT

Ajax 30"	6/-+ 1/-
Playboy 20"	3/3+ 6d.
Eaglet 24"	4/6+ 9d.
Competitor 32" ...	7/-+ 1/2
Gypsy 40"	10/6+ 1/9
Ace 30"	5/-+10d.
Contestor 45"	17/6+2/11
Senator 32"	5/6+11d.

KITS FOR R/C PLANES

K K Junior 60 ... ... 39/6+ 6/7
E.D. Radio Queen ... 78/6+ 2/3

BOATS

Wavemaster ... ... 60/-+10/-
Adamcraft Seaplane ... 45/-+ 7/6
Police Launch ... ... 36/-+ 6/-

★ ACCESSORIES ★

FROG NYLON PROPS

	P.T.
6" x 4"	1/3½+2½d.
8" x 5" and 8" x 6" ...	2/6+ 5d.
8" x 8", 9" x 6" and 10" x 6"	3/-+ 6d.
Dermic Oilers	4/11
Modellers Pins, 2 gross ...	4/6
Coil and Condenser ...	21/7+ 2/6
Flex, 5 colours	4d. per yd.
Venner P.I. Accumulators	25/-

★ ENGINES ★

At the time of insertion ex-stock.

	Price P.T.
Amco B.B. 5	78/8+14/9
Amco P.B. 3.5	60/-+11/3
Allbon Dart .5 c.c. II ...	54/-+10/2
Allbon Spitfire	54/-+10/2
Allbon Javelin	55/-+10/2
D.C. 350	66/-+12/5
E.D. .46 Hornet ...	45/-+ 7/3
E.D. Bee I c.c. ...	47/6+ 7/3
E.D. 2.46 Racer	72/6+ 6/-
E.D. Mk. IV 3.46 c.c. Hunter	72/6+ 6/-
E.D. 1.46	52/6+ 4/6
E.D. Bee + W/cooled ...	104/3+12/-
E.D. 2.46 + W/cooled ...	98/c+10/9
E.D. 3.46 + W/cooled ...	98/6+10/9
Frog 250	64/3+10/9
Frog 50	42/9+ 7/3
Frog 150	42/9+ 7/3
Frog 500 R.G.	64/3+10/9
Frog 500 P.E.	72/9+14/3
Oliver Tiger	108/1+21/8
Mills P.75	50/-+ 8/-
Mills S.75	55/-+ 8/10
Mills 1.3	75/-+12/-
Elfin 1.49 c.c.	47/6+8/8
Elfin 2.49 c.c.	56/-+10/6
E.D. Miles Special 5 c.c.	140/-+26/3
E.D. Miles Special 5 c.c. +W/cooled	165/-+39/6

AMCO ATOM 1.5 c.c.
(Not yet available)
Why not Order Yours for C.O.D. Delivery
50/-+9/4 P.T.

★ FREE FLIGHT KITS ★

KEILKRAFT

	Price P.T.
Cessna 170 36"	18/6+ 3/1
Luscombe Silvaire 40"	18/6+ 3/1
Piper Super Cruiser 40"	18/6+ 3/1
Southerner 60 60" ...	40/-+ 6/8
Southerner Mite 32" ...	10/6+ 1/9
Slicker 50 50"	25/-+ 4/2
Slicker Mite 32" ...	9/6+ 1/7
Outlaw 50"	22/6+ 3/9
Bandit 44"	18/6+ 3/1
Ladybird 41"	18/6+ 3/1
Pirate 34"	12/-+ 2/-

VERON

Lavochkin 17 37" ...	25/-+ 4/2
Skyskooter 48" ...	25/-+ 4/2
Streaker 37"	19/9+ 3/3
Cardinal 35"	14/6+ 2/5
Sabre 34"	25/-+11/2

Frog

Cirrus 48"	14/9+ 2/3
Janus 44"	16/3+ 1/8
Powavan 48"	10/3+ 2/3
Zephyr 33"	8/7+ 1/5
Tarquin	10/0+ 1/8

SOLIDS, Avian Series
1/48 Scale
Spitfire, Hurricane, Mustang
4/10+9½ P.T.
Swift 5/2+10d. P.T.

★ ARMCHAIR AERONAUTICS ★

BOOKS

Including those reviewed in February and May issues.

Observers' Book of Aircraft ...	5/4
The Aircraft of the World ...	26/3
A B C of Model Aircraft Construction	5/5
Design for Aeromodellers ...	5/5
A B C Continental Aircraft ...	2/9
How to Make Model Aircraft	3/5
Radio Control of Model Aircraft	9/11
Keil Kraft Handbook	1/6
A B C Military Aircraft Recognition 1954	2/9
A B C Civil Aircraft Recognition 1954	2/9
A B C Civil Aircraft Markings ...	2/9
A B C British Cars	2/3
A B C Ocean Liners	2/3
Royal Air Force 1939-45. Vol. I	14/6
Test Pilot (Neville Duke) ...	13/6
Heaven Next Stop	13/6
Radio Control of M/A and Boats	9/-
Stunt C/L Flying	11/-
Aeromodeller Annual	10/7

All prices include postage.

OVERSEAS INFORMATION

As a result of so many enquiries for our "Overseas Cash on Delivery Service" we are listing the countries which will accept such consignments. Part 3 herewith, see last 2 issues for parts 1 and 2.

Sarawak, St. Lucia, St. Vincent, Seychelles, Sierra Leone, Somaliland, Southern Rhodesia, Surinam, Sweden, Switzerland, Tanganyika (principal towns only), Tangier, Togo (British), Tortola, Trinidad and Tobago, Zanzibar.

Customers resident outside United Kingdom, including H.M. Forces, buy free of Purchase Tax.

Cash with order or C.O.D. if permissible. Postal rates vary according to postal service requested, and destination. Information concerning dispatch to any country given on request.

FORCES CLUBS. Recognised Clubs can buy on a credit account. Details on request.

NOTE: Will all customers requiring information please include a S.A.E., or, if overseas, International Reply Coupon.

P. E. GREGORY & SON

(ALTON) LTD., ALTON *TEL. 3376* **HANTS**

AN UNEQUALLED RETURN POST SERVICE 3d. STAMP FOR LISTS

HOME ORDERING INSTRUCTIONS. Cash with order or C.O.D. All orders under 10/- add 1/-, 25/- add 1/4, 40/- add 1/8, over 40/- post free.

The first 3 tricks out of the AMCO hat!

B.B. Amco 3·5 c.c.
Price 78/8 (Plus 14/9 P.T.)
Positive needle valve adjustment —crank shaft induction.

P.B. Amco 3·5 c.c.
Price 60/- (Plus 11/3 P.T.)
Plain bearing—rotary shaft induction positive needle valve adjustment.

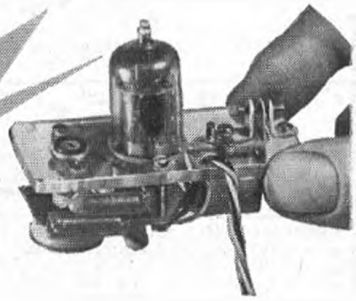
Amco ATOM
1·5 cu. cms.·
·09 cu. ins.
Price 50/-
(Plus 9/4 P.T.) Rotary shaft induction—built-in exhaust stacks—new all purpose mounting—positive needle valve adjustment—integral tank—spinner nut available, extra if required.

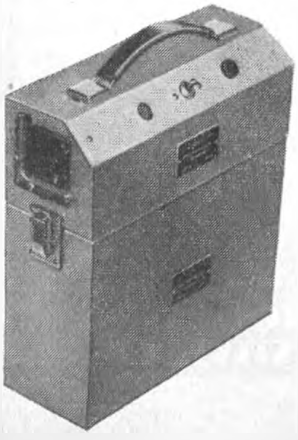
The first three models in the AMCO range have proved an outstanding success. Aeromodellers have been quick to appreciate the finer points of these precision built engines. At the price they set a new standard of excellence in this field.

Designed to maintain a peak performance through years of service, AMCO motors represent the finest value on the market today.

The AMCO Avionic is without doubt the perfection of Remote Control Equipment. The superb design and workmanship ensure a performance and reliability which will delight the most experienced aeromodeller.

AMCO AVIONIC REMOTE CONTROL





TRANSMITTER 112/- plus 21/1 P.T.

Contained in a stoutly built attache type case, this unit is in two basic parts. The upper portion contains the transmitter itself and plugs into the lower portion containing the power supply. Space for a modulator is provided and alternative power units to the normal dry batteries for car operation can be had if desired. Note the two-way aerial connection whereby the set can be operated laid flat. A tuned aerial circuit gives increased range on 27 M/C's.

RECEIVER 65/- plus 12/- P.T.

Small in size and light in weight this single hard valve (1S4) receiver is quench operated with slug tuning. Sensitivity and range are excellent and the new relay design gives reliable performance at all times.

Contained in a damage and dustproof plastic case the set is complete with ancillary components such as wire, plug and socket.

Full details of "Avionic" remote control equipment can be had on request from:—

AMCO MODEL ENGINES LTD

Manufactured by AERONAUTICAL ELECTRONIC & ENG. CO. LTD.
SUNLEIGH WORKS, ALPERTON, MIDDX. *Tel.:* WEMBLEY 8585

WORLD WIDE MAIL ORDER Service

E.C.C. RADIO-CONTROL

FINGERTIP CONTROL

Telecommander

More and more R/C enthusiasts are finding in E.C.C. "Telecommander" equipment the ideal way to control their airborne models. The newest receiver and escapement units are lightweight, wonderfully compact and powerful. Their efficiency is proven by contests won at home and abroad. Costs are moderate, and in use E.C.C. will be found extremely dependable. I can give delivery from stock and can recommend E.C.C. whenever it is desired to control a model's movements from a distance.

Illustrated—951A Receiver and 202 Escapement.

DELIVERED FROM STOCK

1061 HAND TRANSMITTER: £3 10s. 0d. + 11/8 P.T. Totally enclosed in bakelite case with aluminium panel. Weighs only 3 lb.

951A RECEIVER: £3 8s. 0d. + 11/4 P.T. Hard valve, long life equipment, dust-proof plastic case. 4 M/A current change! Weight 2¼ ozs.

202 ESCAPEMENT: 14s. 0d. + 2/4 P.T. Weighs only ½ oz. 3 volt operation. Size 1" x ¾" x ¾". Simplified mounting.

TRANSMITTER UNIT, with valve for building in as required, in case **£2 10s. 0d.** + 8/4 P.T.

INTERNATIONAL TRANSMITTER: A superb instrument in modern styled case with carrying handle and sectional aerial. Built-in milliameter, warning light and keying lead. Transmits to limit of legally permitted power output. With valves **£7 10s. 0d.** + £1 5s. 0d. P.T.

E.C.C. 8ft. collapsible aerial **8/6**

Quench Coil for 951A **6/–**

All accessories stocked including batteries, plugs, sockets, meters, etc., etc.

IDEAL FOR USE WITH FENNERS-PIKE SERVO-UNIT ... ... **58/–** + 10/– P.T.

Britain's most dependable model export service offers you the world's best

Modellers have succeeded in welding themselves into a world-wide band of enthusiasts who know and want each others' designs. I am proud therefore to be able to assist in this flow of commerce by offering modellers the best possible lines, in which, of course, Britain ranks very highly as my ads. show.

- All Overseas orders, including ALL Forces Overseas FREE of P.T.
- All Orders despatched on day of receipt and acknowledged by Air Mail.
- As a Licensed Exporter, I supply direct.
- Correct rates of exchange on all foreign currency.

Progressive Modellers Prefer a Progressive Supplier

ENGINES FROM STOCK

		P.T.
Frog 0.5	42/10	+ 7/2
E.D. Baby .46 c.c. ...	45/–	+ 7/3
Mills 0.75 c.c. with cut-out	55/–	+ 9/10
E.D. Bee I c.c.	47/6	+ 7/3
E.D. Water-cooled Bee	67/6	+ 8/9
Mills 1.3 c.c.	75/–	+ 12/6
E.D. 1.46 c.c.	52/6	+ 4/6
Frog 150	42/10	+ 7/2
E.D. Comp. 2 c.c. ...	57/6	+ 4/3
E.D. 2.46 c.c. Racer ...	72/6	+ 6/–
E.D. 3.46 c.c.	72/6	+ 6/–
Amco 3.5 B.B.	78/8	+ 14/9
Amco 3.5 P.B.	60/–	+ 11/3
ETA 29	119/6	+ 22/6
Fuel Cut-off Valve ...	3/6	+ 7d.

FOR THE NEWEST C/L MODELS

The "AM-PULL" C/L HANDLE with vernier adjustment—comfortable and reliable **5/6**

(P/Tax 11d.)

Made under licence

"DROME" AIRWHEELS

Now available for immediate delivery in the following sizes:

2"	wheels, ¾ oz.	per pair	7/–
2½"	wheels, 1¼ oz.	per pair	8/9
3½"	wheels, 2½ oz.	per pair	10/6

"SUNANVIND" SAILPLANE

A design that modellers demand again and again for its sensational flight characteristics. A world's record breaker. **10/6**

E.D. RADIO CONTROL

Mk. II Transmitter and Aerial ...	112/– + 21/–
Mk. II Receiver	184/– + 24/6
Mk. IV Tuned Reed, Three Channel Outfit, cplt. ...	£20/–/– + 75/–
Boomerang	£10/–/– + 35/9

STOCKS OF COMPLETE RANGE CARRIED

TO-DAY'S MOST POPULAR KITS

Space obviously prevents my listing kits in profusion. You know how to find out about them anyway, and if they're the products of the well-known makers, you know I can supply them. *Todays best sellers are* the MERCURY F/F SCALE (for diesels), VERON C/L KITS, SKYLEADA Jetex models, and of course, the wonderful K.K. Kits which could fill a page of advertising on their own. FROG KITS in the Racer and Senior Series are in steady demand. *ALL THE ABOVE MAKES ARE BACKED BY A REPUTATION FOR QUALITY AND VALUE: I STOCK THEM ALL.*

WEBRA MACH I

Webra MOTORS

A limited number of these splendid motors (whose fame is world-wide) are available for distribution in Great Britain. The rest are helping our export drive. Full stocks of spares carried. Orders in strict rotation.

RECORD 148
Weight 3 ozs.; Bore .51 ins.; Stroke .45 ins.; Capacity 1.48 c.c.s.; .18 h.p. at 14,500 r.p.m. **65/-**

WINNER 15
Weight 3½ ozs.; Bore .56 ins.; Stroke .64 ins.; Capacity 2.46 c.c.s.; .23 h.p. at 11,500 r.p.m. **70/-**

MACH I
The most powerful engine of its size in the world.
Weight 4½ ozs.; Bore .61 ins.; Stroke .51 ins.; Capacity 2.47 c.c.s.; .31 h.p. at 16,500 r.p.m. **90/-**

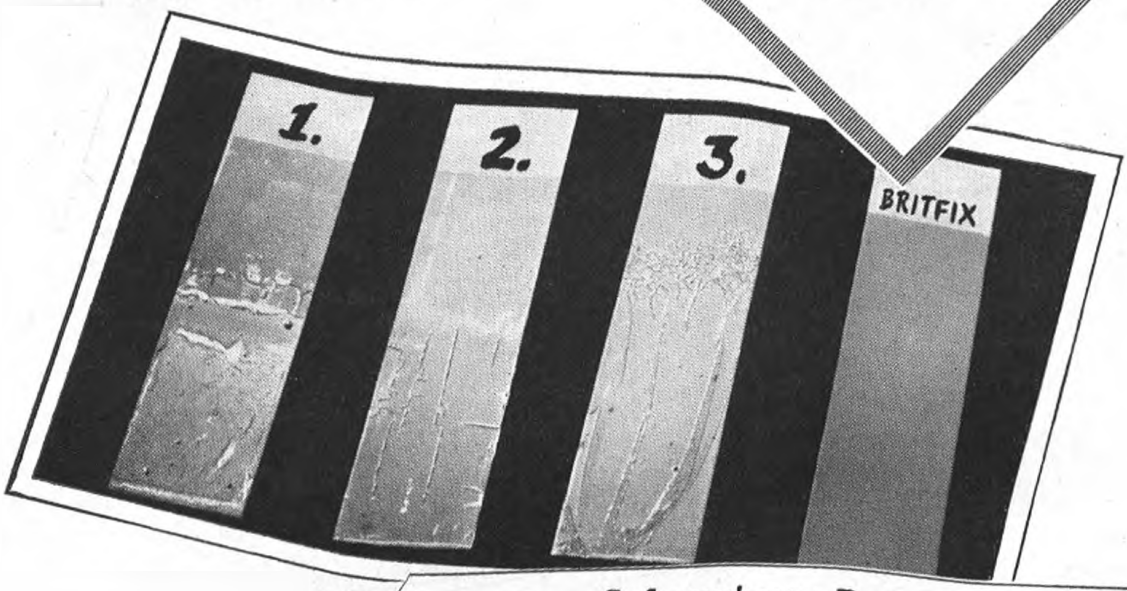
FULL LISTS

3d. in stamps brings my latest 12-page list with details of everything a modeller needs. (Home and overseas prices clearly distinguished.)

ARTHUR MULLETT

16 MEETING HOUSE LANE BRIGHTON - SUSSEX - ENG.

AT LAST! PROOF POSITIVE



After six months of exacting laboratory test, **BRITFIX FUEL PROOFER** has been developed to give complete and lasting protection against all types of fuels . . . better protection than any fuel proofer yet produced—prove it for yourself—get the new 2oz. pack from your model shop now.

Laboratory Report
Test upon Fuel Proofing Varnishes.

The 4 panels were photographed after 6½ hours immersion in standard Diesel Fuel.

Initial Breakdown in Model Diesel Fuel.	
1.	20 mins.
2.	6 hrs.
3.	2 mins.
Britfix	No breakdown after 10 hours immersion.

Initial Breakdown in Model Glo Plug Fuel.	
1.	3 mins.
2.	10 mins.
3.	1 min.
Britfix	23 mins.

The above tests prove that the "Britfix" Fuel Proofer gives vastly superior results against the 3 well-known brands tested.

BRITFIX

FUEL PROOFER

THE HUMBER OIL CO LTD

(HOBBIES DEPT.) · MARFLEET · HULL

only 2/6 for 2oz JAR!

ROLAND SCOTT

THE MODEL SPECIALIST

147, DERBY STREET
Phone 7097
BOLTON, LANCS

★ ★ ★ ENGINES ★ ★ ★

		P.T.
Allbon Dart .5 c.c. ...	54/–	+ 10/2
Allbon Javelin 1.5 c.c.	55/–	+ 10/4
Allbon Spitfire 1 c.c.	54/–	+ 10/2
D.C. 350 3.5 c.c. ...	66/–	+ 12/5
E.D. Baby .46 c.c. ...	45/–	+ 7/3
E.D. Bee 1 c.c. ...	46/–	+ 8/8
E.D. Hornet 1.46 c.c.	48/–	+ 9/–
E.D. Hunter 3.46 c.c.	66/–	+ 12/5
E.D. Hunter W/C ...	92/–	+ 17/3
E.D. 246 W/C ...	92/–	+ 17/3
Miles 5 c.c. Diesel ...	140/–	+ 26/3
Miles 5 c.c. W/C ...	168/–	+ 31/9
E.D. Comp. Special W/C	77/9	+ 12/3
Oliver Tiger 2.5 c.c. ...	130/–	—
Mills P.75 .75 c.c. ...	50/–	+ 8/–
Mills S.75 (cut out) ...	55/–	+ 8/10
Mills 1.3 c.c. Mk. II ...	75/–	+ 12/–
Elfin 1.49 c.c. ...	47/6	+ 8/–
Elfin 2.49 c.c. (New) ...	56/–	+ 10/6
Amco P.B. 3.5 c.c. ...	60/–	+ 11/3
Amco B.B. 3.5 c.c. ...	78/8	+ 14/9

★ ★ JETEX OUTFITS ★ ★

Jetex 50	10/11	+ 1/10
Jetex 50 B (Augmenter)	10/11	+ 1/10
Jetex 100	22/5	+ 3/9
Jetmaster 100 ...	24/–	+ 4/–
Jetex 200	31/8	+ 5/3
Jetex 350	42/3	+ 7/3
Scorpion + Augmenter	33/–	+ 6/–

★ ★ ★ JETEX KITS ★ ★ ★

Voodoo for 50 ...	6/4	– 1/1
Hunter for Jetmaster	18/–	+ 3/–
Swift for Jetmaster	18/–	+ 3/–
Swift for 50	4/1	+ 8d.
Javelin for 50	4/1	+ 8d.

All K.K. 3/6 Jet Kits
All Skyleada 3/6 Jet Kits

★ ★ SECOND-HAND ★ ★

Arden .099 1.6 c.c. G.P. ...	42/6
Frog 150 1.5 c.c.	35/–
Attwood Triumph 49 8.2 c.c. G.P.	95/–
E.D. Comp. Special 2 c.c. ...	37/6
Elfin 249 Beam	47/6
E.D. 2.46 c.c. Racer	50/–
Wildcat 5 c.c. Diesel ...	40/–
Frog 500 G.P.	42/6
McCoy 49 Redhead	95/–
Arden 199 3.2 c.c. G.P. ...	55/–

— *SEND FOR FULL LIST* —

If you have an engine for disposal in good condition I can offer cash or any modelling goods in exchange. Please forward return postage should your engine not be accepted.

★ ★ ACCESSORIES ★ ★

		P.T.
KLG Glowplugs ...	6/6	+ 1/–
E.D. Clockwork Timer	7/–	+ 1/2
XFG-1 Valve	15/–	+ 2/6
Easigrip Handle ...	3/4	+ 7d.
15 c.c. T.R. Tank ...	2/9	+ 6d.
X-Acto Hobby Chest	84/–	
Celspray Airspray ...	8/6	
Aeromodeller Annual	10/–	
Britfix Cement	6d, 10d, 1/6	
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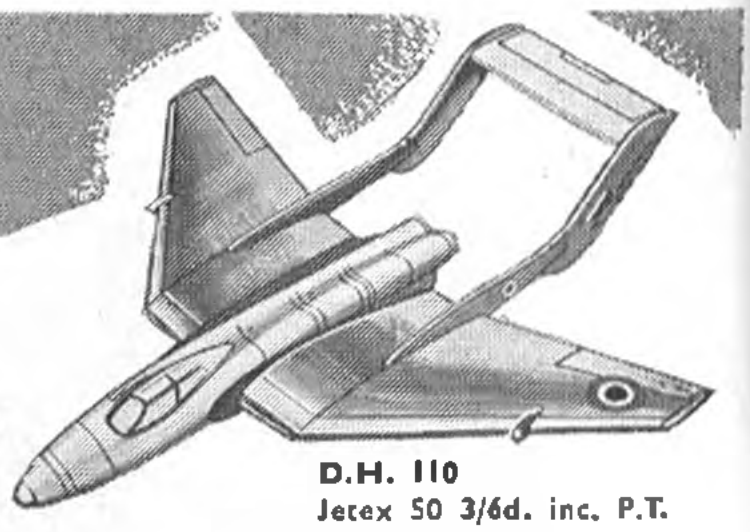

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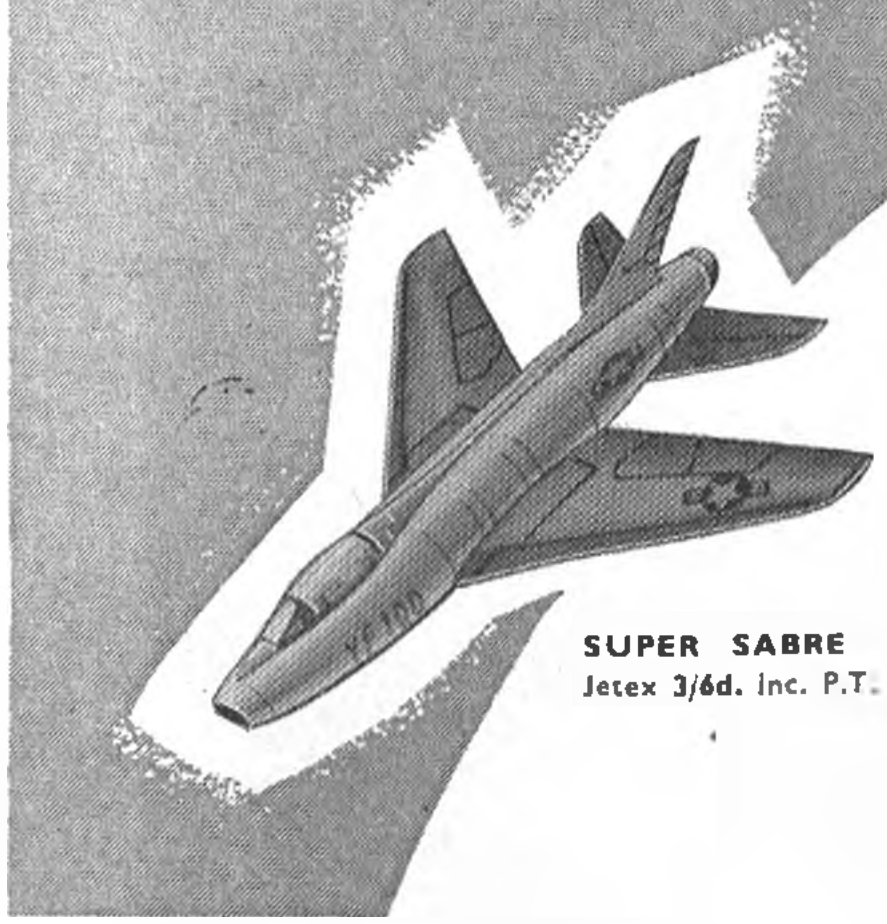

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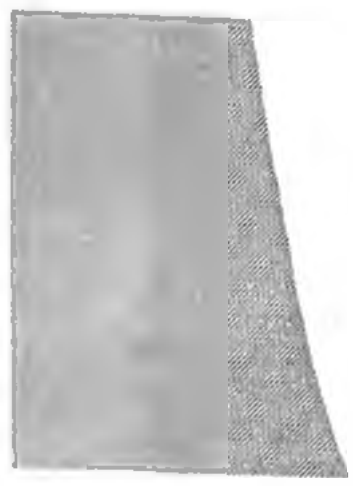

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Contents

Editorial and Advertisement Offices
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A Fine Start

WITH Spring most definitely in the air, thoughts inevitably turn to the great outdoors, and the implementation of those modelling feats we have been dreaming about all through the winter building session.

And what has the Spring brought us—apart from the annual crop of pimples and dandruff? For one thing probably the most hectic and controversial start to a contest season yet witnessed, with individuals, clubs, and Areas taken to task for the incorrect submission of their entries into various National contests, as a result of which many achievements have been "scrubbed." One can only welcome the initiative of the Council, who have clamped down at long last and determined that, in fairness to all modellers, rules shall be obeyed, and those who slip up through carelessness (or more probably the modern disease of "could'nt care less") must pay the price of disqualification.

Next, we experience a day-of-days for model flying, for the 11th of April brought virtually perfect model flying conditions over a large part of Great Britain—and did the lads take advantage of it!! Two applications for new British records have been lodged, one for the A/2 and Open class tow-launched glider record with the extraordinary time of 90 : 30, the fortunate flier being St. Albans club member John Allsop. This beats the record set up by F. Best of Leeds by nearly half an hour and Best's time was regarded as unbeatable! The conditions that allow a model to be maintained in sight for such durations are rare indeed, for the previous record was made way back in 1948.

The second application comes from R.A.F. member D. Green, who flew a Lightweight Sailplane to a new time of 36 : 02, thus bettering P. Hunt's time of 32 : 10 made in 1952.

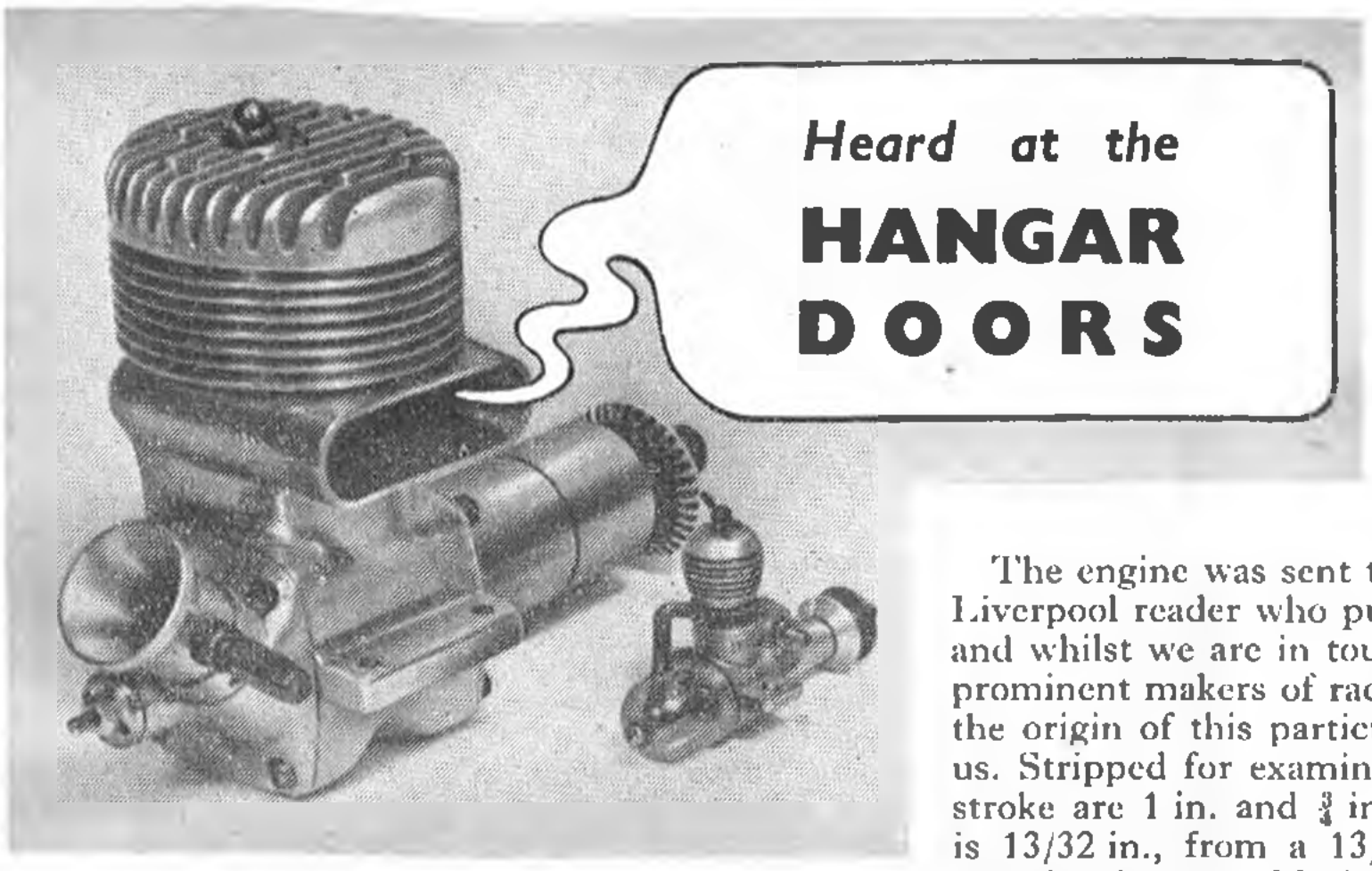
Still on the subject of model records, we give the experience of R. T. Lake of the Surbiton club. On the 27th March he raised the lightweight rubber-driven Canard figure to 2 : 23, only to break his own record on the 7th April with a time of 7 : 32.

But there is more to come! Following a long period of careful preparation, Geoff. Pike of Nottingham made his long-promised attempt on the World Record for radio-controlled machines, and at the end of the Easter holiday he made a flight of 92 : 49 at Tollerton Aerodrome, thus setting a new British record, and a probable World Record. (We say "probable" advisedly, as on previous occasions a claim has been forwarded to the F.A.I. in good faith, only to learn that a superier application has already been accepted from other sources. According to existing records, a Russian holds the present radio-controlled record with a time of 71 : 15, so it would appear that Pike's application should bring a much needed World figure to these islands.)

What else? Talking of World Records automatically brings to mind International affairs—and first in our thoughts is the still very doubtful direct participation of British Teams in the 1954 Championships. Have YOU sent in your donation yet? . . . . . have YOU filled in your Crossword forms yet? . . . . and if not, WHY NOT? Remember, as an aeromodeller—for otherwise you would not be reading this magazine—this vital subject becomes yours, and it is up to each individual to rally round to ensure our proper representation in the most important events in the annual calendar.

And finally, if you have not yet joined the rapidly expanding ranks of the S.M.A.E. as a member, now is the time to rectify this omission. One does not have to be a club member to belong to the Society— a misconception that has been with us too long, so make your application NOW, and be one with the organised British Aeromodelling Movement.

On The Cover . . . . . ***Heralding this special issue on Helicopters, an Army H.C.II Mk. 4 Sycamore hovers for the benefit of the cameraman and so provides extra detail for solid modellers to study. Plans will be found on p.323.***

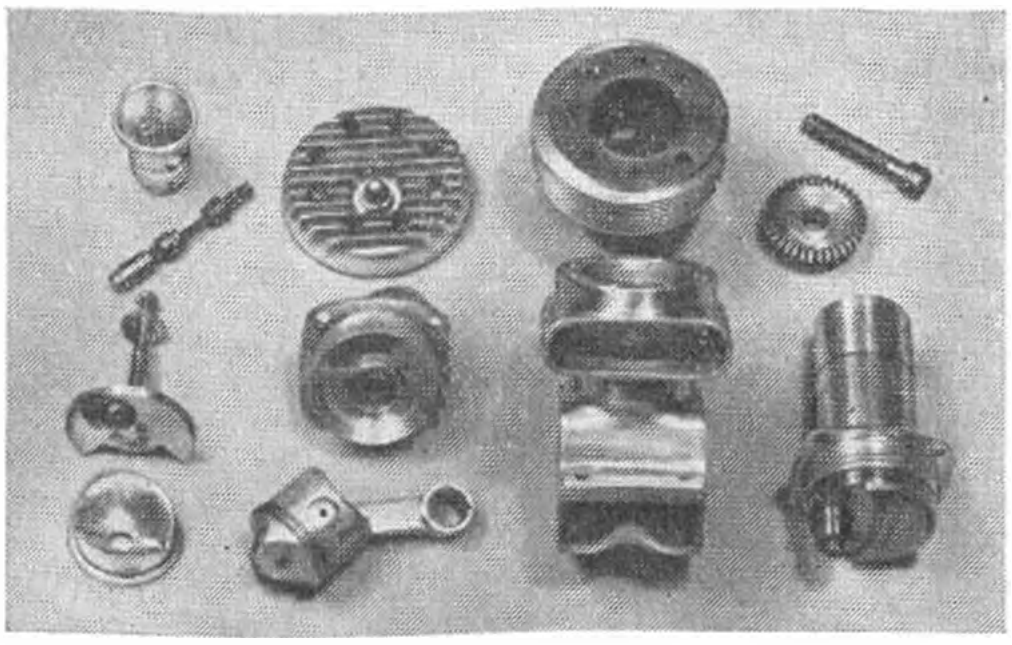


Gratifying Expansion

Response to the new S.M.A.E. Membership scheme has been immediate, and already a very large number of individual and Club fliers have taken advantage of the new Associate Membership, instituted to cater for that majority section who have little or no interest in contests.

The first quarter of 1954 shows 48 new clubs affiliated as against 11 for the same period in 1953, while the re-affiliations are 82 against 50. It is significant that membership within the clubs joining since the inception of the new scheme shows ratios of 46% Seniors, 16½% Juniors, and 37½% Associates, and it will be interesting to see just how membership divides by the year end when existing clubs have re-affiliated under the new system.

Have YOU joined the S.M.A.E. yet? Remember, a strong national model aeronautical movement can only benefit all who are interested in the hobby, and the advantages of membership-cum-insurance are too obvious to need elaborating. If you are still outside the fold, we draw your attention to the form contained on page 328, and urgently request that you JOIN NOW.



Mystery engine—who made it?

Massive in every proportion, and just about the best example of a home-built 10 c.c. racing motor it has been our pleasure to examine, is the beautiful piece of machinery shown with the Allbon Bambi in the heading and bottom photo's.

The engine was sent to us for identification by a Liverpool reader who purchased it "second-hand," and whilst we are in touch with many of the more prominent makers of racing engines of this quality, the origin of this particular 18½ oz. engine escapes us. Stripped for examination we find the bore and stroke are 1 in. and ¾ in. respectively. Intake bore is 13/32 in., from a 13/16 in. bellmouth, and the spraybar jet assembly is aerodynamically sectioned. A bi-metal rotary disc valve spins smoothly on its ballrace mounted shaft, and crankcase volume is cut down to the barest minimum with a large diameter and comparatively shallow big-end assembly. Rings must be home-made, with diagonal splits—the huge finning area is circular in plan, yet offset over the voluminous transfer passage side of the engine, and the contoured portion of the beautifully finished cylinder head is detachable for compression ratio adjustment. A desaxe offset cylinder arrangement is employed. Such workmanship and design is deserving of recognition and if any of our readers can provide correct identification we would be only too happy to pass the information on to the fortunate present owner.

Finger Trouble

A number of Club and Area Competition Secretaries have come in for some sharp criticism this year, and we welcome the decision by S.M.A.E. Council to attempt to put some houses in order! Most of the trouble arises through officials not being fully conversant with regulations, and already some fliers have had their results "scrubbed" through failure on the part of a Comp. Sec. to either send in the results correctly or in time.

J. D. Henderson of Sunderland was originally ruled out of the Pilcher Cup event, but a full and reasonable explanation tendered by the defaulting official responsible was accepted by the Council, and the results have been revised as noted on page 326. We learn that several Areas were penalised in the first of the 1954 Area organised events, and we trust that the lesson duly administered will properly register, and that an improvement in such simple requirements will take place. After all, the rules connected with the forwarding of contest results are simple enough, and the time factor ample. See to it that your Comp. Sec. knows his job, and, what is even more to the point, keeps on his toes and gets your scores in correctly and to time!

Exhibition Contrasts

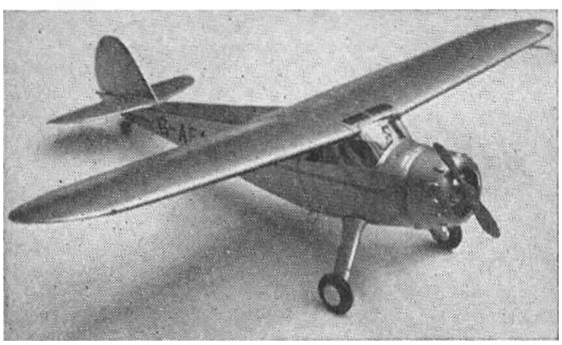
Two well established Model Exhibitions have just had their 1954 airing, and the pleasurable task of adjudicating in the model Aircraft sections gave us a fine opportunity for comparison. First show was the Sixth Northern Models Exhibition, held again at the Manchester Corn Exchange, and our immediate reaction on entering was "where are the aircraft models?" In previous years, aircraft have formed the major portion of exhibits, but something had definitely gone wrong this year.

Only 20 model aircraft shared the nine categories devoted to them, and single entries were received in three of the classes. However, as was to be expected of the North Western Area contingent, the standard of exhibit was high, the outstanding model on show being a very fine Cessna C.34 scale model entered by Ian Cameron of Ellesmere Port. This model is the result of 2½ years of spare time working, progress being related to the rate of information becoming available. The construction follows closely that of the prototype 24 gauge Alclad sheet being used where authentically demanded, and 1/16 in. dia. rivets employed to imitate the full-size construction. Fibreglass was also used where specially shaped parts were required. Altogether one of the best examples of modelling art we have had the pleasure of seeing. (Picture below.)

We forecast a better liaison with the Exhibition organisers in future years, for this years' affair showed up very poorly in relation to previous shows. and the local Area can only feel on their mettle from now on.

In contrast, the Fifth exhibition organised by the Sheffield Society of Aeromodellers was well up to previous standards, and in many respects surpassed its forerunners. Aeromodelling was very well represented, and again the standard of exhibit was if possible better than hitherto.

This was particularly evident in the Glider section, where the judges had great difficulty in deciding between the "Nordic Tern" of old-hand R. F. L. Gosling—well known for many years for the excellence of his workmanship—and the black and yellow "Seraph" of K. Lee. The finish on the sheeted fuselage of the latter model was first-class, and the rest of the model's construction was to top standards. The amazing thing is that Master K.Lee is only 14-years-of-age—a factor that we feel will encourage other youngsters to "have a go" at the old-timers of the hobby.



Our old friend J. D. McHard of the R.A.F. took two classes with his beautifully finished "Cucumber" (tandem biplane with two Albon Darts fitted in push-pull fashion), and a really excellent solid scale Messerschmitt 262 A6. Other class winners were B. F. Ridal (rubber), D. Wynch (flying scale) and J. W. Swift (control line), all of whom were congratulated by the Lord Mayor of Sheffield when performing the opening ceremony.

Control of Radio Control

We understand from the G.P.O. that as and from the 1st June, 1954, a licence will be necessary to operate radio control equipment on the two allocated frequencies of 27M/cs and 465M/cs. The fee will be £1 for a period of five years.

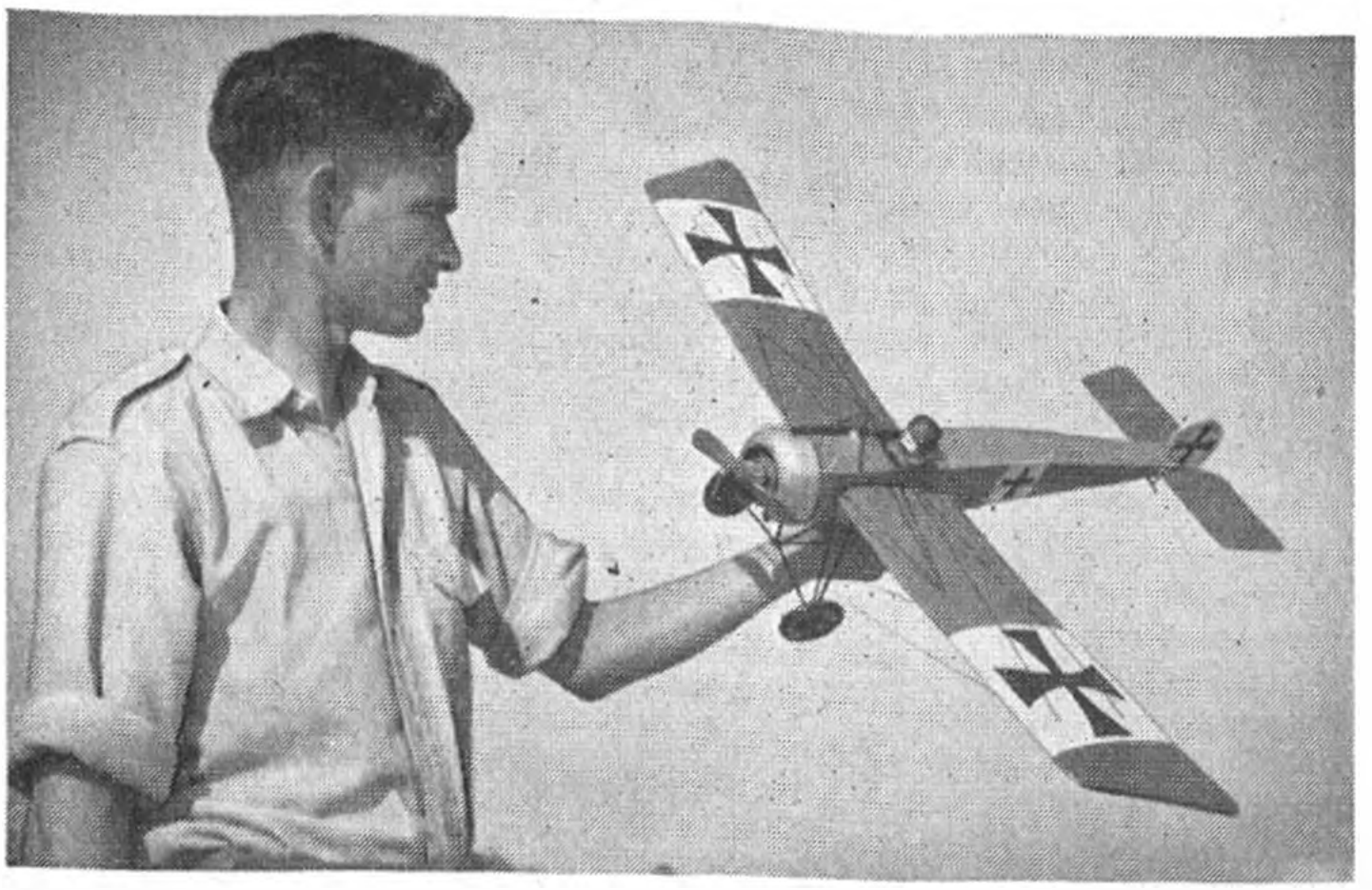
It is emphasised that this is not a restrictive act and that no tests are needed, neither will distinguishing numbers or call signs be issued.

Application for licences (to be issued from 1st June) should be made as soon as possible to:—

RADIO BRANCH,
RADIO & ACCOMMODATION DEPT.,
G.P.O. HEADQUARTERS,
LONDON, E.C.1.

We asked the G.P.O. the reason for this rather sudden move on their part, explaining that whilst everyone appreciated the facilities that had been enjoyed to date, they would obviously not welcome any additional cost to what is already the most expensive section of aeromodelling. The reply was as follows:—When the G.P.O. originally granted the two licence free frequencies it was understood that it was a temporary measure until such time as the Wireless Telegraphy Act 1949 was fully implemented, and, that at the time of the granting of the frequencies Radio Control Equipment was not licenseable under the W/T Act. When the new and wider definition of the Wireless Telegraphy Act 1949 becomes law on June 1st, 1954, the P.M.G. must authorise equipment covered by the act and accordingly is required to issue licences for the operation of equipment under the terms of the Act. Furthermore, the administrative cost of licensing such equipment must be borne by those people operating such equipment. The G.P.O. appear to realise the value of radio control experimentation and have therefore made the licences as simple and straightforward as possible and also have kept the licensing fee to the minimum permissible.

Well there it is, radio men. The law says that as and from the 1st June you must take out a licence It might have been worse, for certainly the annual cost of 4 shillings is reasonable and the licences have been applied with the minimum of restrictions.



THE FAMOUS FOKKER E.IV

An accurate flying scale model of the 'Eindecker' fighter

—— by C. F. Edwards

A VETERAN of more than 200 flights, and yet still pristine enough to win the Concours d'Elegance for scale models at the RAFMAA Championships, this detailed Fokker E.IV, by Sgt. Edwards is the result of many hours careful study at the South Kensington Science Museum. Only a slight increase in dihedral and change of wing section distinguish this 1 in. – 1 ft. model from the full-size museum exhibit, and every care has been taken to ensure accuracy in all other respects. In fact, due to conflicting reports regarding the actual power unit of the "production" Eindecker E.IV, Sgt. Edwards has been forced to steer a middle course in providing us with an interesting history of this early monoplane fighter.

The first E.I's were in fact Fokker's M.8 monoplane which gave air displays before the 1914–18 war. They were termed "looping" aeroplanes as they were the first machines to loop and do various other stunts. With the outbreak of war, Fokker worked out the first system of synchronizing a machine gun to fire through the propeller, and he fitted it to one of his monoplanes and called it E.1. Lieutenant Oswald Boelcke was asked to try it out, and on his third flight he shot down a French two-seater.

The Germans now ordered dozens of the E.1's and the second one was given to Max Immelmann who had immediate results with it. He became the first German "Ace" and invented the famed turn named after him in one of the E.1's. A special E.IV was built for him with a battery of 3 Spandau machine guns on the top decking.

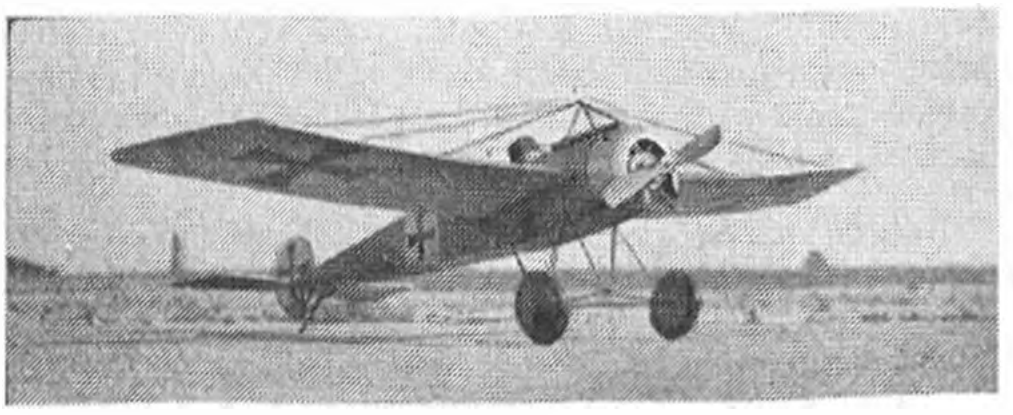
All the "E" series were very similar in appearance, differing only in size, weight and power. Wing spans ranged from 29 ft. to 36 ft. The E.I was powered with a Oberursal 80 h.p. rotary of 7 cylinders. The E.II had a 9 cylinder Oberursal rotary of 100 h.p. and the 110 h.p. version of this engine was fitted to the E.III and E.IV. A lot of the later E.IV's were fitted with the Oberursal 160 h.p. rotary, which was two of the 80 h.p. 7 cylinder engines merged into one 14 cylinder twin row radial

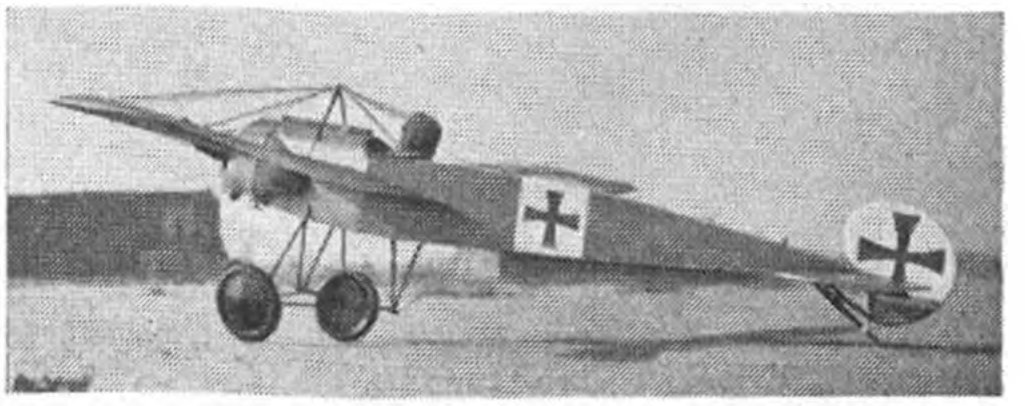
The E.IV so fitted was Fokker's last attempt to compete with the newer aircraft coming into use since the 160 h.p. of the engine overstrained the aircraft resulting in a lot of accidents. As a result of this, few E.IV's were built and the series went out of use at the end of 1916. After that he started designing his "D" series of biplanes.

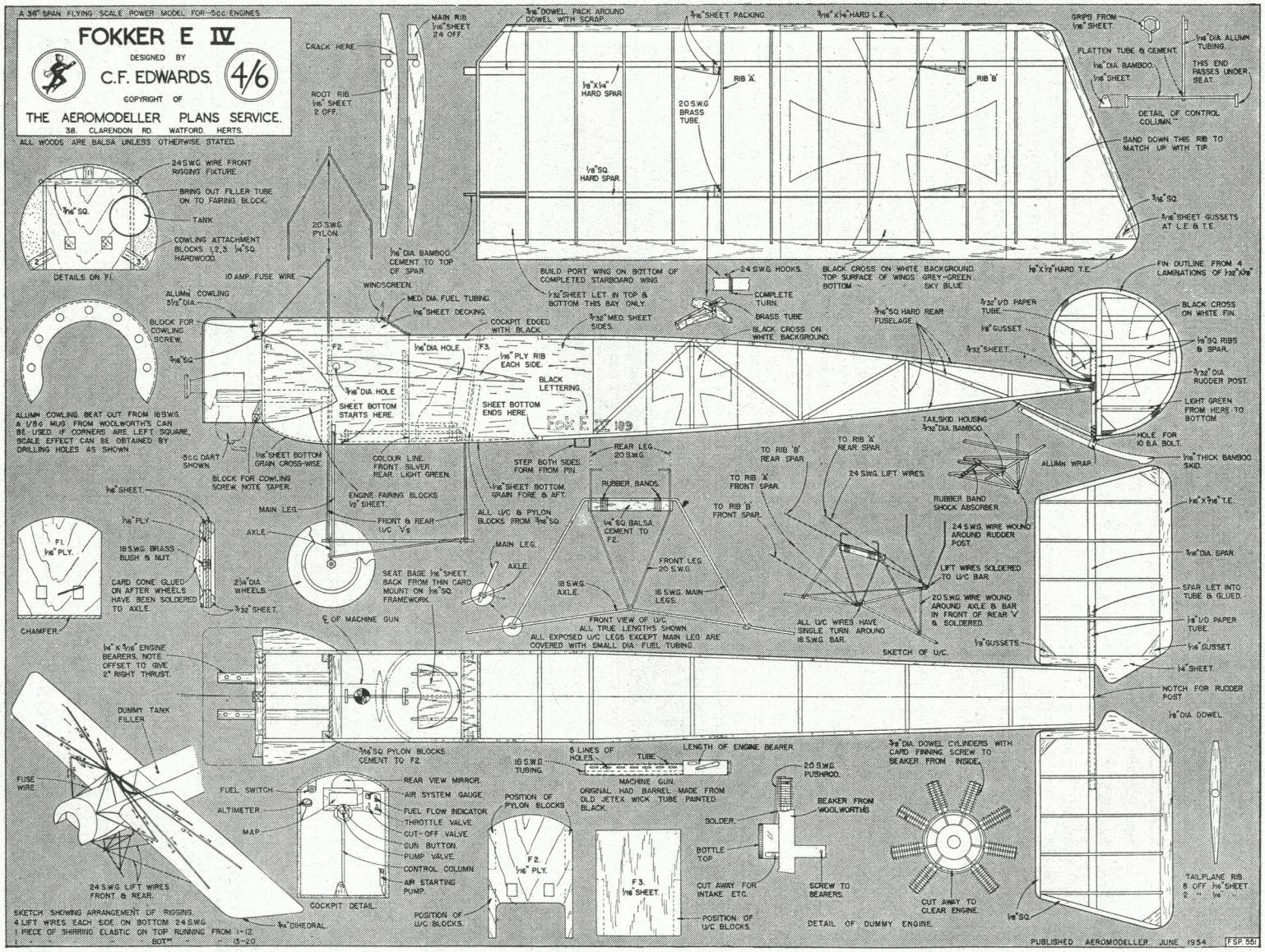
So ended the story of one of the most famous warplanes of all time. They were the first capable of stunting and the first to carry synchronized machine guns. In fact the first aeroplanes to start aerial warfare.

Full details for both building and flying this neat replica of the full-size for .5 c.c. power are included with each A.P.S. plan.

Fully rigged with a mixture of piano wire, fuse wire and black shirring elastic according to the amount of stress and strain applied, the Fokker Monoplane awaits a flick of the prop for a test flight. Engine in original was an Allbon Dart, carefully camouflaged among the dummy cylinders representing the full-size Oberursa







THIS IS A 1/4 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE, PRICE 4/6 POST FREE, FROM THE AEROMODELLER PLANS SERVICE

Straight from the Board . . .

NOW "let's get it straight" as many a power man has said of his climb, and revert to last month. **Tom Smith**,the Blackpool flier, calls his model Oliver 'Twister *not* 'Twist, and he paid £2 10s. *not* £2 for getting *more than* 10% extra power out of his Tiger. Sounds even more like a winged missile that he is flying, flight ratio is said to be 21 : 1 and he hopes for 24 : 1 . . . will be watching you, Mr. Smith, at Wittering! Other Power men to see at the trials will be **Stan Eckersley** (Bradford), with a 'Torp 15 on what looks like an oversize A/2; 10 in. nose, right-right trim with auto-rudder, 550 sq. in. wing (!) 186 sq. in. tail. Weight 24 ounces (min. allowed is 20 oz.). Then **Norman Marcus** topped London Area Trials with some terrific climbing with 350 sq. in Eureka plus 5 ounces solid lead ballast under the wing mount to come up to weight using an Elfin 2.49. **Pete Buskell** followed him along. **D. Painter**, top in S. Midlands with a Tiger on a Bethwaite "One man's approach" (Oct., '52) is one of several Henley men flying this unusual power design with forward keel. **George Fuller** will be there too, with something warm in the way of a new "Zoot Suit" maybe with 2·5 Elfin. **Brian Faulkner** built his wings too light to dare use in his 'Tiger powered "Incinerator"—they weighed 2·9 oz. for 485 sq. in. area—so he is building a 4¼ ounce pair to bring the job up to FAI weight . . . to think that we are using an 8 ounce pair on our particular trials model!!

Talking of Brian, he came up with some definite findings on the use of the rear mounted fin, aft of the tailplane, and with ideal "rolling-out" characteristics for power or chuck glider. Extra moment for the fin is handy in this respect, and the southern protagonist of this layout is **Tony Brooks**. He and the Grange boys started the rear fin arrangement to get a permanent fixed fin without putting same ahead of the tail, and the idea spread to A/2's and even rubber. Croydon men started about the same time with Marcus and **Gordon Perkins** (didn't fly in 2nd elims, nor **Ron Warring**) and the rear fin spread further to Beavers where **Chris Marsh** uses it to good effect. Chris had the 20 knot wind wreck his "Hot-Rod" in the Elims, otherwise it lives up to its name. Total area is 649 sq. in. 40% tail, long moment and E.D.246. Does 3 mins. off 10 secs. regularly. Tail tilt is used for glide turn.

On rubber, pleased to say **Bob Copland** headed the London Area Wakefield 2nd Elims, and **Vic Dubery** took same status for Northern Area where they only had 10–15 knots wind. Each appears to have used an "old-reliable." **Ken Attwell** (Halifax) has a 3 in., 12 s.w.g. extension to compensate for CG change on prop-fold which goes forward via rubber band and trip device. **Eric Dewick** (Swallownest, Sheffield) has a Wakefield representative of the new trend to small size. Only 36 in. span (6 in. chord, semi-circle tips) it has a 19 in. skew hinge folder. Climb is 55 secs. on 14 strands. Length 37 in. **Bruce Rowe** (St. Albans) is planning his 1955 Wake with high aspect ratio 50 in. wing for snappy climb with a 36 in. tight motor . . . he has plenty of time to find out the snags!

Laurie Ellis, the Delta man fromR.A.F. Debden, has a new one (Mk. IX) for the Spitfire with 420 sq. in. and motor on a pylon 3 in. ahead of CG and 2½ in. above airfoil. Prop rotates through a wing recess. Mk. X is a C/line version with McCoy 36; Mk. XI, a 386 sq. in. Spitfire free-flight one with a tailplane on the fin and engine up front, while Mk. XII is a refined 586 sq. in. job with front motor and high tail. Laurie plans a semi-scale Avro Atlantic with two engines to be built for the R.A.F. Champs. He had one of the earlier models go away on a riser . . . so he may have to fit a d/t!

Following the article on various forms of artificial turbulence by Max Hacklinger, we now offer a summary of the extensive research on the same subject by Tokyo aeromodeller—SHIGERU SUZUKI.

Artificial Turbulence

RECOGNISING the fact that the question of boundary layer at low Reynold's Numbers is most important, Mr. Suzuki embarked on a series of tests using a whirling arm apparatus. Turbulence in Low Speed Wind Tunnels is always present, and the system of rotating sample aerofoils in calm air was adopted so that results could be as authentic and accurate as possible.

In all, some twenty aerofoils were tried, among them many of the "R" series of 'Arc of a circle' sections, and the results are based principally about section R.310 which forms a good basis for general comparison. Each test is said to have involved 10–15 hours of research, and the total report as received by us ran to many pages, each interleaved with samples of the covering material employed. Most interesting of these is the "rumpled" paper which, though as light as any other Jap tissue, provides a roughened surface, as noted in the tests.

Without delving too far into the technicalities of boundary layer control, the lay reader will be able to detect from comparative figures the various advantages, and disadvantages of surface turbulators. More radical is the test with a lattice framework in front of the wing—and if the results of this particular test are to be followed up by experimentally-minded readers, particularly A/2 enthusiasts, we may yet see a veritable nest of "radar" gear mounted ahead of high performance designs.

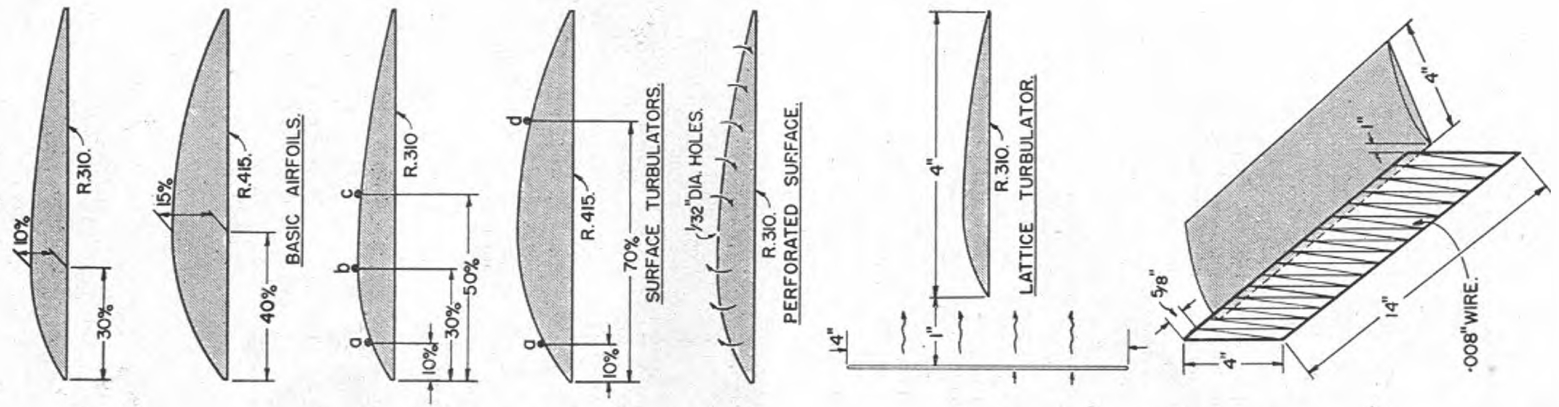
Summing up, Mr. Suzuki states that:—

1. The thinner the wing, the greater its efficiency.
2. The most suitable amount of mean camber is 4–5% Chord.
3. A proper artificial turbulence system improves efficiency.
4. Increase of Aspect Ratio is more effective than that of increased Reynold's Number.

LATTICE TURBULATOR TESTS

(4-in. Chord—0° angle of attack)

Aerofoil Number	Reynolds Number	With Lattice		Without Lattice	
		C_L	C_D	C_L	C_D
R.310	40000 90000	0.14 —	0.044 0.036	0.094 —	0.047 0.040
R.415	30000 60000	0.108 —	0.067 0.061	0.062 —	0.073 0.068



BOUNDARY LAYER TESTS ON AEROFOILS AT R.N. 45,000

AEROFOIL	Angle of Attack	Basic Aerofoil			10% Turbulator (position a)			30% Turbulator (position b)			50% Turbulator (position c)			70% Turbulator (position d)			Other Aids		
		C_L	C_D	C_L/C_D	C_L	C_D	C_L/C_D	C_L	C_D	C_L/C_D	C_L	C_D	C_L/C_D	C_L	C_D	C_L/C_D	C_L	C_D	C_L/C_D
CLARK, Y.	2.6	.435	.058	7.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5.9	.692	.082	8.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	9.2	.940	.126	7.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NACA 6409	2.9	.357	.059	6.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	6.1	.620	.076	8.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	9.2	.886	.104	8.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NACA 6412	2.9	.348	.064	5.4	—	—	—	—	—	—	—	—	—	—	—	—	.392	.059	6.7 †
	6.2	.614	.085	7.2	—	—	—	—	—	—	—	—	—	—	—	—	.670	.077	8.7
	9.3	.870	.120	7.3	—	—	—	—	—	—	—	—	—	—	—	—	.918	.102	9.0
R.310 (& .008-in. Wire)	2.9	.331	.054	6.1	.318	.051	6.2	.350	.044	8.0	.300	.048	6.3	—	—	—	.274	.045	6.1 *
	6.2	.577	.070	8.3	.582	.065	9.0	.600	.059	10.1	.540	.063	8.6	—	—	—	.500	.071	7.1
	9.4	.817	.093	8.8	.867	.090	9.6	.860	.082	10.5	.770	.088	8.8	—	—	—	.714	.111	6.4
R.310 (& .032-in. Wire)	3.3	—	—	—	.217	.065	3.3	.194	.060	3.2	.256	.054	4.7	—	—	—	—	—	—
	6.6	—	—	—	.449	.085	5.3	.427	.080	5.3	.524	.073	7.2	—	—	—	—	—	—
	9.9	—	—	—	.649	.119	5.4	.648	.112	5.8	.762	.102	7.5	—	—	—	—	—	—
R.310 (& .064-in. Wire)	3.2	—	—	—	.230	.043	5.3	—	—	—	.350	.068	5.2	—	—	—	—	—	—
	6.5	—	—	—	.481	.098	5.0	—	—	—	.600	.115	4.0	—	—	—	—	—	—
	9.8	—	—	—	.635	.128	4.9	—	—	—	.845	.162	5.3	—	—	—	—	—	—
R.415 (& .064-in. Wire)	3.2	.265	.078	3.4	.231	.042	5.3	—	—	—	—	—	—	.250	.052	4.9	—	—	—
	6.6	.476	.093	5.1	.428	.083	5.1	—	—	—	—	—	—	.481	.095	5.0	—	—	—
	9.8	.677	.119	5.7	.626	.122	5.2	—	—	—	—	—	—	.700	.135	5.2	—	—	—

† = Roughened Upper Surface. * = Perforated Upper Surface.

June, 1954

Helicopters

A practical approach to the design of Power-driven model Helicopters for small diesel or glowplug engines, this article is the result of many months of intensive research and test flying by one of the World's leading authorities on the subject

—PARNELL SCHOENKY

ALTHOUGH model helicopters seem to fascinate a great many modellers, all too few have as yet tried their hand at building one. Good designs and kits for Jetex-driven 'copters are widely available, and power models are coming in for an increasing share of interest. The steady power and long duration of the latter make them a very practical type for both experimental and contest work. Helicopters in general have a way of appearing to be very simple devices, with the result that many a first attempt at 'copter construction has suffered from lack of study of the factors involved in rotary wing flight. But everything, even riding a bicycle, is easy after one knows how, and the purpose of this article is to help the modeller over those first hurdles and into the realm of successful flight.

How does a helicopter's performance compare with that of the power models with which we are familiar? The helicopter is shown to be much less efficient as a lifting device when we consider, for example, that a "Clipper Cargo" type of payload model using an 0·8 c.c. diesel is capable of lifting some 35 ounces to a height of about 300 feet in one minute, whereas a typical 'copter with the same engine might lift only 10 ounces at the same rate. Of course, a greater rotor disc area and certain blade refinements might help our 'copter in this comparison, but we are interested in keeping to practical proportions for reasons of strength and simplicity. To compensate for the lower efficiency just mentioned, the 'copter's construction must be kept light and its powerplant should be a first-rate engine. The latter may be either compression-ignition or glow-plug type; the point to consider is the ratio of power output to engine weight.

The engine of our 'copter will be mounted on the main rotor hub. This arrangement, which was used without too much success on such full-scale craft as one of Dr. De Bothezat's designs and the more recent single-place "Roteron X-100," has proved very adaptable to model work. By this means power transmission, engine starting and cooling are all greatly simplified, and torque compensation is eliminated as a major problem.

Engine	Rotor Dia.	Weight Range—(Oz.)	Rotor Blade Mat'l.	Blade Chord—Root and Tip	Fuselage Dimensions (Approx.)					
					A	B	C	D	E	F
.5 c.c.	22	4–5	3/32	1⅜–⅞	5½	3½	7½	2½	2½	1½
.8 c.c. (.049 cu. in.)	30	6–9	3/32 or ⅛	1¼–1	8	5	11	3½	3½	2½
1.0 c.c.	34	7½–11½	⅛	2–1⅛	9	5½	12½	3½	3½	3
1.49 c.c.	43	11½–18	5/32	2½–1⅝	11½	7	16	4½	4½	3½

Countless other configurations, full-scale and model have already found their way into print and the beginner may find it difficult to choose among them. This article will describe the system that works well and covers the constructional details that may present problems.

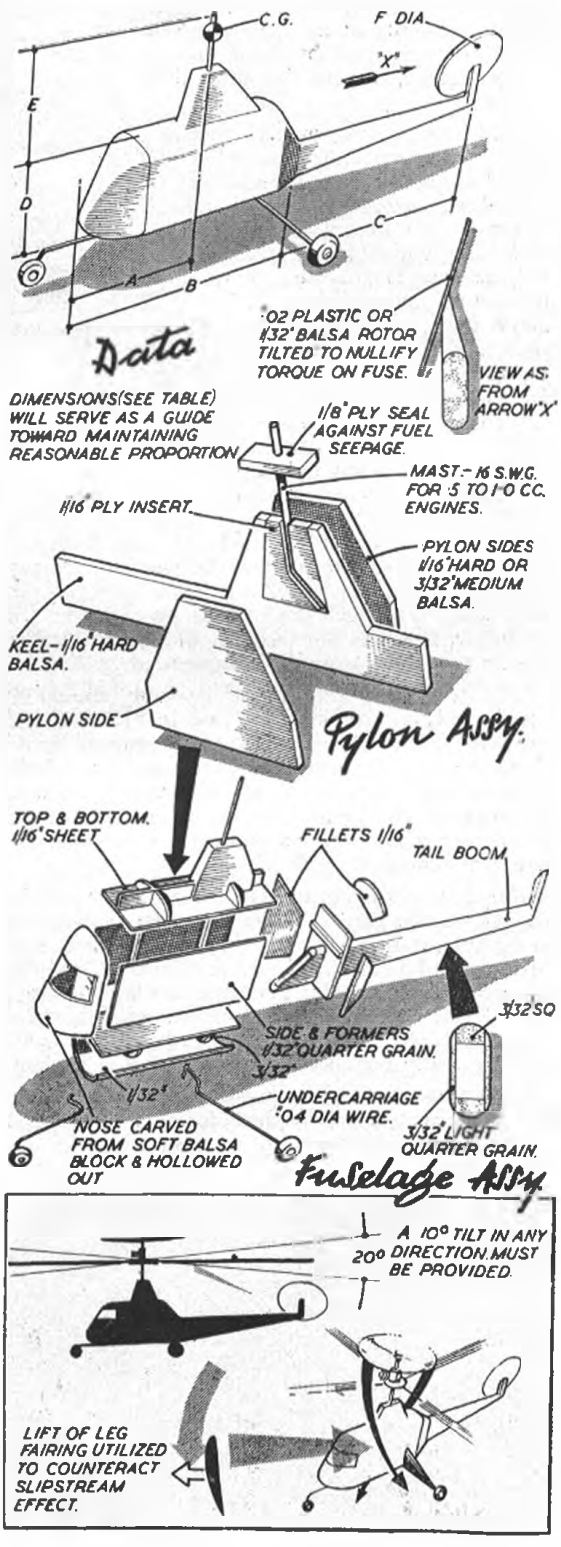
The next problem is that of selecting a means of attaching the rotor blades so as to provide an inherently stable system. For the present, how *not to do* so is by the oft-mentioned "delta-3" or skewed-hinge method which works so well for Jetex-powered 'copters. The best system devised to date is that wherein each blade is pivoted about a spanwise axis (located at about the 20% chord point) and carries a canted counterweight at its tip. This "independent feathering system" was introduced to aeromodelling by R. L. Clough, Jr., after a study of similar full-scale developments. It appears to work best with four-bladed rotors. Three-bladed rotors are slightly less smooth in operation, and two-bladed rotors are decidedly unstable without the addition of fly-bars or other arrangements which also add weight and drag.

A high performance engine has already been listed as essential. Perhaps further remarks on the selection of a powerplant are in order at this point. At first analysis, the diesel may appear less desirable because of its greater weight, but a good part of this deficiency is made up by the diesel's high power-to-displacement ratio. If it were established that over-all efficiency of the main rotor was much higher than that of the propeller, then we might reason that high-torque engines are the best choice for this type of helicopter and that only diesels or long-stroke glow-engines should be considered. The small propeller and comparatively large rotor divide the lifting load between them; the former operates at a much higher Reynold's Number but is partially ineffective as a result of hub assembly and fuselage drag, while the latter is restrained by the drag and inertia of its counterweights. In general, where a small and a large airscrew, each producing the same thrust, are compared, propulsive efficiency will be highest for the latter system because it imparts a smaller velocity to a larger volume of air. The difference in efficiency of the two airscrews is not thought sufficient to justify increasing main rotor torque at the expense of total power output.

To assist the builder in matching the size of his model to the engine available, dimensions and data are given in tabular form for a series of four powered helicopters. It is significant that no large engines are listed. Large-sized "choppers" are best left to the advanced experimenter, who may have actual need for their added lifting capacity for radio equipment or similar purposes. Remember that a high proportion of a 'copter's weight is rotating at high speed, making it more dangerous than a conventional model. Small helicopters are decidedly more practical, rugged, and very simple to launch.

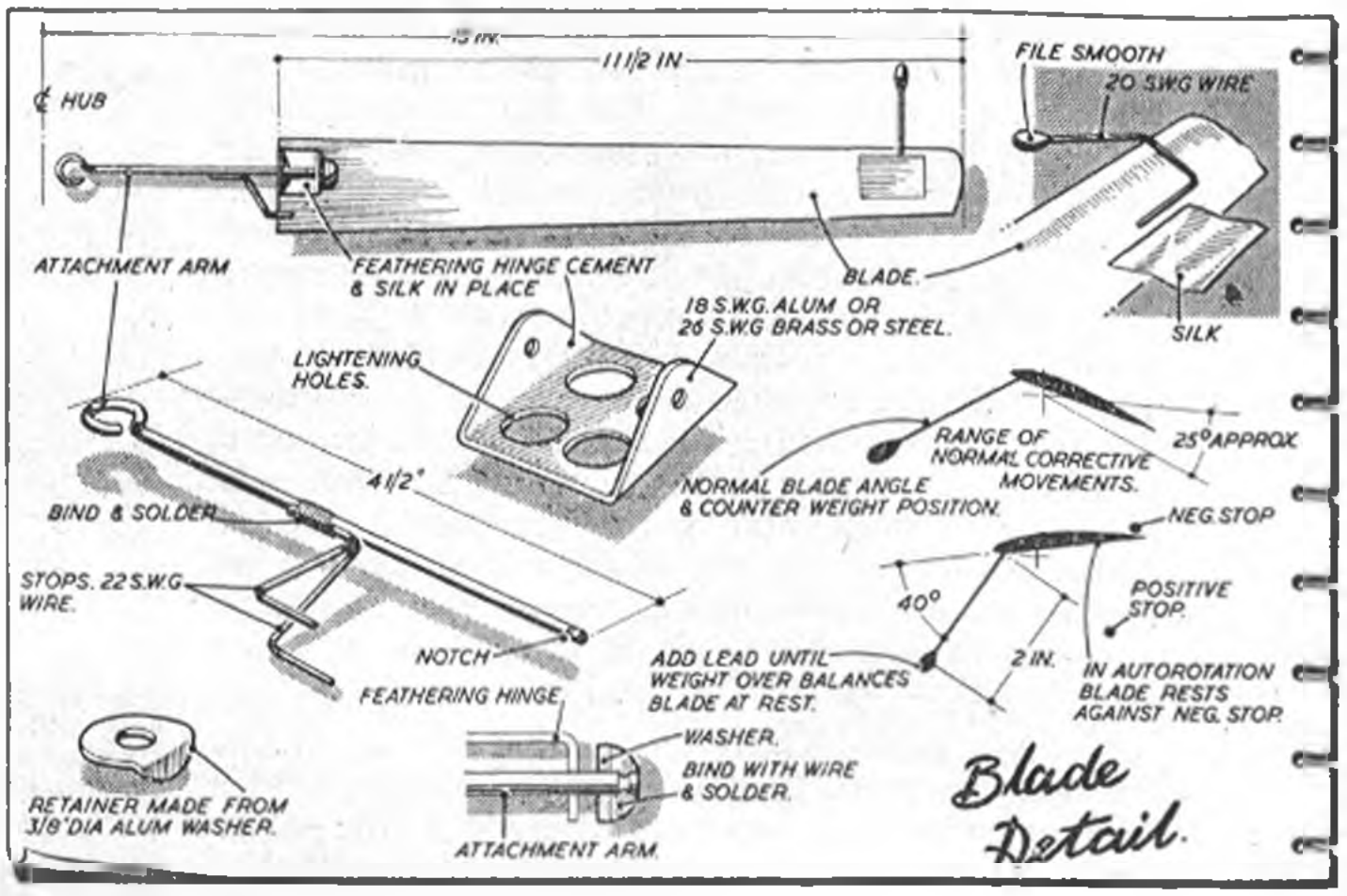
Rotor Construction and Engine Installation

Quite a few items of hardware have to be made for the helicopter, and, inasmuch as many of these parts are subjected to vibration and to considerable centrifugal force, it is important that they be formed with care. Where sheet metal bends are



specified, use a large bend radius. This feature prevents metal fatigue, which leads to cracks and breakage, and is particularly important for aluminium alloys.

The dimensions for the propeller gimbal are typical for propellers of 6 to 7 inches in diameter and may be altered proportionally to fit other sizes. Make this part as accurately as possible and drill the pivot hole in the propeller hub as true as possible, to minimise unbalance and vibration. This will allow the engine to develop greater power. You can fly without this part, but the 'copter with a "stiff" propeller is more likely to land inverted than upright when flown in turbulent air. The gimbal pin illustrated is made from a nail. It is secured in place with soft wire, and is easily removed for airscrew replacement. No machine screws should be substituted for this pivot, as they will break sooner or later. For greatest accuracy drill the hole in the propeller halfway through from each side. The nail pin should be tight in the propeller, free but not loose in the gimbal fitting. Plastic propellers are not recommended.



The rotor hub and engine assembly should fit comfortably in the hand for ease in handling and starting. The hub and the tank support could easily be bent by hand pressure during the flick-starting process, unless sufficient sturdy grip area is provided. The pivoting propeller is a bit harder to manage than a normal propeller, of course, but practice soon erases this difficulty.

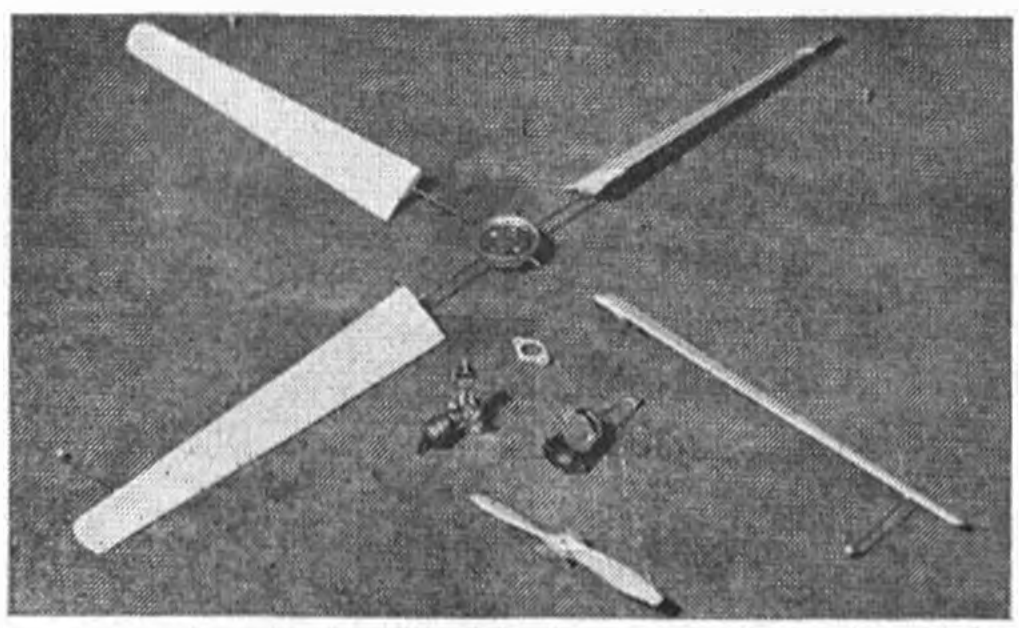
For maximum rigidity, the rotor hub should be flanged at the edges. While a square platform is acceptable, it is usually possible to find a neat hub piece already fabricated, in the form of the lid from a baking powder tin or a similar container cap of one to two inches in diameter. The nine holes required are easily punched with an awl, and the ready replaceability of the part is evident.

Fuel tanks for engine-on-rotor type 'copters can be almost as critical as those for stunt and speed models. Ever stressing the practical viewpoint, it is recommended that the beginner avoid the use of the integral hub and tank which has the rotor mast running up through its centre. Vibration and flexing of the mast lead to solder troubles and fuel leakage. A tank design which has worked perfectly is shown in the illustrations. The very short fuel line adds to its efficiency, and the vents allow no fuel loss when the model is held at a convenient attitude for starting. A sturdy bracket to support the tank and the engine counterweight may be made from tin can stock, or ·012 to ·016 shim brass.

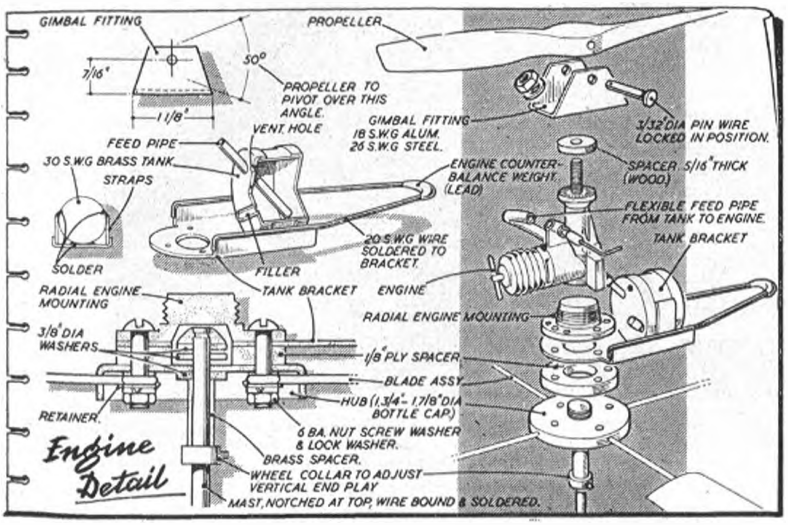
Rotor blades for small powered helicopters are best made of solid sheet balsa, in the manner of a chuck glider wing. Simple, flat-bottomed Clark-Y type airfoil sections are all that are required. Finish the blades well with fine sandpaper and 3 to 4 coats of dope, followed by a thin coat of fuel-proofer if your engine is of the glow-plug type. Broken blades may be repaired quickly and safely with several layers of silk and thin cement, as the joint is largely under tension during flight. The RPM of the main rotor will most likely fall between 200 and 300 RPM, and for this low speed precise rebalancing after repairs is unnecessary. Vibration will be negligible if the blade weights are kept within 3 to 4 per cent of one another during construction. Use care in attaching the feathering hinges so as to pivot each blade at the same chord point.

The rotor blades are kept clear of the smal airscrew's slipstream by attaching them to the hub with several inches of fairly stiff piano wire. These wire attachment fittings are best bolted to the hub with 6 or 4 BA Bolts (don't forget lock washers under the nuts!)

The counterweights at the blade tips function so as to automatically change individual blade pitch in response to such changes as rotor RPM,



Basic rotor assembly for a McCoy diesel Helicopter shows blades at maximum pitch, engine and mount, and propeller in gimbal fitting.



rotor plane tilt, and variance in the relative wind. The weights, trimmed to overbalance the blades in static balance, tend to rise and rotate in the same plane as the major portion of the rotor under the influence of increasing RPM. As an example of the stabilizing action of this system, suppose that a model was tipped to one side; the inertia of the counterweight on the blade passing the low side would act to increase the pitch of that blade (the opposite occuring on the high side), increasing lift and counteracting the tilting force. During autorotation, RPM of the rotor is lower than under power, and the effect of the forces acting on the blades is such as to hold them at a negative angle with reference to the plane of rotation. Stops must be provided to limit the positive and negative angles which the blades may assume.

Most of the model helicopters to be seen these days are semi-scale in appearance, and the Hiller Model Helicopter Competition, already established in America, actually makes such appearance a basic requirement. Among the full-scale helicopters to which the modeller may turn for pleasing fuselage configurations are the Saunders-Roe Skeeter and the Bristol Sycamore. A somewhat simpler fuselage contour to model in balsa is that of the Westland-Sikorsky S-51.

Helicopters, full-scale and model alike, are sensitive to fuselage drag, and therefore it is important that the fuselage be reasonably streamlined. With large 'copters, fuselage drag is a major limiting factor in high-speed flight; with models we are more concerned (a) with the effect of fuselage shape upon stability during forward flight, and, (b) with the reaction of the fuselage to the strong slipstream of the small propeller. It is well worth the effort to streamline the upper and lower surfaces of the fuselage, for the model is subjected to vertical airflow during its entire flight. The use of broad, square-cornered fuselage shapes will greatly reduce rate-of-climb and will also tend to make autorotative descents erratic.

Though the engine-on-rotor design would seem to eliminate torque problems, there remains the swirling slipstream to impart an objectionable spinning motion to the fuselage. The solution that naturally comes to mind is the installation of an anti-torque tail rotor. Realistic though it be, the use of a belt or shaft-driven tail rotor is not advised for the novice. Have a try at this scheme after mastering the fundamentals of 'copter work with a less complicated and more dependable model.

Following are several counter-torque methods which may be employed. Note that the direction in which the fuselage will tend to rotate is counterclockwise, viewed from above.

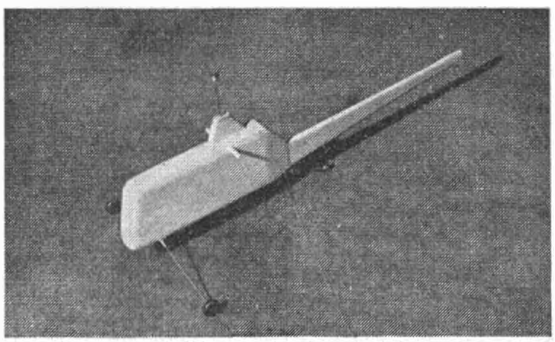
(*a*) Attach small, adjustable-pitch airfolis to the sides of the fuselage amidships; perhaps these may be disguised as landing-gear strut fairings.

(*b*) A set of sheet aluminium airfoils similar to a fan blade may be fixed to the rotor mast just below the rotor hub.

(*c*) The fuselage shape may be subtly changed through the slipstream zone. The shape required would naturally differ for each model; it may be arrived at by means of "mocking up" contour changes on an existing model.

(*d*) A tilted tail fin may be employed, this to act in the main rotor downwash. Such a fin is simple to make and to adjust, and may be given a round shape so as to simulate a tail rotor in appearance. To compensate for the slight tail-down moment induced by drag, add a small amount of clay ballast to the nose.

A type of fuselage construction which has proven successful is sketched in the illustrations. All-balsa construction is very substantial and quite simple to streamline. To keep the nose short (so as to minimize fin area), yet sufficiently heavy to maintain



A simple, sturdy fuselage design, properly streamlined for minimum resistance in vertical or forward flight. The small pegs are for anti-spin surfaces.

the proper longitudinal c.g. position, a solid block nose is shown. Should this be dented in a hard landing, simply soak the spot with water and the wood will swell to its original shape. A strong forward fuselage structure is necessary to provide a hand grip while releasing a high-performance helicopter for a R.O.G. flight. The tail boom should be built up of light sheet balsa. This part is lightly loaded in flight, therefore need not be too substantial. On the smallest 'copters, where structural weight must be trimmed a bit to compensate for excessive engine weight, hold down the dope to two coats.

The modeller may desire to provide some access to the hollow fuselage for later installation of an E.D. clockwork timer or similar device to actuate tail tabs or to shift ballast so as to obtain forward flight or attempt other manoeuvres. While the model may be pre-set to execute forward flight from the moment it leaves the ground, there are several advantages to be gained from delaying manoeuvres until some altitude has been gained. To begin with, it is safer to start a flight with a vertical climb rather than a grass-clipping take-off, and secondly it is easier for competition officials to distinguish horizontal flight from wind drift if the model makes the transition aloft.

Launching and Trimming Notes

To insure that the modeller's first 'copter is a lively performer, much stress has been laid upon light construction and the use of a good engine. There is more to this high performance requirement than the enjoyment of a snappy climb. Flying in windy weather calls for a healthy rate-of-climb. as the model will require both altitude and power to effect recovery from the tumbling action of sharp gusts. A further reason for building plenty of performance into a model is to fit it for extreme hot weather flying. A model that ascends gracefully at 100 feet per minute on a chill evening may refuse to rise from its owner's hand on a 90-degree day. On the other hand, one can have great fun with a model 'copter by deliberately making its performance marginal, adding ballast or throttling back the engine until the model just hovers. One can note the "ground cushion" effect of the hands held flat in the path of the rotor downwash as the model hovers at an altitude of five or six feet. As a fraction of an ounce of fuel is expended, the hovering helicopter should slowly begin to climb. To conserve blades, make initial hovering and slow-sink tests over a grass cushion. The reason behind this conservatism is that the strong blast from the small propeller tends to invert the model, should it alight unevenly or bounce with power-on. Auto-rotative landings, by contrast, are completely safe on the hardest of surfaces.

To determine if a model is trimmed for proper autorotation, observe its actions in a fall of about fifty feet or more. If the descent is a series of "stops and starts," the negative pitch of the blades is excessive. This allows the rotor RPM to build up

The XII-4 rising slowly after release by the author. Fuselage is swinging as a result of having been knocked on take-off.

to the point where the counterweights fly up; this sudden change to positive pitch causes the model to hover momentarily, after which the blades stall and the model falls and goes through another cycle. This situation is corrected by adjustment of the wire blade stops. If the negative blade angle is too small, the flight characteristics will be less distinctive—more in the nature of a rapid fall with side-slipping. Under this condition most of the blade area is stalled out.

When working toward forward flight, make adjustments very cautiously, as the model will gather speed as it moves horizontally and may "tuck under" and dive in as fuselage drag becomes effective. For forward flight, ballast the nose or bend the rotor mast to tilt the nose downwards.

Underpowered 'copters, gusty weather, and ROG flights are a combination to avoid. Feathering-rotor helicopters are somewhat better than jet-copters in their response to upsets caused by ground-level turbulence, but a fast get-away is a vital ingredient for ROG hops.

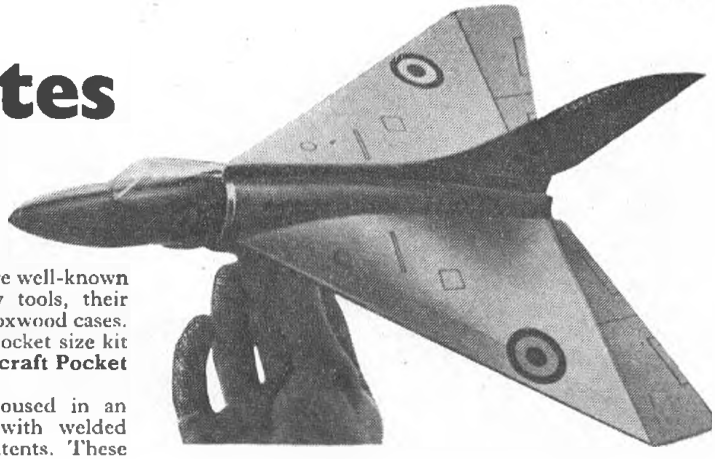
Should your efforts result in a model that is light, powerful, eager to go, a word of advice: have your chaser-mites at the ready! With a minute's worth of fuel in its thimble-sized tank, your model will bore a thousand feet into the overcast and gyrate gently to earth a half-mile or so distant.

The Hiller Event

To promote the development of semi-scale model helicopters that are capable of such realistic manoeuvers as vertical, forward, and lateral flight, the Hiller Helicopter Company of California, U.S.A., have established a new event for this category. The Competition, which provides for the use of models utilizing all manner of jet, rubber, or internal-combustion engines, was created with the thought that it might eventually take a place among the international competitions. With the introduction of this event, the logical trend in model helicopter design would therefore seem to be toward the development of stable, controllable models rather than toward the single goal of duration.

Trade Notes

Latest items from across the counter are reviewed



New Jetex product, the Interceptor Fighter comes complete with "50" unit and is ready to fly.

MESSRS. MULTICRAFT LIMITED are well-known to readers for their range of hobby tools, their existing outfits being handsome affairs in boxwood cases. Recognising the need for a more modest pocket size kit they have accordingly produced the **Multicraft Pocket Kit** at the modest price of 22/6.

Photo overleaf shows the tools are housed in an attractive leather-grained plastic wallet with welded sections neatly designed to take the contents. These include the Multicraft Precision Cutter, a set of 4 blades, a set of 3 chisels, a set of 3 round files, a whittling blade and key-hole saw blade, all of which fit into the same handle. There is also a pocket which houses the Multicraft Saw-Frame, again fitting the handle. As the name implies, this useful wallet fits snugly in the pocket of one's flying suit and is distributed to Model Shops by Messrs. Phillips Omnipool Ltd., 406 Euston Road, N.W.1.

Very neat **Letter Transfers** are now available in both black and red at 2d. per sheet. There are over 100 $\frac{1}{8}$th inch deep characters on each sheet including a duplicated alphabet and numerals. They can be bought through your local model shop and trade enquiries should be directed to P. S. Fisher, 6 Station Yard, Twickenham, Middlesex.

Three new additions to the famous **Keil Kraft 3/6 Flying Scale Series** are the Douglas Skyray, S.E.5A and the Fiat G.80. The latter kit is particularly interesting in that both plan and building instructions are in Italian as well as English. (There is no truth in the rumour that Eddie Keil is kitting an Icecream Barrow!) Seriously, they are all up to the usual Keil Kraft standard and wonderful value for money.

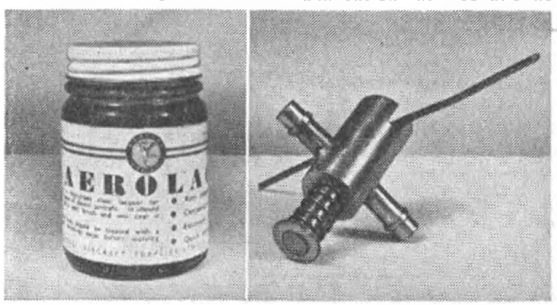
Messrs. E.D. Ltd. have asked us to point out that the name of the lucky purchaser of the **150,000th E.D. Bee** cannot be given in this issue of "AEROMODELLER," but will appear in the July number. The fortunate prop-swinger concerned is going to receive a £10 voucher, so all in all he will be glad he bought his engine.

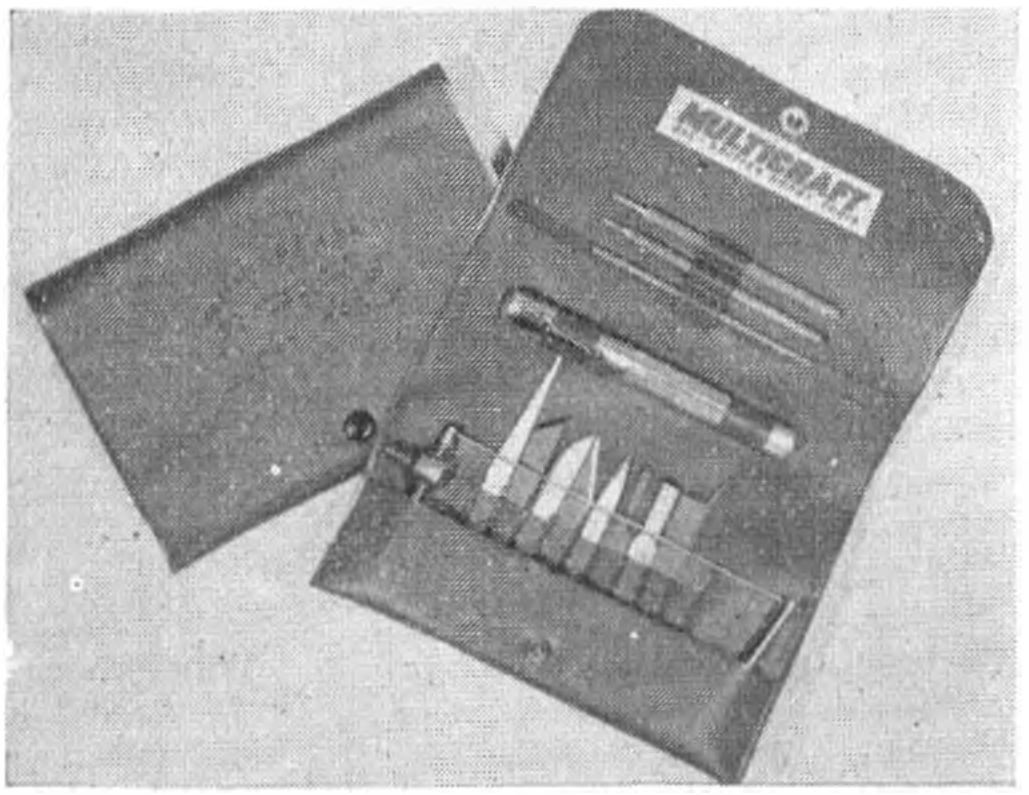
Messrs. Minikscale Ltd., are producing a new solid kit of the S.E.5A to supplement their **1/48th "Avian" range.** We have been sent samples of this comparatively recent range of solid kits which feature the Hurricane, Spitfire, Mustang and Tempest at 5/7d., and the Sabre, Swift F4, and F100 at 6/-. All prices include tax and we were impressed with the general high standard of wood, which includes a pre-shaped fuselage and flying surfaces. Cockpit and other accessories are neatly moulded in plastic, and a full set of accurately printed transfers make up some of the best solid kits we have seen.

Whilst in the North recently we spent an interesting afternoon at **Model Shop Newcastle's** very old-established Keilbuild Works. Proprietor, Cyril Lutman, one of aeromodelling's earliest pioneers, was there to show us round and we learnt many things about the manufacture of airwheels. Did you know for instance, that their giant size six-inch MS airwheels take a full day to cure in the moulds and that they are now producing at the other end of the scale M.S. Lightweight Pneumatic Wheels of 1$\frac{1}{4}$ and 1$\frac{3}{4}$ inch diameter! These tiny wheels which weigh $\frac{3}{8}$ oz. and $\frac{1}{4}$ oz. respectively cost 3/6d. and 4/8d. per pair, are ideal for small models, and are made with the care and precision one associates with M.S. products. Other useful items we saw were **M.S. Lock-fast Engine Bolts** made in both 6BA and 8 BA sizes at 1/6d. per set. As can be seen from the illustration, these have a sliding toggle bar through the bolt heads, thus accommodating varying makes of engines. Another useful and ingenious accessory is the **M.S. Self Locking Nut** which dispenses with soldering when it comes to holding airwheels on undercarriage axles. A twist and it's on, and a twist and it's off! But you try pulling one off a shaft. It's impossible! Cost is 1/- per pair and they will last you a lifetime.

Calling at Hull on our way South, we visited the Humber Oil Company, their **Britfix Cement** being a household word amongst modellers everywhere. It was amazing to see Britfix being mixed in quantities of several gallons and we wondered how many thousands of joints would be held by the vat in question. We were pleased to see samples of their new **Fuel Proofer,** which is the result of many months' research work in their modern

H. J. N.'s Aerolac and cut-out deserve attention, whilst new Britfix lines are bound to be popular.

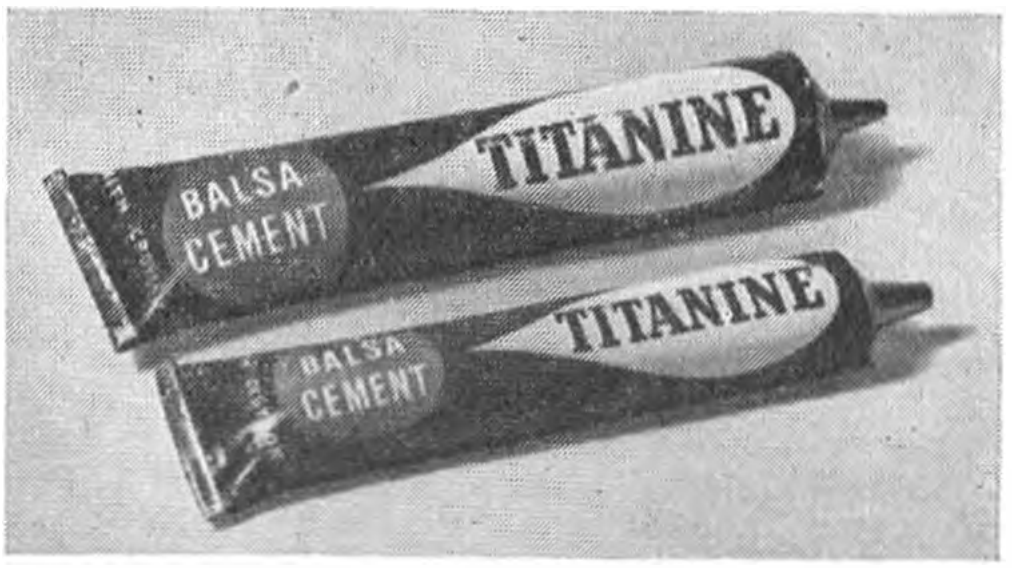




laboratory, and have since tried the samples which live up to the claims made. Smart too, were the new **Britfix Coloured Dopes** contained in plastic sealed, plastic capped bottles in an astonishing variety of colours. These new dope packs have been specially designed to dispense with corks and wax seals which often drop in the dope when used and so affect its quality. The new display boxes, together with colour sample cards, will shortly be appearing in your local model shop.

Messrs. International Model Aircraft have sent us a copy of their beautifully produced Trade Catalogue which will interest Model Shop proprietors everywhere. It covers the full range of **Frog Kits.**

Nottingham's **Oliver** establishment have long been alive to the needs of the discriminating modeller for whom only the very best is good enough, and the innumerable successes in both free-flight and controline contests with the famous Mk. II 'Tiger 2·5 diesel are well-known to all. Some time back, the race car fiends were finding that the 'Tiger sleeved down to 1·5 was a mighty motor, capable of eclipsing all else. Messrs. Oliver produced a kit for adaptation, and the **Tiger Cub** first began to take shape. Now, a new 'Tiger Cub is under way to sell at £5 19s. 6d., boasting re-design to top standards in all respects with the traditional bright roughcast effect on the castings and perfect machining. Size is that of a 2·5 since the stroke is extra long, and the weight is 3½ ounces which is good considering it includes two ballraces. Tiger Cub No. 1 received our blessing as soon as it was unwrapped from the post, and on the bench it turned up 8,750 on a KK truflo 9 × 4 (Radial Elfin 2·49 does 10,200 and Javelin, 7,500) so it bridges the 3,000 r.p.m. gap that used to exist between 1·5 and 2·5 c.c. It sounds, starts and runs just like the 'Tiger, and should be in great demand as soon as the first few have been seen in action.

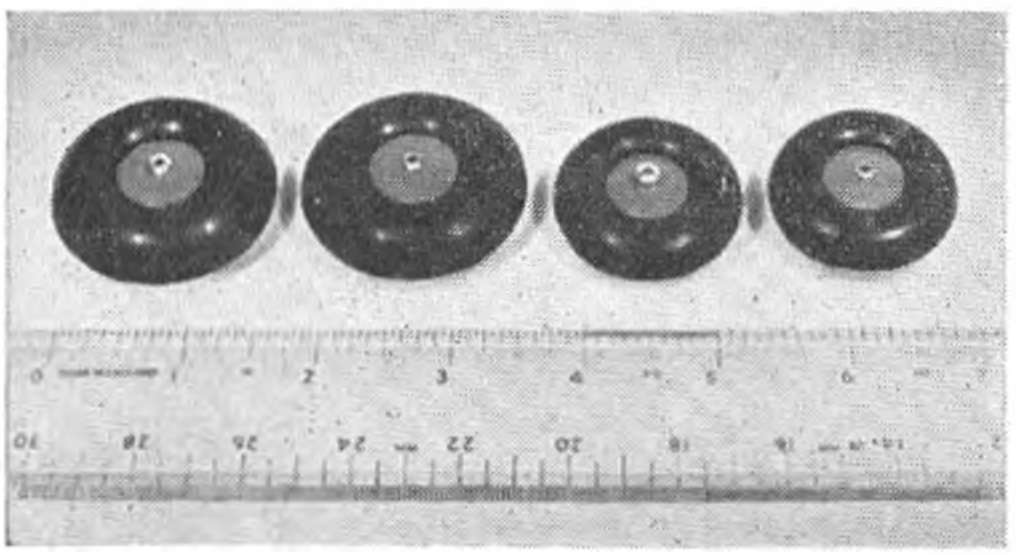


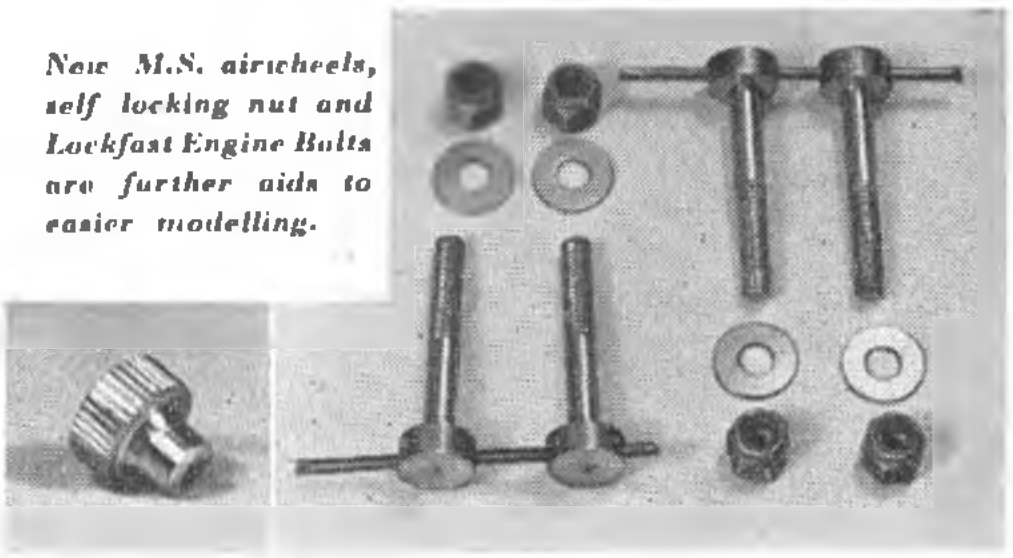
Bright blue leather grained Multicraft Pocket Kit is a wonderful investment . . . would go well as a prize item at rallies. New formula Titanine cement packaged by Peter Smith is in red tubes.

The **H. J. Nicholls** positive cut-out valve will satisfy everyone. Retailing at 5/-, they are from solid brass, come with an adjustable arm, and we have tested one to be positive every time it was operated. We might also remind readers of **Aerolac,** a translucent lacquer that Henry has been distributing for several years and is used by all the experts. Pete Buskell Aerolacs his Slick Stick fuselage black because the finish is lighter, and that bright yellow seen on most top class contest model wings is Aerolac too. It sells at 1/6d. per 2 ounce jar. The **Texan** team racer kit at 15/6d. is another high-class **Mercury** product to be recommended, and we might say that as Ron Young designed this model, it has a lot of his High Wycombe club experience built into it in the way of slim shape, etc., so purchasers can be sure of every chance of success in racing.

Astute controline enthusiasts will have spotted the advertisement in our classifieds for C/L wire in bulk at the very reasonable figure of 25/- per lb. reel. We've checked on this and find you get up to 18 ounces of ·008 in. polished piano wire which is sufficient for more than 35 sets of lines. Actually 3,700 ft. is the claimed length in each reel by supplier **BCM/Modelbob.**

Success brings success and the volume of business brought about by **Gig Eifflaender's reboring service** has been nothing short of phenomenal. Gig sent us a file of compliments to look through, and believe us, if anyone is to rest happy for having been of great service to the model movement, Messrs. Eifflaender will be among the most content. From all over the country, and abroad too, come letters with quotes like this "no longer subject to severe power loss on warming up" and "Believe me a quick service like yours is a God-send to us chaps out here (R.A.F. Kabrit)". Yes, this is a great. service, quick and cheap too, but unfortunately Gig cannot possibly devote all the time that would be required to answer every song of praise or query so please bods, leave it as a service and keep the letters to a minimum.

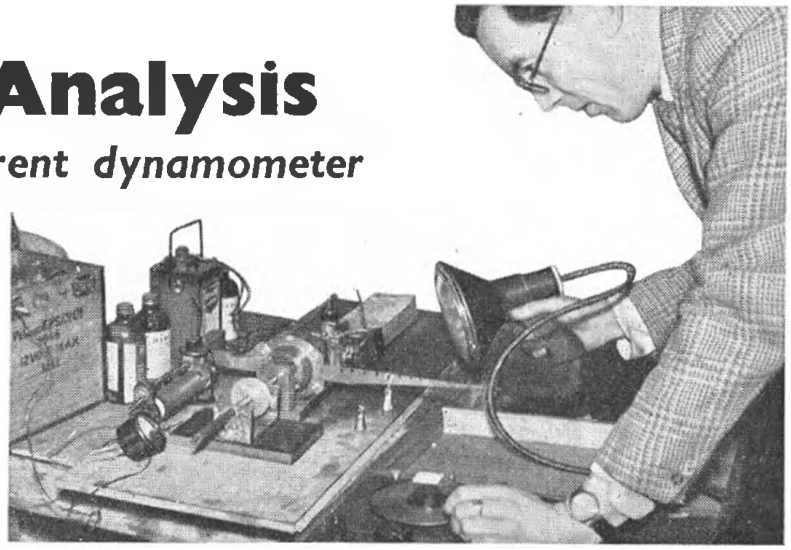




New M.S. aircheels, self locking nut and Lockfast Engine Bolts are further aids to easier modelling.

FIRST Engine Analysis

by the eddy-current dynamometer



The K & B Torpedo "15"

TESTED BY R. H. WARRING

THE K & B "15" has excited considerable interest in this country, largely on account of its spectacular performance at the World Championships at Cranfield last August which was, virtually, its world debut. The American power model team were supplied with a stock of "15's" to use in their models, with the gratifying results (to the United States) now well known.

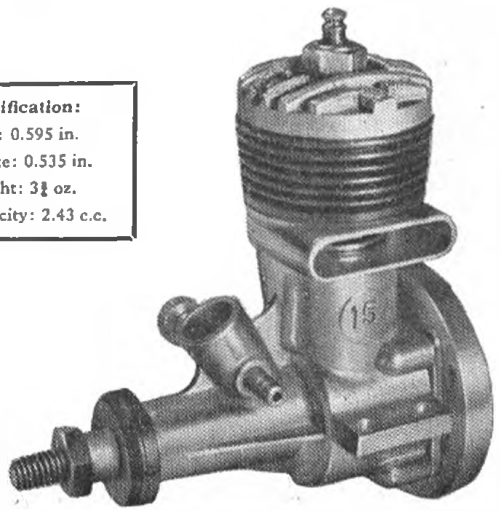
Like the majority of American contest engines (and the majority of all U.S. engine production, in fact), the "15" has glow plug ignition, is light and compact for its size—and beautifully made. The engines used by the American team were actually a batch of pre-production models, essentially similar in every detail except for the fact that the present production "15's" have a green enamelled head. The test engine was one of the "team" engines, well run in and ready for "full speed" operation. It is essential, the makers note, that any new "15" be run-in carefully for a minimum of 45 to 60 minutes with a rich mixture. Piston and cylinder are assembled with such a close fit that high speed running in the initial stages may lead to seizure.

The test engine was, at one period, given an extended run at a speed of around 16,000 r.p.m with no ill effects whatsoever. Cylinder and piston temperatures reached must have been higher than anything likely to occur during normal operation and were, indeed, enough to fuse the cylinder head gasket into a permanent seal. This gasket, and the gasket between cylinder and crankcase unit, is of a plastic type.

With the dynamometer available for use, testing is divided into two stages. First the engine is test run on a normal propeller, and mounted as on a model. It was a significant reminder of how compact American motors are that the "15" exactly fitted bearers on the test bench which had previously been used to mount an E.D. 1.46 engine for running in. Hand starting with a propeller then enabled starting technique to be checked, together with response to controls and general running characteristics.

Summarising these impressions. Starting is quite easy, provided the engine is not over flooded. Direct injection through the exhaust to prime was best, although if the plug was made too wet, a fair amount of flipping was necessary to clear. Response to needle valve control was non-critical. The "15" could be started with the needle valve wide open, closing down to the best running position at leisure. Also noteworthy was the remarkable freedom from vibration at all speeds.

Specification:
Bore: 0.595 in.
Stroke: 0.535 in.
Weight: 3¼ oz.
Capacity: 2.43 c.c.



High-speed consistency

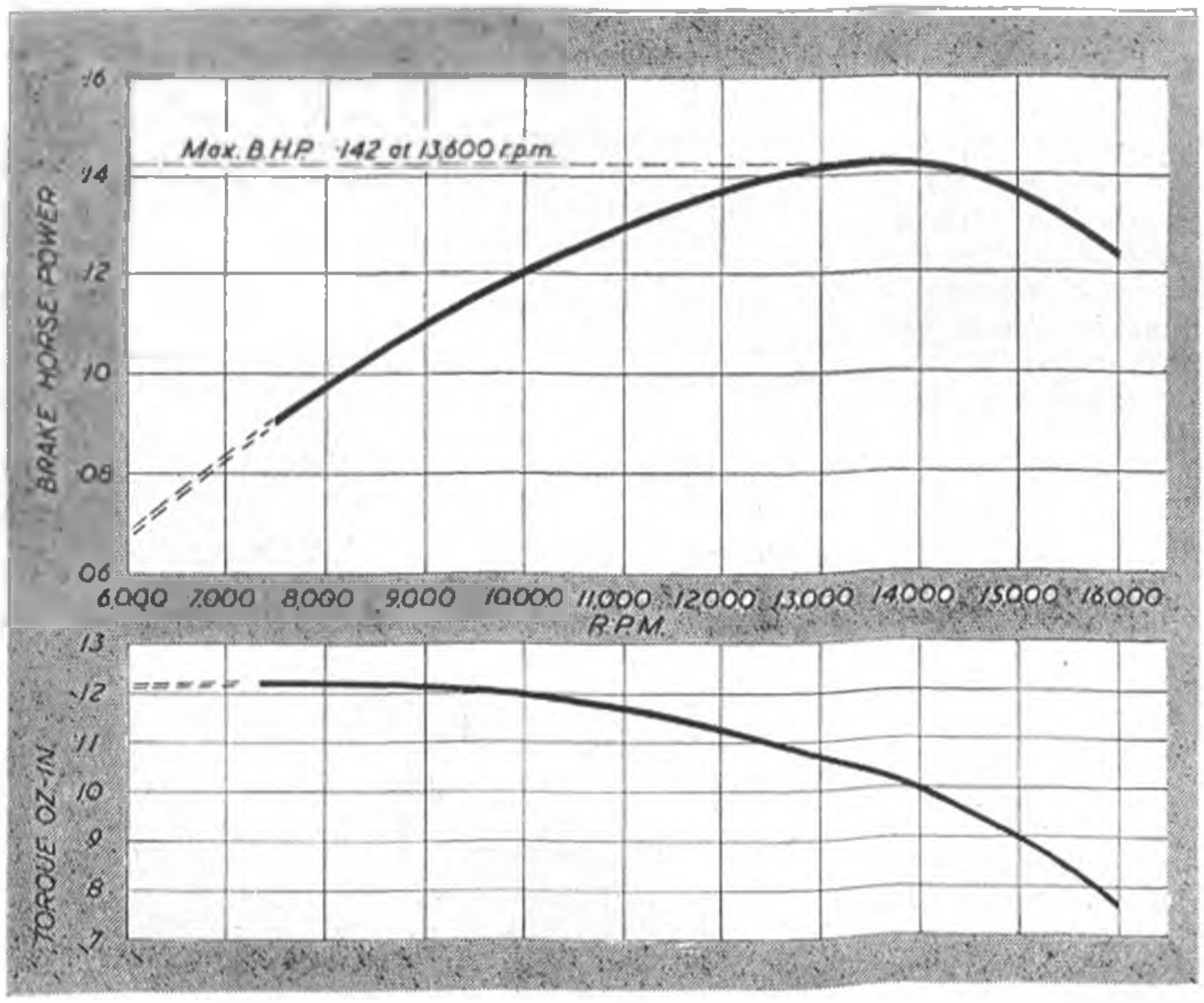
Several different sizes of propellers were tried. The "15" is not at all happy on a large "diesel size" propeller, nor on a propeller with a high pitch. It seems reluctant to pick up speed with a large fan load, with a result that the efficiency of its induction suffers and it becomes harder to get running. Using an 8 × 6 propeller, speed is brought into the "acceptable" range (over 10,000 r.p.m.), starting is easier and running more consistent. The "15" did not run at all consistently on larger props., *i.e.*, at slower speeds. This was subsequently borne out in the dynamometer tests where, despite the smoothing action of the rotor, really steady r.p.m. figures were not maintained until speed exceeded about 11,000 r.p.m.

The next stage in testing consisted of coupling the K & B "15" to the dynamometer and checking torque developed under varying braking loads. In mounting the engine it was apparent that the shaft was fractionally out of alignment with the true longitudinal axis of the engine—possibly not more than a fraction of a degree, but sufficient to be detected. It is unlikely that this affected perform ance in any way and was undoubtedly an inherent fault of the otherwise apparently fautless construction.

On a continuous run, torque was measured at a range of speeds starting from 7,400 up to 16,000 r.p.m. being recorded at any one stage by a stroboscope, and corresponding shaft torque generated measured by a weight on the balance arm attached to the dynamometer casing. It proved particularly easy to hold any one speed and make torque readings at leisure: and also to be able to make a number of individual readings at different stages from 7,400 to 16,000 r.p.m. without having to stop the engine. Readings going "up" were compared with readings coming "down" the r.p.m. scale and were virtually identical. Several separate runs were also made so as to plot final readings as the average recorded on different test runs. Plotted, these joined up into a particularly smooth torque curve, approaching one half of the initial (low speed) torque at the extreme end of the speed range. Carrying the test through to such high r.p.m. figures, too, established the peak of the brake horse power curve, when subsequently plotted.

Best operating r.p.m.

The torque curve is of the type one would expect from an efficient engine, giving a smooth B.H.P. curve with a moderately rounded peak. These figures should be studied together with the recommendation that the engine is most consistent in running at above 12,000 r.p.m. In other words the K & B "15" is best used with light loads (*i.e.* small propellers) when the engine is operating at around peak power. Good power is still available lower down the r.p.m. scale, but in practice the "15' would probably tend to "hunt" and not give anything like the performance indicated by the B.H.P curve, since this latter corresponds to spot readings and not to average readings with that particular load taken over a period of time. In practical language, the K & B "15" might well give a very disappointing performance with a large diameter or high pitch propeller. It is one of those engines that is best operated "flat out."



Its high speed performance is particularly noisy, but pleasantly unlaboured. It seems much happier than a diesel running at the same speed. No doubt much of this is due to the light construction of the piston and the adequately balanced crankshaft. Several good measures have been taken to reduce the weight of the reciprocating parts, such as locating the gudgeon pin above the centre line of the piston (thus enabling lower wall thickness to be reduced) and the use of a polished, drop forged aluminium connecting rod. Also interesting is the oil hole in the big end passing lubricant to the big end bearing an important factor for continuous high speed running.

Design follows orthodox K & B practice with opposed by-pass and exhaust (in contrast to the modern tendency to employ 360 degree exhaust porting on all small engines). The by-pass is of very large area and with a nicely smoothed surface. Considerable attention has obviously been given to internal gas flow for ports are generously filleted and "clean." The air intake is also large in diameter retaining also a large effective diameter since the spraybar crossing it is relatively slender. Suction is perhaps not all that could be desired for starting when using a tank located remote from the engine and possibly experiments with various shaped plugs in the intake might produce interesting results, particularly on control line models.

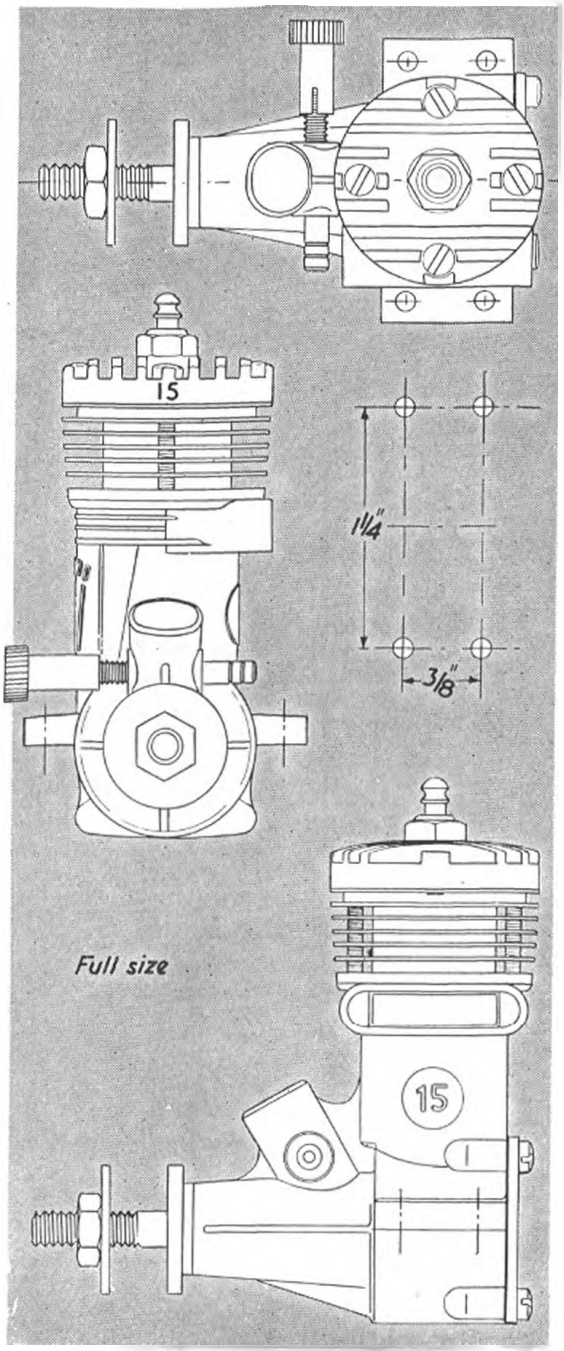
Constructionally one of the outstanding features is the large ($\frac{5}{16}$ in.) diameter crankshaft made from heat treated steel with a crescent-shaped counterweight machined into the web. The surface contacting the bearing is ground to an exceptionally fine finish and hardened.

The propeller backplate fits up against a very sharp taper on the portion of the crankshaft which emerges from the crankcase bearing and, despite its plain design, holds remarkably well. A serrated surface would have been better for gripping the propeller. In fact, to get the backplate to grip the coupling unit used it was necessary to saw-cut the backplate to roughen it. The crankshaft, incidentally, is a beautiful fit in the plain crankshaft bearing which is exactly one inch in length. Thrust loading is taken by a projection of this bearing behind the crankcase front and, assembled, there is a minimum of fore and aft play.

The piston is of hardened steel. The opposed porting arrangement necessitates the use of a baffle on the top of the piston which is well radiused and accommodated in the countoured head at top dead centre position. The piston is actually slightly relieved or "wasted" thus reducing contact area and any tendency to rock. The top $\frac{1}{4}$ inch of the piston is substantially parallel. Tolerances adopted for piston-cylinder fit are very close.

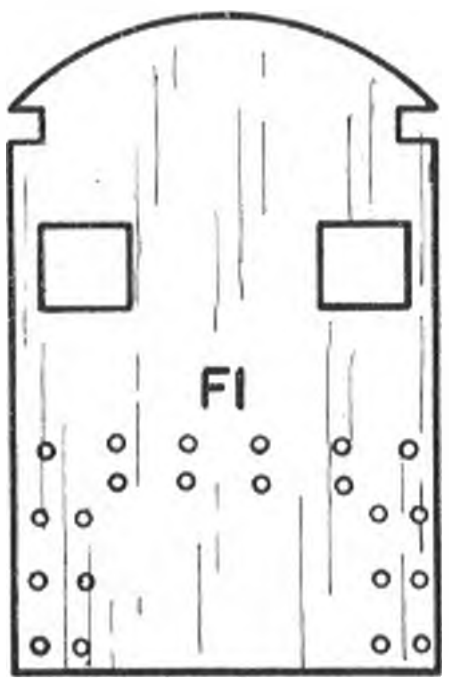
The main crankcase casting, and the head, are of light alloy. The cylinder itself is steel. Two retaining screws extending from the head down through the fins and into the crankcase hold the cylinder down, and also hold down the head, whilst two shorter screws secure the head to the cylinder. The standard short reach K & B plug screws into the centre of the head.

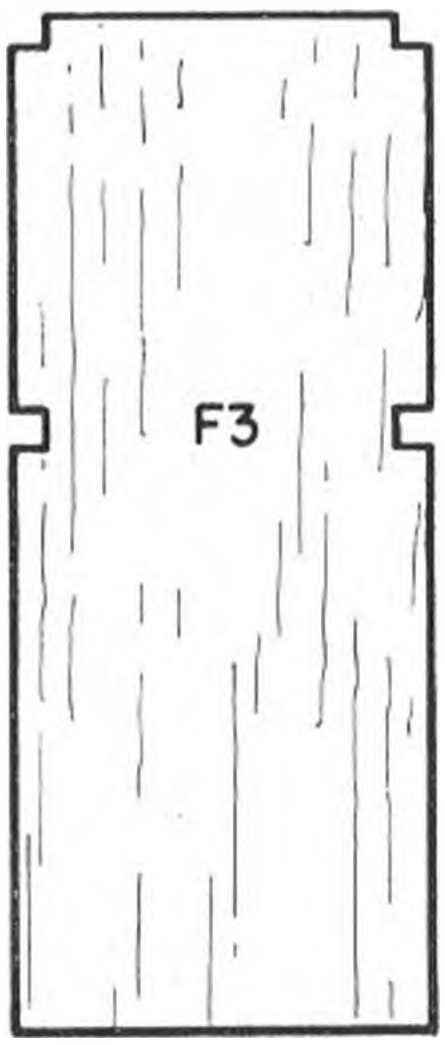
Altogether an extremely well made high speed engine, easy to operate and quite flexible on control. All tests were conducted on Mercury No. 5 fuel which appeared quite satisfactory. Lacking actual data on its flight performance on various types of models we would suggest essentially an engine for free flight power duration and possibly control line speed. One or two examples have been tried in Class A team racers: but using the high pitch airscrews essential to fuel economy, the results have not compared favourably with performance of diesels in current use.



Rev. Check with free flight airscrews:—

ENGINE "A" (Run-in for 45 mins., as per makers advice.)	9 in. × 4 in. KK Truflo . . . 9,200 rpm. 9 in. × 3 in. Tornado Plasticote as advised in U.S.A. . . . 10,600 rpm.
ENGINE "B" (Run-in and subsequently used for several hours—the test engine.)	9 in. × 4 in. KK Truflo . . . 10,400 rpm. 9 in. × 3 in. Tornado Plasticote as advised in U.S.A. . . . 12,200 rpm.





F1 — 1/8" SHEET
F2 - F7 - 1/32" SHEET

TOM THUMB FORMERS

Your first BAMBI

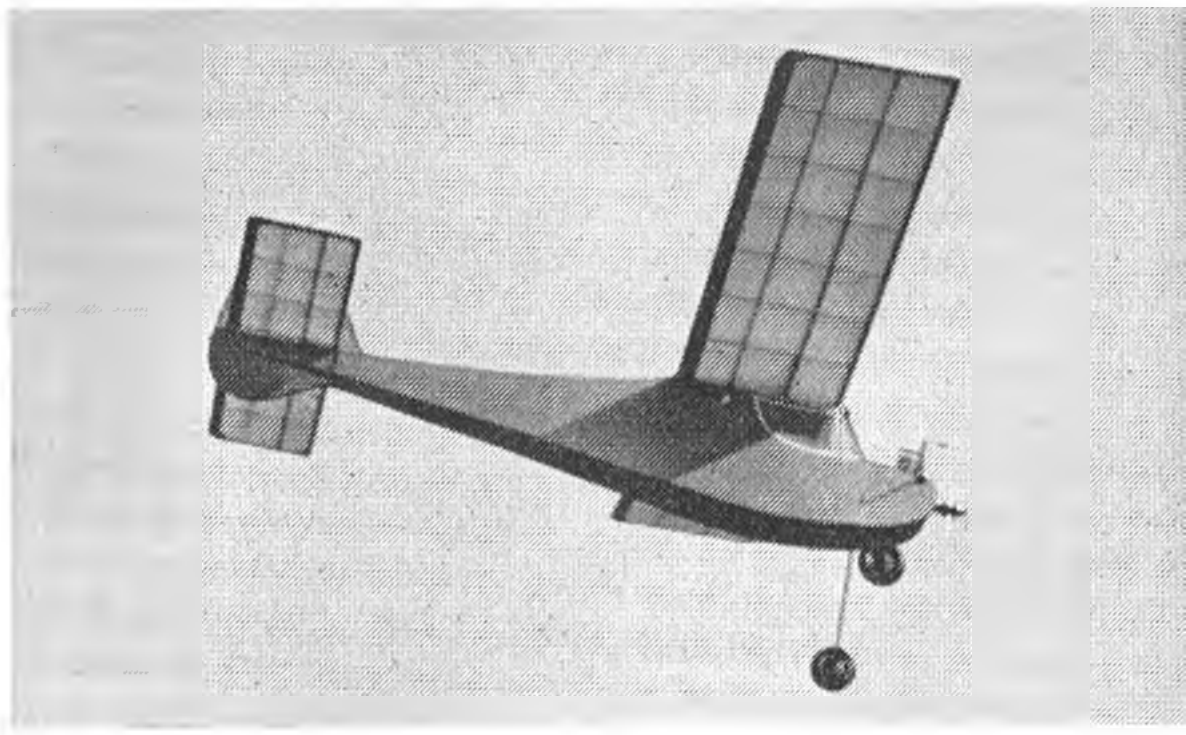
TOM THUMB

A miniature 'TOMBOY' for the smallest of diesel engines

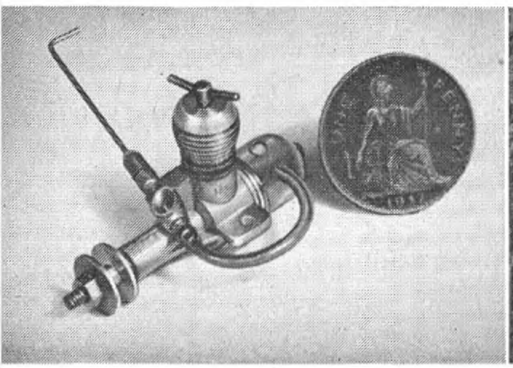
AS mentioned in last month's Trade Notes, the "AEROMODELLER" offices literally buzzed after a pair of prototype "Bambis" arrived towards the end of last year, and the buzzing rose to quite a high-pitched little scream on the arrival of two production engines, modified and incorporating several of our suggestions. There's no doubt about it, these little jobs really wind up, and they are surprisingly easy to start . . . once you have the knack!

Many beginners, particularly young ones, probably see in this engine an ideal means of painless power flying. To these enthusiasts we can only say "Forget it"—the Bambi is a splendid little motor, but some experience of handling engines is necessary to get the best out of it, and beginners are far better off with something around the 1 c.c. mark, especially since there are many more designs available for motors of this size. The Bambi is a wonderful investment for a fairly experienced sport flier or modeller with an experimental turn of mind—suitable models can be built in an evening apiece and the small size makes them practically indestructible. The most important point about the motor is that it is *practical*. It will stand a fair amount of mishandling, it is tough enough to take knocks in its stride, and it will not wear out after a few minutes' running (ours are piling up the hours and getting better all the time). Davies Charlton engineers are to be complimented on a fine achievement, particularly since so much of the manufacturing is hand-work—hence the price.

Our experiments with the engines covered a wide field and have given some very definite ideas on operation and use. Power output is, not unexpectedly, small —we should be amused to see the results of an attempted analysis without special gear being constructed—and although the motor will rev. at over 11,000 r.p.m. with a 4 × 1 metal prop, we found that the highest usable thrust output was at slightly lower revs, using a 4 × 2 propeller. Ron Moulton's exhaustive fuel tests proved that *at present*, Mercury 6R is definitely the best mixture, both for starting and power output. Starting



model as designed by Vic Smeed



is simple enough if the propeller is whopped over instead of flicked; our technique is to fill the tank, choke until the fuel line is full, flood the engine, back off compression anything up to one turn until no danger of a lock exists, then really sock the prop over. There is adequate time to adjust compression to the running setting and the motor is certainly not critical. Whenever starting difficulty has occurred, it has invariably been due to a blocked fuel line, so if we can't start within a couple of attempts we pull the neoprene out of the tank and blow hard to clear the jet.

With regard to the type of model it will fly, we are faced with rather a new approach. For sport flying, the normal model-to-engine weight ratio is seldom less than 4 to 1 (i.e., a 3 oz. motor in a 12 oz. model) but with the Bambi we have to think of a 3 to 1 ratio as near to maximum. Two ounces all up is about as much as the motor wants to handle for comfortable performance, and a wing area of 70-90 sq. in. appears best for this weight. One result of the high weight ratio is that the wing automatically moves nearer to the motor, bringing accessibility problems; fingers, unfortunately, cannot be scaled down!

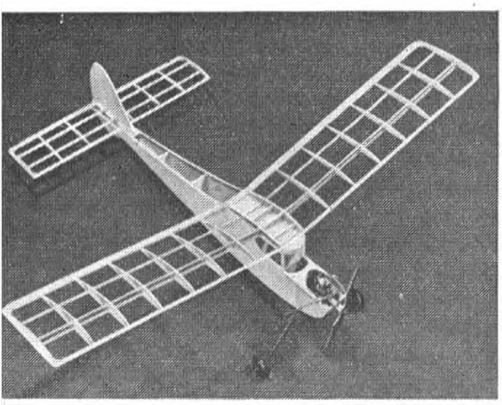
TOM THUMB

During our experiments with models, the Editor suggested that a scaled-down Tomboy (now in its fifth year and still the most popular A.P.S. design) might prove an ideal model for the Bambi. Tom Thumb was the result; we selected $\frac{5}{8}$ full-size as being likely to fit best in respect of wing area etc., and redesigned the structure for a target weight of 2 oz. The finished model in flying trim is an eyelash lighter than six pennies, and the result is a nice steady climb and glide.

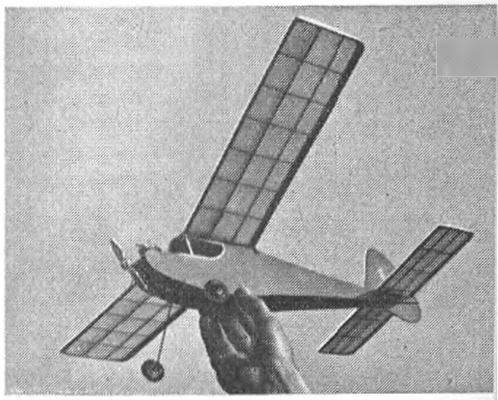
Construction is very simple; use light, firm balsa throughout and don't slosh cement too freely. The fuselage sides are cut and assembled to the formers, binding the undercart to F1 beforehand. If the $\frac{1}{32}$ sht. is tangent cut (i.e., easy to roll) have the grain running *across* the formers. The thin capping strips stiffen the sheet edges and allow a neat covering job, lifting the tissue clear of the former tops and bottoms. Cover the cabin with *thin* celluloid and the whole fuselage with lightweight tissue. We sprayed on thin water-colour for shrinking, which gave a nice opaque body for practically no weight increase. One coat of clear dope completed the covering. The nose must be really thoroughly fuel-proofed, inside and around the cowling.

Wing and tail are ultra-simple and are also covered with hard tissue, shrunk, and given one thin coat of dope. Use coloured tissue if required, but do not use any colour dope. The model should balance on the mainspar and, if free from warps, may be given slight right rudder and power flown from scratch.

Materials: 1; $\frac{1}{32} \times 3$, 1; $\frac{1}{16} \times \frac{1}{8}$, 1; $\frac{3}{32} \times \frac{3}{8}$, 1; $\frac{1}{8} \times \frac{1}{8}$, 1; $\frac{3}{32} \times \frac{3}{32}$, scrap $\frac{1}{16}$, $\frac{1}{8}$-sheet, 18 s.w.g. wire, $\frac{1}{4}$ sq. bearer $\frac{1}{16}$ dowel—say 3s. 6d. including tissue and dope. And if you can't wait for a Bambi, why not a simple conversion to rubber power?



Everything about this 22 in. span power model can be aptly described as "miniature," especially where the engine is concerned, as reference to the heading photos show. The Bambi has now taken the thimble size engine right out of the experimental class and makes it a practical proposition for such tiny sport models to be flown in restricted fields where hitherto only rubber power was considered possible. Simple and easy to make, Tom Thumb is destined to be the first in a new era of power model designs. One test model now flying is only 14" span.



THIN CARD

1/16" SHEET GUSSETS

3/32" SQ. L.E.

1/32" SHEET

CAP WITH 1/32" X 3/32"

C.G.

F1

F2

F3

F4

1/8" SHEET

1/4" SQ. HARD-WOOD BEARERS

3/32" SQ.

1/32" SHEET FROM NOSE TO F2

1/16" DOWEL 1 1/2" LONG

1" DIA. CELLU-LOID WHEELS

1/32" X 3/32" CAPPING STRIPS TOP & BOTT

1/8" THICK SPACING WASHER FITTED TO REAR OF PROP

CUT PROP FROM 18 S.W.G. DURAL

TWIST BLADE HERE TO GIVE 15° PITCH

COVER WITH LIGHTWEIGHT (HARD) TISSUE

1/8" SHEET FAIRING

1/16" SQ.

1/8" SQ. L.E.

1/8" X 1/16" TOP & BOTTOM

1/16" X 1/8" BRACE

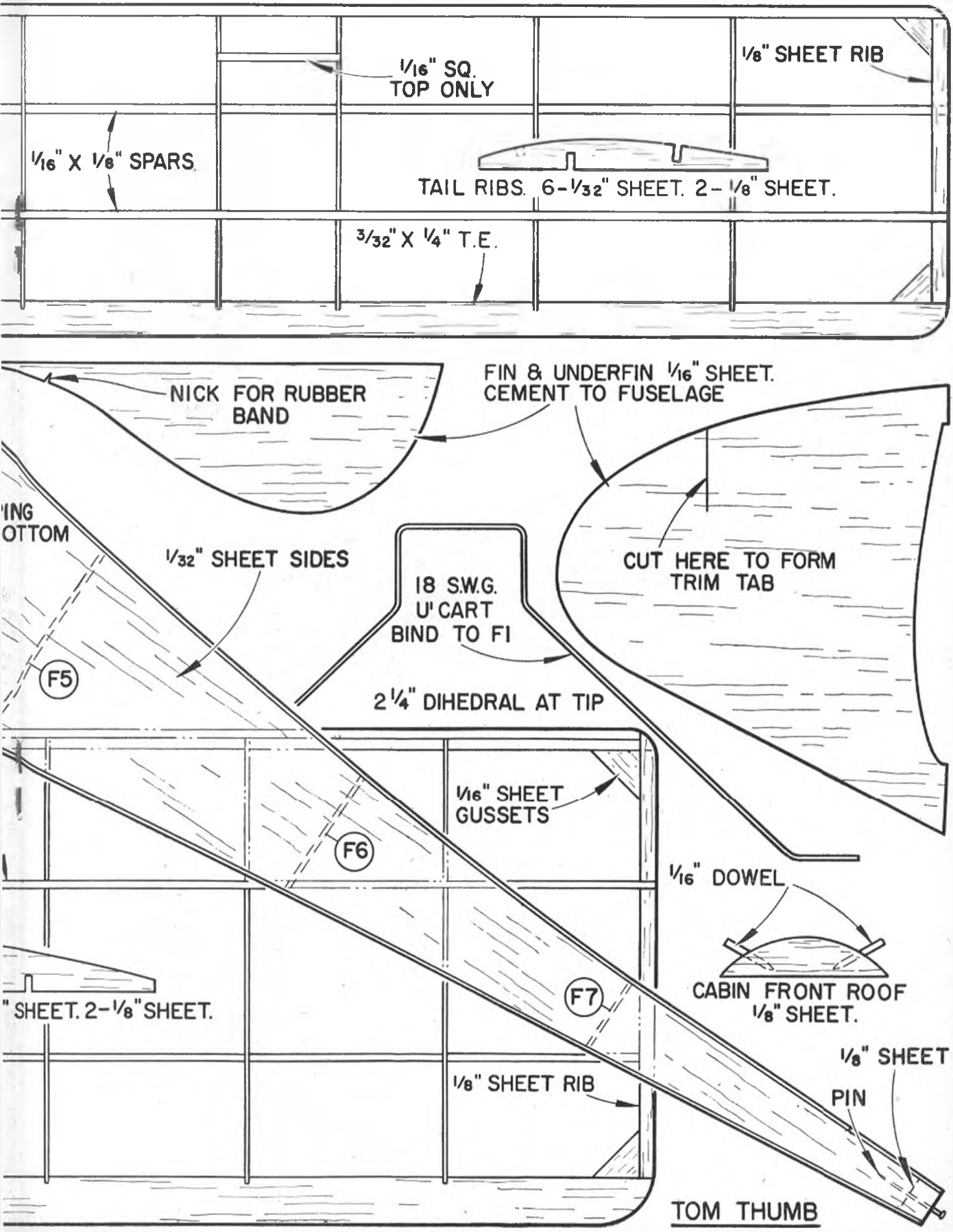
1/16" SQ.

1/16" X 1/8"

WING RIBS. 2-1/16" SHEET. 12-1/32" SH

1/16" SHEET RIBS

3/32" X 3/8" T.E.


1/16" SQ.
TOP ONLY
1/8" SHEET RIB
1/16" X 1/8" SPARS
TAIL RIBS. 6-1/32" SHEET. 2-1/8" SHEET.
3/32" X 1/4" T.E.
NICK FOR RUBBER
BAND
FIN & UNDERFIN 1/16" SHEET.
CEMENT TO FUSELAGE
'ING
OTTOM
1/32" SHEET SIDES
18 S.W.G.
U' CART
BIND TO FI
CUT HERE TO FORM
TRIM TAB
F5
2 1/4" DIHEDRAL AT TIP
1/16" SHEET
GUSSETS
F6
1/16" DOWEL
" SHEET. 2-1/8" SHEET.
F7
CABIN FRONT ROOF
1/8" SHEET.
1/8" SHEET
PIN
1/8" SHEET RIB
TOM THUMB

Model News . . .

IN keeping with the Helicopter speciality of this issue, choice of "model of the month" is appropriately one of those rare gems, a true scale Helicopter. Mike Drozda, engineer in charge of the Piasecki structural test laboratory, built this 1/20th scale free flying model in 600 hours of spare time. Power from what we can suppose to be a 5 c.c. engine is transferred through clutch and shaft drive to twin rotors, each of which can auto-rotate for a glide descent.

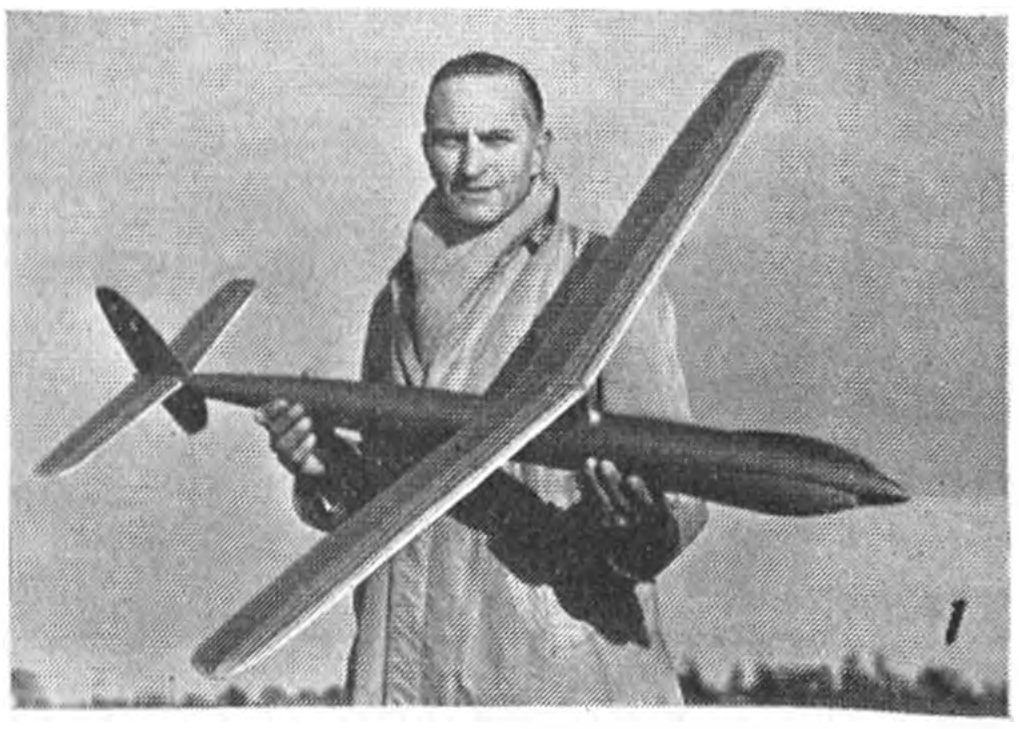
Internal detail as well as shock absorbing and swivelling landing gear, make this a near perfect scale reproduction of the H-21 Workhorse, even to the extent of ·004 in. aluminium covering—so that although flight tests yet to be made might not be successful, Mr. Drozda may well rest on his laurels as an expert scale modeller. Total weight is 48 oz., and that's an awful lot to lift.

Picture **1** is maestro Evans again with his beautiful '54 Wakefield and reveals the magnificent finish on the ultra streamline fuselage with folded prop and retracted undercarriage—this is one model that should become quite the centre of attraction at the team trials to be held at Wittering.

Seventeen year-old Uppingham schoolboy, John Sutton, made the Gloster Javelin 2nd prototype scale jet in **2**, and designed it to 1/20th scale around a Mills ·75 Newbold type ducted fan. Flight trials have not been altogether successful John reports quite frankly, and this he says is due to the general lack of information on the subject of suitable wing sections and C.G. location. Perhaps the Swiss Flying Wing article in May issue will help him over the aerofoil hurdle, whilst J. W. Fozard's treatise on Delta models in the '53 Annual should find the theoretical balance point.

Still on the subject of experiment, how about that small tail on Ron Pollard's latest Wakefield **3**? Only 14·5% of the wing area, the tiny tail must have caused a few surprised mutterings among the Tynemouth boys, particularly as the job maintains an honest 3—3½ minutes in most conditions. Wing is 60 in. span, 265 sq. in. plan area, and hold your breath . . . the prop is 30 in. diameter!

First of the season's many Team Race Rallies attracted over 100 racers to Dartford on April 4th and as usual, Messrs. Smith and Edmonds of High Wycombe had something fast with Oliver Tigers. No. **4** shows what we mean, only these are class B racers with 40 in. and 44 in. 14 : 1 aspect ratio wings on class A converted fuselages. Engines are 2·51 c.c. specials to comply with the rules, and due to low capacity, give a lappage of up to 90 with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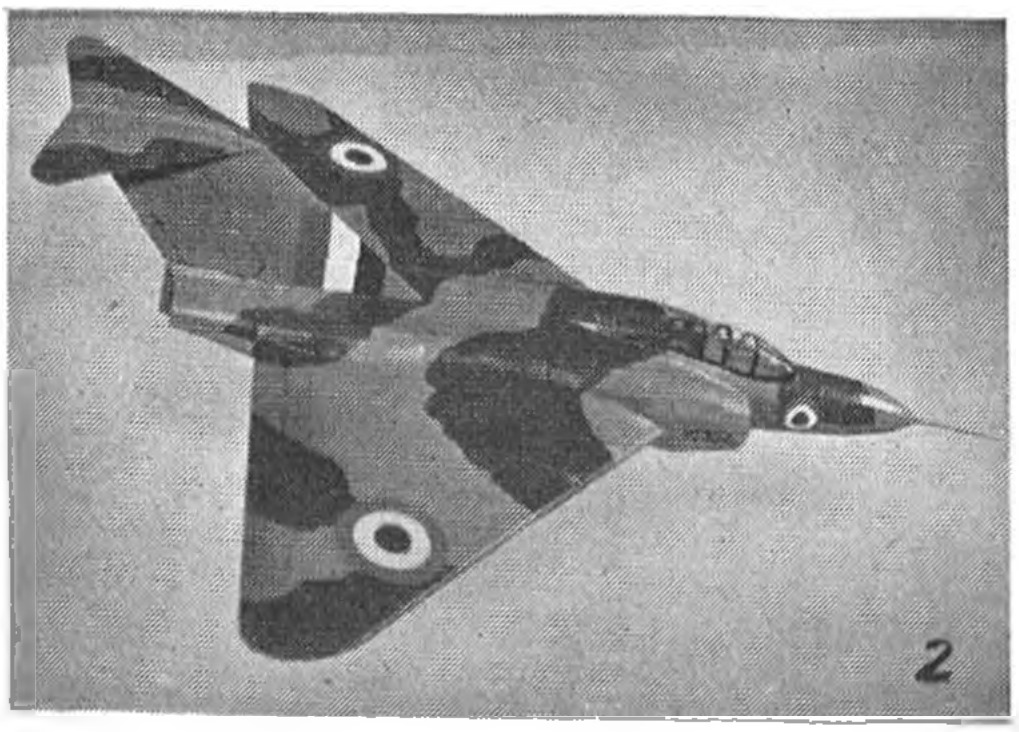
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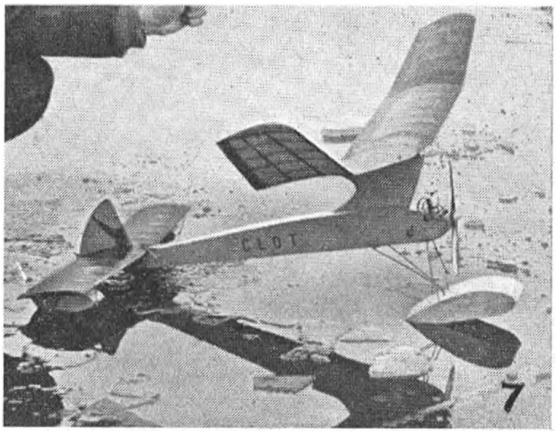
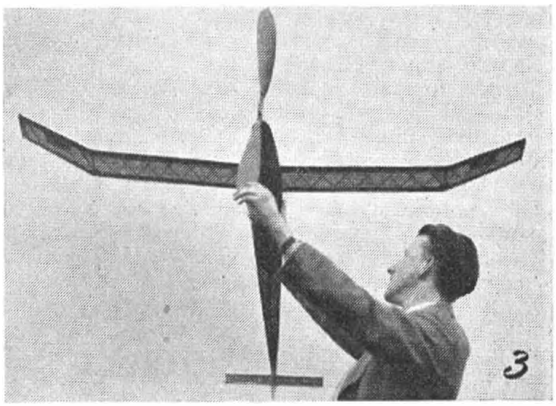


speed peaking at 80 m.p.h. Thus they complete a five-mile heat non-stop, and banking on the unreliability of opposition racers, stand a fair chance of winning against much faster 5 c.c. models. Prop is 7 in. by 9 in. Stant and fuel an equal mix of Paraffin/Castor/Ether with 4% Nitrate. Conventional in aspect ratio, but with unusual power units, are Pete Wright's new Wranglers Mk. 6 and 8 in photo **5**. The "A" model has a Super Tigre G20s and flies at 70 m.p.h. whilst the "B" racer had a K. & B.19 for Dartford. Though faster, says Peter, the smaller motor is thirstier than an ETA 29 and is currently being replaced with a re-arranged '29.

A spate of new A/2 configurations s now upon us, and after our revelations in December issue, a great many are using the Hans Hansen aerofoil. No. **6** is Eric Thompson and his typical example which totalled 7 : 40 in the second A/2 elims. High gloss on this Northampton product is obtained by brushing a coat of Fibreglass finishing medium over the standard two coats of thin dope on Jap tissue. Model also features a concealed wing fixing on the very attractive fuselage.

And so to **7**, record breaker of the month is I. C. Lucas's "Clot" which now holds the British power floatplane record at 4 : 58 for a flight made last October. Lumps in the water are ice . . .Brrrrh!



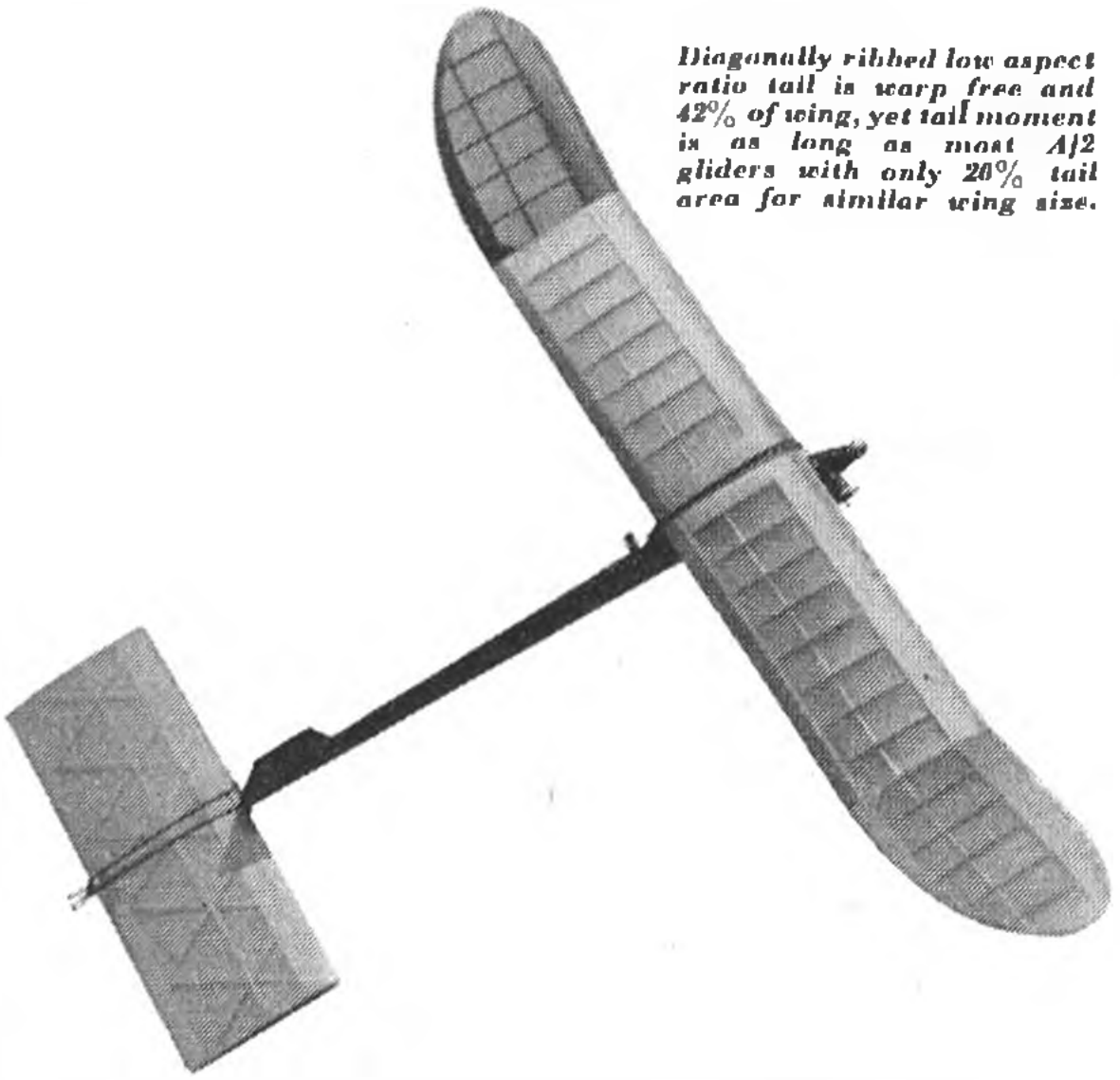
Peter Buskell's

SLICK STICK

CONTEST SUCCESSES

1952		
All-Herts	1st	45.5 ratio
1953		
Power Trials	1st	13 : 36
Keil Trophy	2nd	8 : 55
All-Britain Rally	2nd	4 : 30
Sir John Shelley	1st	7 : 36
Y.E.N. Rally	1st	6 : 00
Astral Trophy	2nd	20 : 49
World Champ.	4th	12 : 30

THE name of Peter Buskell goes with Power models as Ted Evans does with Wakefields. It signifies precision in design, construction and contest performance and represents the top of its class. We are proud therefore, that "Slick Stick" the most successful of all entirely original British power model designs should join the ranks of A.P.S.



Diagonally ribbed low aspect ratio tail is warp free and 42% of wing, yet tail moment is as long as most A/2 gliders with only 26% tail area for similar wing size.

FOR the few seasons that Peter Buskell has specialised in power duration, his rise to fame has been nothing short of meteoric, and if we were to be asked for the prime reason for such success we would answer in just one word"—consistency". In Slick Stick we have his latest design for an all-weather model capable of top performance no matter what the conditions, whether they be tempestuous or calm—in fact, the ideal model to suit the vagaries of British weather.

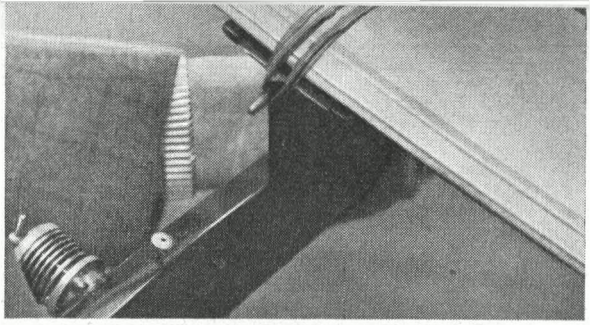
That list of contest successes at the head of the page is no small achievement. It truly represents the Slick Stick as a design and not merely the super-trimmed Peter Buskell originals, for honours go to Jeff Hancock for the Y.E.N. victory, and the list omits the many previous wins with "Stormie," Pete's earlier power design.

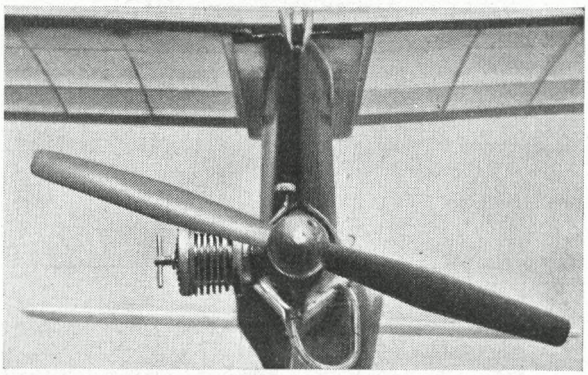
"Sticks," as they are known to the habitués of Epsom Downs or Chobham Common, appear in two versions. One, the primary design for F.A.I. Power, with the E.D. 246, and two, the "open" contest variation with a BB Amco. The first holds the distinction of having represented Gt. Britain in each of the two International Power teams, and the second is possibly the most potent piece of flying machinery to be found on any flying field this season. Yet—we add with every assurance—here is a design that is as docile to trim as it is relatively easy to build.

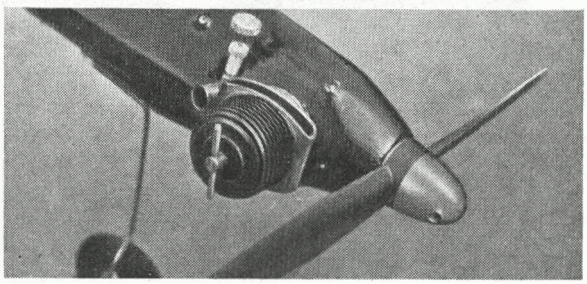
Pete's original aim in creating the Slick Stick was to take every advantage of the F.A.I. Power regulations. It is sleek and streamlined, it weighs no more than the required 17.5 oz. minimum, and the wing loading is only 0.3 oz. sq. ft. above the 3.93 low limit. What, you may well ask, makes it so superior to other models? To start with, it is a *developed* design, it utilises a sound and proven Don Butler aerofoil which gives a high degree of longitudinal stability and it needs no engine offset or downthrust. The rigid fuselage structure allows "indoor trimming," for rigging angles can be set on the building board without fear of a structural warp upsetting vital incidence settings.

Above all, it is designed (and for once, this is no misnomer), to have a right spiral climb at 70% in 60-100 ft. circles.

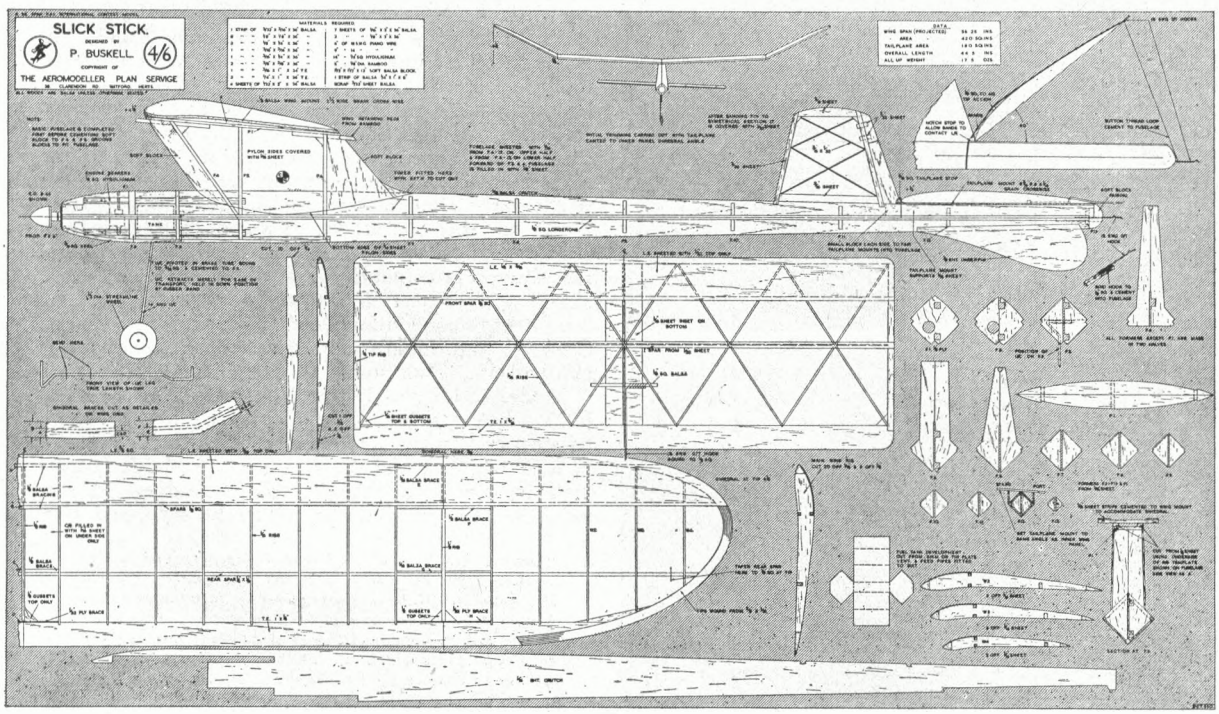
Only twice in its two season career has the "Stick" misbehaved in a contest, and as most astute modellers know, one of these occasions was the World Championships at Cranfield last year. Each time the symptoms were identical—a loop in the initial climb—and for a long time the Surbiton lads were baffled as to the cause. Persevering and patient in analysing the fault (his work as a BBC engineer at Broadcasting House, has some influence here), Peter came to the conclusion that a fin warp was the answer, hence the "new look" fin now situated completely in front of the tailplane and having no cutaway portion for tip-up d/t. This seems to solve the situation, and couples with the ultra low aspect ratio tailplane to identify the '54 version. This and many another minor detail used in trimming the Slick Stick to perfection, are revealed in full in Peter Buskell's own building notes and trimming advice, which accompany each copy of the full-size drawing, reproduced to $\frac{1}{8}$th scale here and available price 6s., post free from "AEROMODELLER" Plans Service.



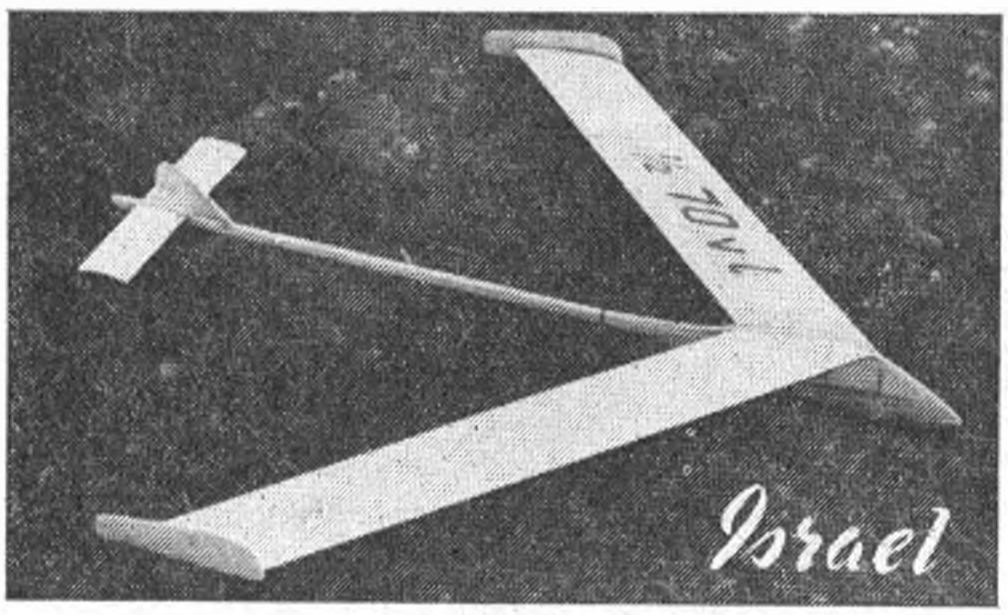


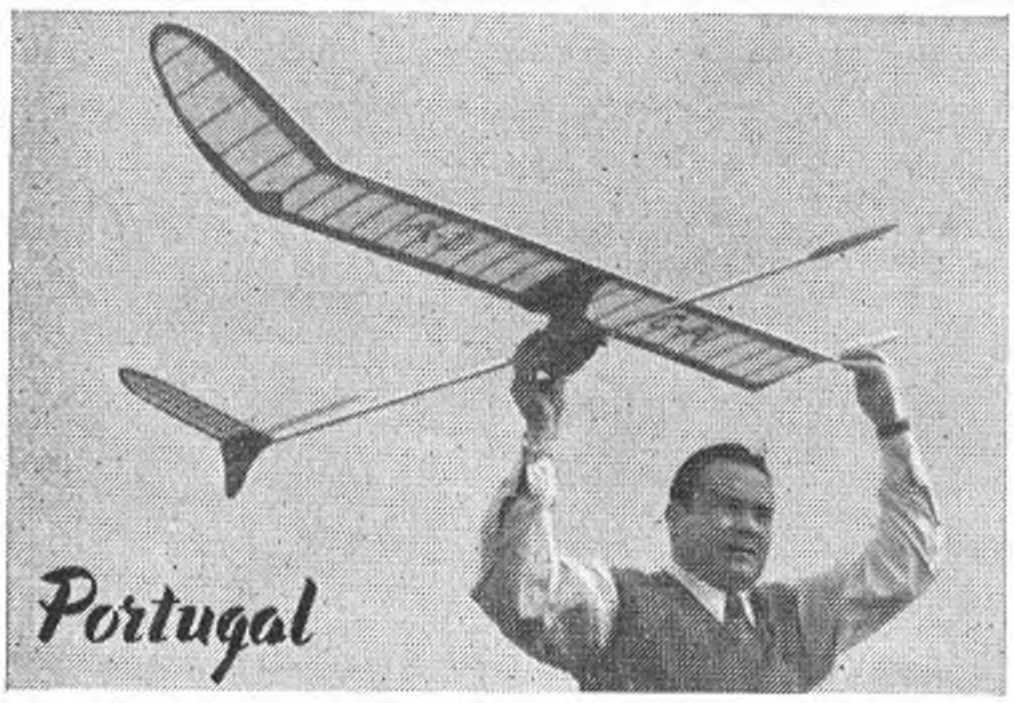


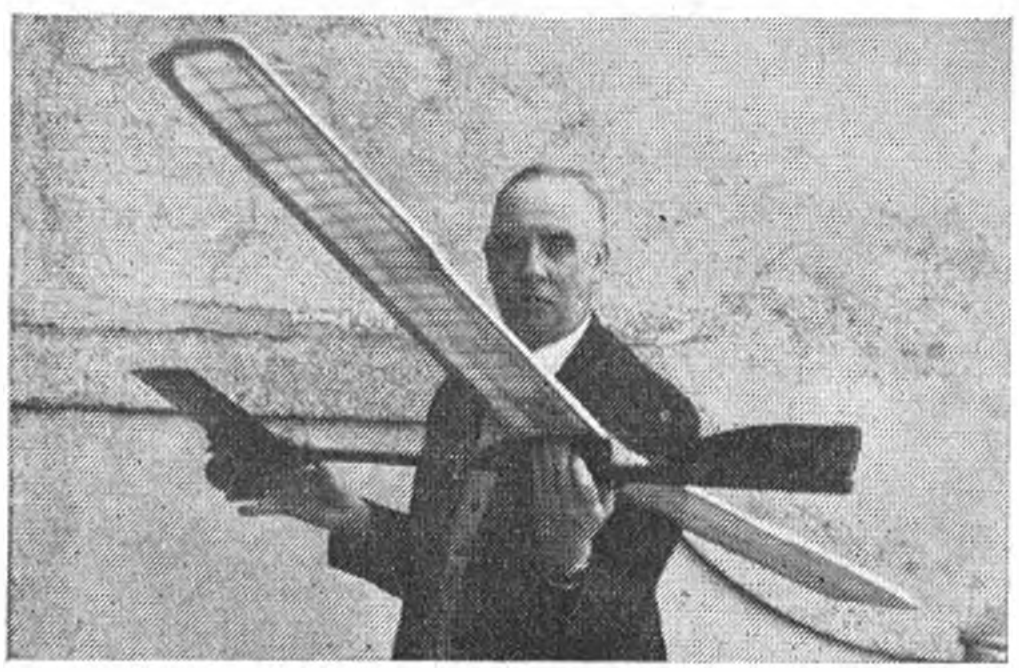
Stick detail, top: Double turbulators on '54 model improve glide and are simply lengths of fine cord tissued in place. Note the doctored E.D.246. Centre: The slim head-on lines of Slick Stick show how the fuselage is tailored to a minimum around the engine crankcase. Fibre prop is 9 in. × 6 in. Buskell High aspect ratio special as used last season. Bottom: The BB Amco now fitted for open events needs little extra modification and the upswept carb allows easier choking. A PB Amco was fitted in '53.



World News







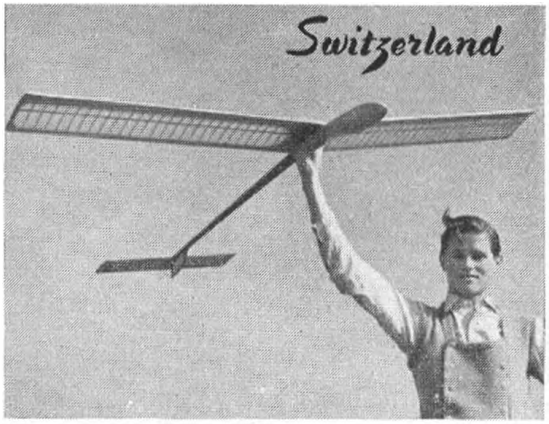
THE first '54 model meeting of any note in **Portugal** took place at the Oporto airport on March 21, when competitors from a large area massed for an A/2 Championship event. We have no confirmation that this was in any way an eliminator for a National team; but the winning time gives an average of 2 : 37 for five flights under the International rules, so this year should well see first participation of Portugal in the A/2 World Championships. Photo of Mr. Rafe and his Golden Cup winner is below left.

The International Modellers Contest to be held for Soviet Satellite States in late July will take place in **Russia,** and it appears to have given more than a boost to **Czechoslovakian** modellers. The Russians are already equipped with good high speed engines, the Hungarians use the well-known Italian Super Tigre products: but the Czechs, up to now, have had to depend on a few "one-off" home made racing engines. Consequently a production centre has been established under the management of Mr. Z. Husicka to develop 1·5, 2·5 and 5 c.c. motors for this International event. As a one-time World speed record holder, Mr. Husicka can be counted upon to produce something powerful for control-line or free-flight use—a photo of one of his latest 2·5 c.c. diesels is shown overleaf.

At Birrfeld, a flat glider/lightplane airfield in N. Western **Switzerland,** the Swiss A/2 team was finally selected on March 27/28. Each of the entrants had to make eight flights, four of them in windy conditions on the Saturday and the other four in perfect weather on the Sunday. The results show surprising consistency among the leading men, particularly Hauenstein the leader, who averaged 2 : 22 in this marathon. Two of the team use elastic artificial turbulence as described by Max Hacklinger last month, and the other two, each significantly better in the windier conditions, are reasonably conventional—that is to say—apart from the traditional superb Swiss finish. Team is:—Hauenstein, Thommen, Bartschi and Bodmer.

Model activity in **Hong Kong** was boosted by a PAA contest which brought forth no less than 45 entries, mostly from the "Termites" club at R.A.F. Kai Tak and the Hong Kong MEC. It was won by an APS PAAgeboy by Andrew Wong using a Mills ·75. Later, when he swopped the

Reading: Mr. K. L. Roy's Falcon being prepared for r/c contest flight at All-India Rally. Enthusiastic crowds prevented R.O.G. Israel swept glider by Naftali Kadmon is ½ scale A/2 experiment with Go.417a section, now has no fin and pod. Portuguese A/2's are aluminium uselage job by Cesar Abott which is subject to flutter, blunt nosed winner at bottom by Mr. Rafe has unusual outer wing panel shape.



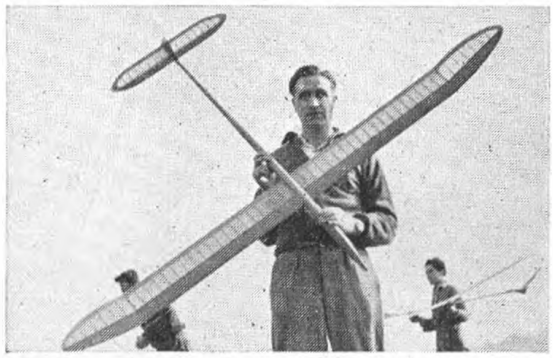
Mills for an E.D. Bee, the same model collected 2nd place in an open free-flight event with a best flight of 2 : 14 off 15 secs. engine run . . . good going Mr. Wong! The boys are now chipping balsa fast and furious for another PAA organised event in May, this time for Clipper Cargo. Incidentally we learn from this part of the world that the Japanese engine fabricators have started distribution of a 1 c.c. diesel hard to distinguish from an E.D. Bee.

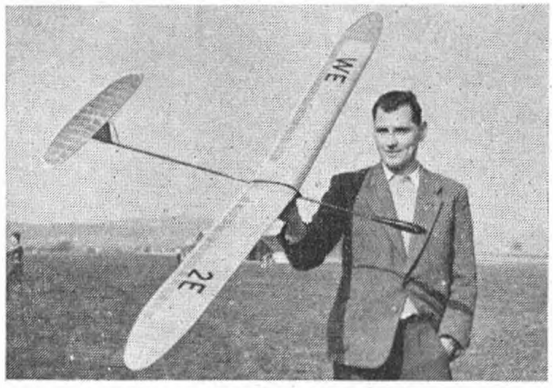
News of radio activity, the model aeroplane variety, comes in profusion from the **U.S.A.** The mags are full of advts for new equipment, sets, etc., and reports include eye witness opinions of inverted flight, outside loops, rolls . . . . the lot. Perhaps European modellers will have the opportunity of seeing such advanced r/c aerobatics when that wizard of the control-lines, Jim Walker, makes a caravan tour with models over here next year. He is due to bring his famous "three Fireballs at once" act, plus full radio gear.

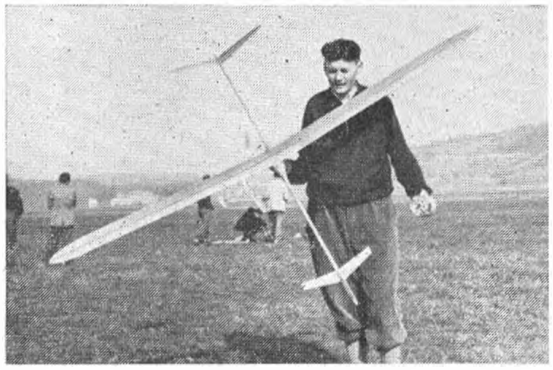
Reason why Team Racing which started in California, is now more popular in Europe than U.S.A. is because "It takes up all day and you don't have time to fly in other events," states Ralph Biddles in "*The Flypaper.*" Same reason prevails here Mr. Biddles, resulting in TR specialists who fly little else, and very little new influx among the leader board teams in the past two seasons.

Engine news is that McCoy are producing a 2·5 c.c. diesel to sell at $ 9·95 from this month. K & B have a "35" for stunt work to sell at $ 14·95.

That mention we made of a lone modeller at Poona in **India** aroused quite a pile of correspondence from all over the world, not the least important being one to us from the Poona "Nose crashers" model club. Well, just goes to show you never know what goes on around the corner! The club





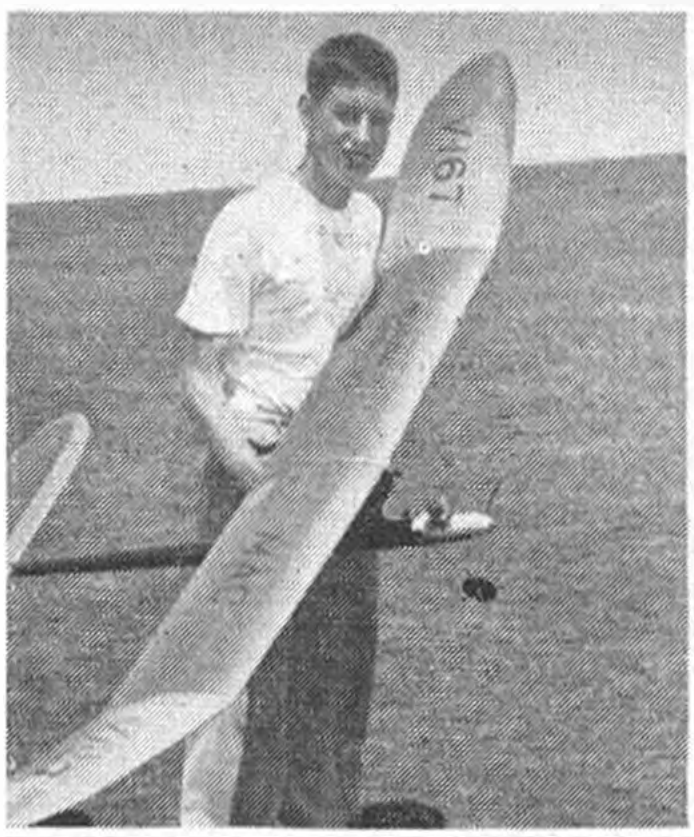


12-year-old Loy Meng Yeo of Sentul, Malaya with his O.D. power model shows youthful enthusiasm alongside young Swiss A/2 team member W. Bartschi. Top Swiss A/2 flier is Hauenstein of Dietikon in next view; whilst other novel designs at Swiss team trials were Alum. fuselage high tail glider by Herman and bottom, the two-tailed experiment by A. Meier for better towline stability.

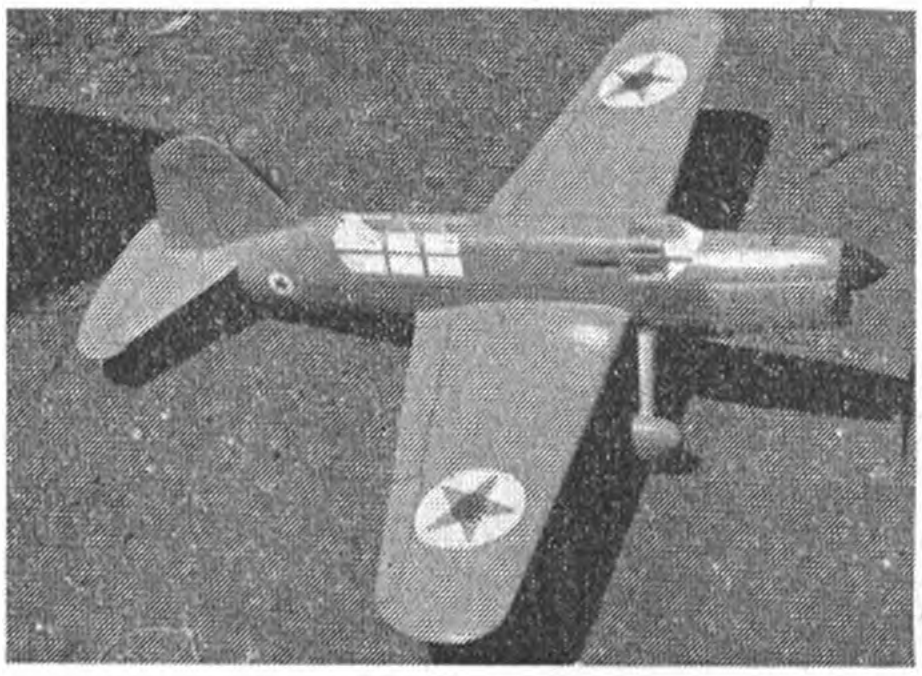
confirms high cost of aeromodelling in those parts, due to State Taxes and transport costs, so all-speed to them in their difficulties and especially to Sam Rustomji the club organiser. Elsewhere in **India,** there have been further moves toward a better understanding of the hobby by higher officialdom, resulting from the 5th Annual All-India Rally at Calcutta, attended by the Director General of Civil Aviation and his Highness the Maharaja of Mayurbhani. Though much beset by hindrance of an over-zealous crowd of enthusiastic youngsters, the Roy family, on whom so much of the aeromodelling organisation in this part of the World seems to depend, appear to have put over a good representative rally including all types of model from solids to r/c. Result is that a token grant of Rs.1,000/- has been given by the Government towards the expenses of the previous rally.

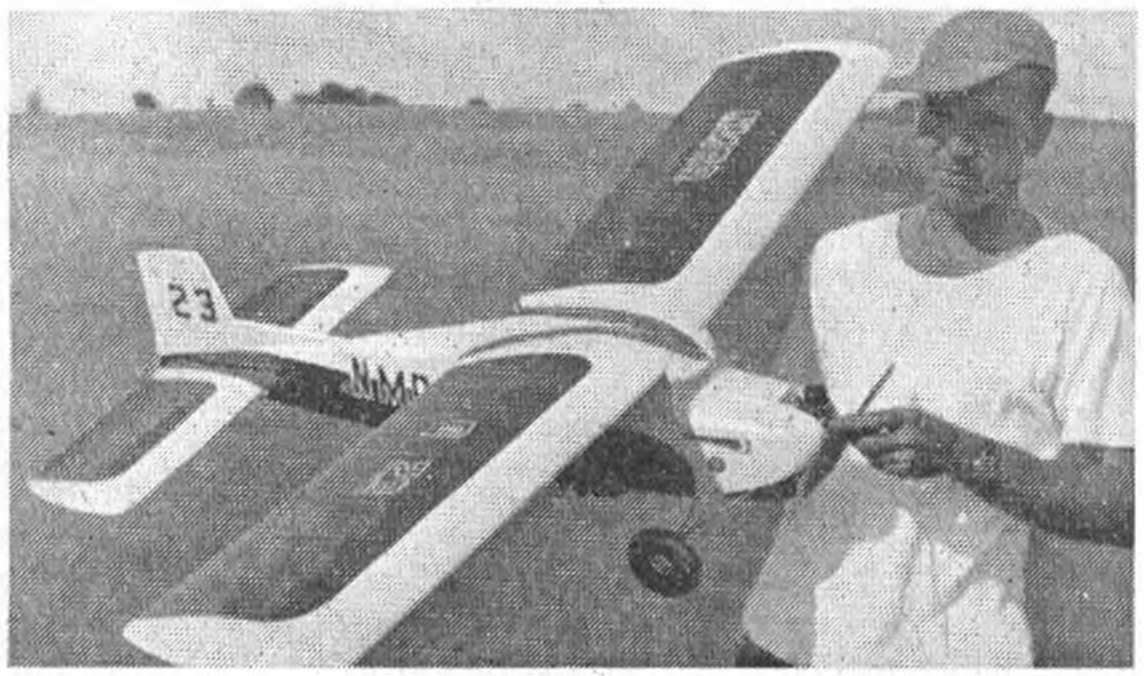
Across the Indian Ocean to **Australia** where we learn of one of the most isolated clubs in the World at Woomera the famous rocket range in the heart of the "donga" or desert. In this place where grass is unknown, the local Clay-pan forms a magnificent base for control-line and future racing car meetings, so it is not surprising to learn that the comparatively young club has an active 33 membership despite

Moving lights at the Woomera Club are Pauline and John Brown seen here with John's stunt Spitfire. Supplies are hard to obtain for this remote club in the desert.



FF scale entry at Toowoomba; below is Don Adams and BB Amco Live Wire Senior r/c winner, and left, Theo Sheppard's Class C scale Curtis Seagull. Top left is Victorian Noel Harding, power scramble and class IV power winner.



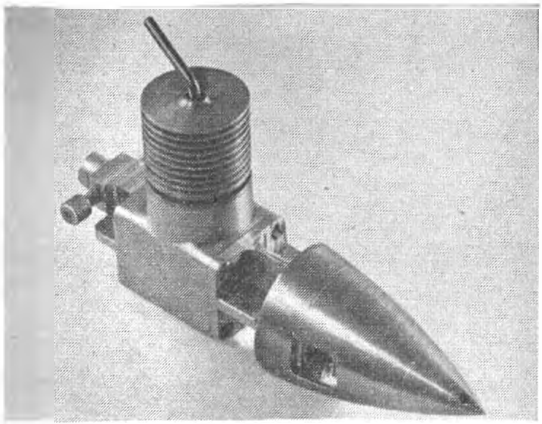


constant movements of the Service personnel. Official encouragement from top level, G/Capt. Pither the Superintendant of the Long Range Weapons Establishment who was once a modeller, and the provision of a club trainer for control-line beginners are helping to build up further interest in this dry spot where the temperature ranges about the 110° F. mark.

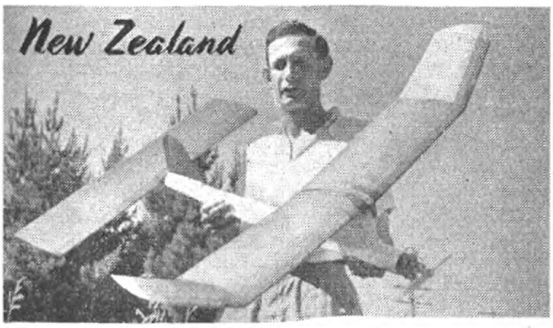
At Toowoomba in Queensland, the Aussies held their Nats. over the New Year holidays and a series of postal delays has prevented a full report until now. From Authur Gorrie's official screed we get facts and figures to confirm our view that when the boys "down-under" get moving on a model meeting, things begin to hum in a big way. Many entrants made round trips 2,000 miles or more to get there, Col. Somers' utility truck covered 150 miles for the recovery service alone, and some of the more zealous types arose at 3 a.m. for 5 a.m. free-flight contest starts, then flew through the day till it was time for the Annual Conferences which finally shut down at 1.30 a.m. next day. Those who had the nerve and energy to tackle the one-hour power scramble (no retriever allowed—you fetch it yourself) were in dire need of a re-lining after the long jaunts enforced by a strong southerly wind, in fact this event is now referred to as a "killer." Best time was N. Hardings' total of 8¼ mins. (2 mins. counts as a maximum).

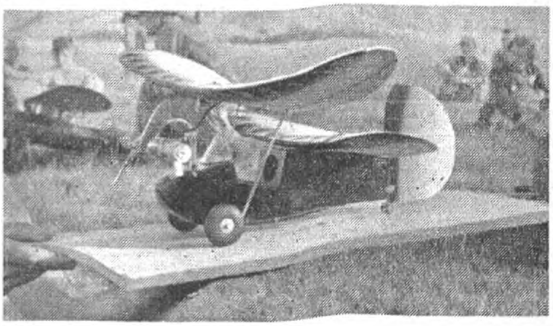
Wake and A/2 teams were picked at this Nats. and will be—Lim Joon, Stuchberry, Somers and Bradney for the Wakefield and Stowe, Bird, Wright and Bradney for A/2 while Alan King the popular winner of FF Power will go to the U.S.A. as sole and special representative for Australia. The name of Stowe features in the who-won-what lists as well as several side reports on the nocturnal happenings at Toowoomba, and it so happens that we've heard direct from this live-wire concerning certain highlights which we quote. "Food, served on tables—with tablecloths—waitresses and super meals," that was Ivor's main praise, then "Barry Gorman of NSW lost his 9 ft. sailplane in a vast open area after almost pin-pointing the touch-down—model was returned next day—it had flown *inside* a garage! An APS Satu did 1 : 45 with 150 ft. line *and* a Meccano winch! And finally the one they all wanted to witness but didn't when a job flew into a Toowoomba windmill. Toowoomba windmills are 10 ft. dia.: have 24 blades of 4 in. wide 16g. galvanised steel and spin as fast as a Dooling 61,—how would you like your entry sir?—minced, diced or just plain sliced!"

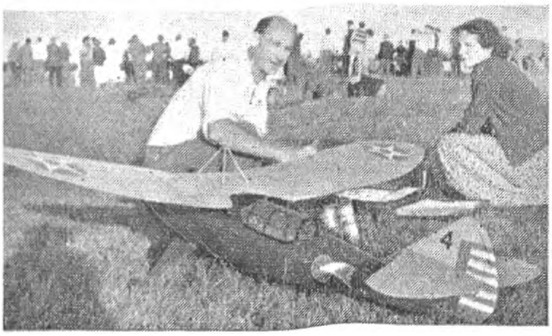
The **New Zealand** Nats. also had early morning starts: but at the more reasonable hour of 7 a.m. Highlights were a World duration attempt by Les Wright with his r/c job which was aloft for 1 hour 25 mins., this is now an N.Z. record but has not been ratified by the FAI due to delay between flight and the claim. A thermal indicating windsock on the Omaka hangar which would whip out straight from a limp vertical position each time a thermal bumped off the hot tarmac caused a rush to get models into the air!



Above: Z. Husicka's racing 2.5 diesel is one of several he is producing in Czechoslovakia for the Soviet States Nats. Below, top to bottom: Champ of Champions Doug Kennedy and winning power job at N.Z. Nats. Pou du Ciel was 3rd in scale, built by Wakefielder Brian Marsh. Bottom, L. Napper's beautiful 0-46a scale entry.







Radio Control in easy stages . . .

Making your own Aeromodeller Receiver

In concluding his three-part article on Radio Control in easy stages, SID MILLER tells how to assemble, adjust and field check the No. 1 receiver, home made parts for which were described last month.

MOUNT the tuning coil first, pushing up through the appropriate hole, from the underside of the panel. Work the coil centre tap through the slot afterwards turning the coil until the mounting holes line up. The centre tap should point towards the relay position. One end of the coil winding should also project up through the slot for connection to tag 2, on valve base. Photo 2 (15). The other end of the coil remains below the panel. Two half-inch 8 BA bolts hold the coil in position, placing a spacer between coil former and panel (6 BA half-nuts will do). Fig. 9A. Place an 8 BA solder tag before screwing on the nut. Photo 1A. 8 BA washers are fitted to all bolts top and bottom. The quench coils are next. They should have the aluminium "L" bracket fitted as follows. A 1 in. 8 BA bolt has first a washer followed by a double-ended tag threaded on. The "L" bracket next, the bolt being passed through both coils securing them with a washer and nut. Do not tighten up hard yet! The *START* of the inner quench coil is soldered to one side of the tag. (Photo 2B) Fig. 9B. Mount the coils working the remaining three wires and the foot of the bracket through the square hole provided. (Photo. 1C). Fix bracket to panel with an 8 BA bolt. The half inch bolt will be too long. Therefore, cut to length if neater finish is desired. Press coils down firmly into the square opening and tighten the bolt holding them in position. The high frequency choke comes next, one end being soldered to the tuning coil centre tap, the other end of the choke to the free end of the tag on the quench coil mounting bracket. (Photo 2). The choke is mounted direct by means of the two solder blobs previously left at each end (Fig. 3). The positions of the coil centre tap and the tag will have to be adjusted to suit the choke.

To mount the beehive condenser the halves should be separated, the bottom or fixed half being pushed up through the hole provided for it. It should be a tight push fit. On this half will be found two tags. Cut the long one off and turn the condenser until the remaining tag touches tag A on the coil former (Photo 1). Screw on the top half of condenser fully, thus holding the beehive in position until soldered. Cut short the central spike, leaving enough to solder the necessary wires. When mounting the valve base, the balsa wedge is replaced before unscrewing the bolt. Place an 8 BA washer and tag on the bolt, push up through hole in panel (Fig. 1). A non-conductive washer approx. $\frac{1}{16}$ in. thick comes next followed by the valve base. Carefully work the free end of the 100 pfs. condenser through the slot, then screw into position with the bolt. Withdraw the balsa wedge and tighten up the bolt (Fig. 10). The relay will, of course, be fitted according to the type used. With the Siemens 73, cut as much of the base away as possible from the contact point end to enable it to be located close to the quench coils. About $\frac{1}{4}$ in. will do. A tag is placed on one of the bolts holding the core and main body to the panel. This will be eventually joined to H.T. and L.T. negative and should be on the underside of the panel (Photo 1H). Fit bolts E and F (Photo 1 and 2) with tags, top only for E, top and bottom for F. The relay coil is soldered to these, on top of the panel, one end to E, the other to F. It does not matter which way round the coil is connected. (Photo 2). All the following connections are shown on Photo 1, and are numbered in the order of working. Cover with 2 mm. sleeving where shown.

Assembly by Numbers

1. Finish of outer quench coil to tag D held by valveholder mounting screw.
2. One end of .003 fixed condenser G also to tag D.
3. The free end of the 100 pfs. fixed condenser protruding through the slot also goes to tag D.
4. Start off outer quench coil to tag A.
   The free end of the .003 condenser to tag A.
   The end of the tuning coil on underside of panel to tag A.
   All these connections are soldered together, including the tag on the beehive condenser, which should be in position as previously described.

5. About 6 in. of flexible wire (any colour but Black, Red, Yellow or Blue), is passed between coil former base and panel at S, first loosening the coil former mounting screw nearby. The wire is soldered to the free end of tag A. A short piece of 2 mm. sleeving is then slipped on to the wire and located under the former base. Screw the former bolt up tight gripping the sleeving and aerial wire. This will prevent any tension being placed on the connection to tag A.
6. Connect pin 5 of the valve base to tag H, which is the core and main body of relay. Use black flex and solder to pin 5, first passing wire between 3.3 megohms resistance and valve base and through the slot in panel. Protect with 2 mm. sleeving.
7. Connect about 12 in. of the black flex to tag H.
8. Connect about 12 in. of yellow flex to pin 1 on valve base passing it up through the slot.
9. Connect 12 in. of Red flex to tag E, on top of panel passing it up through hole adjacent (Fig. 1).
10. Connect 12 in. of blue flex to tag K. This tag will vary in position according to the type of relay used. It is fixed under the bolt holding the rear contact, point and in the case of the Siemens 73 should be under one of the bolts marked X near the lower edge of panel (Fig. 1).
11. The four leads are twisted together and thin fuel tubing slipped over them, the whole being held firm at E, by means of a 6 BA tag or clip. Again, this precaution prevents tension being applied to the actual soldered joints.
12. Connect tag F to centre pip on beehive condenser.
13. Connect finish of inner quench coil to beehive centre pip.
14. The .01 fixed condenser has one side soldered to tag F, which is one end of relay coil, the other side of .01 going to tag H.
15. Connect the free end of the tuning coil (on top of panel) to pin 2 on valve base (Photo 2). The condenser C.R.1 (.1 mfd.) and resistance R (100 ohms) are joined together and connected across the relay contact points K and H. This spark suppressor, while not essential, definitely prevents dirty points, removing any possiblity of faulty contact.

Check all wiring and re-tighten nuts and bolts. The following method of connecting the four pin plug should definitely be carried out. This system, to be carried out on all later connections, is well worth while, giving trouble-free flying, reducing servicing and, above all, removing any fear of a broken lead while in the air. The model receives a terrific battering on each landing, therefore, joints should be relieved of strain or tension.

Returning to the plug, twist the four coloured leads together, again fitting a short piece of tubing over them Z (Photo 2). Cut the leads to a suitable length, allowing enough for forward and rearward movement of the receiver. Carefully remove about ½ in. of insulation from each lead and tin. It is immaterial to which pin any lead is connected but suggest as in Fig. 11A. A short length of 20G. tinned wire is placed in the appropriate pin. Now place the correct coloured lead in after slipping a piece of fuel tube on to it. Join up with solder. Push the fuel tube down over the 20G. wire and the flex, gripping the covering tightly to the stiff wire. Fig. 11B. Proceed with the other leads. By the way, don't forget to thread the aluminium plug cover on before starting! This completes the receiver. The complete theoretical diagram is shown in Fig. 15.

Hook up and Operation of Receiver

Before fitting the receiver in to the fuselage, a temporary hook-up should be made (Fig. 12). The pot/meter is essential in the hook-up, as relay adjustments can only be made with this. The positions of batteries, sockets and receiver should be approximately as shown, although the receiver is not at all "touchy" about this. The aerial position is important, running clear of all other components and wiring. Lay the receiver face up on an inverted box lid, clear of the bench. The switches S1 and S2 in Fig. 12 can be omitted on the test hook up, the L.T. being used to switch on and off. The H.T. battery should be only 45 volts for test purposes, as once the set has been adjusted correctly, it may be increased to suit the relay used. The L.T.battery consists of two 1½ volt pencells wired in parallel (Fig. 12). The filament current is only 50 m/a and these will last quite a long time. Note that the L.T. connections are reversed. The wiring is done exactly as shown. The H.T.−will be joined to L.T.−in the wiring but instead of connecting L.T.−to battery−it will go to the battery +. The actual L.T.+ lead will go to battery−. This simple alteration raises the standing current by

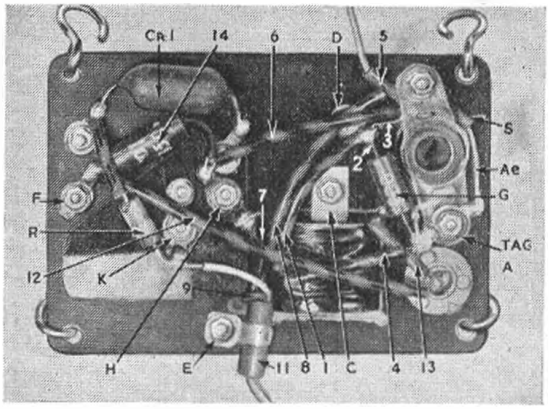
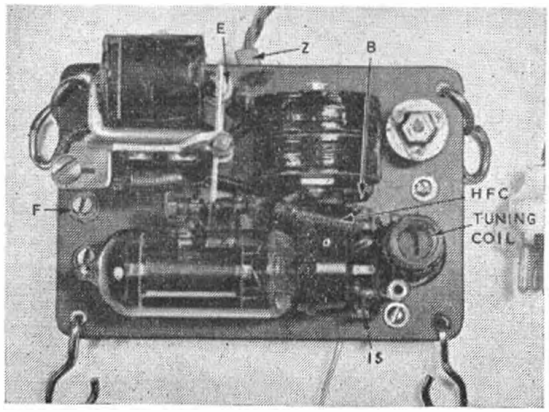


Photo 1, "Bottom" side of Receiver.

approximately ·2 m/a, the current on signal still dropping to its previous figure. A worthwhile alteration. Join about 18 in. of wire to the aerial lead (Photo. 1, 5) by means of a twist connection, after removing the covering, the aerial then being 24 in. long. Do not connect H.T.+ till last. The receiver plug and m/a meter should be in position and L.T. on. Only then attach H.T.+. If a mistake has been made in the wiring, the foregoing may prevent a "blown valve." The beehive condenser should be screwed up to max. capacity. Set the tuning coil dust core or slug about halfway in to the coil winding. As the slug will be a loose fit, a very thin length of rubber should be screwed in with it. All being well, the standing current will be about 2 m/a. It may vary slightly, depending on quench coils and valve but should be between 1·75 m/a and 2·25 m/a. If the current is on the low side, it may be raised by placing a non-metallic washer between the quench coils (Fig. 4A at X). The thickness depends on the amount of raise but should not need to exceed $\frac{1}{16}$ in.

Unscrew the beehive slowly, the meter should begin to flicker and then drop suddenly. When this occurs, screw up the beehive until the current just rises to maximum and holds steady. The idea is to adjust the condenser until the current is on the

Photo 2, Relay and valve side.



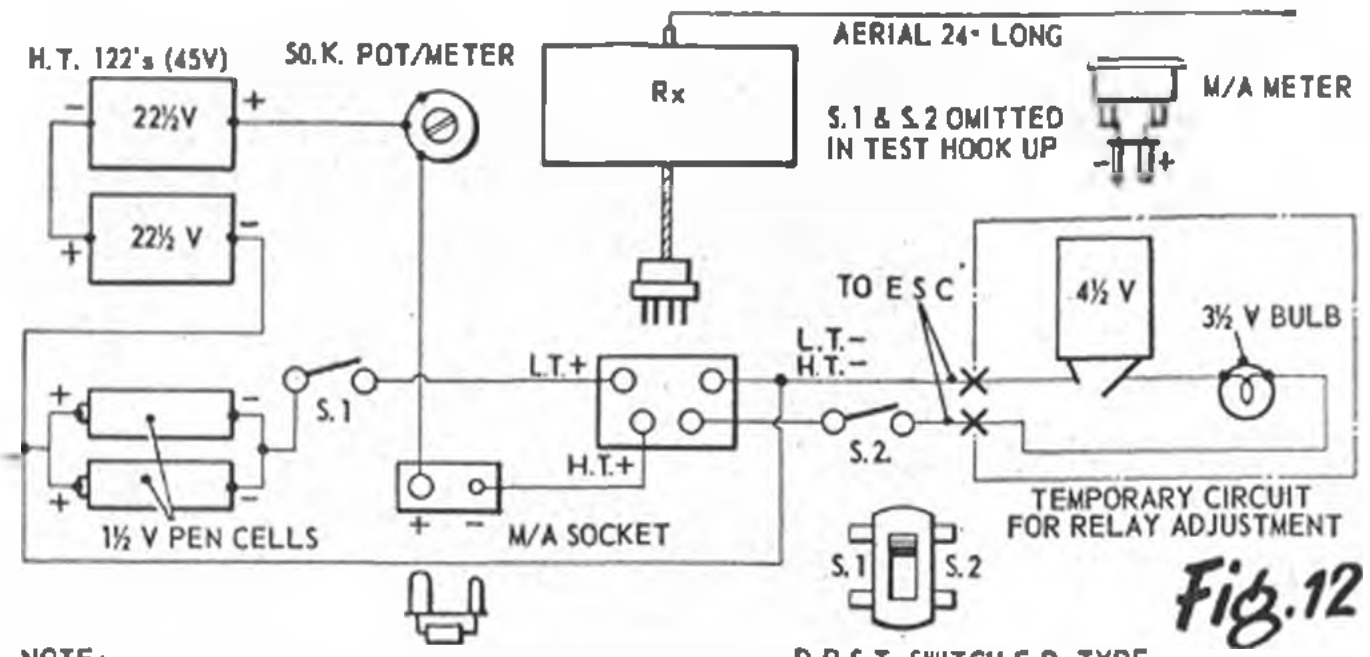


Fig. 12

verge of dropping when the receiver is in its most sensitive condition. Do not overdo it, otherwise when a signal is applied, the current will drop and refuse to rise again. If the standing current is much in excess of that stated and the foregoing results cannot be obtained, check receiver and layout. If correctly made, *it must work*! Assuming that the standing current is correct, but will not drop, shorten the aerial a few inches. If the current is down (about ·8 m/a) with the beehive fully screwed up, lengthen the aerial. The idea is to adjust the aerial length until the critical point occurs with the beehive screwed about halfway in. *All this without transmitter on.* When satisfactory operation has been achieved, key the transmitter and tune in the signal by means of the slug. A useful and easily made tool for this purpose is shown in Fig. 13. Use no metal for the tuning blade, ply or paxolin being best, preventing de-tuning upon removal. All being well, the current will slowly drop as the slug is turned. Continue until the current shows signs of rising. When this happens reverse turn until the lowest current reading is obtained. This is not at all difficult, as the tuning is quite broad. The idea is to find the centre of the tuning band giving the lowest reading. Key off transmitter and the current should rise. Re-adjust the beehive to its most sensitive setting. Key TX again and re-tune. The two adjustments interact slightly, but are tuned separately, as neither are critical. The foregoing may sound a lengthy job, but once the positions have been found, will only take a few seconds when re-checking. Incidentally, the TX should have low power and reduced aerial to give distant reception results. Get really familiar with the operation of the whole outfit before fitting into the model. With voltages as stated, the current drop should be at least 1 m/a and may be 1·2 m/a (our own RX gives this drop). very few readers will possess the SCR 522 relay, therefore, 67½ volts will be needed for other types. The standing current should then be 3 m/a, dropping to 1·15 m/a giving an operating drop of 1.85 m/a. The beehive will need screwing up a little more and possibly a slight re-tune.

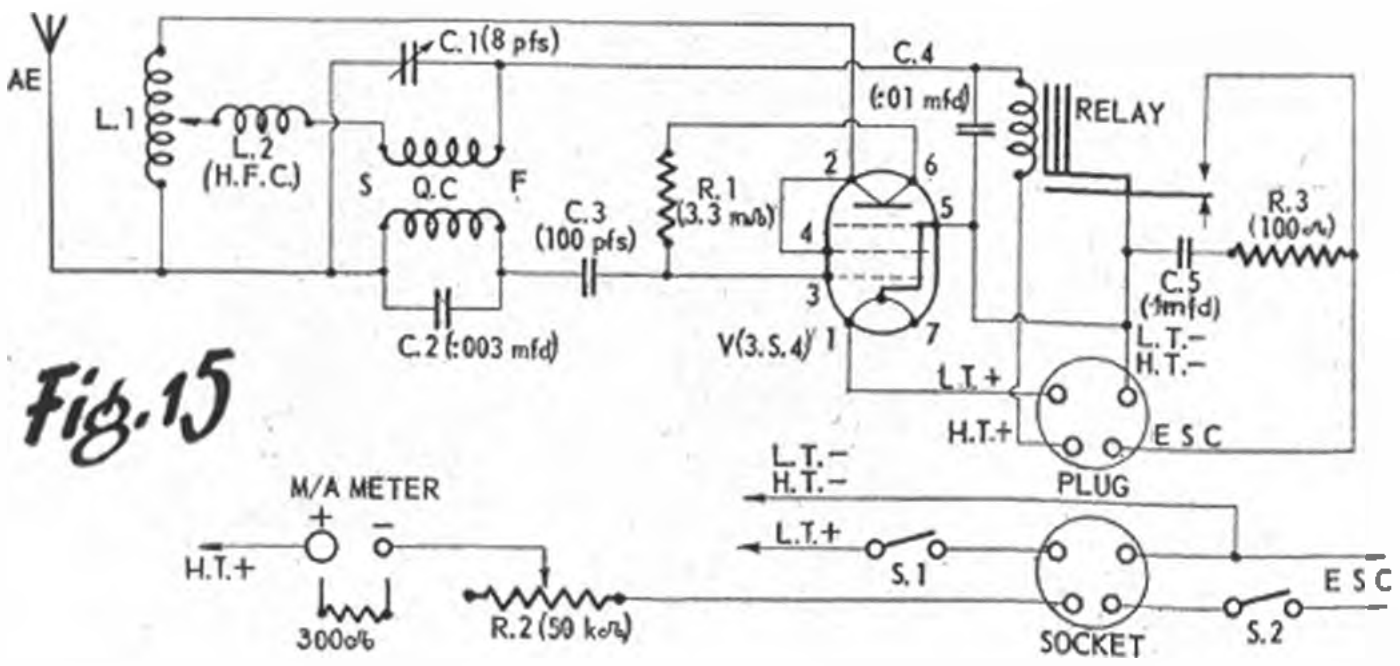


Fig. 15

Relay adjustment

The correct operation of the relay is the most important item in the whole radio network. Howard Boys, in his "Radio Notes" has dealt with this aspect frequently. With this receiver, the relay must be adjusted to operate about halfway between standing current and greatest current drop. A little higher will not be harmful. Remember, the drop remains the same regardless of range. As the operating point will be well below the standing current, a valuable safety factor is introduced, for when the H.T. batteries begin to age, ample warning is given by noting the reduced standing current. This reduction will not be enough to bring the relay into action. With a standing current of 2 m/a dropping to say ·8 m/a the operating point could be at 1·5 m/a to 1·6 m/a. With the high voltage the following figures will apply 3 m/a standing, down to 1·15 m/a; operating point being approximately 2·25 m/a.

Fuselage Layout

The receiver is not at all critical regarding its position in relation to other components, but the following may help in obtaining easy and consistent results. The "set up" used in "Rohma" proved satisfactory in every way. The receiver is suspended on rubber bands from the four corners of the receiver compartment. The wing retaining dowels are used for the top suspension, the undercart tube and compression strut for the forward lower suspension. The lower rear bands are held by two hooks, cemented each side in a suitable position. (Fit the

hooks in really well) The bands are fitted as in Fig. 14. This method prevents excessive side swing saving the fuselage sides from extra damage. The receiver must not hang sloppy, sufficient bands being used to hold it firmly. It should also be hung well to the rear of the radio compartment giving plenty of forward space.

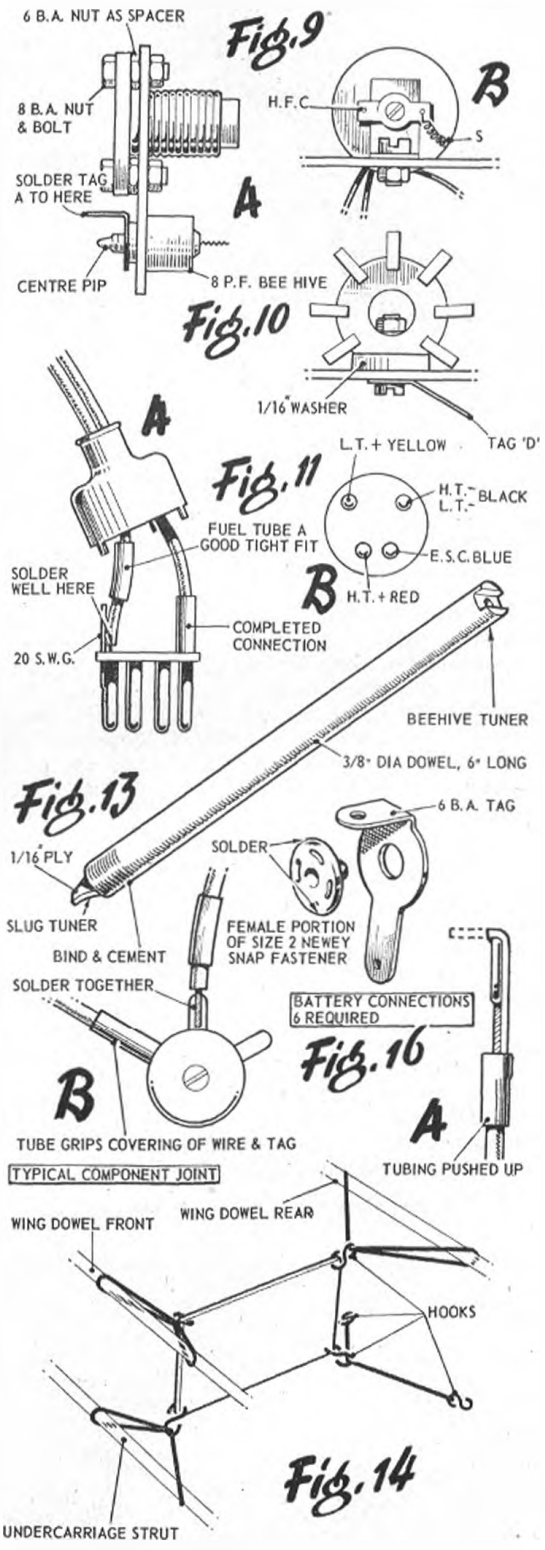
The aerial passes out through the fuselage top just behind the wing T.E. and is hooked to the fin with rubber bands. It must not be allowed to trail loosely or hang below the fuselage as was common practice some time ago. Variations in its position during flight will cause the standing current to fluctuate. The H.T. and L.T. batteries should be mounted on a shelf forward and above the receiver. The socket to take the receiver plug is glued to the fuselage floor just inside the side hatch opening. The escapement battery rests on the floor to the rear of the receiver. The m/a meter socket, on/off switch (D.P.S.T.) and pot/meter are fitted conveniently near the side hatch, again to the rear, all being on the port side. The escapement is mounted near the tail, the wiring passing along the floor of the fuselage. This places it well clear of the aerial. Wire up as in Fig. 12. Keep all wires neat and tidy, taking those from the H.T. and L.T. batteries along the top of the radio compartment, down to their appropriate points. Attach wiring to framework at intervals with sellotape. When field checking and holding the model by the undercart position, all wiring is clear of the hand. Fig. 16 shows two methods of connecting components, this arrangement being used on *all* fuselage connections. Newey Snaps Size 2, as shown in Fig. 16A are highly recommended being brass, ready tinned, and of a convenient size.

Field Check

Field check prior to a flying session is simple in the extreme. First switch on receiver which should, of course, show the normal standing current. Turn down pot/meter and note if relay is working at its correct position. If all correct turn pot to max. Adjust beehive until current is about to drop. Get assistant to key transmitter, the full aerial now being used. Standing several yards away, tune in signal fully. Re-set beehive again. A distant check should then be made about 200 to 300 yards being sufficient. The tuning here will be more critical but not to the point of difficulty. Tune again to centre of current drop, finally adjusting beehive for the last time. Signal assistant to give alternate rudder, remove meter and replace with shorting plug.

As removal of the m/a meter may upset the sensitivity setting (the Beehive Cond.) causing the Rx current to drop or get too critical, a 300 ohms resistance must be wired across the plug used for shorting purposes, instead of the normal direct wire. (Figs 12 & 15). If your m/a meter is of the low resistance type (appx 7-10 ohms) the resistor can be permanently fitted across the actual socket, in which case the shorting plug will not be needed upon removal of the meter. Its effect on meter readings is negligible except on high resistance meters when the shorting plug should be used with resistor fitted.

Use a *self neutralising* escapement.



Sycamore H.R.13 of Coastal Command employs its winch for rescue training whilst hovering stationary.

AIRCRAFT DESCRIBED No. 62 . . . . by G. A. CULL

Bristol 171 Sycamore

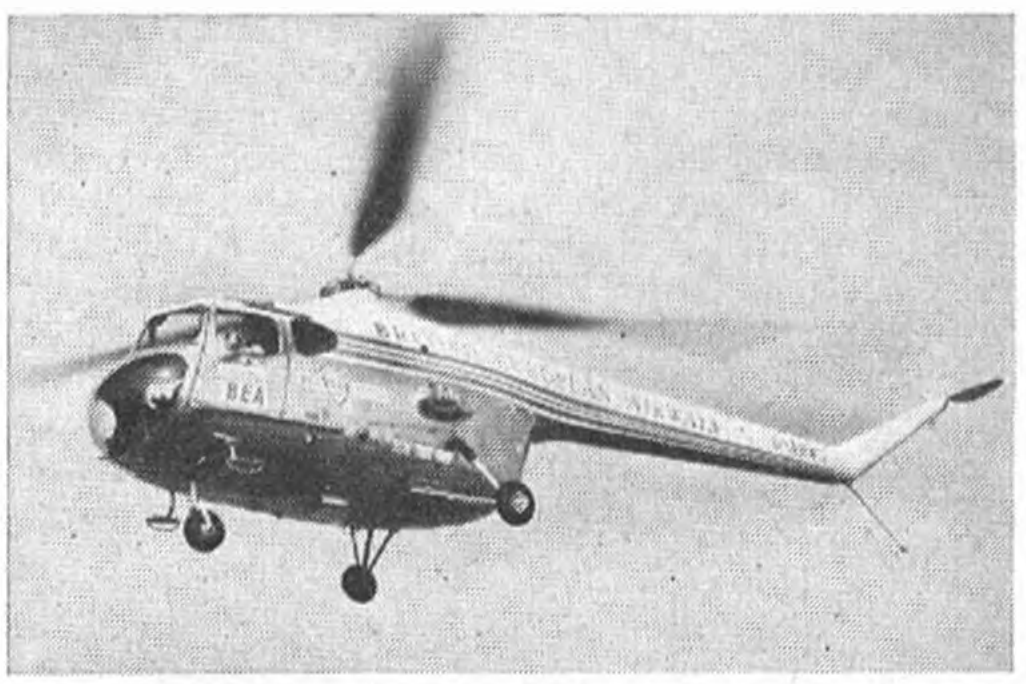
THE Bristol 171 now has seven years' flying experience and is still the only all-British helicopter in regular production, although the first two had American Pratt and Whitney engines. The Bristol Aeroplane Co. were new to rotating wing aircraft when work started after the war, but largely responsible for design was Raoul Hafner, an old hand at the game, who brought one of his early helicopters to this country in 1933. A general purpose machine with seating for up to five persons, the 171 is powered by the 465/485 h.p. Le. 23HMV Mk. 73 helicopter version of the Alvis Leonides 9-cylinder radial engine. Mounted with the crankshaft vertical, this engine drives the rotor through a centrifugal clutch, freewheel and gearbox from which the drive for the torque-compensating rotor is taken. The gearbox also drives all auxiliaries which so remain operative in event of engine failure. In the 171 the usual helicopter vibrations are lessened by employing a high rotor speed which endows the additional benefit of a safer, slower touch-down under autorotation.

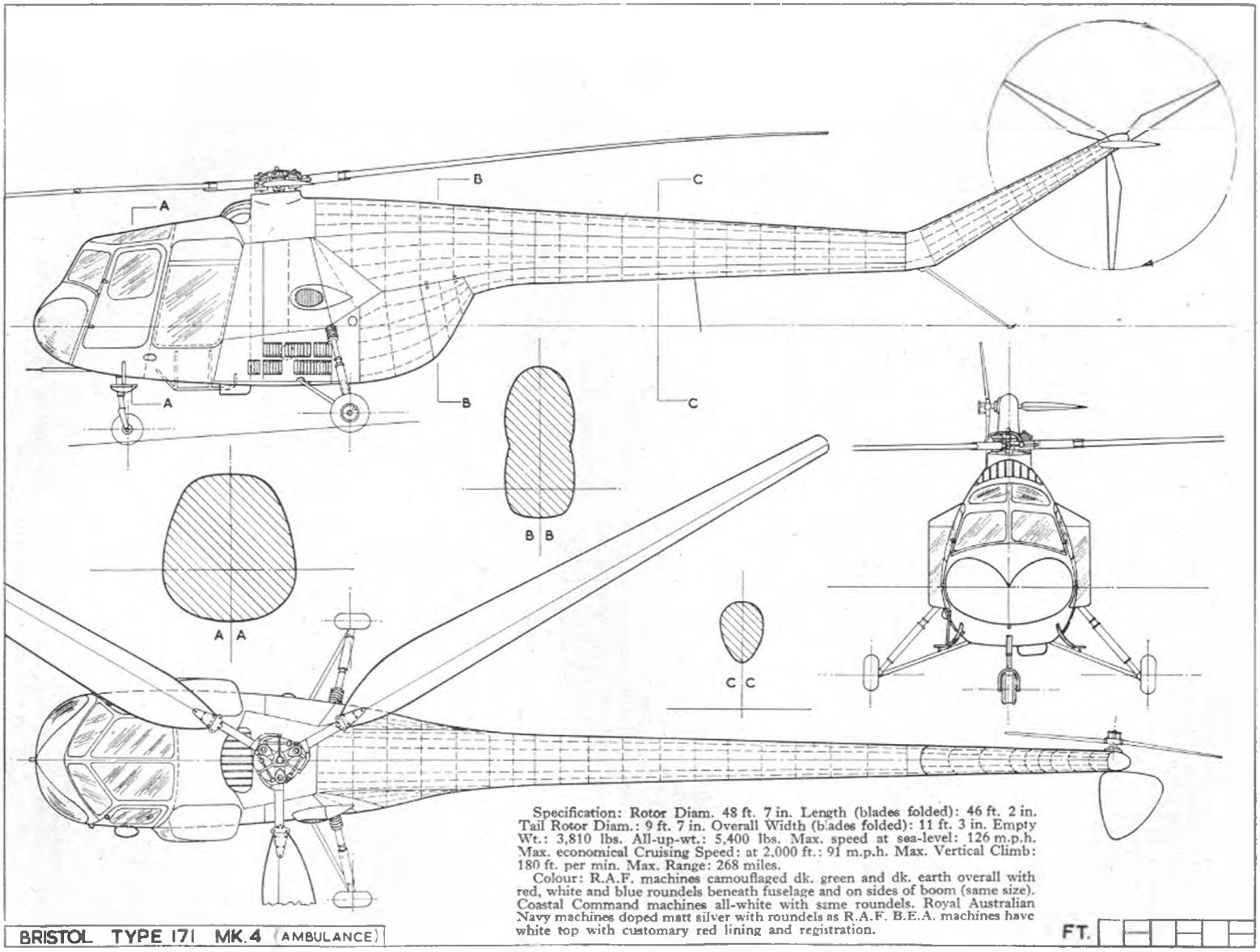
Lacking none of the usual helicopter virtues, the Sycamore, as the type is known in the services, is available for freight/passenger, crop spraying, photography and ambulance duties in civilian life, and in uniform can be an effective offensive weapon. On anti-submarine patrol, a depth charge can be delivered, and as an aerial crane the 171 can be equally useful on constructional work. For adaptation to specialised roles, various fittings are supplied and the best known of these is the hydraulic winch mounted on the st'bd. side. With this, loading or unloading while hovering is possible, or a survivor may be hoisted aboard from the sea and, if needed, a crewman can be lowered to help as the weight of two men is well within the winch's power. For rescue duties like this a special drip-tray is fitted in the cabin, and the 171 has performed these rescue duties in earnest during the Dutch floods in recent years. For crop-spraying, wire-braced spray-booms are fitted and are fed by two streamlined 50-gall. external tanks on either side of the fuselage. On ambulance duties, the three rear side-by-side seats are replaced by two stretchers and large Perspex blisters substituted for the normal panels so as to accommodate the patient's head and feet.

After the usual period of development flying, during which the tail damper vane was introduced, the standard passenger machine emerged as the Mk. 3 and, for B.E.A., the Mk. 3a was produced with enlarged luggage boot, Decca nav. aids and exhaust on the st'bd. side. Previously, two pipes discharged beneath the fuselage. The current production machine is the Mk. 4 which, in addition to the large boot and side exhaust, has hinged front doors which facilitate the use of alternative types of side panels by the rear seats, and a longer u/c. In service the Mk. 4 bears distinguishing designations; the ambulance is the H.C.10 and the Army's transport and observation machine is the H.C.11. H.R.12 and 13 are for search, rescue and communications with the R.A.F. and Coastal Command respectively. The H.R.50 is the same, but operates from the carriers of the Royal Australian Navy.

Construction: The cabin is a semi-monocoque with many Perspex panels, while centre fuselage is a tubular steel structure mounting undercarriage, engine and rotor-head, and is faired with alloy panels. Engine cooled by air sucked in by engine driven fan through grille forward of rotor-head and escapes through underside louvres and oil cooler grille on port side. Compartment behind rotor houses 65 gall. flexible fuel cell and is isolated from engine bay by fireproof bulkhead. Rear fuselage boom is conventional metal semi-monocoque. Ply-covered wooden main rotor blades now superseded by metal, tail rotor blades of compressed wood. Wheels have hydraulic brakes.

Left: Coastal Command H.R.13 which took part in first stage of rushing Coronation films to U.S.A., Right: Polished alloy Mk. 3a for B.E.A.





BRISTOL TYPE 171 MK.4 (AMBULANCE)

Specification: Rotor Diam. 48 ft. 7 in. Length (blades folded): 46 ft. 2 in. Tail Rotor Diam.: 9 ft. 7 in. Overall Width (blades folded): 11 ft. 3 in. Empty Wt.: 3,810 lbs. All-up-wt.: 5,400 lbs. Max. speed at sea-level: 126 m.p.h. Max. economical Cruising Speed: at 2,000 ft.: 91 m.p.h. Max. Vertical Climb: 180 ft. per min. Max. Range: 268 miles.

Colour: R.A.F. machines camouflaged dk. green and dk. earth overall with red, white and blue roundels beneath fuselage and on sides of boom (same size). Coastal Command machines all-white with same roundels. Royal Australian Navy machines doped matt silver with roundels as R.A.F. B.E.A. machines have white top with customary red lining and registration.

FT.

Postbag précis

A Synopsis of pertinent points from our daily correspondence

Half-A Team Racing

FOLLOWING W. Gottlieb's letter quoting an American set of rules for ½A **Team Racing** in March issue, innumerable correspondents have written to air their opinions on establishment of such a class in British contest. Our own view, following practical participation in one event, and witnessing the ½A race at Dartford in April, is that for club and inter-club activity here we have a novel diversion: but for the big rallies, or even National competitions, such a class does not as yet justify itself either in competitor support, or spectator appeal.

"Wing area at 75 sq. in. is too large for 1·5 c.c. In our district we use the 50 sq. in. rule"—states **Peter Brown** of Eltham—"Also, the 26 ft. 3 in. lines suggested would make racing impossible . . . . how about a ½B race class for 3·5 engines, same rules as for B, but giving the 3·5's a chance."

Study of Model News will show that 2·51 c.c. engines are quite capable of giving the 5 c.c. power units a run for their money as demonstrated by the High Wycombe latest experiment.

C. M. Milford, another ½A flier with experience states "Mr. Gottlieb quotes rules drawn up by the FAST Club for *indoor* racing in large drill halls. British races are invariably held in the open air, subject to our notorious weather, which accounts for the smaller areas favoured by us. The existing Cambridge rules, have stood the test of two year's practical use with few complaints. Almost the only criticism that can still be levelled at them is that the races are too short. Even on 7½ c.c. of fuel, the long range models at the '53 contest were covering 75 laps or more non-stop and the fastest models flew at 50 m.p.h. Such performances deserve longer distances over which to battle, say at least 2½ miles per heat and 5 miles for finalists. Problem of the 1·5's is another story: but please leave us our ½A!" Thanks Mr. Milford, and from Naval **Cadet R. H. Milverton** we have the plea "Juniors cannot always afford the expensive 2·5 c.c. racing engines. Smaller engines are less costly to run, models cost less and I am sure the ½A class would be a success among junior *and* senior modellers."

Just for the record, and at the risk of being accused of repetition, here are the two sets of rules in current use:

Cambridge M.A.C.:—

Max. Engine capacity	1 c.c.	Line length	30 ft.
Wing area	35 sq. in.	Fuselage depth	2½ in.
Tank capacity	7½ c.c. max.	Pilot's head	½ in. deep

High Wycombe M.A.C.:—

Max. Engine capacity	1.5 c.c.	Line Length	37 ft. 10 in.
Wing area	50 sq. in.	Fuselage depth	2½ in.
Tank capacity	12 c.c. max.	Pilot's head	½ in. deep

Still Air

Mr. Bowerman's explanation of **Still Air** also raised the dust and two correspondents write to correct a false impression. "Dense air is beneficial to a model's performance" writes **P. Neilson,** "but Mr. Bowerman makes a mistake in assuming that the density of air increases with humidity. This is obviously wrong as can be shown by the fact that a humid atmosphere causes the barometer to fall." A similar view is taken by Australian **David Harris** of South Perth who says "Contrary to what might be expected, damp air is *less* dense than dry air! The relative vapour density of dry air is approx.: 14·5 while that of water-vapour is 9. Thus, the addition of the less dense water vapour will *lower* the overall density of the air. This is discussed in the theory of sound when, as sound travels faster through a less dense medium, it travels faster through moist air than through dry air."

The next step?—replies

Fewer letters than expected came in on the subject of D. C. Smith's leading article **The Next Step? Pat Wheeler** of Cape Town was hot off the mark with an air letter on this subject of "miniature or model?" aircraft beginning—"Now, the only things we can reproduce are payload (weight), stage distance (duration) and fuel cost (consumption). Fix the payload and duration and it will then be up to the builder to use as little fuel as possible, ... with duration at 90 secs., then ½A power may consume less than 2·5 c.c. for only 30 secs. and besides the actual timing, the only processing is measurement of the fuel left in a standard size tank. This should give us a good basis for a "Transport Contest" for it will nearly duplicate full-size practice but leave ample scope for design thought, *i.e.* combine model and miniature aeromodelling. How about 5 ounces payload for a start?" . . . . Now there's some food for thought.

Colin Campbell has some strong Scots views on this Next Step business and opines "It is only a new twist to the dreary Bowden type of flying at the expense of P.A.A. enthusiasts who might well include the surviving semi-scalites in their ranks . . . . Were I to take on the very responsible task of reforming an aspect of the non-duration class of free-flight by attempting to divert thought into a new channel, I would suggest a spec. by which models of a given power/weight ratio maximum had to r.o.g. in the manner of the Prestwick Pioneer (or the Leonides Beaver to name a sassenach aircraft—Ed.) *and* clear an obstacle of given height at a distance in proportion to wind strength . . . . this is the field in which the aeromodeller has the most to offer the full-size aeronautical world." Hmmm!

Club News...

LOST any good comp. results lately? It is a little early for us to get much reaction for this issue, but we have an idea that many Comp. Secs.' ears are well and truly burning, and the next General Elections look like being a lively affair! Our sympathies are with the individual fliers whose efforts are negatived by the failure of certain officials—but after all, the election of the right man for the job lies with the fliers themselves, so perhaps in future we shall see a little more attention given to the election of officers, either at Club or Area level. Remember, it is no good electing the first bloke who weakens enough to be given the onerous job—certain qualifications are essential if the job is to be done properly on behalf of members, so give a little thought to these aspects at your next "political meeting."

Probably the largest set of red ears belong to the Area Comp. Sec. who balled up his Area results—and lost a National Trophy himself in the process!

Southern Area

GRANGE M.A.C. started the season well at Larkhill, where, despite poor weather and field, Tony Brooks, Roger Henson, and Dave Waters placed 1st, 2nd, and 3rd in the Area results for the A/2 Eliminators. Johnny Blackmore headed the Area results in the Farrow entries.

The usual well-produced **BOURNEMOUTH M.A.S.** club mag. indicates that the members are gradually getting over the annual dinner—quite a good way to celebrate the inter-club victory over neighbours West Hants. First round for rubber jobs proved an exciting match, with Bournemouth member A. Arnold just pipping Taylor of West Hants with a score of 5 : 34 against 5 : 12. With J. Manville of Bournemouth finishing 3rd, the points were 4 2 in favour of the older club. Best flight of the day was Arnold's 2 : 40 made in windy and cold weather.

For the first aerodrome tour of the season, members of the **READING SOLID M.S.** cycled to London Airport, where they enjoyed a conducted tour of the admin. and maintenence areas.

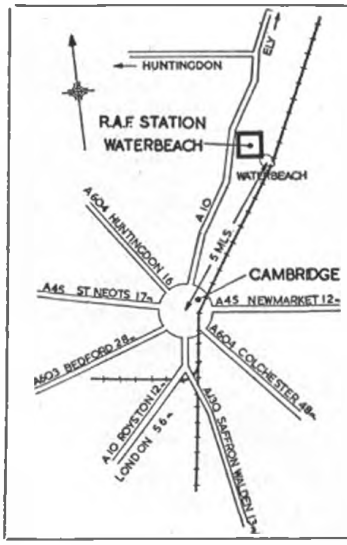
Youthful Belfairs club team racers are displacing High Wycombe supremacy in Class "A". These two teams placed 1st and 3rd at Dartford.

North East Scotland

Members disapproved of the abandonment of fuselage cross-section rules, and the old rules will operate in the Area for 1954. The Angus section will be in operation at H.M.S. "Condor" most of the time, where eight contests will be staged during the year.

CARNOUSTIE M.C. is all free-flight at last, after a long history of C/L activity—though they will find it a bit of a bind now that the League ground is at Condor, instead of on their doorstep! A number of scale jobs in the club make for interesting flying.

Tricky conditions were experienced by the **MONTROSE M.A.C.** lads for S.M.A.E. Cup day—one giving K. B. Whyte's "Seraph" a flight of over 5 minutes, whilst his two rivals pranged into house and tree respectively. Latest senior member started when building kits to amuse his two bairns—since been inoculated with the "aeromodus virus" and is deeply immersed in handbooks. With C. M. Christie flying at Bucksburn, and the only other entrant Wannop doing his stuff at Edinburgh, the Gamage Cup effort was a true decentralised event with the **BUCKSBURN A.T.** Christie made



BRITISH NATIONALS

R.A.F. WATERBEACH **JUNE 5/6/7**

ORGANISATION: Appeal is made for volunteers to assist with the conduct of contests—especially team-racing—as members of the Cambridge club will be busy in other directions. Remember, no helpers—no contests, so anyone wishing to help please contact the Nationals Comp. Sec. at 37 Earl Street, Cambridge.

PROGRAMMES: By the time this appears in print, admission programmes should be hot from the presses, so if you want to avoid waiting in the inevitable queue at the gates, please order your copy from M. B. Reynolds, 18 Milford Street, Cambridge, price 8d. post free.

TRAVEL: Cambridge is well served by rail, with frequent trains from all parts. Several trains from Liverpool Street run direct to Waterbeach Station, and the airfield is about 10 minutes walk from there. Check up locally for your particular train times.

There is a good bus service from the station to Cambridge city centre. No. 101 buses run at seven minute intervals on weekdays, and twenty minute intervals on Sundays. Ask to be set down at Downing Street. Cross the road to Drummer Street Bus Station, from where No. 109 buses run to the airfield at approx. half hourly intervals on Saturdays, and hourly on Sunday and Bank Holiday Monday. It is anticipated that these services will be augmented for modellers.

DON'T FORGET—Put down at the Denny End Road/Ely Road corner, otherwise you will have about a mile walk!!

all sorts of crazy trimmings on his "Sunday Girl," but managed flights of 3 : 00, 2 : 24 and 7 : 23, to give an official score of 9 : 24 for a 4th place in the results.

North Eastern Area

Events have been happening with startling rapidity in the **TYNEMOUTH M.A.C.** and a new club outlook is forecast. March 28th also saw some smart manouvring in flight affairs in the second A/2 elims, only 3 qualifying for Wittering.

South Eastern Area

Despite atrocious conditions, reps. of the usual six clubs turned up at Ashdown Forest to fly in the Area events on March 28th, but the wind, rain and poor visibility made it quite impossible to fly, and the field was abandoned at 3 p.m. (Needless to say, by about 5 p.m. conditions had become quite flyable!) As a result, the Area conducted its eliminator at a later date, though of course the results do not count in the individual contest. **SOUTHERN CROSS A.C.** are still battling with the local authorities for room to fly in one of the parks—though it does seem as though they are flogging a dead horse now that the Ministry have informed them that they have taken the Hove Council's side in the matter. As pointed out, the club cannot understand why, with a boasted 170 acres of open park space, a half acre cannot be found for their control-line activities—but then you know how hidebound non-modellers can be. Or don't you?

S.M.A.E. CUP
(28/3/54)

1.	King, M. A.	Belfairs	12 : 00 + 1 : 41
2.	Yeabsley, R.	Croydon	11 : 00
3.	Larcey, P.	Henley	10 : 47
4.	Cooke, A.	Henley	10 : 15
5.	Hutton, B.	Northwick Park	10 : 09
6.	Upson, G.	Northwick Park	10 : 00
7.	Firth, R.	York	9 : 41
8.	Illingworth, G.	West Yorks	9 : 37
9.	Marshall, J.	Hayes	9 : 22
10.	Wyatt, P.	Ipswich	9 : 11
11.	Marsh, C.	St. Albans	8 : 34
12.	Plant, C.	Stockton	8 : 30

(160 competitors; 117 disqualified)

WOMEN'S CHALLENGE CUP
(28/3/54)

1.	Healey, Miss P. R.	Belfairs	8 : 28
2.	Moulton, Mrs. B.	West Herts	6 : 29
3.	Parkinson, —.	Leeds	5 : 32
4.	Sayer, J.	Chelmsford	2 : 50

(4 competitors disqualified)

FARROW SHIELD
(28/3/54)

1.	Croydon D.M.A.C.	40 : 39
2.	Leeds M.F.C.	38 : 49
3.	West Middlesex M.A.C.	32 : 48
4.	Northern Heights M.F.C.	30 : 21
5.	Cowley M.A.C.	27 : 40
6.	Sheffield S.M.	24 : 10

(16 clubs competed: 14 clubs disqualified)

JETEX CHALLENGE CUP
(28/3/54)

1.	Dowsett, I.	West Middx.	25.43 ratio
2.	Snewin, J.	Blackheath	22.33 "
3.	Roberts, G. L. Z.	Lincoln	17 : 80
4.	Monument, R.	Lincoln	17 : 02
5.	Hancock, J.	Cowley	16 : 80
6.	Allaker, P.	Surbiton	16 : 45
7.	Wortley, P.	Lincoln	15 : 54
8.	Roberts, A.	Lincoln	15 : 15
9.	Elmer, M.	Lincoln	15 : 14
10.	Moore, G.	Lincoln	13 : 70
11.	Dilly, M.	Croydon	13 : 11
12.	Glynn, K.	Brixton	12 : 58

(18 competitors: 13 disqualified)

PILCHER CUP CONTEST
(Revised Result)

1.	Henderson, J. D.	Sunderland	9 : 19
2.	Laxton, D. A.	Oundle	9 : 04
3.	Wisher, A.	Brixton	8 : 51
4.	Waldron, J.	Henley	8 : 37
5.	Kay, J.	Loughborough	7 : 25
6.	Gooding, G.	Hull Pegasus	7 : 19
7.	Allsop, J.	St. Albans	7 : 19
8.	Yeabsley, D.	Croydon	7 : 14
9.	Larcey, P.	Henley	6 : 48
10.	Stoker, T. W.	Tynemouth	6 : 39
11.	Parrott, J.	Whitefield	6 : 35
12.	Mole, K.	Tynemouth	6 : 23

Midland Area

The March Area meeting at Long Marston was cussed with poor weather, which was all the more vexing as the previous day had been brilliant. (Certainly seems to save it up for modelling Sundays does'nt it) A slight clearance late in the day brought bright periods, with occasional strong thermal activity. On top of all that, finger trouble meant that the Area results were scrubbed, so John Rogers' (Birmingham) time of 9 : 56 in the A/2 class did not net him his rightful 7th place in the National results. Few new designs were seen, with the possible exception of Thompson's (Northampton) long-fuselage A/2 with highly finished surfaces, which clocked 7 : 40 to place third in the Area results. Contrary to expectations, few flew in the Farrow event, most awaiting the 2nd Wakefield elim. For the first occasion for some time, a large contingent of sports fliers took advantage of the facilities at Long Martson—surely an indication of the change of heart now that they as well as contest fliers are welcomed into the ranks. **LEICESTER M.A.C.** plods steadily on, though it has apparently been found necessary to appoint a Control Officer at Rearsby—curse these trespassers! F. Canham leads the "winter building competition" in co. with R. Shepherd.

Following a rather dormant winter, **WOLVES M.A.C.** snared a coachload for the Area meeting mentioned. Jetex r.t.p. has formed the major part of winter activities, speeds ranging round the 50 m.p.h. class. This club comments on the superiority of the 3 × 4 min. rules over the 5 × 3 min., and welcomes the new application of published rules—yes, excess towlines were cut and surplus removed at Long Marston! Many new members have infiltrated into the club recently, backed up by Forces members skiving off for all the comps. they can manage.

The **WALSALL M.A.C.** is again holding its Annual Control Line Rally on August Bank HolidayMonday; usual programme, with organisation on top lines.

Gales welcomed the **RUGBY M.E.S.** on Gamage Day, but times were not too bad under the conditions. A number of members are toying around with R/C, J. Andrews' old model giving excellent flights, so a large number of members heralded the first good weather conditions this year, at least thirty models taking the air, including seven R/C jobs.

In the calm air of the clubroom, **BIRMINGHAM M.A.C.** members have been slinging chuck gliders about, launching technique proving to be the most important asset. Despite the low ceiling and hanging lights, the three flight aggregate with 12-square-inch models has now reached 25 seconds. High winds have made outdoor trimming difficult, nevertheless club members did well at the first Area meeting, racking a useful score in the Farrow. A welcome influx of new members has been enjoyed, and newcomers are welcome at the International Centre, opposite the West End Cinema, 8 p.m. every Friday.

Northern Area

Seems the Area P.R.O. has the right slant on International Contest participation—and I would urge that those hot contest fliers, who strive so hard for a place on the team, but are stone deaf when it comes to noticing an appeal for the wherewithal to send 'em, bend an ear to the following. "If the money is not forthcoming by May 31st, nobody will be sent anywhere. You can't blame the S.M.A.E. Council for this attitude. Obviously they cannot send teams to some events and not to the rest without being accused of bias, so they have made their minds up early to send teams to all the World Championships or none at all. Neither can you blame them for the amount of money involved; facts are facts, particularly where ackers are concerned. But at the risk of being torn limb from limb by the aeromodelling upper classes, we might very cautiously ask 'Is it worth it?' We have heard that magical word 'prestige' mentioned in this connection. If British prestige is meant, then surely the prime custodian of British prestige —H.M. Government—should be only too glad to uphold it out of the taxpayer's money. No?"

Them's our sentiments, but with other sports much more in the public eye than aeromodelling unable to get top drawer support (remember how subscriptions had to be organised to allow Great Britain to be represented at the last Olympic Games), we are very pessimistic about the success of any approach on behalf of our particular hobby.

Membership in the **HEATH AEROMODELLERS** group nears the 50 mark, with seniors in the minority! Some clubs groan about the so-called junior problem; not so Heath—they know how to treat 'em. The secret—get a set of hard-working officials with plenty of patience, and don't talk down to the youngsters. Just set a good example—after all they are full members!

BRADFORD M.A.C. was another club to experience appalling conditions in the Gamage event, with the result that only two flew. Ron Calvert did very well to score 5 : 15, the low times being largely due to o.o.s. conditions. A club contest postponed to the following week went to Silvio, undisputed with a beautiful flight of 3 : 05 with his new Torpedo powered F.A.I. model, Pannett coming next with a mere 1 : 44. By contrast, the A/2 elim. at Rufforth was flown in almost ideal conditions, but Bradford's entry was not crowned with success. Stan Eckersley only aggregated 4 : 47, but prestige was regained in the power event by Silvio's first place with 9 : 19.

Western Area

The winter rally was held as usual in fine weather, if anything slightly warmer than the summer affairs! G. Woolls of Bristol and West scored 5 : 25 to win the rubber event, J. Down (Bristol Aces) clocking 5 : 03 in power, and M. Pocock (Trowbridge) 4 : 26 in glider.

The **WESTLAND APPRENTICE ASSOCIATION** model club was started about a year ago, and is very active, though not necessarily in the contest field. Main interest centres around Class A racing, though a number of interesting models of other types are on the stocks. A twin impeller "Canberra" sounds the goods to us, and we look forward to meeting the proud owner of an Atwood Super Champion, who is busy preparing a fleet of 6 ft. span stunt jobs!

South Midland Area

Weather at R.A.F. Henlow on March 28th was anything but ideal at first, but improved in the afternoon. Honours in the A/2 event went to P. Larcey for putting the seniors in their place by topping the Area score with 10 : 47, which also gave him 3rd place in the collated National figures. Cooke of the same club followed him in both Area and National scoresheets, Mrs. Betty Moulton placing 3rd in the Area, and 16th in the S.M.A.E. Cup. She was the only Area entrant in the Women's Cup event, placing second to Pat Healey of Belfairs in the trophy.

A thriving club of some 30 members now exists at Hatfield under the title of **BEAVERS M.A.C.**, and already plans are on the move for a big exhibition early next year. The nearest thing they have to a "tall story" is the brief history of a certain "model" which took shape one dinner hour. A certain member, wishing to concentrate on trimming a rather tricky A/2, gave a couple of keen types who were getting in his way a pair of power job wings to keep them quiet. Imagine his consternation on looking up a little while later to see the said wings strapped to some seven feet of roof lath with a small rubber-job wing acting as tailplane. The whole disappeared downwind gracefully, and ended up in a tree.

CONTEST CALENDAR

May 22/23rd	INTERNATIONAL TEAM TRIALS, R.A.F. Wittering.
June 5/6/7th	BRITISH NATIONALS, Waterbeach.
June 13th	Daily Dispatch Rally, Woodford.
June 20th	Northern Heights Gala, Langley.
July 4th	HAMLEY TROPHY, De-centralised.
July 11th	Clwyd Slope Soaring Meeting, Clwyd, N. Wales.
July 11th	Arbroath C/Line Rally, Low Common, Arbroath.
Aug. 1st/2nd	NORTHERN GALA, Darlington.
Aug. 2nd	Walsall Control Line Rally, Walsall.

North Western Area

The subject of non-forthcoming comp. results being a thorny subject, we will say no more than that Meinert of Wavertree topped the Area A/2 result with 7 : 27; Cheadle made the best showing (as a club and individual) in the Farrow; and R. K. Ridyard clocked a ratio of 27·9 in the Jetex.

CHEADLE & D.M.A.S. report that they scraped the bottom of the barrel for their Farrow team, all four models ending up u.s., Harrison ending up as usual by firing his model. This chap is a menace with a box of matches! Walt Neild did well in the A/2 elims., aggregating 7 : 27 with his high-tailed slabsider.

WALLASEY M.A.C. will be holding their usual Open Day on July 18th, with Power, Rubber, Glider, and class A and B team race events. Usual ground near Bidston Station; S.M.A.E. rules with the exception that the "max" will be fixed on the day.

Offer of freedom of their flying field(s) again comes from the **HYDE M.A.C.** Seems strange to us that they are not taken up on the offer, particularly in view of the general cry about lack of flying space.

S.M.A.E. INTERNATIONAL CONTEST FUND

	£	s.	d.
Headley & D.M.F.C.	5	0	0
M. D. Redler		7	0
N. C. Holding		10	0
D. J. Bacon		5	0
Novocastria M.A.S.	1	10	0
P. E. Marsh		5	0
W. Dean		10	0
Scunthorpe M.A.C.	1	0	0
Gosport M.F.C.	1	0	0
Kentish Nomads M.F.C.	1	0	0
Oldham & D.M.A.C.	3	0	0
Stourbridge & D.M.C.		5	0
Swansea M.A.C.	2	2	0
Model Aeronautical Press Ltd. ..	50	0	0

CLUB NEWS...

continued from page 327.

LEIGH M.A.C. have undertaken in full the new S.M.A.E. Associate scheme, and new members will be welcomed any Thursday evening from 7.30 onwards at Rowbottom's shop, next to the Hippodrome.

D. Cook of the **SHARSTON D.M.S.** put up a new club glider record when his "Goolite" clocked 12 : 05, and A. Sedgbeer claimed a niche for himself when his rubber job did 6 : 38. The club was recently visited by the Lord Mayor of Manchester, who showed great interest in their activities, and was very taken with a control-line stunt display put on at a moment's notice by G. Crichton.

WAVERTREE M.F.C. got away to a good start in 1954, with a junior placing 12th in the Gamage, and a senior top in the A/2 elims. With plenty of competition, Sunday, April 11th, was an ideal day for the inter-club contests held at the club field, R.N.A.S. Burscough. A good attendance of the Merseyside clubs, plus an abundance of thermals, ensured a most enjoyable and successful day.

The **BLACKPOOL & FYLDE M.A.S.** has returned once more to active modelling, as the result of having regained the use of Stanley Park Aerodrome, for so long out of bounds owing to Royal Show use, etc.

CHESTER M.F.C. have taken over the organisation of the Clwyd Slope Soaring meet, to be staged on July 11th, when open glider, nordic and radio events will be conducted. Prizes will be medals, cash vouchers, and the Gosling Trophy. Entries taken on the field, and all enquiries to K. Modern, 34 Well Lane, Chester.

London Area

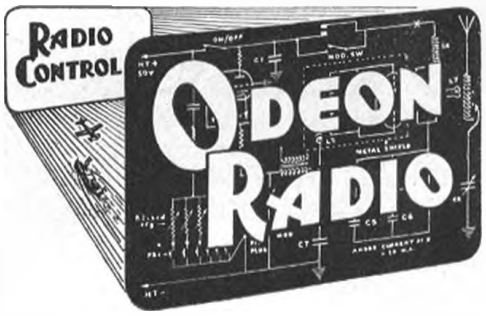
NORTHWICK PARK M.A.C. report plenty of winter flying, and a comp. is now being organised with the West Middlesex group at Hounslow Heath on the 9th May. Proceeds will be donated to the International Contest Fund, and we echo the N. Park sec.'s remarks that if all clubs do something on these lines, the fund will not be entirely broke.

MILL HILL & D.M.A.C. now numbers some 30 members, main interest being in Jetex, power, rubber and glider in that order.

Formed last year, the **WRAITHS M.F.C.** membership has now settled at around the 25 mark, main interest being team racing. Flying against Dartford, they gained 1st place in the Class A event, with an ED 2.46 powered "Starlight" flown by J. Templeman.

Fred Pudsey of the **CRYSTAL PALACE M.A.C.** set a new rubber powered canard record for the club with a flight of 1 : 31, also a new record for indoor r.t.p. speed (Jetex 50) of 75.6 m.p.h. LOST at Epsom; ED 1.46 powered model, blue and yellow, similar to "Madcap." Please advise G. Thurston, 54 Poplar Walk, Herne Hill.

John Blount of the **CROYDON & D.M.A.C.** produced 3 maximums and 5 : 09 with his lightweight rubber job to lead the club team to an aggregate of 40 : 39 in the Farrow—so poor old Croydon clean the "Thing" for yet another year! On the same day, Roy Yeabsley totalled 11 : 00 with his profile fuselage, new-ruler A/2 giving him 2nd place in the S.M.A.E. Cup. The "Sorcerer" team notched yet another victory at the Dartford Rally in the expert hands of Pete Cameron, Butch and Ron Martin, although outnumbered by High Wycombe in the final. "Daffy" Dilly flew his new model in the Jetex for a 13 : 1 ratio, and his rubber job "Hot Mop" (the answer to the "Duster") proved only a little less aerobatic in the high wind prevailing at Chobham.



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1 .003 mfd. Fixed Condenser. (Hunts Miniature)	1s. 3d.
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1 2-pin Polarised Socket	6d.
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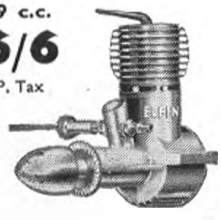

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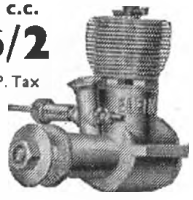

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CLUB NEWS (Cont) ....

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The Clubman

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P. Ainsworth, 26 Avondale Avenue, Maghull, Lancs.
STANLEY & D.M.C.
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WHITEHILLS M.A.C.
J. Wilson, 18 West End, Whitehills, Banffshire.
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E. Farnley, 37 Wintringham Road, Grimsby, Lincs.
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M. A. Wesley, 28 Ember Gardens, Thames Ditton, Surrey.

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CORK M.A.C.
M. Gerard Sheehy, 115 Oliver Plunkett Street, Cork.
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G. Rowbotham, 10 Lodge Street, Newton, Hide, Cheshire.
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T. Whitehouse, 45 Dunbar Crescent, Birkdale, Southport, Lancs.
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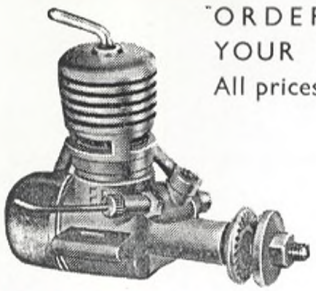

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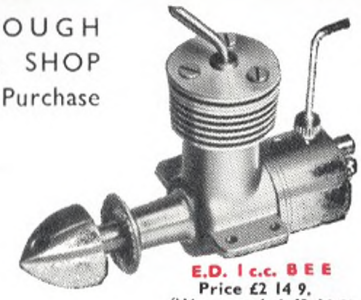

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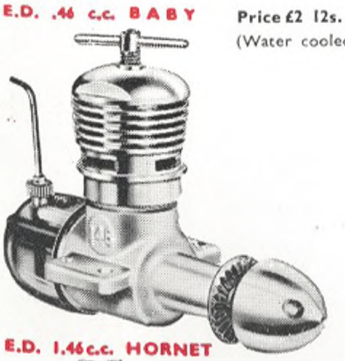

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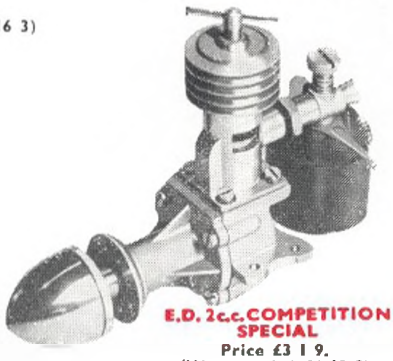

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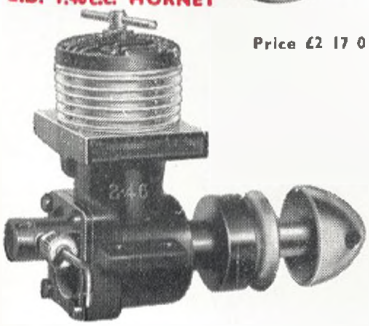

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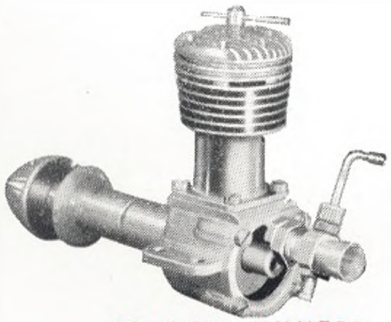

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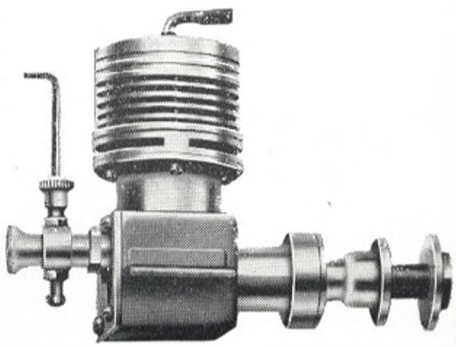

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