FEBRUARY 1967

Aero Modeller

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INCORPORATING
MODEL AIRCRAFT

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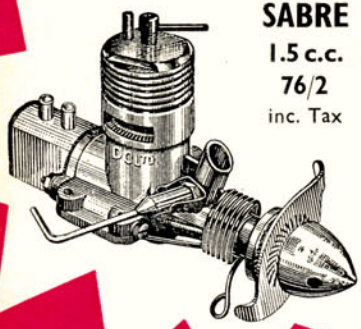

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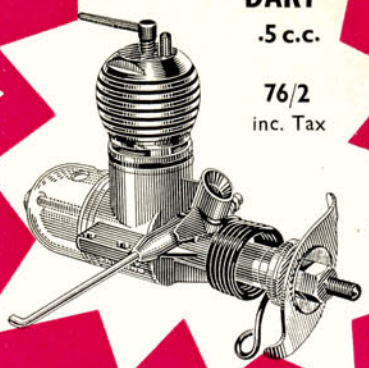

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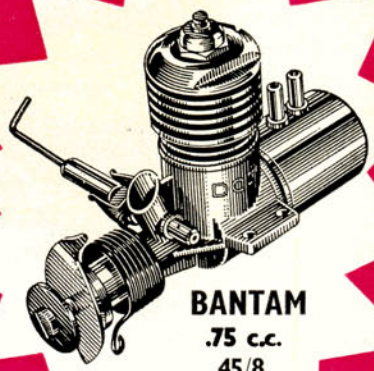

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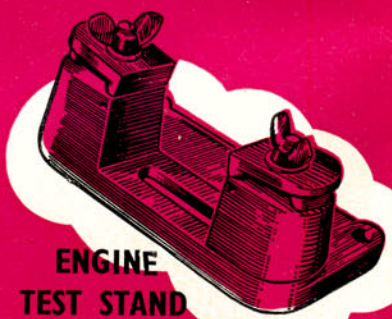
Free with every Quickstart diesel this invaluable handbook covers the handling, care and maintenance of model diesels. Prepared by experts, it is well illustrated and an invaluable aid to trouble free operation.
Send 1/3d. (P.O. or stamps) for your copy — today!



ENGINE TEST STAND
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in case of difficulty write direct to:

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QUICKSTART ACCESSORIES

- ★ CONTROL LINE HANDLE
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DART, MERLIN, SPITFIRE, SABRE, ALSO AVAILABLE AS A MARINE ENGINE COMPLETE WITH FLY-WHEEL AND WATER COOLED HEAD

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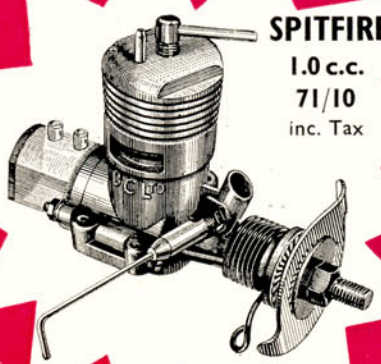

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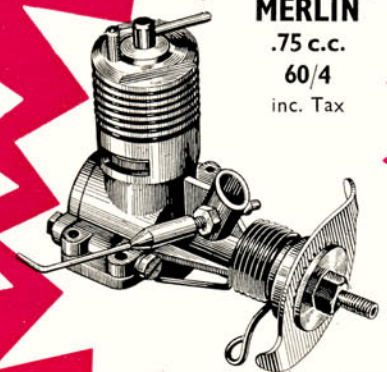

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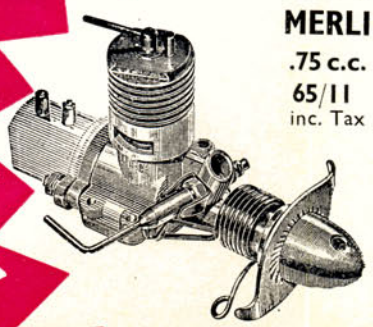

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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

February 1967 VOLUME XXXII No 373

CONTENTS

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Editorial Director **D. J. LAIDLAW-DICKSON**
EDITOR **R. G. MOULTON**
Assistant Editor **J. FRANKLIN**

COMMENT

"I would cheerfully give £5 for a can of fuel" may seem an outrageous statement. It *might* have been made by a competitor, envious of another's advantage through special fuel research—but it wasn't. It came to us in a letter from a modeller in the Falkland Isles.

Imagine the situation.

Unable to obtain fuel or dope by normal mail service which in any case involves a four month delivery from the British Mail Order house he praises, our fellow modeller has flapping tissue and empty tanks in a 27,000 acre tree-less flying field! Shows that we cannot have our fortunes in all directions!

The model-maker is inherently ingenious and we are sure our correspondent is no exception. Celluloid cuttings dissolved in acetone (If he can get it) or a lick of marine varnish will provide his surface finish. Tractor Vapourising Oil, any lubricating oil and Ether (again,—if he can get it) will solve the fuel problem for a diesel.

We are sure that many other "lone hand" readers will sympathise with the Falkland Islander. Perhaps some of them may care to offer practical advice in which case we'd be very pleased to forward correspondence.

Makes one realise how lucky we are to have a model shop within easy reach of most town centres and how dependant on the postal services are the enthusiasts in remote parts of the World. Spare a thought for them when you next have to nip out for a few minutes to buy another tube of cement!

cover

Flight Sub Lieutenant R. A. J. Warneford pierced the thin covering of German Zeppelin LZ 37 with his small bombs over the Belgian City of Ghent on June 7th 1915. In the violent explosion which followed, the French Morane-Saulnier tumbled violently. For his valour, Warneford received the first ever Victoria Cross of the Air. Vividly portrayed by artist Laurie Bagley, Morane Parasol 3253 is the subject of our full size free plan this month.

next month

Special **survey of all known aeromodelling clubs** in Great Britain, with addresses, data on membership & meetings, geographical location plus tips on how to form a club with basic specification for all types of models. **Fieseler Storch** is the major scale subject with **1/72nd plan** plus **1/12th radio or free flight** flying scale design, plus **colour views** of no less than 6 versions, plus cover photo! A superscale issue on the Storch in fact! Also a **wind speed meter,** an **anti-crash device** and all regular features. On sale Feb.17th.

308 FOR THE BEST IN- RADIO CONTROL

EQUIPMENT · ENGINES · ACCESSORIES

The past year has seen the greatest advance in Radio Control since it started way back in 1947, and remember we were selling R/C then and have been selling it ever since, which adds up to twenty years experience in R/C. Four of the proportional equipments we now recommend and sell are as near to 100% perfect as anything as sophisticated as this can be expected to be. Certainly they are as reliable now as the best reed equipments. Top of the league are Kraft, Logictrol and Microavionics. Our many friends in the States with whom we keep in constant touch for the latest R/C news have been telling us for the past year that these sets have earned themselves a reputation head and shoulders above the rest, and American contests results bear this out. The important thing is that they have proved reliable in the hands of average modellers. One customer claims 2,000 trouble free flights from a Kraft, another more than 600 from his Micro Avionics. So we recommend them with every confidence. Amongst British equipments Flight Link, the analogue proportional system that offers outfits from 2+1 with super-regen receiver, to 3+1 with superhet, is ideal for the sport and scale flier. Apart from these proportional equipments we still sell a lot of single channel sets and will be pleased to advise you on your choice of a first outfit in this field.

FOR YOUR R/C REQUIREMENTS YOU CANNOT DO BETTER THAN SHOP AT "308".

KRAFT KP4 & KP6

The Kraft Proportionals have earned themselves an unbeaten reputation for reliability. Range is adequate under all conditions. Highly temperature stable 0-140°F. Servos weigh only 2½ ozs with 3lb. thrust. Total airborne wt.: KP-4 18 ozs., KP-6 19 ozs. Comes already wired to power packs and harness ready for installation.
KP-4 **£245.** KP-6 **£275.**

LOGICTROL 5

Although a recent addition to the range of American Proportional equipments Logictrol is already acknowledged one of the leaders in this field. Beautifully made to advanced digital design concept by Bob Elliott (designer of the original Bonner Transmite amplifier) component count is down to a minimum with resultant high reliability. Flying weight with 4 Orbit servos 23 ozs. Thrust 4.5 lbs. Outfit ready wired with power packs and chargers.
Complete with 4 servos **£270.**

MICROAVIONICS MA

Another fine reliable digital proportional from the States. Outstanding stick assemblies on TX. Has proven extremely reliable in the hands of our customers (one reports over 600 flights—no trouble). Designed and produced by Don Mathes and Doug Spreng. Airborne weight approx. 20 ozs. Uses Orbit servos. Thoroughly recommended.
MA5 with 4 servos power packs and chargers **£265.**

FLIGHT LINK

Still the most popular set for sport fliers wanting analogue system with up to four servos working on the 3+1 system. Also available with superregen receiver. Outfits are completely wired with RX power pack ready to install.

2+1 superregan	**£90.9.8.**	2+1 superhet	**£110.16.4**
3+1 superregan	**£108.15.8.**	3+1 superhet	**£129.2.4**

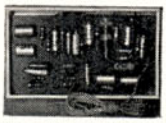
D E[R E K T O L'L[E Y

Here is a thoroughly practical production on the well-known galloping ghost principle that works well and affords the sport flier the cheapest and simplest approach to proportional flying. When wired to a Rand LR3 actuator it is the last word in GG technique and gives amazing results for so simple a set-up, with proportional rudder elevator and engine controls.

Olley "Fleet" TX and RX **£29**
Olley ready wired to LR3 **£39**

SINGLE CHANNEL

Despite the advent of proportional equipment and cheaper multi channel reed sets, single-channel still has its adherents and in our opinion it is still the best way to get started in R/C. Besides it's easily the cheapest as well as being the easiest way to get initiated. We strongly recommend the following.



The "308" RECEIVER

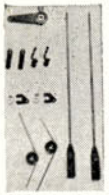
Made for us by a well-known manufacturer this is a fine reliable receiver with terrific range and stability. Will respond to any tone from 400 to 1,000 cycles. Compatible with almost every commercial transmitter. 2⅛" x 1¼" x⅞, wt 1¼ozs. Price **£6.10.0.**

FUTABA miniature TRANSMITTER

This miniature hand held transmitter is a revelation in power and range for so small a unit. A thoroughly practical transmitter in an extremely compact form. Runs on eight pen cells for weeks of flying. Price **£8.5.0.**

NEW MACGREGOR All-Transistor TRANSMITTER

Smaller than the original MacGregor TX this is a compact unit that will appeal because of its rugged construction and simplicity. Power is from two 9V batteries Complete with telescopic aerial. **£9.19.6**



NEW ROCKET CITY ACCESSORIES

Simple mechanical wheel brakes. Have to be seen to be appreciated. Light, effective, economical and simply fitted. per pr. **19/6.**

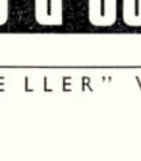
Nylon ends for ¼" sq push rods per pr. **5/9**
Nylon push rod retainers for 16swg. Set of 4, **5/9**

Bushed nylon ext'n arm nosegear bellcranks, ea. **5/9**

Strip aileron swivelling links with screwed collar. per pr. **7/9**

MONOKOTE

We carry adequate stocks of all colours of Monokote for immediate delivery. We will send two or more sheets post free in our specially made non-crease postal tube which ensures delivery in perfect condition. Single sheets 4/6 p. & p. White, Silver, Yellow, Orange, Red & Black. **25/-** a sheet.



The "308" UNIVERSAL CHARGERS

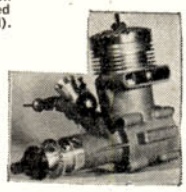
We have now introduced an improved version of our universal mains charger which charges Deacs up to 18V and 2V accumulators simultaneously, with terminals instead of leads. "Works" remain exactly the same. Also available for immediate delivery our "Field Charger" which will charge Deacs and a 2V accumulator from a 12V car battery. Universal mains charger **£5.19.6.** Field charger **£4.10.0.**

ENGINES AND ACCESSORIES

If you want more details of the stocks of engines and accessories that we carry than are contained in this advertisement please send S.A.E. for reprints of our previous ads.

RAND ACTUATOR

The Motor driven actuator that gives really practical proportional control of rudder elevator and engine from pulsed single channel Tx and Rx. **£10.5.0.** From the makers of the LR3 the remarkable AILERAND. The perfect linkage to fit your aileron servo and give smooth balanced aileron control. (Not illustrated). **£2.2.6.**



NEW from K & B the 40R

Here is a powerful new R/C engine specially developed by Bill Wisniewski for Pylon racers and models needing a light unit with lots of urge. New single piston ring and ball races. **£11.19.6.**

The UEDA range from Japan

This range of glowmotors at very economical prices is proving very popular. At these prices you can't go wrong. All units are well made from high grade materials and castings. Please note all are supplied without glow plugs.

Ueda 09 standard	**£2.1.6.**
Ueda 09 R/C	**£3.5.0.**
Ueda 15 standard	**£3.13.6.**
Ueda 15 R/C	**£4.3.6.**

ACCESSORIES

DUBRO: Kwiklinks **4/9;** Kwiklinks 12" **4/9;** Wheels normal round, round non-bounce and slicks 1½" **21/9** pr; 2" **23/9** pr; 2½" **25/9** pr; 2¾" **27/9** pr; 2½" **29/9** pr; 3" **31/9** pr; 3½" **33/9** pr; 3½" **35/9** pr. **WILLIAMS** Pilots, civil and military; 1" **5/9;** 1⅛" **7/9;** 2" **8/9;** pylon racer 2½" **11/-.** Moulded canopy 10" **9/6;** headrest canopy 5" **7/6;** racer wheel pants pr. **29/6;** racer engine cheek cowls pr. **18/6.** Smooth contour semi-preu. wheels 2½" **14/6** pr; 2¾" **22/6;** 3¼" **29/6.** W.W.1. scale wheels 1½" **12/6;** 2½" **19/6;** 3½" **39/6;** 4½" **49/6** pr. **TORNADO:** nylon props at new low prices; 6x3 **2/3;** 7x6, 7x8, **3/3;** 8x6 **5/-;** 9x4, 9x6, 10x4, 10x6, **7/-;** 11x6 **8/3;** 12x5, 12x6 **12/3;** pusher 8x6 **7/-;** 9x6 **8/3;** three-bladed 8x6 **10/3;** 9x6, 19x6 **12/3. VECO** spinners aluminium 1½" **7/9;** 1¾" **9/6;** 1⅞ **10/6;** 2" **11/-;** 2¼" **14/-;** 2½" **15/-;** 2¾" **16/6. MERCURY** aileron horns pr **5/9;** steerable nose wheels set **6/5;** horn set (4) **4/3;** nylon clevises 12" pr **4/9. MODEL COVERING CO** super quality Jap silk and American nylon **9/11** yd.

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Just arrived as we go to press. The fabulous AEROMASTER BIPE kit. As advertised in December. Price now **£18.13.0.**

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There are over 250 Airfix kits covering 19 different series. And at 2/3d. to 19/6d. you can well afford to make all your models *just like the real thing!*

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CONSTRUCTION KITS

Just like the real thing!

From model and hobby shops, toy shops and F. W. Woolworth

STOP PRESS

Mosquito and M.E. 262A

The third in the series of World War II Dogfight Doubles. Here are two of the most successful aircraft ever produced by Britain and Germany, complete with transfer markings and double display unit. Add these to your collection for only 5/-

All that's new in modelling!
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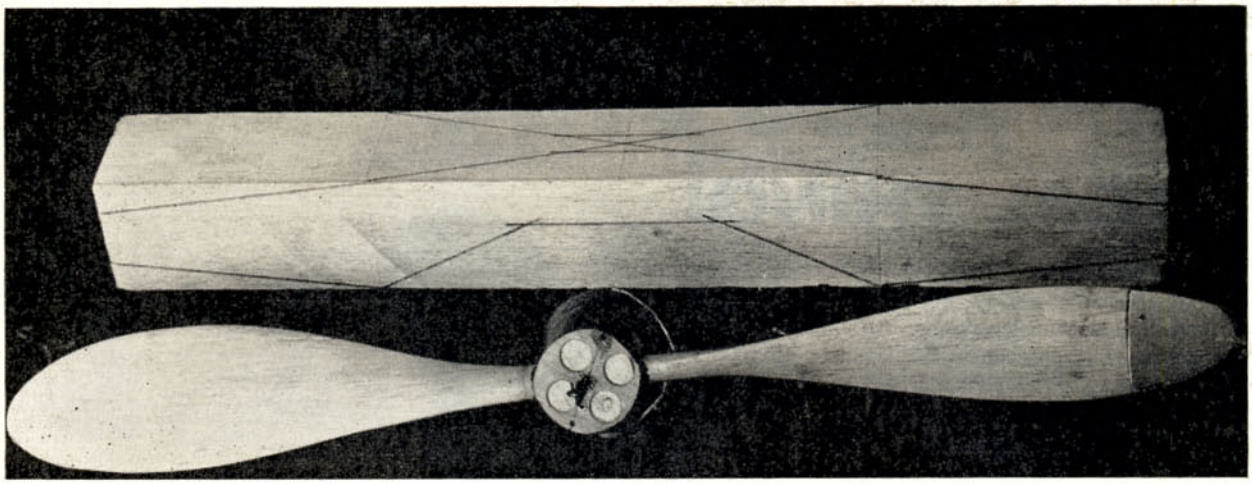
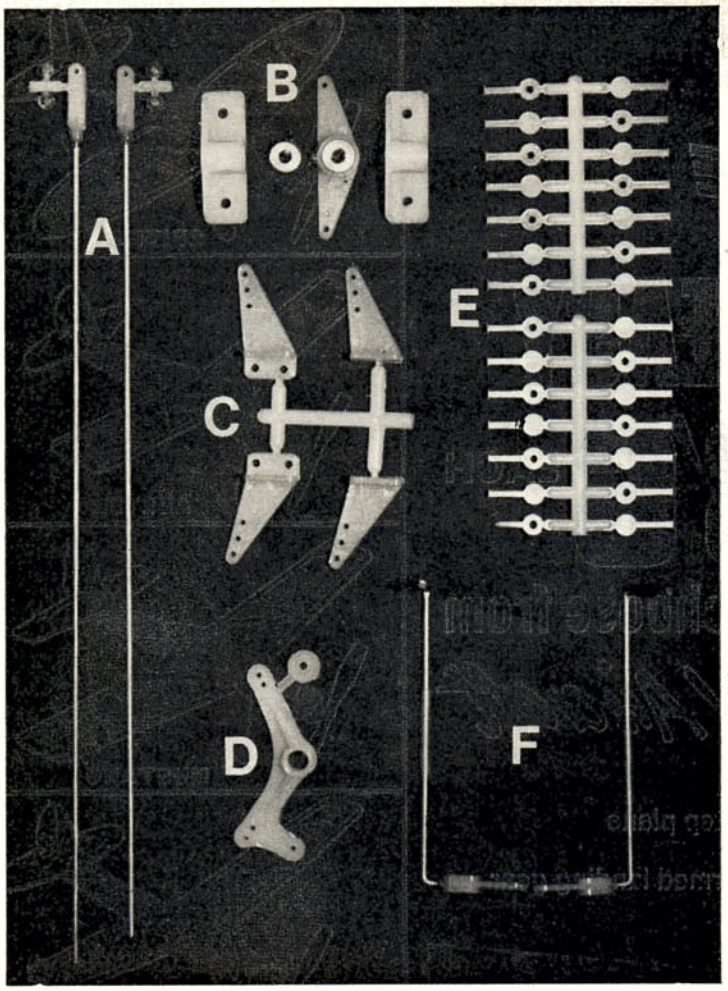


PROP CARVING...A DYING ART?

When today's 'old stagers' were young aeromodellers the rubber model was the leading contest type and performance was very much dependent on how good a propeller you could carve. The rules were insistent that you did carve your own props and results ranged from the rather rough to wonderful examples of modelling craftsmanship—all in Balsa, of course. No other material offered the strength and rigidity necessary, combined with light weight.

Props carved from the solid are in the minority these days. The contest rubber jobs all have folding props., and here you can simplify the job by carving the individual blades from $\frac{1}{2}$ in. sheet or wedge-shaped block. Smaller rubber models have plastic props—but once you get above about 8 in. diameter a carved balsa prop would still beat plastics hands down on weight and efficiency. In fact, a balsa prop is 'right' for any lightweight rubber-powered model, just as balsa is by far and away the best airframe material. And if you are skilled at carving, a first class Balsa prop., polished to a high finish, can be almost an exhibition piece on its own. Certainly it can be a wonderful example of the suitability of Balsa as a material for craftsmen to use.

We are not promoting the use of more carved props to boost Balsa sales—the demand for block Balsa goes up and up because it is so useful for other shaped parts on modern aeromodelling construction. We are only underlining a point that working in first class Balsa can be a pleasure . . . satisfying . . . and real modelling craftsmanship. Especially, of course, when you are working with Solarbo Balsa—the best you can buy, anywhere.



ASK IN YOUR LOCAL MODEL SHOP FOR THESE NEW R/C ACCESSORIES FROM MERCURY

A Nylon clevises complete with spare pivot, threaded on to 12″ wire rods. Adjustable, no-noise, strong and reliable linkages at the economic price of 4/9 per pair.

B Steerable nose wheel bearing and bellcrank set with collar. These no-noise nylon bearings are a must for all proportional installations. Set complete 6/5.

C Horn set comprising one pair of elevator/rudder horns plus one pair of horns suitable for all controls including built in ailerons, price 4/3.

D 120° nylon bellcrank for aileron linkage to strip ailerons for wing mounted servo. 3/6.

E Nylon surface hinges. Set of 14 proper pin and socket type hinges suitable for all control surfaces in tough grade nylon for free surface working combined with strength and reliability. One set is enough for one complete model installation. Price 6/3

F Aileron cranks for strip ailerons. With adjustable nylon horns, 4″ arms and no-noise nylon hinge tube already fitted. Per pair 5/9.

MERCURY ACCESSORIES ARE THE BEST FOR CONTROL LINE OR RADIO CONTROL. ASK FOR THEM AT YOUR LOCAL MODEL SHOP

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

RipMax bring you the BEST from AMERICA

CARL GOLDBERG MODELS

JNR FALCON 54/6
37" span for single-channel and 049 engines.

FALCON 56 . . . 131/6
56" span for single to 6 channel 09's to .19.

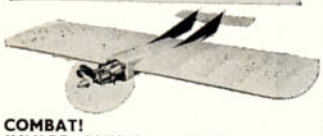
SNR FALCON 252/-
69" span for 10 channel multi engines .35-.45.

A SUPERB KIT 197/6
Here's the most beautiful R/C model ever kitted—a Goodyear Racer with enough stability for ANYONE to handle. For 6, 8, 10 channel or proportional. You can use 'Shoestring' for Sport or Contest flying and pylon racing.

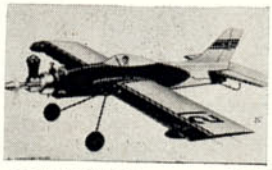
SINGLE OR TWIN

JUNIOR SKYLARK . . . 65/0
39" span .049 or twin 2's

SKYLARK 56 . . . . 153/6
56" span .19 or twin 09's



COMBAT!
JUNIOR SATAN . . 27/6
29" span for 09's up.
L'IL SATAN . . . 16/6
19" span for 049 Combat.



L'IL WIZARD 27/6
21" span stunt-trainer

42" span

SHOESTRING 54/6
Profile stunt for 19's-35's

SWORDSMAN 18 . . . . 21/6
18" span for 02's-049's

Sterling models have achieved International recognition as the pacemakers in setting consistently higher standards of authenticity, beauty, performance and quality.

TOP FLITE

TAURUS £17.19.6
The 'world champ' R/C multi model—70" sp. 45's up.

FOR THOSE WHO WANT THE BEST!

ROARIN' 20
(01-02) . . . **32/6**

SCHOOL-MASTER
39" span .049 **71/6**
also 29" sp. **SCHOOLBOY 38/6**

RASCAL
27" span
Single-channel 'Compact' . . . **32/6**

TAURI 57" span £14.19.6
Now with strip ailerons

CESSNA 43/6
30" scale for single channel.

SCHOOL-GIRL
32" span
£3.5.0

CONTROL LINE • STUNT

Contest-winning designs by top American flyers in de luxe fully prefabricated kit form! Unrivalled for performance!

COMBAT!

FLITE STREAK . 55/0
FLITE STREAK JNR . 38/6

NOBLER
50" span for .19's—35's **137/6**
NOBLER JUNIOR
Also 40" span **77/6**
PEACEMAKER 46" span . . **87/6**
Superform kit for fast assembly

WIZARD 54" span . . . **£7.2.6.**
Semi-scale biplanes for single or multi radio and engines .09 up to .45. A superb kit.

MAMBO SPECIAL £7.2.6
The fabulous 'Mambo' sport or trainer design in 52" span size for .09 to .19 engines. 1 to 6 channels.

L'IL ROUGHNECK £2.3.6
A specially designed kit to bring out the best in single-channel performance and .10 or .20 engines. 22½" span.

KING COBRA 70" span . **£16.9.6**
Superb fully aerobatic performance on 8 to 12 channels with real semi-scale appearance. Takes proportional, too.

THE WORLD'S BEST—AT YOUR MODEL SHOP!

AEROMODELLER ANNUAL

HAVE YOU BOUGHT YOURS? STOCKS ARE RUNNING LOW FOR THIS TOP SELLER

AEROMODELLER ANNUAL 1966-67 breaks new ground with its cover picture of Dr. Kaletsch's Rotary Wing, which might just conceivably be the new approach to quick lift flying . . . all developed so far with models. Scale modelling fullsize as practised by a number of experts producing aircraft for the spate of historic flying films will fascinate. Peter Chinn gives us a breakdown on Tester's Twelvemonth with the new and interesting engines of the year. Metrics are all the thing today, and we have a fine mixture of conversion tables. Fuel Formulae, once the regular first lesson of the power flyer, is having a new lease of interest in the search for speed and better fuel consumption. Other special aspects of modelling covered include the Latest in Pylon Racing with Goodyear models, Canopy Moulding, Rubber Motors, Swept Wings, the New Materials of the year, Use of Jigs in Construction, Cut and Try Design, some Old Timer models . . plus Why Model Rocketry . . . popular in U.S.A. banned in this country! In addition to this fine miscellany of articles there are some twentynine plans of models throughout the world, selected for their interest, success, unorthodoxy, or specially interesting approach to design or performance, covering all types of control line, free-flight, powered and glider models. Results of British, International and World Championships are included to maintain an unbroken record since 1948.

160 pages size 8½ x 5½ ins. Bound in hard boards with full colour cover painting on high quality gloss paper, 30 model plans, hosts of articles, sketches, photos.

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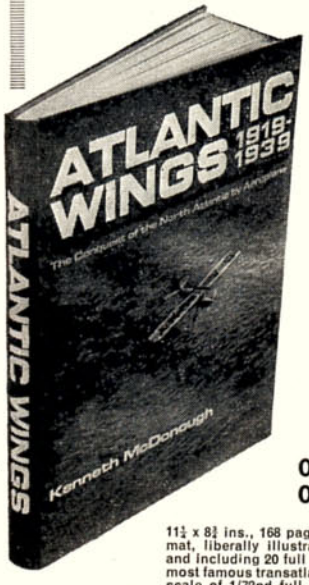

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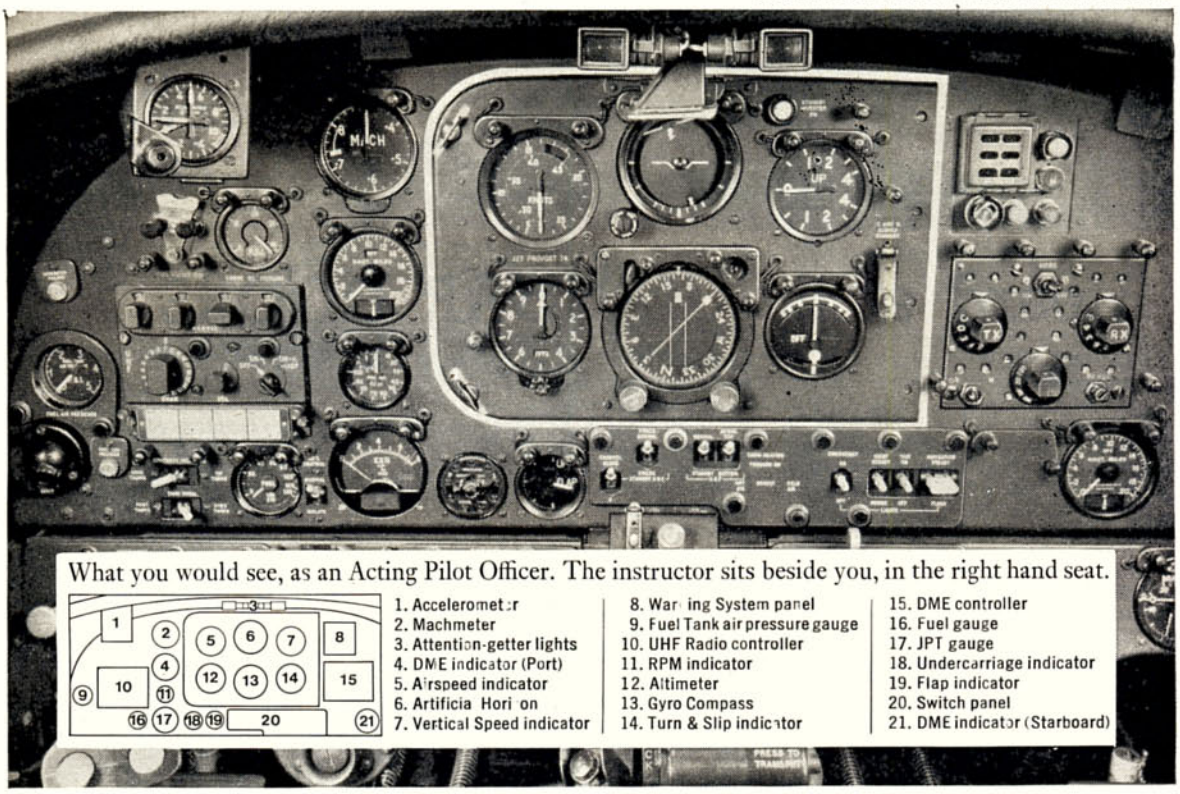

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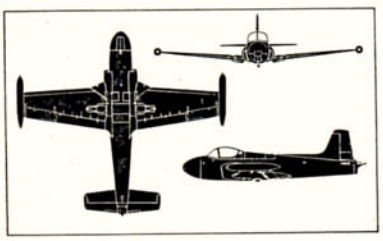

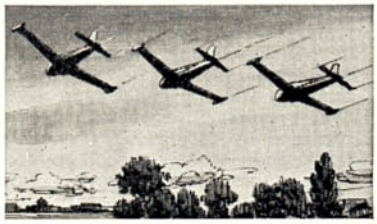

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The Royal Air Force

Too late to include in the description of the Sopwith Pup last month was this view of a 1966 version as made by ex-modeller Dick King. It has an 80 h.p. Le Rhone rotary engine (5 hours since new in 1918!) and it is seen at Cole Palen's famous airstrip at Rhinebeck, New York. Dick hopes to celebrate the 50th Anniversary of the first Carrier landing on August 2nd with this fine reproduction.

Heard at the HANGAR DOORS

EPSOM DOWNS has been an aeromodelling venue since the days of the old Kite and Model Aircraft Association, for over 60 years in fact. Although restrictions have been instituted since about 1956, no ban has been implemented—until appearance of the Byelaw concerning Model Aircraft confirmed by the Secretary of State on 2nd November 1966. In effect, the Byelaw restricts the area which can be used for model flying, limits the time to between 12 noon and sunset or 8 p.m. (whichever is the earlier) and prohibits control-line, catapult launching, or jets other than those with solid fuel pellets not exceeding one inch in length. Silencers are obligatory. Models cannot be flown on the days of a racing period.

These terms have been the subject of protracted negotiation with the S.M.A.E. and are the result of growing concern for public safety and convenience as well as the risks involved through discarded control lines in the area used by exercising race-horses near the famous race-course. For similar reasons the time limits are intended to stop model flying during exercise periods.

The Byelaw came into effect from December 1st and it seems significant that up to the time of going to press we have received only one complaint in opposition from an aeromodeller. It will be some time before the regular Epsom flyers fully appreciate the terms, but they must surely realise that the restrictions are most reasonable and perfectly acceptable in place of a total ban. It now remains for the model flyers to operate with due care and to respect the requirements. For the control line flyers we are sure that alternative areas must be accessible within the same district.

JANE'S "All the World's Aircraft" is a massive 560 page reference, each year becoming larger and more detailed thanks to inclusion of home built machines, and certainly worth the eight guinea investment for so valuable a reference. This year's edition includes many well-known designs from Aeromodeller contributors. (Meyer Little Toot, Isaacs Fury, Urmston Currie Wot etc—and we might also include the Hawker P1127 Kestrel). One which may not be so familiar is the Clutton-Sherry "FRED". The names may well ring a bell in your ears for Eric Clutton's "Sharkface" R/C design and his novel unconventional types have frequently graced our pages while Sherry's cartoons are regular features. Their combined product in FRED (Flying Runabout Experimental Design) is a parasol mounted training glider type wing over a simple fuselage with power provided by various units ranging from Scott and Triumph motor cycle engines to a Lawrence radial. The 22 ft. 6 in. aircraft is virtually unstallable, cruises at 65 m.p.h. and has provided hours of fun for its zealous constructors at Stoke-on-Trent.

Odd twist in the inclusion of the aircraft in "Janes" is that it appears with alphabetical precedence before De Havilland (*see "Hawker Siddeley Aviation"*) and English Electric (*see British Aircraft Corporation*). As a new name in the great manufacturing field arises, so do the mighty fall into the net of Government consortiums!

Page in "Jane's" '66/'67 is sign of the times when our contributors Clutton and Sherry fill an alphabetical gap caused by loss of D.H. and English Electric. See text above.

NEW PRESIDENT for the Academy of Model Aeronautics in the U.S.A. is Cliff Weirick the 39 year old radio control equipment manufacturer, twice U.S. National R/C Champion and member of the 1967 international team to represent the U.S.A. in Corsica next June (NOT August as we erroneously stated last month). Cliff was elected with a large majority over the other four candidates, illustrating the exclusive benefit he enjoyed from extensive publicity of an election statement he had published in two of the U.S.A. modelling periodicals. We will regard with interest the outcome of his promised policy and the fortunes of the A.M.A.

POWERHOUSE on our cover last month caused a bit of a stir. We were told that "Powerhouse" 41, 56 & 62 looked quite different and certainly was never designed by Sal Taibi. True enough, there *was* a Powerhouse of '46 vintage, kitted by Berkeley Models Inc. in Brooklyn and designed by Dick Korda. It was a pylon style power duration contest model with single retracting landing leg and it became holder of U.S. National duration records. However, we *were* still correct! Plane on our cover was most definitely a Powerhouse of approximately 10 years older vintage, created by Sal Taibi as we described, so honour is satisfied.

COUPE D'HIVER team from the U.S.A. for the International Con-

test near Paris on February 26th will be twelve strong. Models are to be flown by proxy, and up to six British volunteers are requested to look after and fly models which will be sent over by air. Meanwhile, entry forms are still available at the editorial offices for the *Aeromodeller* postal event, programmed for flying on either February 20th or 26th according to local weather conditions.

Avro 748 G-ATEJ is about to take on a load of Harley-ford Books for export to the Continent, an occasion made especially interesting since the Publisher D. A. Russell (right) handed over the consignment to his son, Capt. Michael Russell, who is Chief Training Captain for Channel Airways at Southend Airport.

PAPER DARTS are "old hat" to most of us. A few folds in a sheet of paper, a twist of the nose, a paper clip for balance in some designs and you have a chuck glider of the simplest form. Or is it? The magazine, *"Scientific American"* has offered four prizes for paper glider designs. Closing date was January 18th, and we apologise for having to expose our ignorance of the great contest until such time as it is too late for Aeromodeller readers to enter, but not until it received the blessing of BBC and TV publicity late in December did we become aware of the event. The idea is to explore the unknown in the simplest form. Who knows what the paper dart gliders might teach tomorrow's space age designers? We recall correspondence with a modeller from the Shepherds Bush district of London over fifteen years ago when he claimed duration flights from paper darts that matched a high performance lightweight balsa chuck glider. He "discovered" by development what is now universally accepted as conical camber of the leading edges and tips of his delta design. The Convair and Fairey delta aircraft followed our correspondent's revelation which passed without recognition. Today the Scientific Americans are gliding to earth from mother plane B52s in shapes more akin to the bath-tub than the aeroplane of our conception, the Concord(e) is approaching completion in paper dart shape, complete with conical camber and Dornier paragliders are about to be tested as cargo carriers. Even if you have missed the opportunity of entering the American paper glider design contest—why not submit *your* plan for the future to AEROMODELLER, for a British Contest? Closing date is February 20th and a year's subscription will be awarded to each of the three designs considered to be most original and efficient. Samples and folding plan must accompany each entry. No entry form is required.

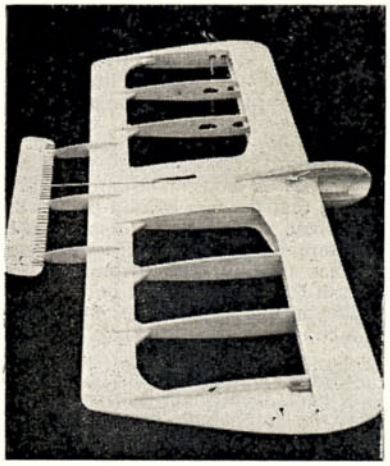
TOMORROW'S WORLD is a BBC-TV programme claiming to report on what's new today for those interested in tomorrow. On December 21st, the commentator introduced viewers to a report on Man Powered Flight—which is always a cue for Derek Piggott to appear. This time Derek was seen air-pedalling the Southampton machine in both Mk. I and Mk. II versions—delicately dressed in pyjamas as he had left his running shorts at home! For aeromodellers, the most interesting part of the programme was a filmed flight of two ornithopters by Reg Parham. Hardly "new" to us or indoor exponent Reg, they must certainly have stirred the imagination of the average viewer and rate in our opinion as being the best film record of any kind of model flight yet to have mass public showing.

MODESTY forbade that we should review our own latest publication "Atlantic Wings" by Kenneth McDonough and the sales of this definitive work in transatlantic flight indicate that it needed no trumpets of praise from us to become established. The value of such a book for the scale modeller, historian, or occasional aero-book browser is inestimable and we are sure that the first edition print will become a collector's item of the future. So if you're still wondering what to buy with Auntie's 90/- cash Christmas present our suggestion is that the obvious answer is a copy of "Atlantic Wings".

TWENTY YEARS on . . . and it doesn't seem half as long since Henry J. Nicholls first established his model shop in Holloway Road, London N.7. At a celebration on December 6th, HJN (now *and* Son) entertained trade associates in the newly reconstructed shop—a far cry from the original war damaged front and salvage timber shelves of 1946! Those were the days when the Mills 1.3 diesel was a rare buy for which one had to queue on a waiting list—or have times changed so much? The Mills is still a valued rarity!

CO-ORDINATION of effort among the many aircraft preservation Societies in Great Britain is at last a possibility. Peter Schofield, editor of "Control Column", the duplicated newsletter of the Northern Aircraft Preservation Society has announced that he has the support of the Shuttleworth Trust, Skyfame Museum, the Historic Aircraft Preservation Society, the recently formed British Historic Aircraft Museum and of course N.A.P.S. to produce a new monthly joint magazine. Since collectively these societies own, or look after a small air force of veteran and vintage aircraft and include renowned authorities, the new magazine will have considerable appeal to all aero enthusiasts and we wish it all success.

WE REGRET to report the sudden death of Lily Rushbrooke, widow of the late Editor of this magazine on December 18th at her Watford home. Lily had been a stalwart supporter of our hobby since 1935. Her name appears in the contest records—once defeating her husband in a Wakefield event and her hospitality at the caravan, or at home to aeromodellers was renowned. We know that readers will join us in extending sympathy to her daughter Joan and son Peter.



Turncoat basic structure shows "flat" section ribs for ease of building on a board, sheeted L.E. for strength and triple tailplane booms.

"Moggs" Morris poses below with one of several Turncoats outside our offices, Northwood M.A.C. will be more active in combat soon.

MOST of "Turncoat's" features may be quite familiar to those aeromodellers who build and compete in the combat class of control line. They should be! as "Turncoat" has been developed from such designs as *Razor Blade '64*, *September Warrior*, *Dominator*, and *Early Bird* all established A.P.S. favourites

Taking all the best features from each of these models, a fast, manoeuvrable and virtually indestructible model has evolved. In the right hands it will prove to be a winner in the 1967 season. Having already won the South Midland Area Gala at Cranfield in prototype condition, flown by Mike Delaney of Northwood.

TRY THIS FOR CONTEST WINS

2·5cc Flying Wing Combat Model

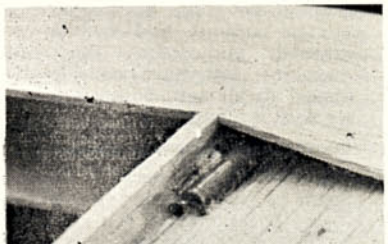
The Latest in the Flying Wing Trend by Combat Exponent M.J. "Moggs" Morris

29" Wingspan

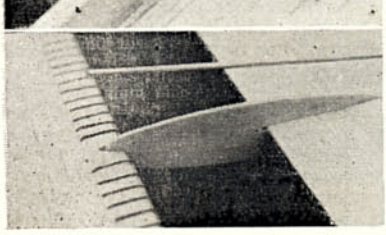
TURNCOAT

Construction

Commence construction by gluing together the trailing edge which consists of $\frac{1}{2}$ in. x $\frac{1}{4}$ in. hard balsa strip $\frac{1}{4}$ in. x $\frac{3}{16}$ in. spruce and soft $\frac{1}{4}$ in. sheet, pin down to board and glue. Glue laminated tips together from soft $\frac{3}{32}$ in. sheet, cross the grains and remember to insert brass lead out tubes into inboard tip. Make a $\frac{1}{16}$ in. plywood rib template and cut ribs from medium close grained $\frac{1}{8}$ in. balsa sheet and one centre $\frac{1}{4}$ in. sheet rib, making holes for controls in the inboard ribs. Pin 1 in. square hard balsa leading edge to building board and cement all ribs to it except the centre rib. After sanding trailing edge to shape, slot and glue to ribs on board. Shape the $\frac{1}{2}$ in. x $\frac{1}{2}$ in. beech engine bearers, add spacer, glue and screw together. Remove framework from the building board and cement engine bearers over leading edge, add centre rib then allow to dry.



Wing tip detail shows outer tip, lead counterbalance weight buried in sheeting to prevent it coming out in a crash landing.



1/16 plywood tailplane booms should have hinge wire holes drilled together to get them aligned. Note stitching round hinge wire.

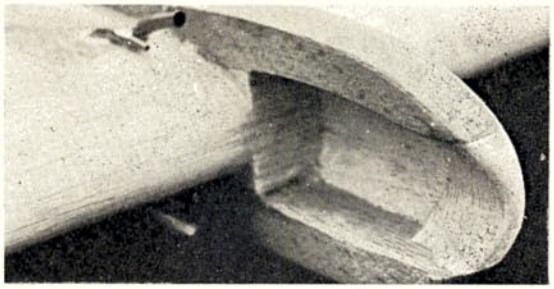
Cut out developed tank shape from tin plate and solder up with air vents and fuel feed pipes. Fix tank in position using Araldite, riblet W4 and $\frac{1}{4}$ in. sheet fillet. Cement on $\frac{1}{16}$ in. bottom sheeting, and glue on laminated tips, adding $\frac{1}{2}$ oz. of lead weight to outboard tip.

Bind and solder Bowden cable extensions to 20 s.w.g. wire leadouts, solder to bellcrank, add 16 s.w.g.

pushrod, bolting unit to $\frac{1}{8}$ in. plywood bellcrank mount, then glue into position.

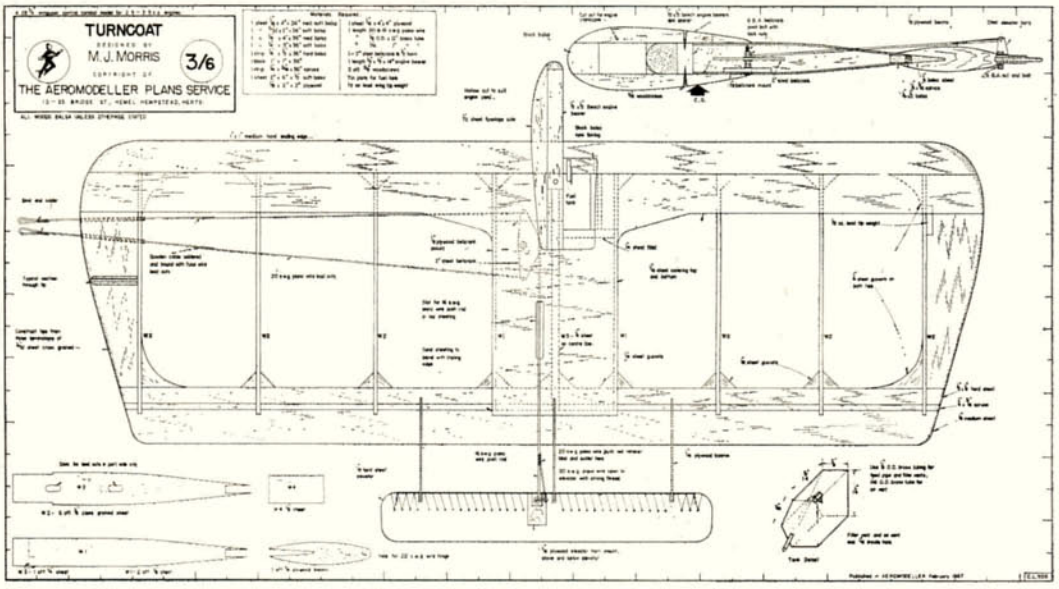
Add $\frac{1}{8}$ in. sheet and $\frac{1}{4}$ in. sheet gussets, also cement top $\frac{1}{16}$ in. sheeting in place. Double cement $\frac{1}{2}$ in. soft balsa sheet fuselage sides and nose block to engine bearers. Carve and sand fuselage to streamline shape. Drill engine mounting bolt holes. Round off leading edge and sand the framework smooth. Bind and solder loops on the end of lead out wires. Either bandage or fibre glass the engine pod wing joint area. Dope framework with one coat of clear dope, cover in nylon and apply three coats of dope. Cut $\frac{1}{16}$ in. plywood booms, drill holes for the 20 s.w.g. wire hinge then cut $\frac{1}{8}$ in. hard sheet elevator. Slide booms on to the hinge wire, bend to shape and sew it on with carpet thread and cement well.

Cover elevator with nylon, add $\frac{1}{16}$ in. plywood elevator horn mounts and elevator horn. Double cement booms to model and fuel proof. Connect up control system. Bolt in your 2.5 c.c.—3.5 c.c. engine/silencer unit and "Turncoat" is finished.



The engine bearers should be well blocked-in with balsa and made as tight a fit as possible around crankcase, fill grain cement and fuel proof well, to prevent cracks and fuel seepage.

To make "Turncoat" fly fast, build light but strong Aim for around 15 ozs. all-up weight, taking great care in choosing the right wood for the job.



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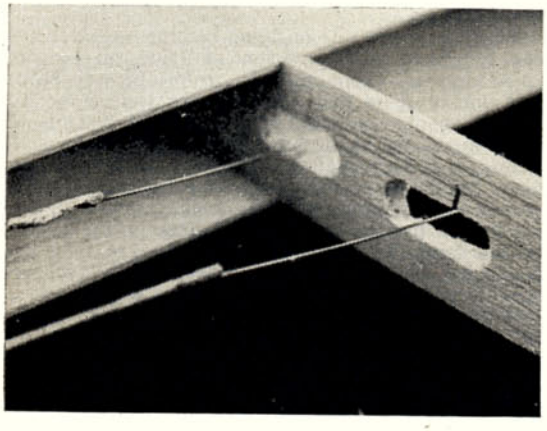
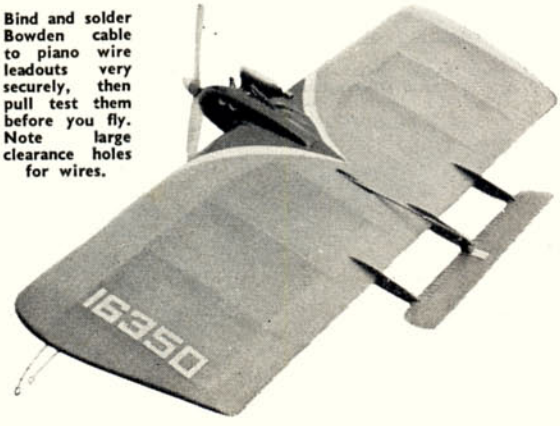


Bind and solder Bowden cable to piano wire leadouts very securely, then pull test them before you fly. Note large clearance holes for wires.



STRICTLY SIMPLE

Single Channel R/C attempts & ambitions

By David Boddington

Reminiscences

Why do aeromodellers who have previously been active in the free flight and control line branches of the hobby graduate to radio control modelling? For my own part it was for a mixture of reasons, probably the chief reason being a natural development and interest in all aspects of flying, both of models and fullsize aircraft. A further contributory factor was no doubt an inherent laziness in chasing after free flight models. I always considered the effort in chasing miles over fields after a model was barely sufficient reward for the satisfaction of seeing the model flying. In any case, my ability in climbing trees was never my strongest point, and in latter years there seemed to be a great shortage of "fetcher-mites" to relieve one of the more tedious aspects of free flight flying.

I have great regard for the contest enthusiasts who think nothing of taking part in five rounds of a competition consisting of launching the model, tearing after it, often over difficult country, trudging back, just in time to launch it again for the next round etc., etc. Possibly my regard is tinged with some lack of understanding of the mental attitude of these competitors, maybe I was born with a lack of "killer instinct" necessary for these events.

To be truthful, when I first embarked on radio control flying, some years back, far from decreasing the amount of searching and retrieving models, it tended to *increase* it. The control side of the flying was somewhat intermittent due to unreliable equipment and personal inexperience. For the first year or so, "flyaways" were nearly as common as successful flights terminating in the same area, if not the same field, as the launch! However, one was always convinced that "next time" everything would be fully under control and perfect flights would be made after a while. This, I suppose, is the attitude that keeps us striving when in theory it would be more sensible to pack up and contemplate a more static pastime.

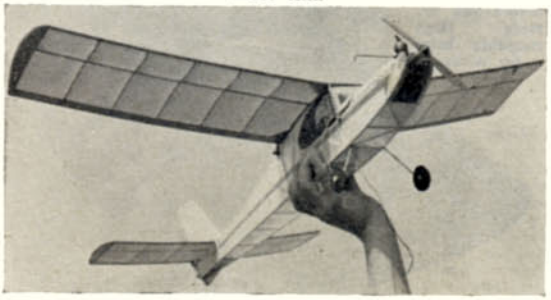
Author's field test of another new model—the "Ugly Bug" for our companion magazine "Radio Control Models & Electronics (see Feb. issue for plan) makes a typical club scene in winter sunshine. Nothing like taking the kids out flying is there Dad?

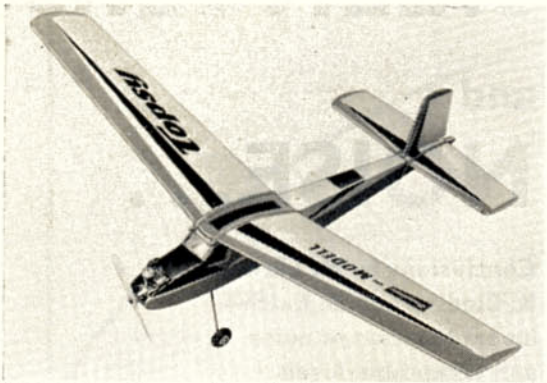
My initial ambitions were to become sufficiently proficient in the art of single channel flying to be able to apply it solely to scale models, another branch of the aeromodelling field that has continually fascinated me, right from the days when rubber driven scale *Spitfires* were more ambitious than practical. Although I have never lost my interest or desire to build and fly successful radio controlled scale models, it has often had to take second place to the designing and experimenting with models of greater variety; the result is I've never become master of one particular sphere. Probably this is a good thing because, unless I have been mistaken, it seems that the dedicated expert in any particular class frequently becomes rather self-centred, less interested in the good of the hobby overall, and a less sociable fellow. This is, of course, a generalisation and there are many exceptions, but as I see it, ours is a hobby for the enjoyment of all, and as soon as we take it so seriously that it matters a lot if we win or lose, then is the time, to give it up.

When the radio side of flying became more reliable and I became more proficient at flying, all sorts of "pipe dreams" came into the realms of possibility, and one of these that was near the top of the list was to be able to build a small model capable of being flown out of the back garden. Just think of it! Sitting in a deck chair on a glorious summer's evening, throwing the model into the air and flying it around in lazy circles until the engine cut, and bringing it back to a beautiful three pointer in the middle of the lawn. It would be untrue to say that this dream has been completely fulfilled, but the fact has been accomplished even if the serenity was absent.

With a *Graupner Topsy* model powered with a DC Dart, my brother and I were determined to achieve our goal, and with a certain amount of misgiving, the model was launched over the fence. Flying around presented no problems but when the

24 inch Bambi diesel powered sub miniature single channel design by David Boddington for indoor or dead calm air flying —see text.





Ever popular Graupner "Topsy" Kit design, ideal for a wide range of engines and equipment. Needs a spot of centre section strengthening for rough field work.

Formation flying! Chance shot of two Watford Wayfarer models at the local field each with Superhet of course. One is a "Falcon" with Remcon and the other a "Citizen Krote" design (to appear as a plan in R.C.M. & E.) with Citizen-Ship Proportional equipment.

engine cut, the 60 ft. x 20 ft. landing area appeared to be even smaller than it did before. The landing approach had been worked out previously, and involved a fairly perilous flight path round the back of two houses, when the model would temporarily be out of sight. The big decision, however, was whether to go under or over the neighbour's washing line, and eventually I decided on the latter course and to slip off a bit of height in the final turn. Everything worked out fine and indeed the model landed right at our feet, but from then on we decided to land the model in the field adjacent, even if we were standing in the garden, it is less wearing on the nerves.

Sub Minatures

A logical step from being able to fly from the garden or small field is to be able to fly a R/C model indoors. Now by this I do not mean in the average lounge, this is too much to hope for even with the miniaturisation of receivers being undertaken, but in a large size hall (somebody is now bound to prove me wrong, and have a R/C microfilm model flitting around the chandeliers at 8 ft. altitude). To prove that an indoor model was in the realms of practicability, I designed a small tissue covered cabin model of 24 in. span to be powered by a *D.C. Bambi*. The wing section was well undercambered and of a fairly thick section in an attempt to obtain good lift, with a slow flying speed. The model was equipped with an "Otarion" receiver and "Conquest" escapement in standard form; the fuel tank for the "Bambi" was made from a plastic toothbrush case. Our attempts at reducing the weight of the batteries was not successful, as neither the miniature 1.5 volt batteries, or mercury cells, provided sufficient output for the receiver and escapement; eventually we installed two U7 batteries. Also to save weight no switch was included and two bare wires were simply twisted together to complete the circuit. Finding a suitable propeller for the "Bambi" has always been a problem, and after a fruitless search for a plastic propeller of the right dimensions, one was sawn and shaped from dural.

The disadvantage with the dural propeller is that every time the model lands it bends back one of the blades and this has to be straightened before the next flight. Sooner or later metal fatigue is going to set in.

Having built the model, the next problem was where to fly it; unfortunately, we are not blessed with large indoor areas in the vicinity except for the airship hangars at Cardington; these having explosive gas stored in them, the authorities do not take kindly to such escapades as we proposed. Luckily, we didn't have long to wait for one of those rare evenings of perfectly calm conditions, and it was decided to take the coward's way out and test fly outdoors.

After a couple of prolonged powered glides and adjustments to the tailplane incidences, the first successful flight was achieved. The model gained height slowly and was responsive to rudder without losing too much height in turns; this was just as well as the maximum ceiling appeared to be about 10 ft. The speed of the *Diddy Plane*, as it was christened, was reasonably slow for outdoor flying, but may prove to be a bit of a handful in all but the longest hall. I am now working on a design with a lower wing loading and slower flying speed that will be more conducive to gentle trips round the gymnasium and less prone to damage on contact with immovable objects. In the meantime, if anyone knows of any large unused indoor areas in the Midlands, I should be pleased to hear about them, and if anyone is also willing to have a go at this form of weather free flying, so much the better.

Future Ambitions

The future is still bright with possibilities and unfulfilled ideas. At the moment I am still experimenting with float planes, and I hope soon to do some night flying at the local aerodrome. Other projects will have to await their turn and my family commitments; I wonder if I can sneak a seaplane away with me on holiday by the sea! One lasting ambition that my brother and I have is to own a pair of houses situated on a large flying field with suitable hangarage included so that we may combine fullsize and model flying without any inconvenience. If my wife reads this I should explain that this is only a dream and I promise to buy the new 'fridge and washing machine first.

Ailerons on this version of the author's "Senator" design produced by Aviette Kits, call for a servo blister over the centre section in this case. The 52 in. span model is prefabricated with styrene wings and suits 2.5-6 cc. engines.

SILENCERS and NOISE...

Conclusions by M. Larcombe, K. Lindsey and D. Balch— an explanation of noise and acceptable levels

Mike Larcombe with Eta 15 test rig.

THE data presented in the first chapter and the subsequent discussion has dealt mainly with the design of silencers from the point of view of minimum power loss (or even power gain). This has defeated the original aim of making a good acoustic silencer, in other words one which drastically reduces the noise level.

Before a good acoustic silencer can be designed it is as well to know something about noise itself, how it is carried through the atmosphere and what type of noise annoys the local residents who are not participating in the sport.

Two noises having the same reading recorded on a sound-level meter may produce completely different reactions from non-modellers because one may be an annoying noise and the other a pleasant noise. Therefore, we are not only interested in a maximum noise level at a particular distance away from a motor, but we also have to take into account its annoyance. One method of distinguishing the annoyance of a noise has been proposed in the Government sponsored 'Noise' report by the Wilson committee.

If we say the maximum noise level that a nearby resident can be expected to tolerate without complaining to the Local Council is 50dB, we then add to this value certain weightings which account for the annoyance of the noise. For example, the weightings suggested by the Wilson committee are as follows:

(I)	If the noise has a continuous note, as with a model aircraft motor	— 5dB
(II)	If the noise is irregular, as with a control-line model	— 5dB
(III)	If the noise occurs on weekdays only, between 8 a.m.-6 p.m. (If the noise occurs at weekends 0dB)	+ 5dB
(IV)	If the model is being flown in a Rural residential area (in a suburban area with no traffic 0dB) (in a residential urban area + 5dB) (in the middle of a shipyard, etc. + 20dB)	— 5dB
	TOTAL	— 10dB

From the table it can be seen that for the more noticeable noises the weightings are negative. Therefore, the maximum noise level for the nearest resident should be less than 40dB (i.e. 50dB—10dB).

We now need some method of checking that the noise level is less than the specified value without going along to the nearest resident and standing in his garden while taking a noise reading, since it is only possible for us to measure noise easily at a standard distance of, say, 15 ft. from the motor. If we assume that the noise level drops by 6dB every time the distance is doubled and that the average noise from the motor at 15 ft. is 80dB then the noise will have dropped to 74dB at 30 ft., 68dB at 120 ft., etc. so that at 640 yds. away the noise will have dropped to 38dB, which is within the limit specified above and, therefore, as long as the motor is run at a greater distance than 640 yds. from the nearest resident then no complaints should be expected. This simple analysis gives us a starting point for deciding whether flying on a particular site is liable to create a nuisance which may lead to the loss of the flying site.

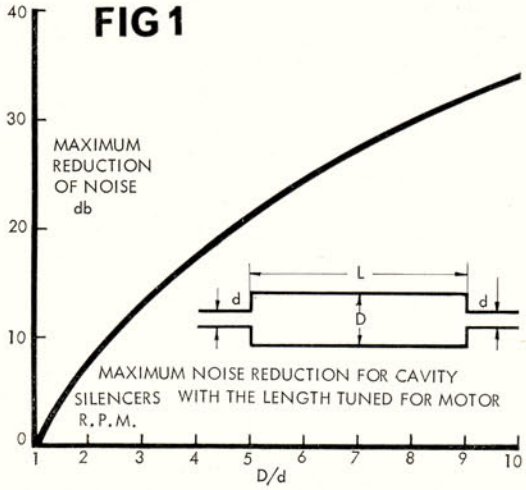
The figure of 6dB reduction in noise every time the distance is doubled is only correct for low frequencies. The higher frequencies are attenuated or absorbed by the air more than the low frequencies due to humidity and other atmospheric features. The noise from a motor consists mainly of low frequencies corresponding to the motor r.p.m., but superimposed on this are many higher frequencies. The majority of commercial silencers only reduce high frequency noise close to the motor so that the low frequencies present in the exhaust note are still carried through the atmosphere. That is the reason why some people have noticed little difference in the noise level of a silenced motor and an unsilenced motor at large distances away. An effort should therefore be made to reduce the low frequency noise from the motor since this will be the most beneficial approach.

Careful design of cavity and resonator types of silencer can reduce specific sound frequencies, particularly the low frequencies, but the simple calculations only provide a basis for development work and also it is difficult to assess the effects on the motor performance. The length of a cavity silencer for which the noise reduction is a maximum can be calculated from

$$L = \frac{250{,}000}{\text{r.p.m.}} \text{ inches}$$

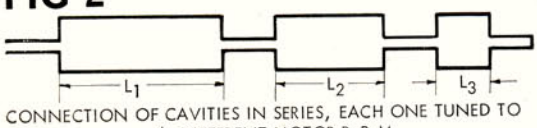
which is similar to the formula for tuned-length silencers, therefore indicating that they are good devices for the absorption of low frequencies. The reduction in noise can be determined approximately from the dimensions of the

FIG 1



cavity as shown in *Fig. 1*, but values achieved in practice will probably only be about half of those shown due to other sources of noise and the unsilenced higher frequencies in the exhaust note. One disadvantage of the cavity type, as well as the tuned-length silencer, is the fact that for low r.p.m. motors the most efficient silencers are very long, for example, at 10,000 r.p.m. the length is approximately 2 ft. This indicates one of the reasons why many commercial designs are inefficient acoustic silencers because they are too short and only reduce the high frequency noise which is not the real offender. A cavity is a very simple type of acoustic silencer and is designed to attenuate over a very small frequency band. The cavity, if designed for a motor running at 10,000 r.p.m. will also attenuate the basic noise from a motor running at 30,000 r.p.m., but not vice versa. At a motor speed between these, i.e. 20,000 r.p.m., the attenuation will be zero, so the silencer is not very efficient for a range of frequencies. Many variations of the cavity type have been used so that a greater range of frequencies can be attenuated thus enabling the motor to be run at varying speeds and still have an efficient silencer. The simplest variation is to connect a number of cavities one after the other, as in

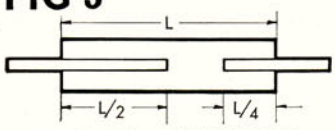
FIG 2



CONNECTION OF CAVITIES IN SERIES, EACH ONE TUNED TO A DIFFERENT MOTOR R.P.M.

Fig. 2, each one tuned for a different frequency so that the total effect is to give a reasonable attenuation over a range of frequencies or motor r.p.m. The other method is to insert the inlet and outlet tubes into the cavity which has the effect of improving the attenuation at frequencies where there would normally be none at all. If the length of the cavity is L then one tube should be L/2 inside the cavity and the other L/4, as shown in *Fig. 3*.

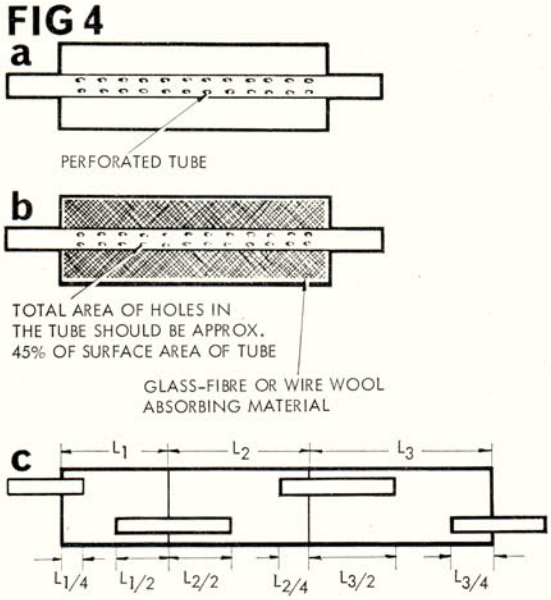
FIG 3



CAVITY WITH INTERNAL TUBES

Fig. 4 shows some of the more efficient types of acoustic silencer, but no straightforward design characteristics can be given as the mathematics involved becomes rather too complex for this article. To illustrate this point many silencers for industrial purposes are designed using high speed digital computers, so we are not the only ones with problems! Although the types of silencer illustrated in *Fig. 4* are efficient in reducing noise it is not known whether they drastically reduce motor performance.

FIG 4



All silencers suffer from noise generated by the silencer itself, in other words all the noise should be directed out of the rear tube but a great deal is generated from the sides of the silencer. This is particularly noticeable on tuned lengths where the maximum noise is recorded at the side not at the back of the device. To overcome this problem the silencer should be a relatively stiff structure to reduce vibration or have some form of absorbing material around the outside. Types of silencer with internal absorbing material such as in *Fig. 4b* and the KLML3 reduce the effects of noise generated from the sides and are, therefore, more efficient acoustic silencers.

We are aware of the problems that some competition modellers face in that they cannot purchase a really effective commercial silencer at present, and therefore, consider themselves at a disadvantage compared with those who have the time and equipment to develop efficient silencers. This is not an unusual situation and many who are at present complaining about silencers are effectively 'one-up' in that they think nothing of using non-standard motors or receiving special works-tuned versions. We hope this series will inspire some enterprising manufacturers to start marketing efficient silencers from the point of view of maximum noise reduction and minimum power loss. We also hope it will encourage modellers to make their own silencers, be they "Rolls-Royce" quiet, or performance enhancing, or both; it is not as difficult as many people would have us believe.

BASIC Aeromodelling

Part Eight: Concluded.

Doping with Butyrate and Epoxy

ONE type of finish which must be avoided on power models is aluminium paint which is formulated on an oil-base. This will be attacked *immediately* by any type of fuel. The same applies to enamels or colour finishes which are oil-based formulations. Apart from being heavy they are quite unsuitable for use on model aircraft. For colours, only cellulose base finishes or coloured dopes should be used. Coloured polyurethane, polyester and epoxy finishes are fuelproof, but heavy, unless specially formulated for aeromodelling use and applied over a suitable basic finish.

There is a type of cellulose dope which *is* fuelproof. This is based on cellulose acetate butyrate, and is generally known as a *butyrate* dope. It can be made as a clear dope (with rather limited shrinking powers compared with an ordinary cellulose dope) and as coloured dopes. The Americans use butyrate dopes almost exclusively because of their predominant interest in glow-powered models.

There are a considerable variety of so-called "fuelproof" dopes based on butyrate compounds. Not all are entirely satisfactory in performance. Some have definite limitations as regards fuel resistance; others fail by crazing or lack of adhesion. Also some butyrate dopes are compatible with conventional cellulose dopes and others are not. This can only be found out by experience with different types. As a general rule it is best to stick to one basic type—e.g. cellulose dopes throughout with a fuelproof finish, if necessary; or butyrate dopes throughout, when no final "fuelproofing" coat should be necessary.

The question of how to use colours is also a tricky one. Colour dopes perform no function other than to decorate. Thus on small free flight models, where saving weight is important, the use of colour dopes should be avoided. Colour can be given by using coloured tissue, and decoration or trim restricted to transfers of doped on coloured tissue panels or letters. The doping scheme is then accomplished entirely with clear dope.

On larger models or where weight saving is not so important, colour can be used for trim, such as picking out wing leading edges, etc. Also greater permanence and depth can be given to tissue (or silk or nylon) colours by using a *small* proportion of the same colour dope in the final coats (not the first one or two "filling" coats, which should still be of clear dope). On larger models still, a higher proportion of colour can be added to the "shrinking" clear dope; or final colour coats applied after the covering has first been sealed and tautened by clear dope. The latter technique applies to silk or nylon coverings; or to sheet or solid balsa surfaces which have been adequately sealed.

The main thing to bear in mind is that coloured dopes will add weight, so an increase in model weight is an inevitable part of an overall colour finish, too, will take a lot of time as, for best results, each coat of dope should be rubbed down smooth before application of the next coat. This is particularly necessary when applying colour over a "solid" surface.

Another important point is that the weight increase will vary with the colour used. Aluminium (or silver) is the lightest of all the colours. Black is usually the next lightest. The lighter the colour the greater the weight, white being the heaviest colour finish of all. This is because the lighter coloured pigments are usually heaviest in the bulk necessary, and also more dope (and pigment) is usually required to get a good filled in colour.

For best results with overall colour finishes, the polyurethane and epoxy resin colours are probably the most satisfactory since they give extremely high gloss, have high covering power (i.e. need only a minimum of coats) and are completely permanent and durable and resistant to all types of fuels. The finish obtained, however, will only be as good as the surface over which they are applied, and proper sealing of the surface is essential. This can be done with cellulose dopes in the usual manner, but the final finishes of this type are not compatible with cellulose. Thus it is necessary to leave the prepared surface for several days for all traces of cellulose solvents to evaporate off before attempting to apply polyurethane or epoxy resin finishes. Where a surface does not require tautening as well as sealing, however, this can be tackled from the start with a compatible filler material.

Finally, some words on how to *apply* dopes and finishes. Without any doubt at all spray application

Close up view of two mistakes in finishing. Masking tape covering the white strip has been removed quickly at 90 degrees to the work and not doubled back on itself to reduce surface tension, hence the tissue shows through, where painting is pulled off. Butyrate Aerosol dope was applied over Nitrate clear dope and did not bond, thus it retracted from the white edge line as the second error.

is best right from the very first coat, whether a simple clear doping scheme is being tackled or an elaborate colour finish to exhibition standard. And with the variety of relatively inexpensive spray equipment available these days there is little excuse for the aeromodeller who takes a reasonable pride in the appearance of his model not taking advantage of spray finishing.

Obviously, the better the spray equipment you can get the better the results you should achieve. But for ordinary overall clear doping the simple type of gun worked off a vacuum cleaner is quite adequate and will produce far better looking results than a brush. It is also suitable for applying well thinned overall colours (i.e. clear dope plus a small proportion of colour dope). For more intricate work and for spraying colour dopes, however, a higher pressure is needel (e.g. 30 p.s.i.), which can only be achieved by using a suitable compressor and a matching spray gun.

Brushing is, of course, the simplest way of applying dope finishes. Opinions differ as to whether it is best to use a cheap brush for overall clear doping which can be thrown away after use; or a better quality brush which is scrupulously cleaned with thinners and kept in good condition. These days there are no really cheap brushes to be had, and so the latter technique is probably the best. Choose a soft "mop" type of brush for clear doping, always clean immediately after use by swilling out in thinners, and keep it only for use with clear dope.

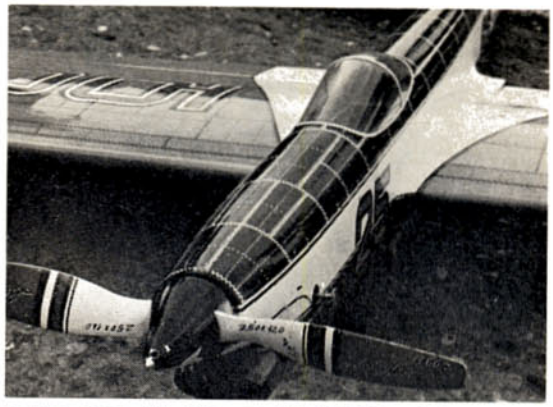
When clear doping over any tissue surface the dope should be "flowed" on with the brush, but not in excessive quantities otherwise it will drip through the surface and produce a very patchy appearance. With silk or nylon the dope can be brushed in, again taking care to spread any surplus of dope over the surface rather than letting it leak through the pores of the covering.

There is a "short cut" technique which can be useful at times for initial clear dope coatings—applying the dope with a pad of soft cloth and spreading it over the surface. Some modellers prefer to use a wad of cotton wool for this job, but there is always the possibility of leaving stray wisps on the doped surface which have to be picked off before the dope dries. This is quicker than brushing, as well as saving the cost of a brush, but is suitable only for preliminary (tautening) coats.

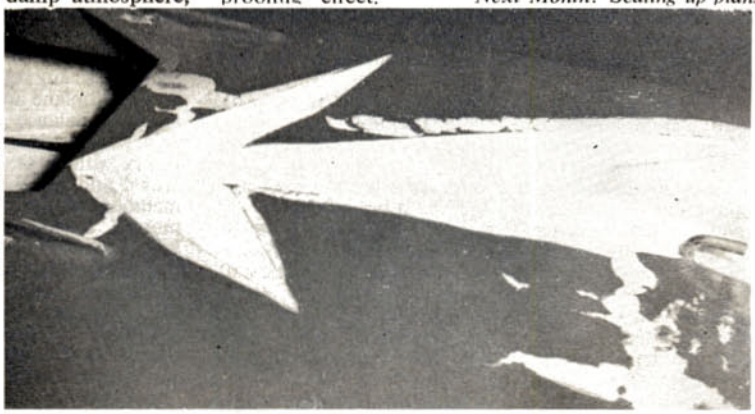
All doping should be carried out in a reasonably warm and *dry* atmosphere. The solvent evaporation rate of most dopes is controlled by additives, but very rapid drying, especially in a damp atmosphere, can lead to "blushing" or the development of white patches. These will usually disappear when the next coat is applied. If a clear dope persists in "blushing", however, it should have a small proportion of "anti-chill" thinners mixed with it. This will slow down its drying time and eliminate "blushing". Colour dopes are normally slow enough drying to "blush" under all normal circumstances. Synthetic resin finishes, however (e.g. epoxy and polyurethane) may need to be applied in a relatively warm atmosphere for successful results (not in an air temperature below about 55 degrees F).

As soon as a clear doped surface has dried to a state where the covering assumes its normal opaque appearance the component (e.g. a wing or tail) is dry enough to pin or weight down on the flat surface to avoid warping during the final tautening. Examine the lower surface first for any spots which may be still tacky, however. Also wax the surface to which the component is to be pressed against as a further precaution against sticking. This "weighting down until dry" technique is generally applicable to all tissue-covered wing and tail surfaces; but not usually to more rigid silk or nylon covered components. Components should be left in this state for at least 12 hours before applying the next coat of dope. Succeeding coats appied immediately after the first is surface-dry do not have the same overall "waterproofing" effect.

Next Month: Scaling up plans



Intricate paint trim lines on Juri Sirotkin's stunter seen as the 1966 World Control Line Championships, R.A.F. Swinderby, can offer "Character" to a model, when applied with a line brush, pen or stencil pen.



Our test Goldberg Jnr. "Satan" model was the unlucky subject of the mixed dope disaster seen opposite. In our case the U.S.A. manufactured dope did not have "Butyrate" noted on the Aerosol can. Note the large shrinkage cracks and blisters. This finish was beyond repair, the whole airframe was stripped and re-covered in silk. Take note of our mistake, don't let it happen to you.

MODEL FLYING DEMO'S

How to run them
by Whitefield M.A.C.
Public Relations Officer.

D. R. Peters

Far left: Jeanette Will (Miss Lancashire Rose runner-up) displays Alan Moss' semi-scale model at the Middleton Round Table Fete, June '66. Left: Whitefield club members pose with models and Radcliffe Carnival Queen, Shirley Jackson, after flying at the Prestwick Carnival, June '66. Note wide variety of models.

EVERY year countless organisations run fêtes, galas, carnivals etc., usually all proceeds helping to swell the coffers of some charitable organisation.

It is usual to see displays such as the Army, Police Dogs, Pop Groups, and on rare occasions one can see a demonstration of control line flying; this is usually arranged by a few local modellers flying a number of battered models which have seen better days. Occasionally these demonstrations are well presented with a pleasing display of models.

Whitefield MAC started display work several years ago, flying anything and everything with as many as seven and eight models in the air at one time. This looked spectacular until the inevitable happened and one chap pulled the wrong line. Through the intervening seasons, together with some harsh self criticism from one member who shall remain nameless, much debate, and some specialised building, Whitefield now has a respectable and efficient team capable of putting on a thirty minute display of control line flying which is not only a crowd puller but also an important contribution to the club funds.

Probably the most important person is the poor old club secretary who deals with the invitations, issues acceptances and generally acts in a liaison capacity with the carnival committee.

Once an invitation has been accepted, the carnival committee organiser should be informed as to the *minimum* requirements as regards size of roped off arena (at least 150-160 ft. square) for safety reasons and whether a P.A. system is available. The latter is to enable one non-flying member to give a running commentary during the session. It is surprising, (provided that the loudspeakers are mounted upwind of the spectators) how well a commentary is received. A P.A. system is a good idea for two reasons, firstly a gap may occur in the flying due to a crash or motor failure and secondly about ninety per cent of the crowd have little or no idea as to what exactly is supposed to be happening. To the eyes of the uninitiated the models are just flying around on lines, even if they are performing various functions.

An overall team manager is a necessity. Preferably he does no flying but gives all the instructions, organises the flying and, most important of all, sees that no one takes off out of turn. In other words if the rehearsed routine is broken then chaos can be the result. The team manager decides when to cease flying before the crowd becomes bored and starts to drift off in search of other attractions and experience has taught that this happens after approximately thirty minutes. Therefore it is advisable to limit the demonstration to roughly this duration.

Having worked out what type of models the club possesses, the question should be asked, "Are they suitable and of a sufficient standard to display to the public?" The obvious choice is to have a number of scale models but the majority of these are extremely limited in their capabilities, only just managing to stagger round in flat circuits. At the other end of the scale are the combat models. Not even by stretching the wildest imagination can one see any resemblance between the average concept of an aeroplane and a combat model. The answer lies in giving a balance between the two and this has been achieved by commencing the display with two noisy rat racers with large glow motors up front to attract the crowd and get everything "off the ground". The other members of the team can spend the time warming up motors, checking lines and ensuring that the correct fuel is in the correct bottles. Glow motors have been known to run on diesel fuel but not for long!

The next models to take the air are the "scale" models. One a Bucker Jungmeister from A.P.S. and the other a semi-scale 1914-18 German monoplane. Both these models have a near scale flight pattern and can perform simple manouvres such as wingovers and loops. Two Autogyros follow and although both of these models are becoming rather ancient they are kept on as the crowd appeal is nothing less than astonishing. They also provide

the necessary build up for the combat session which is given the longest time in the air (about ten minutes), the other models being restricted to one tankful of fuel giving about five minutes flying time.

There are no holds barred in the combat session but it must be emphasised that only plenty of practice can make a successful combateer. The popularity of the different models can be judged by the crowd reaction but this too can vary from district to district. The display is usually brought to an end with some aerobatics by the large .35 engine size stunt models. Sometimes a full SMAE schedule is given and sometimes two or three go up at the same time with one model flying inverted.

There are many variations on the theme but the essence of success is simplicity. The reasons for this are manifold, but basically the simpler a display is, the less there is to go wrong.

Preparations are very important, and this includes examination of lines, renewing any with kinks, checking tool boxes and if deemed necessary, testing motors to find the approximate needle settings, as there is nothing worse than to have an embarrassing silence descend on the programme. There has been, and will be, much argument as to the suitability of diesel engines as opposed to glow motors but the only criteria is whether a motor is easy starting or not. If not, discard it in favour of something that is, be it diesel or glow.

Fuel is generally supplied by the club and bought in bulk from the local model shop. It is cheaper that way. Some of the combat boys prefer to supply their own brew and for this they are reimbursed.

Publicity both before, during, and after the demonstration requires the services of a fairly energetic PRO. Most local papers are "hard up" the week before the local fête and are glad to print a half or full page on club activities with the addition of a few pictures. Preference appears to be for a group photo with the carnival queen elect or even last year's personality girl. It is a good idea to give a resumé of the types of models that will be on show with their function. After the event, the local press is reluctant to give coverage to any one group, so one must be content with a brief mention in dispatches.

If there is a keen amateur photographer in the club then get him to approach the local Mayor, Mayoress, beauty queen or personality girl and ask him/her to pose for a few photos, but please don't forget to wipe off the oil first. Very few people refuse to pose as their egos are flattered and the prints can be used for next year's publicity.

Talking of the public probably one of the most important items during the show is crowd control and to accomplish this, several non-flying members are essential.

Alan Moss and well-known Beauty Contestant Maureen Lidgard-Brown (Miss Lancashire Rose, etc.) displays two of the club's models flown at the Middleton Round Table Fete, July '66.

Picket lines help in this direction but one gets the unwanted attentions of the usual hordes of small boys with their inevitable questions such as "*will it fly mister? has it got an engine?*" and so it goes on; but if not effectively controlled their enthusiasm gets the better of them and they trample on lines, knock fuel cans over and generally become a nuisance.

It is an idea to ask the club secretary when accepting the original invitation to include a short dissertation on the forthcoming programme so that the fête organisers can include a description in the programme of events. This is invaluable in giving the public an insight into what to expect.

One item not yet mentioned is insurance. All carnivals, fêtes, etc. must carry a third party protection for liability

Whitefield members prepare to fly, Geoff Smith (stooping) and Alan Moss (standing) with a typical line-up of models and spectators at the Middleton Round Table Fete, July, '66.

David Peters (right) explains a point to Lyn Mitchell (Whitefield Personality Girl) and Council Chairman Mr. Fox at the Whitefield Fete, July '66.

of some description, but this does not cover the flying of model aircraft. To obtain specific insurance means an additional outlay of several pounds by the organisers and this reflects on the fee to be paid to the club. Fortunately Whitefield have been able to come to an arrangement through their SMAE membership.

Accidents have been non-existent apart from one or two members putting their fingers in the propeller, but this is an occupational hazard and must be accepted. One consolation is that the St. John Ambulance Brigade is generally in attendance.

Suggestions have been made for inclusion of a multi engined model, but this has practical difficulties. Namely, that unless one is extremely fortunate in being able to start both or all engines within a short time then the whole schedule is thrown out of balance. Also due to the high wing loading of most scale multi-engined models a fairly level strip is required for take-off and at most "sites" all that is available is grass which varies, like the weather, normally rough and blustery.

Whitefield have more or less adopted the routine downwind position for siting of the pit area, with the lines laid out at right angles to the wind direction, in order of flying. This makes for ease of entry into the circle leaving the model in the best position for take-off.

TO SUMMARISE

Pointers towards a successful demonstration team and display consist of:—

a. A hard working Club Secretary
b. A simple and well rehearsed routine, lasting for about thirty minutes.
c. A certain amount of discipline among the flyers, e.g. is not taking off until given the word.
d. About eight flying members and as many non. flying members as can be reasonably transpo rted
e. Practice.

READERS' LETTERS

Builder of the model ?

Dear Sir

After reading "Round the Rallies" in the December 'Aeromodeller' and noting that Richard Wilkens won the Combat Competition at the S.M.A.E. Summer Gala with a model constructed and flown by Dan Jones of the U.S.A. in the Combat Demonstration at the World Control Line Championships I took out my Rule Book to check on the legitimacy of this entry.

On page 18 of my S.M.A.E. Rule Book under the heading Control-Line General Contest Rules, it states under section 7.2 that "*the entrant must be the constructor of his model*".

While I find no mention of this rule in the Addendum sheets, headed "Special Rules for Combat Contests", which I received with my F.A.I. Rule Book, surely the General Rules still apply to all contests sanctioned by the S.M.A.E.

This letter is not a case of "Sour Grapes" as I acknowledge the fact that "Wilkie" is one of the top Combat Fliers in the country, and may have overlooked this rule in innocence, but after all, Rules are not made to be broken.

I feel that if any blame is to be attached to anyone, then it must surely go to the organisers of the Combat Competition for not enforcing the General Competition rules.

T. C. B. Bailey

Houghton-Le-Spring.

By raising these valid points the success of the "Builder of the model rules" is seriously questioned and it is by no means restricted to the Combat class. How many other Control-Line models are being operated other than by the builders?

Modellers are expected to honour their moral obligation to abide by the rule book and cannot therefore expect any sympathy if complaint is made against them in the coming season and they are found guilty of using someone elses model.

Ed.

Safety Officer

Dear Sir,

In the November edition of "Aeromodeller", under the heading "Hangar Doors" you had a report of two more accidents involving model aircraft and the subsequent injuries sustained by those unlucky enough to be on the receiving end.

With the increase of the "*cheque book—no brains*" and the pure "*no brains*' element in the hobby, the time has come for the election of a Safety Officer at competitions with the authority to throw offenders off the site. *(see opposite—Ed.)*

This need was demonstrated at the Southern Area meeting at RAF Station Odiham when a group of pure yobs, with a whole airfield at their disposal were allowing models to take off within the hollow square formed by marked cars close to the free flight area. Only after giving a car, luckily not competitor nor spectator, a resounding whack did they move off, presumably to annoy someone else.

Having cleared that subject, and still referring to the November edition, are we to expect the "old cornflake packet" pages to be a permanent feature of the magazine. The September issue also suffered from this insertion and the reproduction of the drawing on those sheets was worse than awful. I, for one will be terminating my order for a cardboard "Aeromodeller".

Eastleigh, Hants. *K. Barker.*

Fair comment Mr. Barker—we too tried to prevent hazardous free flight sports launching in a confined area at Odiham and witnessed removal of a glowplug accumulator from one culprit. You'll be relieved to know that our "cardboard" page "extra" features will in future be on a different kind of paper. This makes a thinner issue: but obviously will gain in quality.

Ed.

TOPICAL TWISTS

by 'Pylonius': illustrated by 'Sherry'

Boy meets Girl

After many years of stoic fortitude in the face of extreme public ridicule the model flyer is sloughing off his old, ultra-thick pariah skin to emerge as an adult and acceptable human being. So acceptable has he become that we now find him making a very with-it appearance as a troglodyte character in the monosyllabic pages of a pop-pic weekly. Making a proper Lulu of himself, in fact.

Anyway, his presence therein is connected with a startling discovery. Apparently, the primitive utterings of pop idols are capable of translation into near English. Who undertakes these feats of profound scholarship I do not know; I only wish that they wouldn't. We learn, however, that basically the pop song lyric exploits the age old theme of boy meeting girl (Yes. They can actually tell the difference!), sometimes in unique circumstances.

In the story in question the damsel is not exactly off her nut over the guy, but very nearly becomes so when his model plane ruffles her home perm.

"Lacquer day!" she cries, *"To think I only sprayed it last week".*

"Same with this thing," comments the modelling Romeo gloomily, brushing the dandruff off the wing, *"Now I can't do a thing with it".*

"You're a brute," says the girl, angrily.

"What! One of that crummy group?" he snorts, *"Not a patch on us Yobs. Only got two guitars."*

"What gives with the kid stuff?" she enquires, pointing demurely at the model.

"It's all the rage, love," he answers.

"I know that," says she. *"I'm talking about the model".*

That is not the real story, of course. I wouldn't like to disillusion you by letting you know that he's not flying the model plane just for the fun of it, but because he thinks it's the right sort of youthful approach to becoming an aircraft designer. And we on our part won't disillusion him by revealing that aircraft are now designed by computers, or will be by the time he trades in his guitar.

Sound Hobby

Still on the subject of Pop, from last month's editorial comes the quote, "Every Working Man should have a hobby". Of course, before the days of plastic pre-fabrication it was otherwise worded, "Every hobby should have a working man." But whether the working man should have a hobby or not, he remains extremely resistant to the idea, preferring the mathematical delights of Bingo and the drama of the Betting Shop.

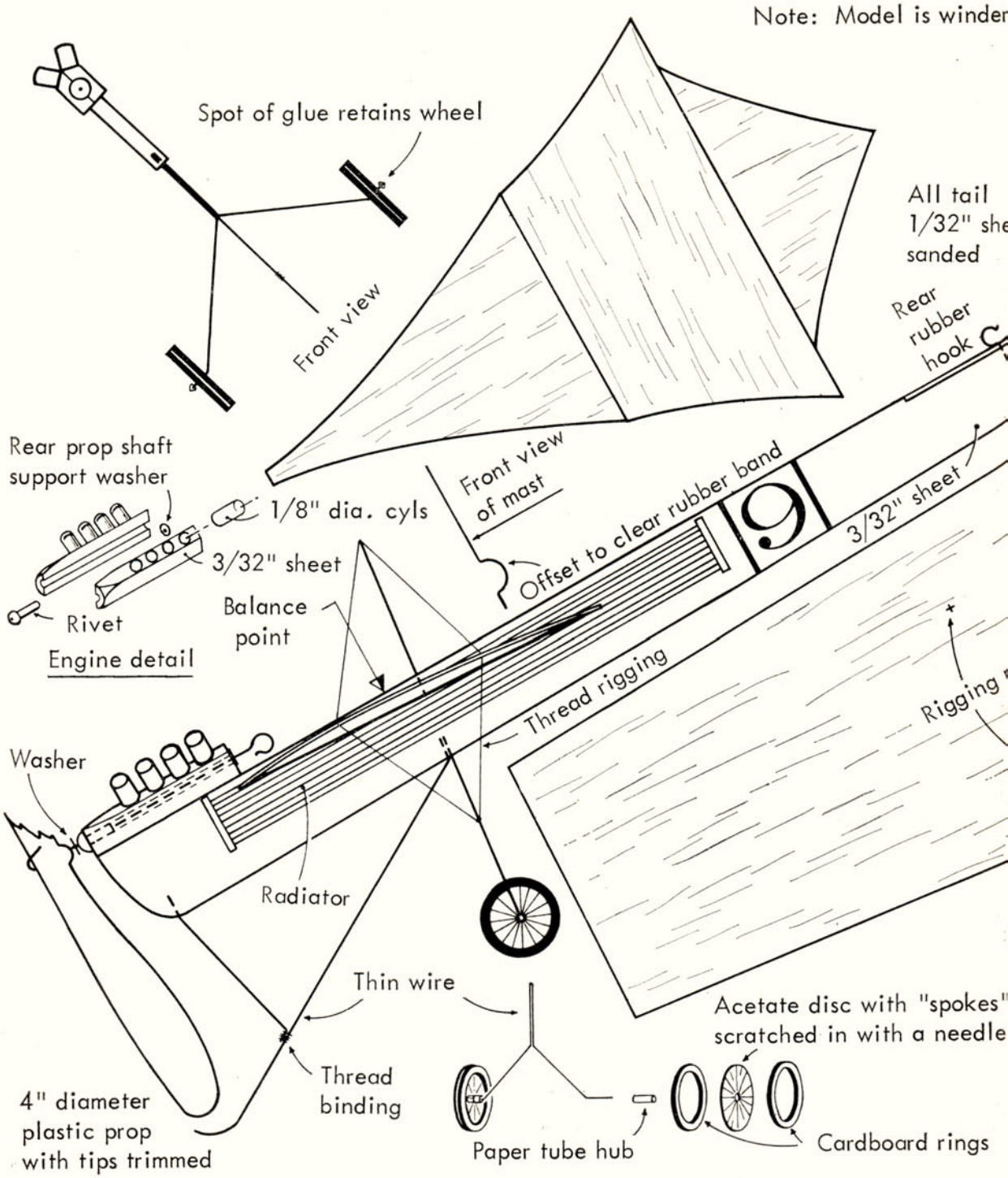
However, the quote was culled from a woman's magazine, and is, by some strange quirk of feminine logic, connected with a pop song writer who, when not modelling a melody is to be found meddling with models. (So that's what happened to the lost chord!). Thus giving rise to the suspicion that there is some connection between pop song writing and model flying. If there is, it could only be due to the inspiring noises made by model engines. I remember at the last model meeting I attended an unsilenced 3.5 and a six band transistor fighting out a bitter duel at ten paces. It must be said, in all fairness, that the engine had the particular advantage of being in tune.

The question thus arises: is the teenage public ready to take straight doses of engine noise? Is the day far off when an E.P. of a Team Race Event, with a Combat group on the flip side, will make the Top Ten? Or, horrible thought, has it already done so?

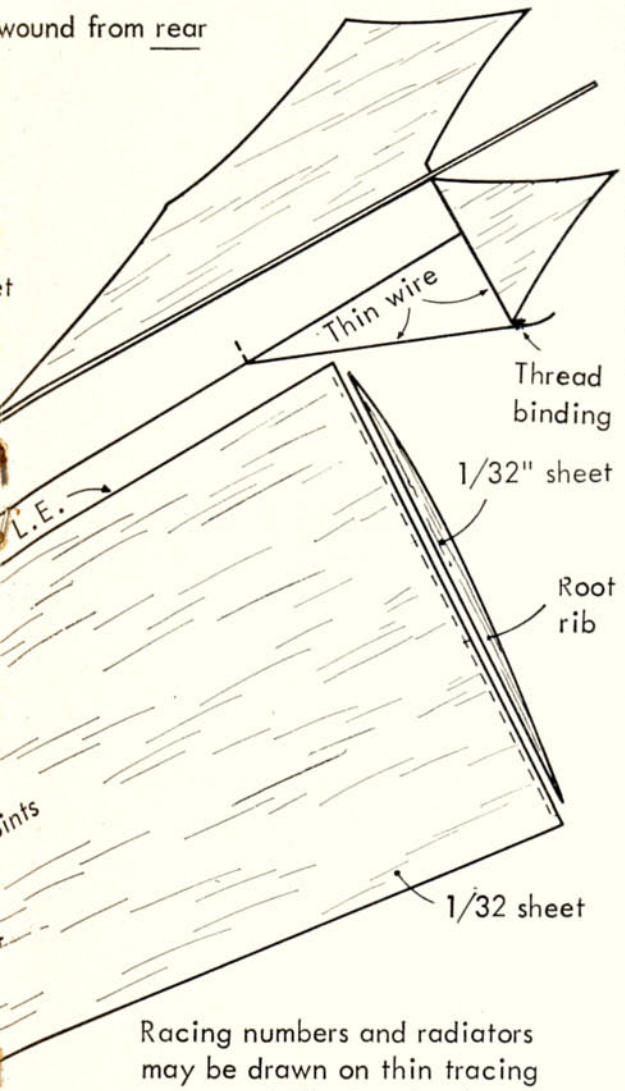
Safety (Tail) First

A striking feature of these "Old Timer" models to be seen bumbling about our flying fields in all their pseudo antiquated glory, is the way they look so well nourished compared with their emaciated modern counterparts. Whilst lots of model fliers still like to put on side, seems the yesteryear flier did so literally. From this we can well imagine that the timekeeper of way back was, like the models, a jolly, more comfortable body than the tense, lean optic strainer of today, and far less imaginative.

The brainchild of the yesteryear modeller, in accordance with the ruling child psychology of that day, were very much seen but very little heard. This posed a particular problem for the pioneer safety officer. The public revealed a particular aversity to having its well based headgear dislodged by the silent depredations of the sharp end on an A-Frame Pusher. This led to the more fearsome airborne projections of the day being buffed off by wire loops and skids. Not that the modern modeller is not concerned about the danger of his model striking a member of the public. His answer is to make his model so fast and fearsomely noisy that no spectator who has anything in his head worth protecting will come within earshot.

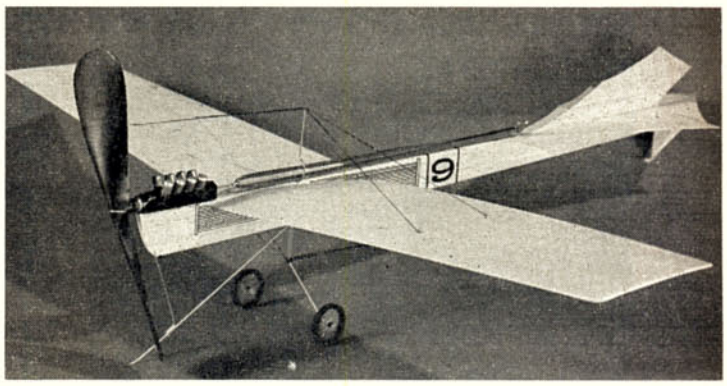


A 12inch Indoor Flyer for free



Racing numbers and radiators may be drawn on thin tracing paper and glued to fuselage. Dihedral: 1/2" each tip. Power: one loop of 1/16" square rubber.

the
"ABSTRACT ANT"
DRAWN BY W. C. HANNAN



A great little Vintage Flier for indoor or calm outdoor flying based on the classic Antoinette of 1909 era—just one of Bill Hannan's collection, photographed by Roy Scott.

HOW'S this for a neat little indoor flier,—simple to build and inexpensive. *Abstract Ant* can provide hours of fun, and under calm conditions even outdoor flying could be contemplated. This is the historic *Antoinette* monoplane simplified to the maximum degree, but no matter how hard one tries to simplify, the charming character of this classic still remains.

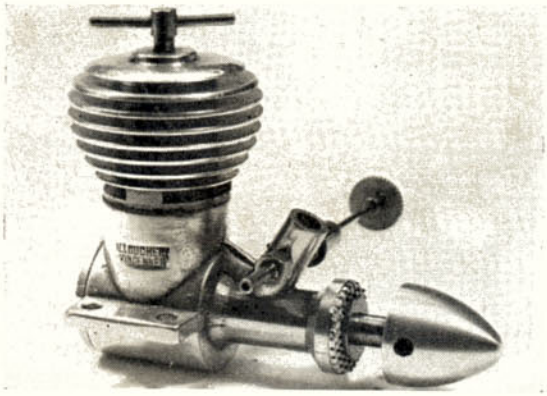
Bill Hannan's Ant has made take off ground flights of over 25 seconds, all from a mere 12 in. wing span!

Choose the lightest possible wood you can find and make sure the density is as even as possible. The $\frac{3}{32}$ in. sheet wing halves only have one rib and this is also from $\frac{1}{32}$ in. sheet, positioned at the root to help join on the fuselage the rest of the wing forming its own camber. Next, cut the $\frac{1}{32}$ in. sheet tailplane sections and cement edges together with the grain directions as shown. Make up the engine from $\frac{3}{32}$ in. sheet, with $\frac{1}{8}$ in. diameter cylinders, then use a hollow aluminium rivet as the propeller shaft bearing, bending the shaft from 20 s.w.g. piano wire with a hook at one end for the propeller hub and a loop at the other for the rubber band motor. Bend the undercarriage legs and nose skid from 20 s.w.g. piano wire, attach Acetate and sheet cardboard wheels as shown, then shape the king post with a bend to clear the motor. Select firm and light $\frac{3}{32}$ in. sheet for the fuselage. Rub down to a smooth finish then glue on engine/propeller unit, wing halves, tailplane, undercarriage and $\frac{1}{32}$ in. sheet fin above and below fuselage. Sand smooth all over. Press rear rubber motor hook into fuselage, in front of fin, and king post directly in line with undercarriage attachment point.

Lightly dope or Indian ink the radiator lines, engine unit and fuselage number, then add thread rigging as shown. Alternatively, the racing number and radiators may be drawn on thin tracing paper and glued to fuselage.

All that now remains is to get *Abstract Ant* into the air. For a motor either use $\frac{1}{16}$ in. square rubber strip or a suitable elastic band and wind the motor from the rear then replace onto the hook.

flight in parlour or clubroom



ENGINE TEST
By Peter Chinn

Allouchery Cormoran 1c.c. Diesel Engine

" . . . an interesting different design, attractive in appearance, easy to handle . . . "

AS we mentioned in last month's *"Latest Engine News"*, the Allouchery Eclair engines were among the very first diesels to be manufactured. As with most French makes, they are currently made in only very small quantities and are little known outside France.

Unlike the older Eclair models still in production, the Cormoran is a relatively modern design, employing shaft-valve induction and a compact short-stroke layout. It nevertheless has some features that take it out of the rut. These include multiple transfer passages within the wall of the main casting and, most unusual of all, rotary-valve timing that is decidedly at variance with accepted practice. Externally, the engine is distinguished by large diameter cooling fins and an all-over polished finish.

The design and construction of the Cormoran is basically conventional insofar as it uses a cast aluminium alloy crankcase with integral crankshaft bearing and screw-in rear cover; a hardened steel cylinder liner externally threaded to screw into the crankcase and a screw-on machined alloy finned cooling jacket.

The crankshaft, of heat treated steel, has a full disc web and no counterbalance. It has a 6 mm. dia. journal and a 4 mm. solid crankpin. The gas passage through the shaft is 3.8 mm. and is fed from an oval port in the crankshaft. This allows a normal induction period of 160 degrees of crank angle but is positioned to give uncommonly early opening and closing.

Unorthodox valve timing and transfer porting

It is unusual for a rotary-valve, whether shaft, disc or drum type, to open earlier than 30 degrees after bottom dead centre. Most do not open before 35-45 degrees and some open much later: for example, the current D-C Spitfire, tested in this series last July, was timed to begin admitting gas at 85 degrees ABDC —though it must be remarked that this is almost as unusual, in lateness of opening, as the Cormoran is unorthodox in earliness of opening at only *5 degrees* ABDC. Even more unconventional, however, is the fact that the Cormoran's rotary-valve closes *15 degrees before TDC*. In every other model engine we have tested to date (and these number several hundred), the induction port has closed after TDC, normally not less than 40 degrees ATDC and as late as 50-60 degrees ATDC in a high-speed racing type motor.

The Cormoran's induction timing of 5 degrees ABDC to 15 degrees BTDC might be expected to result in some unusual performance or handling characteristics. In fact, one would not normally notice any marked change but performance tests, as we shall see in a moment, did reveal some differences which may well be attributable to this departure from orthodox timing diagrams.

Ahead of the main journal, the shaft is reduced to 5 mm. for the prop shaft length, the intervening section being tapered to provide a friction drive to the machined alloy prop driver. A hexagon nut and washer, plus an optional machined spinner-nut, are provided. The shaft runs direct in the crankcase material, no bushing being used. The bearing length has a minimum o.d. of 10 mm. and no webs are used to brace it to the crankcase except at the top behind the air intake. The air intake, bored 4.4 mm., is raked forward 30 degrees from the perpendicular and carries a brass spraybar, externally threaded for needle-valve adjustment, via a soldered on brass split thimble. There is a wire circlip around the thimble which maintains just the right amount of stiffness in the adjustment. The needle-valve stem terminates in a large diameter brass adjusting knob.

That part of the crankcase casting which forms the lower cylinder casing is internally threaded to accept the screw-in cylinder liner. The wall of the casting is 2.8 mm. thick at this point and, instead of using transfer flutes in the casting or the cylinder liner, this thick wall is employed to transfer the charge by means of twelve 1.5 mm. dia. holes bored vertically through it and spaced at 30-degree intervals. An annular chamber is formed at the top of these multiple passages and, from this, the gas is fed into the cylinder via three groups of three small transfer ports, through the cylinder wall immediately below the flange. These ports which also have a diameter of 1.5 mm., are inclined at approximately 30 degrees to the cylinder axis and each group is spaced at 120 degrees around the cylinder, breaking into the bore between the three exhaust ports. They open approximately 15 degrees after the exhaust ports have opened. Cylinder port timing, according to measurement of the test engine, was: exhaust 63 degrees of crank angle each side of BDC; transfer 48 degrees each side of BDC.

The piston is of simple design, with shallow conical crown and a thick (1.5 mm.) skirt. The gudgeon-pin is fixed in the piston, apparently by peening the ends, the pin being unhardened for this purpose, and the connecting-rod is a very substantial item of hardened steel.

Performance

The Cormoran test sample was acquired by the Editor, while in France, from the manufacturer and it was obvious that the motor was already adequately run-in as received. We nevertheless gave it a further thirty minutes running time prior to actual testing. No silencer was supplied with the engine and so far as we are aware, Allouchery does not, as yet, offer such accessories. The Cormoran was therefore tested "unsilenced".

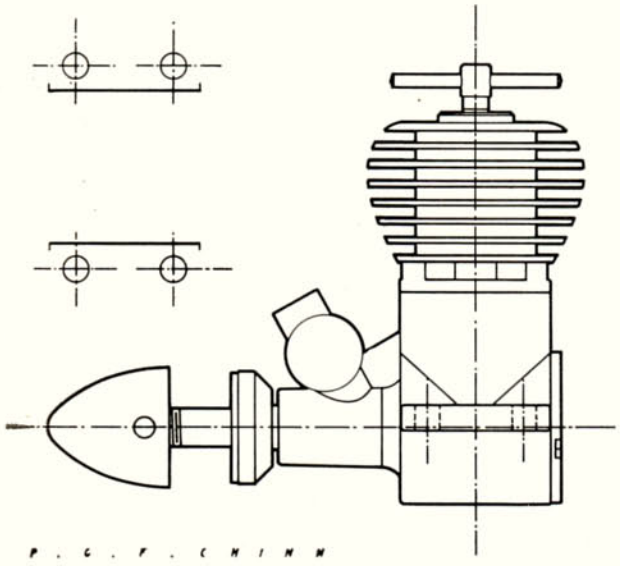
The Cormoran liked to be port primed when cold but started easily at all times. Except when re-starting the engine quickly after a run, we found it best to open up the needle-valve slightly, from the best running position, and to then close the needle again only after the engine had warmed up and the compression adjustment had been re-set. If the needle-valve was closed too soon, there was a tendency for the engine to cut out abruptly during compression adjustment.

Maximum torque recorded by the Allouchery on test was 8.4 oz. in. at 8,000 rpm. This is quite good for a 1 cc. engine. Beyond this speed, torque declined at an ever-increasing rate and when plotted, indicated a peak bhp of just on .085 at 12,000 rpm. This is somewhat less than the output delivered by the most powerful of current 1 cc. class engines and it seems reasonable to suppose that the very early closing of the rotary-valve (which much inevitably limit the breathing ability of the engine at high speeds) is, to some extent, responsible for this.

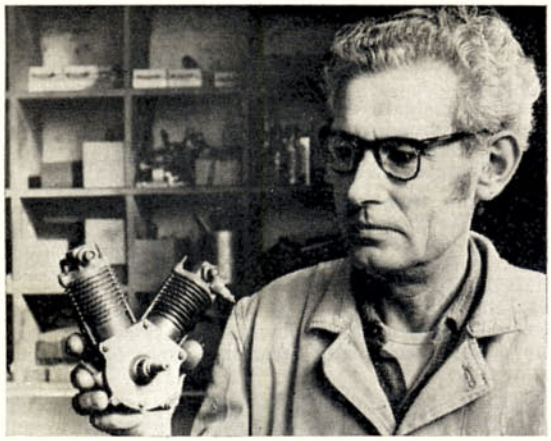
These performance characteristics are, of course, reflected in the speeds achieved with various props, which, when compared with the performance of other 1 cc. engines, clearly show that the Cormoran is at its best on props no smaller than about 7 x 4 in. On test, for example, we obtained 7,600 rpm on an 8 x 5 PAW, 8,200 rpm on an 8 x 4 Top-Flite nylon, 8,800 rpm on an 8 x 3½ Top-Flite wood, 10,300 rpm on a 7 x 4 Top-Flite nylon, 10,750 rpm on a 7 x 4 Top-Flite wood, 11,600 on a 7 x 3 PAW, 12,100 on a

Continued on P.90

SIDE ELEVATION FULL SIZE



P . G . P . C H I N N



Numa Allouchery, veteran engine designer with a 1919 vee twin of about 35 c.c. which he used in a model. His son, Serge is also in the business.

SPECIFICATION

Type: Single-cylinder, air-cooled, reverse-flow scavenged two-stroke cycle, compression ignition. Crankshaft type rotary-valve induction. Plain bearings.
Bore: 11 mm. (0.4331 in.) **Stroke:** 10 mm (0.3937 in.)
Swept Volume: 0.9503 cc. = 0.0580 cu. in.
Stroke/Bore Ratio: 0.909 : 1
Weight: 2.7 oz.

General Structural Data

Cast aluminium alloy *crankcase* and unbushed main bearing unit. Hardened steel *crankshaft* with disc web, 0.236 in. dia. journal, 0.157 in. dia. crankpin and 0.150 in. bore gas passage. Screw-in hardened steel *cylinder liner*, flanged at exhaust belt. Screw-on machined aluminium alloy finned *cooling jacket*. Lapped cast-iron *piston* with fixed 0.118 in. dia. solid non-hardened *gudgeon-pin* and hardened steel *connecting-rod*. Lapped cast-iron *contra-piston*. Machined aluminium alloy screw-in crankcase *backplate*. Machined aluminium alloy *prop driver* fitted to taper on crankshaft. Machined aluminium alloy *spinner-nut* or plain steel hexagon-nut and washer. Brass spraybar assembly. Beam mounting lugs.

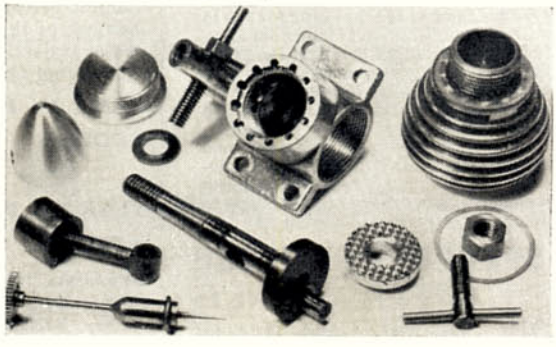
TEST CONDITIONS

Running time prior to test: Manufacturer's use 30 mins.
Fuel used: Keilkraft diesel.
Atmospheric temperature: 44 deg. F.
Barometer: 29.1 in. Hg.
Silencer type: Nil.

MANUFACTURER

Moteurs Eclair Allouchery, 19 rue de la Maison-Rouge, 94 Fontenay-sous-bois, France.

Parts of the Cormoran, showing the drilled multiple transfer passages in the main casting.



7 x 3 Top-Flite wood and 13,100 on a 6 x 4 Tornado nylon.

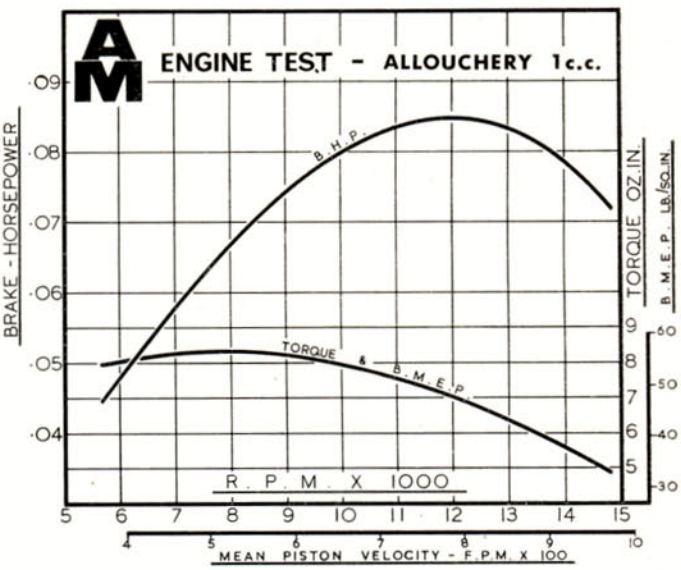
At the lowest speeds tested (6,000-9,000 rpm) we experienced a fair bit of vibration. This decreased as load was reduced and, as diesels go, the Cormoran was quite smooth at speeds corresponding to the peak of the power curve. There was no power loss with warming up at these speeds.

Controls were easy to adjust and held settings firmly. The contra piston was obviously a good fit in the bore. It did not seize when the engine was hot and would return to a lower compression setting immediately when the compression screw was slackened. At the same time, the contra piston fit was still close enough to obviate any risk of unwanted movement which might cause the compression screw to loosen.

To summarise, the Allouchery Eclair Cormoran 1 cc. diesel emerged from our examination as an interestingly different design, attractive in appearance, easy to handle, not too heavy and with a performance adequate for all but hot contest models.

Power/Weight Ratio (as tested): 0.50 bhp/lb.

Specific Output (as tested): 89 bhp/litre.



GOLDEN WINGS AEROMODELLER MODEL CLUB

Dear Sir,

I would be very grateful if you could name the diesel engine which I have acquired and give me some indication of its performance.

The crankcase is of a single light alloy casting and on the left side of the cylinder block is the letter "T" in relief in a circle. On the other side is 1.5, also in a circle. The screw on alloy fins are red anodised and the vernier screw has a compression locking lever. The engine is of the front rotary valve type, the carburettor assembly being made of brass. Below the needle valve is a threaded lug which is integral with the casting. I presume this is for the mounting of a spring steel needle valve grip.

The inside of the engine bearers is $\frac{7}{8}$ in. and the holes are $\frac{7}{16}$ in. apart. Also, the piston top comes to a point.

This engine is very powerful for use in my *Keil Kraft Radian* but I found the plane to be sluggish with a *Cox Babe Bee*. With the diesel I have executed loops and vertical 8's. I have recently made an exhaust which runs the length of the fuselage—from plastic (does not melt).

I would also be pleased if you could tell me where I could get a 2 volt accumulator for starting a *Cox Medallion* (with resistance) since I have been unable to do so.

I look forward to the Aeromodeller each month and also to reading the club articles.

North Leigh, Oxon. *Mark Noel.*

The engine you have sounds like the Australian **Taipan 1.5cc** *and this is made by Gordon Burford and Co. Peak B.H.P. is 0.1 at 10,000 r.p.m. and it will perform well using a 7x6 in. propeller in a control line model such as the* **Keil Kratt Radian.** *Two volt accumulators are on sale at several large model shops and can be purchased cheaply at Government Surplus stores, try Rolabd Scott Mail Order. To reduce the 2 volt output of the accumulator as the Medallion uses a 1.5cc glow head, fit a six ft. long pair of leads. This should prevent burning out the glow head.*

Dear Sir,

Last Saturday (September 17th) I was at Chobham Common, near Guildford, test gliding a K.K. *Caprice* which I had just built. With the help of my Uncle I trimmed the glider and then we tried a few tow line launches using about 50 feet of line.

However on our 4th or 5th successful launch the plane disappeared over the other side of the hill. It must have flown into a thermal because we finally saw it as a dot in the sky disappearing through the clouds about 2,000 ft up. I did not have a D/T fuse on the plane and certainly learned the hard way.

I know the chances of recovering the glider are very small, but I would be very pleased if I could locate its whereabouts. The plane has a black fuselage with orange nose, tail fin, and wing leading edges. If anyone has any information about this plane I would be pleased to receive it. I would be willing to pay a small reward if the glider is recovered. Clive Taylor, 'Desley', Upper Lambourn, Nr. Newbury, Berks.

C. Taylor.

Dear John Bridge,

I am between 10 & 16 years of age and would like to become a member of the "Golden Wings Club". With this application I enclose postal order (International Money Order) for 2/6d. to cover cost of the enamel club badge, two coloured transfers and membership card.

NAME IN FULL .....

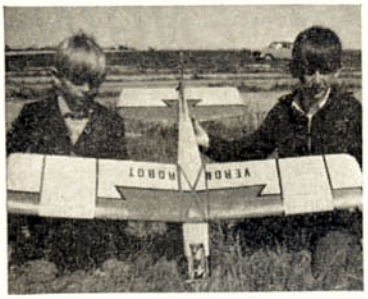
ADDRESS .....

.....

YEAR OF BIRTH.....**SCHOOL**.....

NAME OF ANY OTHER CLUB OR CLUBS TO WHICH I BELONG (if any) .....

SEND TO:- GOLDEN WINGS CLUB, AEROMODELLER, 13-35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.



M. Carder poses with his "Veron Robot" and a friend at Wigsley Aerodrome.

Dear Sir,

I am enclosing a photo of myself and my *Veron Robot.*

Ever since I got interested in Aeromodelling I have made several good models but have been unsuccessful in getting airborne. But the *Veron Robot.* proved to be my pride and joy, my joy was soon ended for when we got her into the air for the first time, we got a bit too excited and wanted to get as many flights as possible in the day.

It was on our third flight that she spiralled down and ended up in a heap of balsa on the tarmac. It was found out later that the actuator had stuck on. My dad and I are in the process of rebuilding her to go with our collection of other Veron models all ready for a good start in the next season.

We have the *Mini-Robot, Pinto,* and *Mini-Concord,* and two control line models

Worksop, Notts. *M. Carder.*

Dear John Bridge,

I am enclosing an application form and postal order for 2/6d in respect of membership of the Golden Wings club for my son Alan Richard Clarke who is 10 years old. I would be obliged if you would dispatch his membership card. He has been a keen modeller for a couple of years or so now giving me the opportunity to become a second-winder. We were at Swinderby for the International Championships and had a thoroughly enjoyable time. Richard got some excellent photographs of some of the competing models and was thrilled by the combat display. In consequence, his fifth model, with dad's help of course had to be the *Mini Early Bird* powered by his A.M. 10.

We were not sure that its name was sufficiently "in" at the time and his choice of title for his own model was *Mini ComBatmobile* with the model decorated with red bat wings on the upper surface and blue bat wings underneath. The underside also carries this name in white lettering.

Draycott, Derbys. *F. A. Clarke*

★ ★ ★ ★ ★ ★

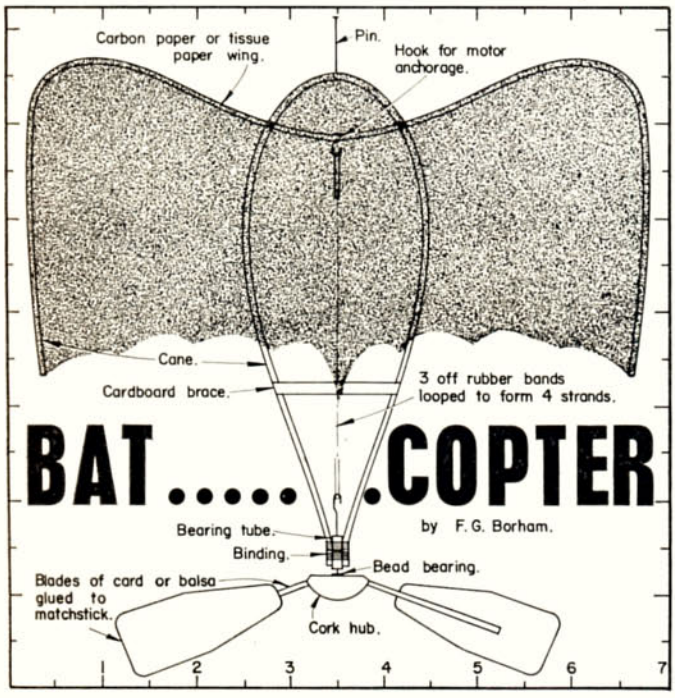
Dear Sir,

On looking at the plan presented in *Aeromodeller* (February 1966) I noticed a model which immediately took my liking. The "Swannee" a 38in. single channel radio control job. Unfortunately I have no radio control equipment, but I do have the Babe Bee .049. Do you think the Swannee would be suitable for free flight (I have made one free flight plane before, the Mercury "Wizard" which flys very well) if so please be so good as to give details of what changes may be necessary on the structure.

Wotton-under-Edge, Gloucestershire. *S. Herrick.*

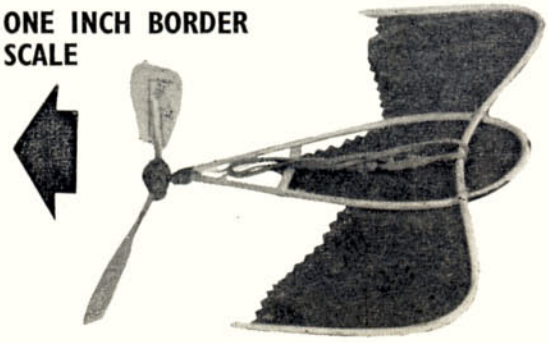
This is not a suitable model for a free flight conversion at all, especially as your second model. Being low wing you will have instant stability problems and the dihedral would have to be at least twice as great as the R/C version, for F/F. The all sheet structure would make it fast flying due to its higher wing loading and some form of control over it would be essential. As David Boddington has recommended in "Strictly Simple" you could style an existing model. Take the wing, tailplane, and engine positions of the Mercury "Wizard", ignore the rest of the fuselage lines then fill in your own outside lines keeping the same aerodynamic areas and fill in with construction lines.

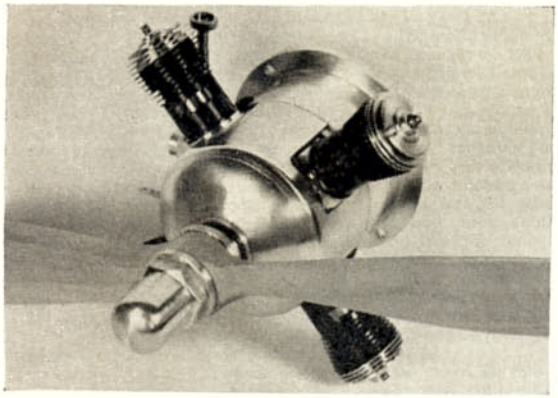
Alan Clarke poses with his "Mini Early Bird" decorated Mini ComBatmobile, his father helps him to fly.



A simple little novelty flier, *Batcopter* is the "In thing" just now as "Goggle Box" fans will know. The materials needed are inexpensive to say the least, 12in. x 1/16in. basketwork cane, black tissue or carbon paper, cork, 1½in. of 20s.w.g. piano wire, two match sticks, thread, bearing tube, rubber bands and card. Here is a method for bending cane so that it won't spring out of shape when released. Bend the fuselage hoop with the apex of the curve over a candle flame, not so close as it will burn, but near enough to get the heat. Hold to the desired shape until cool, release and it will retain its bent shape. Bind the aluminium bearing tube between ends, carve cork propeller hub to shape, cement propeller blades to matchstick then push the matches into cork hub. Bend cane wing frame over flame then bind to fuselage, cover with black tissue or carbon paper and *Batcopter* is finished. Fit rubber band motor, oil bead bearing and press a pin into the front on the fuselage hoop, wind up hold propeller and fin, allow Batcopter to rotate a few times then release for hovering flight in the vertical attitude.

ONE INCH BORDER SCALE





The production version of the Bancroft & Martin 4-cylinder geared R/C engine. Full details of this interesting motor will be found in this month's issue of RCM&E.

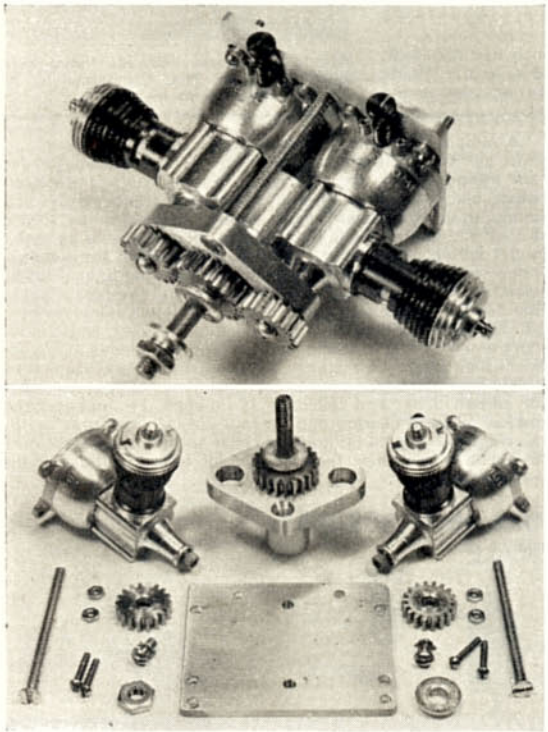
LATEST ENGINE NEWS.....

By Peter Chinn.

FCP Twin-Bee

In the May/June 1966 issue of *American Modeler* there appeared an article by Walter A. Watkins on how to make a twin cylinder engine, using a pair of Cox Golden Bee motors geared to a separate propshaft. A commercial application of this idea later appeared from Flight Control Products of Salina, Kansas, in the form of conversion kits for Cox Babe-Bee or QZ engines. Completely assembled units are also being offered.

We recently acquired one of the assembled Twin-Bee units for examination and test. Inevitably, the conversion parts push the weight up considerably, so that the power/weight ratio falls somewhat short of contest requirements, but for a scale model, particularly free-flight or single-channel R/C, this is an interesting and quite practical unit. The Cox Babe-Bee is not, itself, a motor of contest potential: it is the least powerful of the three 0.817 c.c. Cox .049 models (Bee, Medallion and Tee-Dee) and, even excluding gearing losses, the specific output of the 1.63 c.c. Twin-Bee could not be expected to equal that of a high-performance type 1.5 c.c. engine. On a power-weight ratio basis, it looks even worse, since it weighs 6½oz.—or about twice as much as the average 1.5.



Above: the FCP 1.63 cc. flat twin engine which is based on two Cox Babe-Bee units. Also conversion parts of the Twin Bee. The propeller drive shaft is ball-bearing mounted.

All this is, however, to some extent compensated for by the fact that the Twin-Bee incorporates reduction gearing. This enables the engine rpm to be kept up to a figure corresponding with the peak of the power curve, while turning a prop larger than would otherwise be practical. The actual reduction ratio is only 1·22:1 (and it might, in fact, be beneficial to increase this) but this reduced, on our test model, the bhp peaking speed, at the crankshaft, of 14,000—14,500 rpm, down to 11,500—12,000 at the prop. Power developed (allowing for acceleration in the air) corresponded with the use of 8 x 3½, "slow" 7 x 4 or "fast" 8 x 4 props.

One could undoubtedly increase the performance of the Twin-Bee by using Tee-Dee cylinders and heads. So far as the U.K. is concerned, where the use of silencers is obligatory, it would indeed be plain common sense to use QZ engines (which have a specially ported cylinder and a Tee-Dee head in addition to a silencer) rather than to fit silencers to the Bee type cylinders which, with their sub-piston induction feature, would suffer a power loss that could be ill-afforded. The slightly higher price of the QZ engine is of little account when set against the overall cost of the Twin.

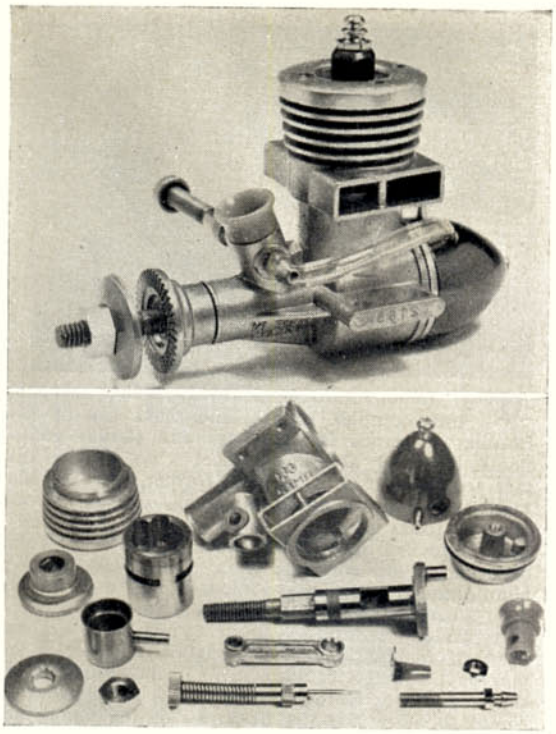
It is fairly obvious why the Cox Babe-Bee and its "QZ" derivative, were chosen for the FCP twin conversion. Firstly, the low price of these engines keeps the total cost of the Twin within reasonable bounds. Secondly, conversion can be made with a minimum of special parts and without modification to the basic engines themselves. Thirdly, the fact that they use reed-valve induction and are therefore equally efficient, whether running clockwise or anti-clockwise, overcomes the problem of reverse-rotation introduced by the use of gearing and so eliminates the need for "pusher" props or specially ported crankshafts or valve rotors.

As the photographs show, the Twin-Bee is of the horizontally-opposed type. The two engines are mounted side by side with their radial tank mounts turned through 90 degrees to bring the needle-valves and filler and vent tubes to the top. The engines are secured to a rectangular ¼in. thick aluminium plate at the rear, while at the front they are braced together by a ¼in. aluminium yoke which, itself, is tied to the backplate with two 6-32 c/s head machine screws. Press fitted to the rear of the yoke is a cylindrical housing which forms the bearing for the $\frac{7}{16}$in. prop shaft. It encloses a ½in. o.d. ball journal bearing.

The normal Bee prop drive hubs are removed and are replaced by ⅜in. dia. 18-tooth brass spur gears pressed onto the knurled crankshaft ends and retained by shortened screws with lock washers. These mesh with a ¾in. dia. 22 tooth gear pressed onto the propeller shaft which is knurled to take both the gear and prop drive washer.

The crankshaft pinions are, of course, meshed with the main shaft gear in such a way as to synchronize piston movement and produce simultaneous firing in the accepted flat-twin manner. As in an orthodox horizontally opposed twin, the balancing of the reciprocating masses that simultaneous firing produces, means immensely improved smoothness. The Twin-Bee generates far less vibration than a single Bee and, therefore, only a fraction of the vibration of a single cylinder engine of equivalent displacement.

Since the Twin-Bee retains two needle-valves, a little practice may be necessary to get the mixtures balanced for easy starting, but we found that, once this has been established, the Twin was quite easy to operate. One should, of course, try to introduce an approximately equal prime into each cylinder, when starting from cold, in order that both cylinders fire when the prop is flicked, otherwise the engine will tend to simply oscillate.



The low-priced Fuji 099 motor shown assembled and in parts. The engine weighs 3.4 oz. complete with detachable fuel tank.

As we mentioned earlier, the FCP Conversion is available as a kit of parts or as an assembled unit. The complete kit of conversion parts costs $19.95, or $29.95 with two Babe Bee motors. With Cox QZ's, instead of Bee's, it costs $31.95. Ready-assembled units are priced at $31.95 and $33.95, respectively. All units are obtainable direct from Flight Control Products, 1937 Simmons, Salina, Kansas 67401, U.S.A.

Fuji 099

Hobbies Limited, of Dereham, Norfolk, one of the largest, and certainly the longest-established, model manufacturers and distributors in the U.K., have recently entered the model aircraft field with an extensive range of domestic and imported model products. Among these are the Japanese Fuji glowplug engines and we shall be dealing with some of these in L.E.N. during the next few months.

Most of the Fuji engines are moderately priced and many are available in R/C and/or water-cooled versions. The one illustrated is the low-priced 099, which is also obtainable in an R/C version, having the moulded plastic venturi insert replaced by an extended machined aluminium intake with machined brass butterfly throttle. Alternatively, this engine will accept the barrel-throttle type carburettor of the slightly more expensive 099-S R/C model.

An idea of the general design of the Fuji 099 can be gained from the photograph of the component parts. The crankshaft, which runs direct in the aluminium crankcase material, is counterbalanced and hardened, has a 0.315 in. journal and a 0.216in. bore gas passage. The very thick walled cylinder sleeve has a large exhaust port area and internal flute type transfer passages. It is held in position by a diecast and machined finned jacket which screws into the top of the crankcase. The lapped cast-iron piston is coupled to a diecast conrod which, surprisingly for a small, low-priced engine, is bronze bushed at both ends. The Fuji has a square bore and stroke of 0.500in., giving a capacity of 1.61 c.c.

ONE MAN AND HIS MOTORS

Dr. R. E. Nichol, age thirty-seven, is a Dentist with the U.S. Army Dental Corps., currently stationed at Ft. Carson, Colorado. "Doc", or "Nick" as he is called by his friends (anyone who models or collects), started modelling at nine years of age and built some two hundred small models before going on to power designs in 1945. His first power models were a Baby "V" Shark, Tether Trainer, and Playboy Sr. His first engine was a "Megow" in 1943, then an Ohlsson .23, when they became available by obtaining a priority!

While in High School, he worked at several model shops and later opened one of his own, which he operated in College and Dental School, for twelve years, as a sideline because, quote "*I just like the stuff*".

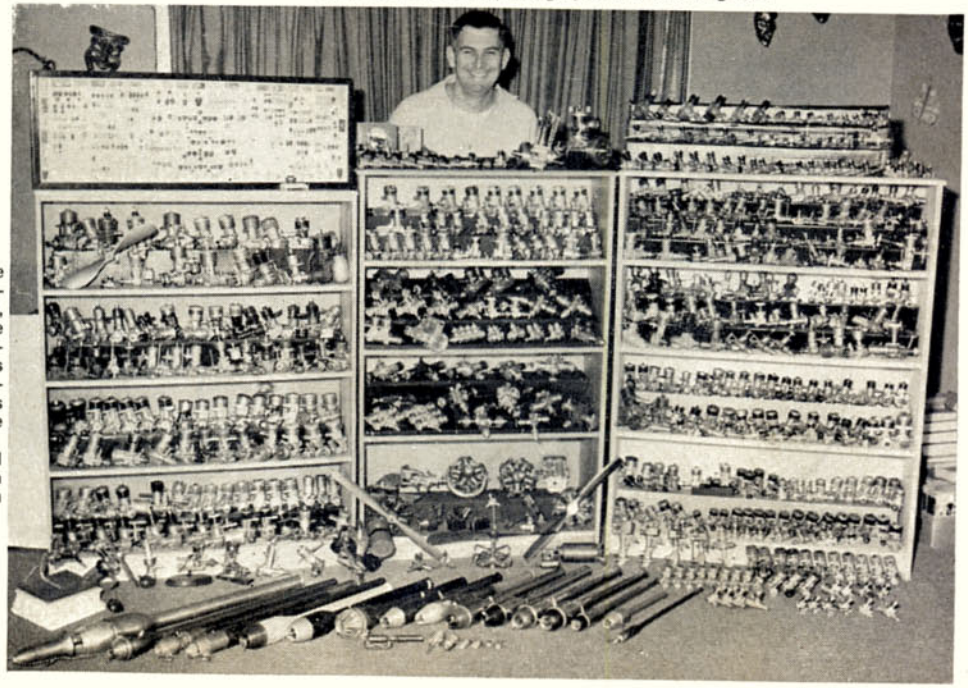
In modelling competition he won the Oregon State Championships in 1947-48 and 49, and has been at most of the U.S.A. Nationals with cameras hanging all over him, as he is also a freelance photographer and sells to various Model magazines. Many have been seen in these pages.

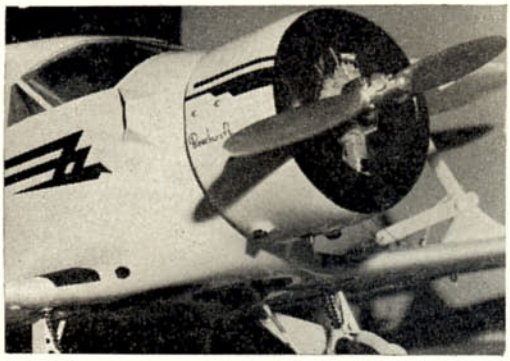
His interests cover all phases of modelling from plastic cars to microfilm models.

Model engine collecting for "Nick" officially started in 1954, and his speciality is multi-cylinder engines of which he now includes forty-five specimens. Engine collecting interests are as varied as his modelling because he collects almost *all* types of model engines. Ignition, glow, compressed air, steam, diesel, jet, Foreign, and Domestic, or anything else that powers models including Drone engines, totalling to well over five hundred specimens.

Other collections of interest are over two-hundred spark and glow plugs, two-hundred-and-fifty different propellers, and twenty-five race cars.

Dr. Nichol is an active model historian and has a library of over four-thousand photographs of model engines.





COWLINGS

How to make those aluminium cowls for scale or sport models.

By A. J. Bunting

MOST modellers prefer to avoid beating sheet metal into complex shapes, and make use of more familiar materials for cowlings and similar components. However, aluminium sheet is not all that difficult to shape over a suitable former, and for scale model cowlings in particular it has obvious advantages. It looks realistic, cannot soak up fuel, and is easily knocked back into shape if it gets bent. Radial or rotary type cowlings look particularly good in aluminium. The following method was used to produce a cowling for an $\frac{1}{8}$th scale Sopwith Pup.

A wooden former is needed, and there are two ways of making this, depending on whether or not you have a lathe. If you have, turn a block to the shape of the cowling, but about $\frac{1}{32}$ in. smaller all round to allow for the thickness of the metal, and with a recess in the front face the same diameter as the open front of the cowling, and about $\frac{1}{4}$ in. deep.

If you have no lathe, the wooden former can be made by laminating pieces of thick ply or planking, cut roughly circular, then finishing to as accurate a shape as possible with a wood rasp or "Surform" tool. The front lamination can be of $\frac{1}{4}$ in. ply with a circular hole in it; this will form the recess on the front face referred to above.

The material for the cowling is pure aluminium sheet (not duralumin, which is harder, and unsuitable for this work). 22 to 24 gauge sheet is suitable for 3 to 5 in. diameter cowlings. Cut a strip of aluminium long enough to wrap right round the block, and about $\frac{1}{2}$ in. wider than the distance from the rear edge of the cowling round to the edge of the frontal opening. Bend the strip round a tin can or other object about 1 in. smaller than the former, so that it finally fits closely round former with the two ends just meeting. Then cut a strip of some heavier sheet metal, about 1 in. longer than the cowling strip, as wide as the straight cylindrical part of the cowling, and with the two ends bent at right angles, drilled, and joined with 2 B.A. nuts and bolts.

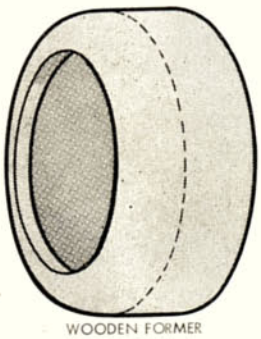
Before clamping everything, the aluminium should be softened or annealed. This is done simply by heating it to about 300 deg. C in a gas flame; the kitchen cooker will do. Rub the aluminium with soap before heating it, when it turns brown, it is hot enough.

After annealing, clamp the aluminium round the former with the back edge of the former and the front edge projecting forwards over the curved nose. Using a small hammer, start tapping the aluminium inwards over the former, beginning where it emerges from the clamp, and working right round the block. The metal will begin to wrinkle as it is bent inwards, but by tapping gently at the "high spots", it will be gradually compressed so that it conforms to the curved surface of the former. As it is shaped, it will tend to work-harden and should be taken off the former and re-annealed from time to time to keep it malleable.

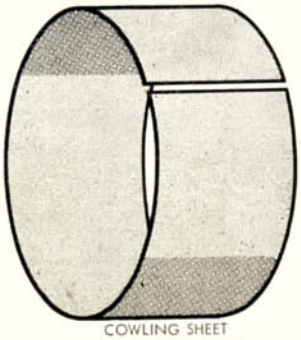
As the sheet is worked further round over the curve, it will become more difficult to tap out the wrinkles, but as long as the metal is kept soft by reheating occasionally, they can be gradually worked down to the shape of the former until the sheet is wrapped right round over the front face, with the edge projecting inwards over the recess. At this stage trim off the edge of the metal, (taking it off the former to do so if necessary), so that it projects only about $\frac{1}{4}$ in. beyond the edge of the recess. Then tap to form a flange.

The hammer marks are removed by alternately rubbing with emery cloth and tapping down the high spots, until a smooth finish is obtained. The cowling is joined up with a patch of aluminium about one inch wide, bonded with "Araldite" to the inside.

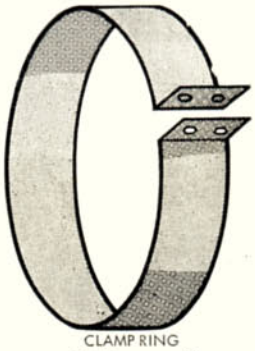
Finally, drill and file out any cooling slots, and holes for engine controls. Finish may be plain metal, painted, or if you really want to stagger the spectators, "engine-tuned" with a piece of ink-eraser on an electric motor shaft.



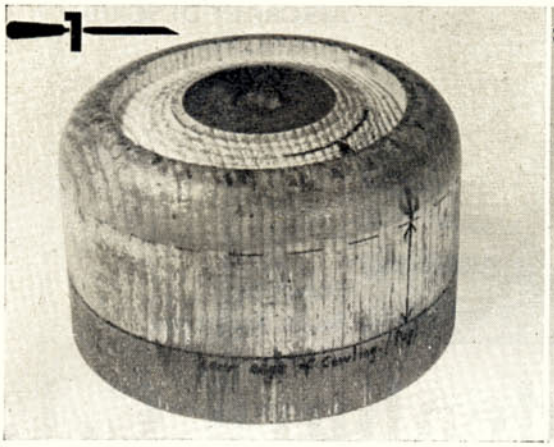
WOODEN FORMER
Carve to finished shape of cowling



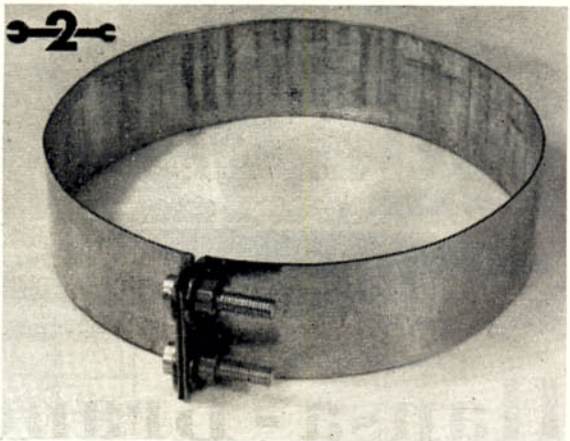
COWLING SHEET
22-24 s.w.g. sheet Aluminium



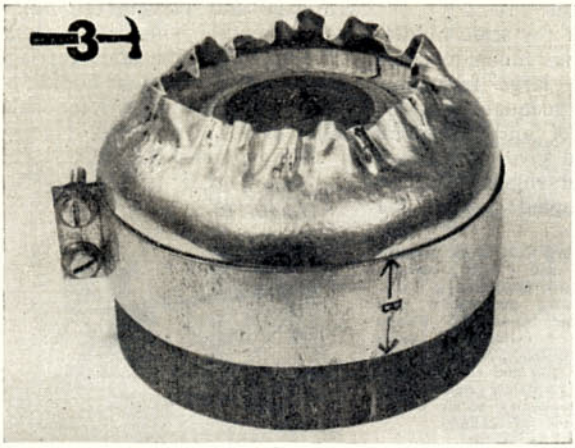
CLAMP RING
18-22 s.w.g. with holes for bolts



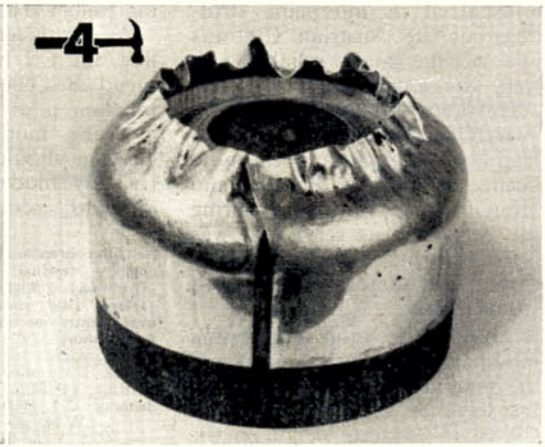
The hardwood pattern should be turned or carved to the final cowl shape required, less the thickness of the aluminium sheet.



A clamp band of thicker material with flanged ends and allowing for the final diameter. Make as deep as possible, i.e., length of straight side 'B' in next picture.



Hammer the sheet aluminium from the outside towards the centre with the clamp ring bolted firmly in place to prevent any slipping.



How the job will look without the clamp band in place—don't worry, just keep on tapping it to shape, gradually folding the top edge over.

Polish all the hammer marks off with a fine buffing wheel or by hand with emery cloth, then trim all edges including the join seam.

Finish the seam off with a patch of aluminium Araldited to the inside, then give it a final polish and it's ready for the model.

AIRCRAFT DESCRIBED
Number 159

drawn by
Bjorn Karlstrom

Hansa-Brandenburg C.1.

Ugly it may have been; and unusual in its interplane strutting but the Austrian C.1 was one of the most reliable and well developed two seat reconaissance bombers of World War One. Designed by Ernst Heinkel, it was made under licence by both the Phoenix and Ufag factories and since during the period of its service, it was fitted with five different types of engine, the number of variations seems infinite.

Among the more interesting modifiations was the raising of the rear gunner's ring mount to the level of the upper wing as shown in separate detail on the drawing opposite.

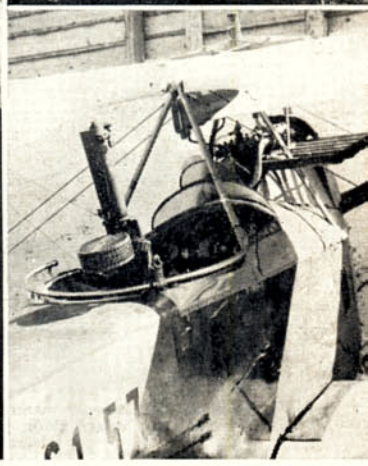
Ordinarily the crew of two were seated back to back in a "bathtub" cockpit the front coaming of which varied according to the type of engine. A fixed forward firing machine gun was mounted above the centre section, and at a late date, also on the port side the engine cowl. The latter had of course to be synchronised to fire through the airscrew. The wing mounted gun was either water or air cooled and was sighted to clear the apex of the airscrew disc.

As a bomber, the C.1 carried a useful load of one 176 lb. bomb and a pair of 22 pounders. It served with the *Kaiser und Kaiserlich Luftfarttropen* and the K.u.K. Naval Air Force (land based), being in action on the Italian front.

As a subject for scale modelling, the C.1 has much to commend it. The large triangular tailplane is of adequate area for a flying model and the deep cowling should give camouflage for any model engine. Shallow dihedral, coupled with the generous keel surface of the fuselage and vertical tail ought to provide sufficient lateral stability. Even the undercarriage and propeller sizes could be safely reproduced to exact scale.

Dimensions

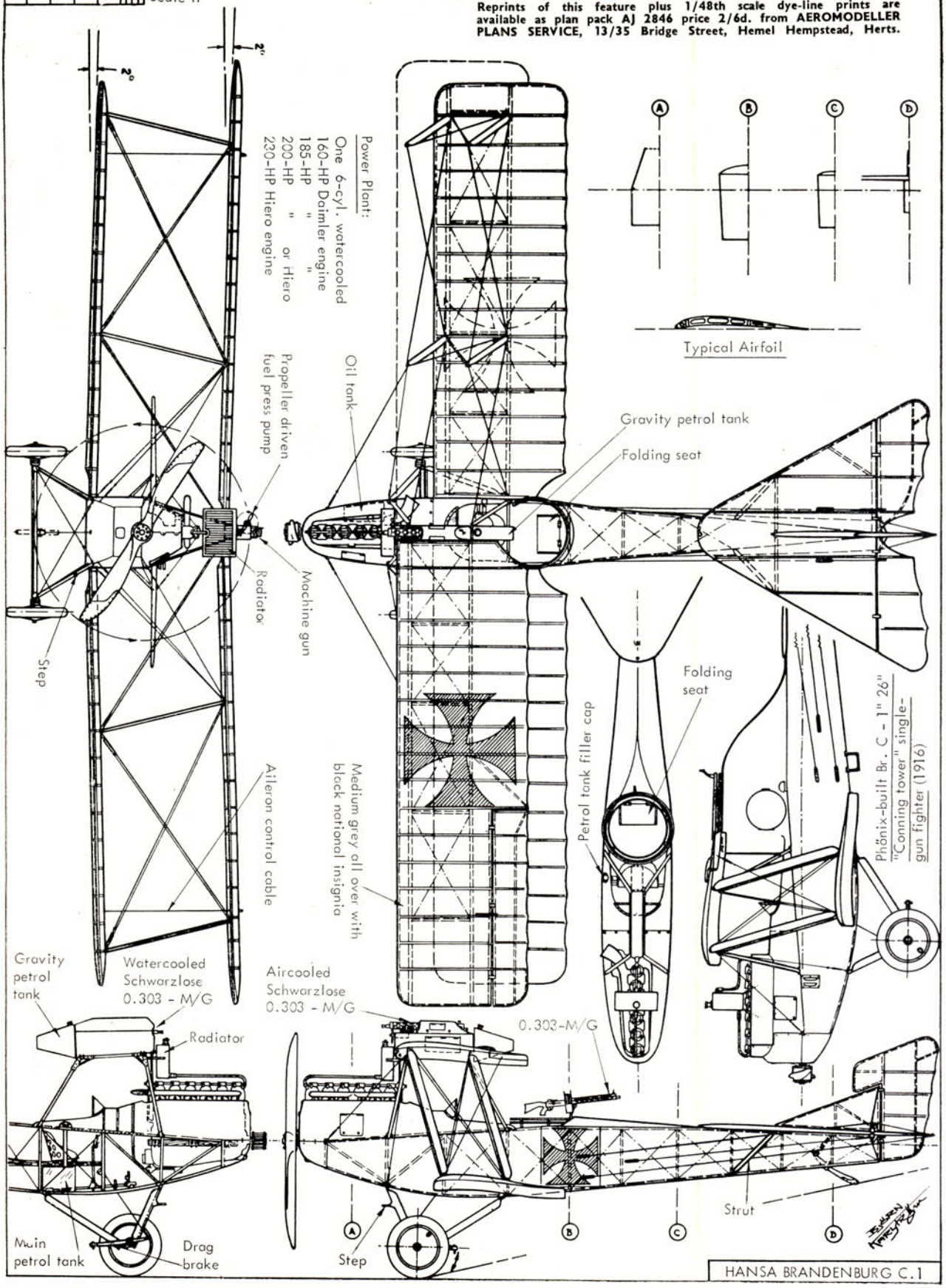
Wingspan 40 ft. 2 in.
Length 27 ft. 10 in.
Height 10 ft. 6 in.



Heading: Brandenburg C.1. Note rounded engine cowling and high radiator (Q.69465). Right: Brandenburg C.1. (Ufag) view showing the gravity tank over centre section (Q.69467). Below: Brandenburg C.1. (Ufag-built) series 64.07 with 160 h.p. Austro-Daimler engine. Note wing gun and rear gunner's position (Q.68867). Below right: Brandenburg C.1. (Ufag-built) series 61.57. I.W.M. photos (Q. 68866).

Scale ft

Reprints of this feature plus 1/48th scale dye-line prints are available as plan pack AJ 2846 price 2/6d. from AEROMODELLER PLANS SERVICE, 13/35 Bridge Street, Hemel Hempstead, Herts.



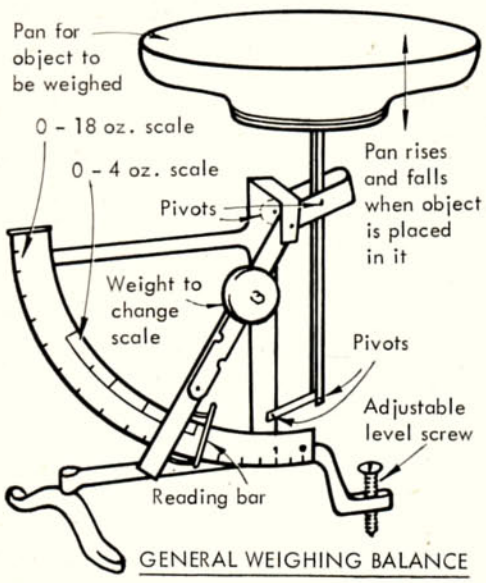
FREE FLIGHT COMMENT . . . .

. . . . By John O'Donnell

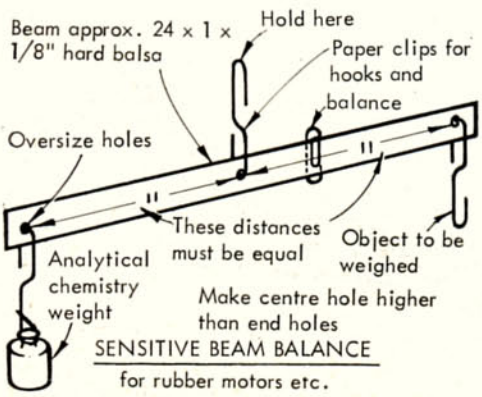
THE present time is very much the "off-season" as the Winter Rallies popular a few years ago in the North of England are no longer scheduled. A few club-organised galas, mostly at Chobham, indicate more interest and initiative further south. Unfortunately I can't report personally on the Richmond/Welsh/Crawley Galas, and will have to rely on "Club News" rectifying this omission.

The provisional S.M.A.E. 1967 Contest Programme has appeared in "*Northern Area News*" and is pretty much "the mixture as before". Once again any ideas for changing the concept of the programme (say, by dropping area-semi-centralised events in favour of more galas) have been shelved with the perennial excuse of it being too late for this season. The failure of the S.M.A.E. to elect a Competition Secretary (to replace Stan Wade) can hardly help the situation.

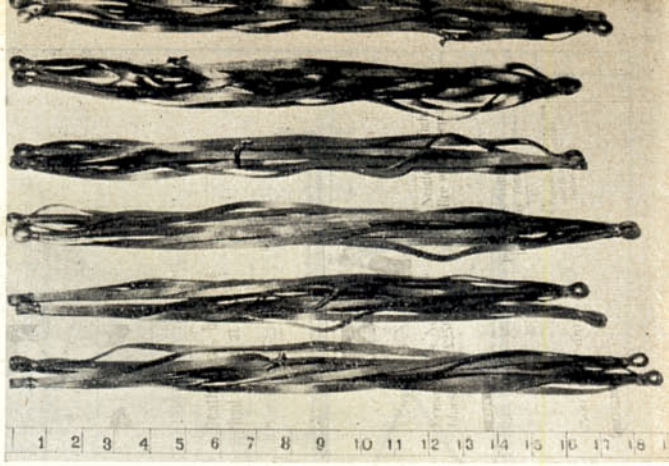
This organisational deficiency is only too typical of the apathy currently prevalent throughout *organised* aeromodelling. From what I hear most Areas and Clubs are conspicuously lacking both in volunteers for official positions and in efficiency thereafter. This has resulted in most free-flight events being run very much on a "do-it-yourself" basis. We have already passed the stage of 'providing our own timekeepers to the *widespread* acceptance of one timer. As an increasing number of fliers have adopted the very practical (and completely legal) solution of enlisting their wife or girlfriend to handle the stopwatch, it only remains for the fliers to be allowed to time their own flights.



GENERAL WEIGHING BALANCE



SENSITIVE BEAM BALANCE
for rubber motors etc.



Rubber varies even throughout a skein! These six 40 gram motors were made up (by weight) from the same continuous length of bulk Pirelli. Three were from each end of the skein —but even the "long" motors are far from identical in length.

I have been accused of being critical of informal contests—and I certainly am, especially when they should be otherwise. Local events obviously need less organisation than those attracting wider participation. The trouble comes when ambitions out-run resources and in particular manpower. Timekeepers have always been a problem, "solved" of late by casually giving flight cards to competitors and leaving them to find their own timekeepers. This is bad enough for the well-known participant with friends or clubmates—but is woefully inadequate for the newcomer to the game, who has to rely on whom he can persuade.

Basically the solution to these problems is the *responsibility* of the organisation. A club (or area) wishing to hold a contest for prestige, publicity or satisfaction should ask itself whether, in fact, its envisaged events can be adequately organised and manned. The N.W. Area has been forced to do just this of late, and is not very optimistic of the answers!

One suggestion of dropping large meetings and running smaller and localised events is surely "progress backwards" and would, to me at least, appear to be the "beginning of the end" of worthwhile f/f competition.

But competition is not the *only* facet of modelling! Those who are surprised at *my* saying this should remember my many years association with an active and all-round club that is very far from being just a "competition group". Perhaps I should take the opportunity for more general comment than that appropriate to specific events, and include some "handy hints" for the free-flight enthusiasts not already involved in the "contest circuit".

Like many other subjects aeromodelling can benefit from "technological fall-out" from its competitive side. Consider a simple subject like **weighing.** For anything that flies weight is of paramount importance—yet most modellers neglect any attempt at scientifically evaluating this aspect of their products. Some only check weigh to see if their models meet the F.A.I. regulations. But this is only a very restricted (!) application.

For anyone desirous of producing strong, light models, possession and use of a *suitable* weighing device is strongly recommended. There is no need to go to laboratory balance extremes. The one I have had for many years is of the quadrant lever type (see sketch) and is just about ideal. Objects can be placed on the pan which is often more convenient than hanging them off a hook, and the two alternative scales offer useful ranges of 0-4 and 0-18ozs. The more sensitive scale is graduated to $\frac{1}{4}$ozs. which is enough for most applications. In this day and age a decimal scale would be both appropriate and advantageous.

This is only intended to illustrate the sort of device and the basic requirements. Applications are many. One that is very useful is to weigh sheet balsa *before* doing any cutting whatsoever—and mark the weight onto the sheet. Afterwards it is a simple matter to use the lightest wood for, say, the tailplane and wing tips. It is also useful for matching sheet for, say, fuselage sides. For anyone systematic enough to keep records this practice can be used to ensure that equivalent wood is used on successive models, or that strength can be added or removed where appropriate. This *really* is development.

Systematic weighing can show which parts (of the model) are heavy. It is soon realised that metal is heavy! In the days of unlimited rubber "Wakefield" models recourse was made to built-up hollow noseblocks. This saved weight—but no more

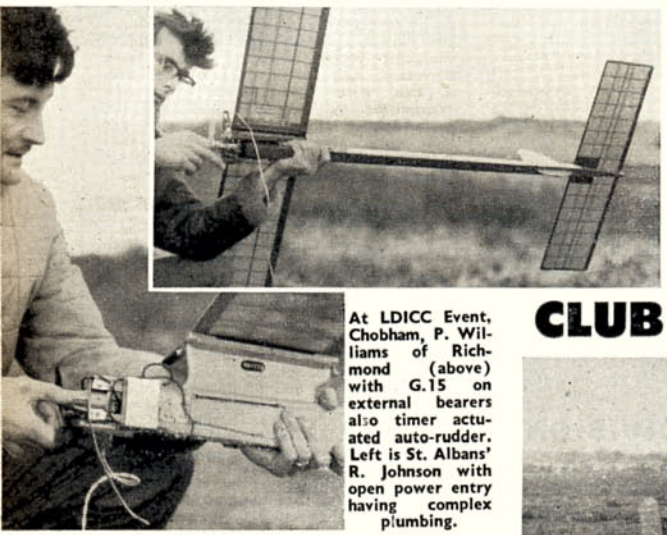
than that saved by substituting a length of brass tube for the usual screwed bush!

Another obvious application is the weighing of rubber motors. Many fliers still make up motors by length not weight—even when it comes to restricted rubber contests like Wakefield and Coupe d'Hiver. Present day rubber is notorious for varying in size and /or density—and motors made up by length can vary widely in weight. The converse is, of course, also true as illustrated in the accompanying photograph (at left) of motors made from a single skein.

For working close to a definite weight limit a more sensitive device than the usual commercial scale *is* required. This doesn't need to be elaborate, and I use a very simple and crude balance—but of more than adequate accuracy and sensitivity. The sketch gives all the details. The *only* critical aspect is to ensure that the distances of the end holes to the centre one are *identical*. Analytical chemistry weights enable motors to be made up right to the limit, and in case of argument at contests enable the official scales to be corrected. Alternatives to acquiring such weights are to have some homemade ones weighed out on a lab. balance—or even to use coins. The latter sounds crude, but it is surprisingly accurate.

Coin	Weight
Halfpenny	0.2 oz.
Penny	0.33 oz.
5/0d. of silver	1.0 oz.

Adhesives are another worthwhile topic. Epoxy resins (typified in this country by Araldite) are often used for securing heavily stressed components such as engine bearers. They are also often and inappropriately used as a substitute for solder or bolts. Their use for repair work is however not quite so widely appreciated. Several well known fliers have claimed complete success in sticking together snapped F.A.I. Power and A/2 fuselages. For this an epoxy rather less viscous than the household Araldite is required—but more than one *is* obtainable



At LDICC Event, Chobham, P. Williams of Richmond (above) with G.15 on external bearers also timer actuated auto-rudder. Left is St. Albans' R. Johnson with open power entry having complex plumbing.

CONTEST CALENDAR

January 22 *Blackheath Gala.* Chobham Common, Surrey. Open R/G/P, Bill White Cup for Rubber. Pre entry to M. Stagg, 85 Wiverton Road, Sydenham, London, S.E.26.

February 12 *Airtech R/C Spot Landing Contest,* Haddenham Bucks. Field entry, R/C licence and insurance must be shown.

February 19 *Western Area Winter Gala.* R.A.F. Wroughton, Nr. Swindon, Wilts. All-in-F.A.I., All-in-Vintage, Coupe d'Hiver (ROG), A/1 glider.

April 30 *Airtech Free Flight Gala.* Haddenham, Bucks. Open R/G/P, Chuck Glider. Shield for Rubber. Insurance required.

CLUB and CONTEST NEWS

RICHMOND GALA

Held at Chobham Common on November 13th the poor initial weather improved to fair with very little lift about, only two fly-offs being needed. The rubber fly-off was the usual timekeepers eyesight test and was won by J. Maybey (Lee Bees). John West (Brighton) in the power fly-off used his F.A.I. model having demolished his open model attempting his third flight. After an eight second motor run he returned 3:08 for his third flight and 3:52 from a ten second run in the fly-off. In all 103 entries were taken and for the first time a Public Address system was used on Chobham, this being available to other clubs on request.

Results: (18 entries): J. Maybey (Lee Bees) 9:00+5:43; 2. R. Lennox (Birmingham) +4:29; 3. F. G. Sharp (Blackheath) +4:22. *Power:* (15 entries): J. West (Brighton) 9:00+3:52; 2. B. R. Peers (Congleton) +3:14; 3. T. Payne (Northampton) 8:21. *Glider:* (24 entries): 1. A. Wisher (Croydon) 8:31; 2. A. Young (Croydon) 8:19; 3. P. Jellis (Croydon) 7.40. *All in F.A.I.* (14 entries): 1. D. Welsh (Brighton) 8:40; 2. A. Young (Croydon) 8:19; 3. R. Johnson (Croydon) 7:38. *A.2 Glider:* (15 entries): 1. G. M. Hannah (St. Albans) 6:28; 2. C. H. Morris (St. Albans) 6:16; 3. P. Newell (Surbiton) 6:15. *½A Power:* (5 entries): I. D. Hipperson (Croydon) 9:00; 2. M. Brown (Maidenhead) 7.40; 3. I. W. Keynes (Croydon) 6:15. *Coupe d'Hiver* (8 entries): 1. B. Rowe (St. Albans) 6:00; 2. D. Hipperson (Croydon 5:48; 3. R. L. Bailey (Croydon) 4:42. *Chuck Glider* (4 entries): 1. A. T. Slater (Leatherhead) 2:45.

Bristol Clubsters at the Welsh Rally

WOLVES M.A.C. ACTIVITY

Members of the above club which is affiliated to the Fordhouse and Oxley Community Association put on a static and control line flying display. Although public attendance was poor the club promotion was ideal as the Town Council and Education Authority were present. Mike Gagg and Bob Ivans helped things with their skilled flying and Dave Day was unfortunate to have a motor cut whilst demonstrating the S.M.A.E. stunt schedule, the only crash was a combat model (to be expected?)

Sheffield News

Sheffield S.A. have elected Trevor Faulkner as their P.R.O. and his first report details interesting models and comparative tests. Fred Wilkinson's latest A/2 is 104 in. span with aluminium tube *main-spars* and *fuselage boom.* It's interesting to hear of more modern methods in use, so we wish Fred all the best. Their six-minute competition was held in October and won by Competition Secretary John Shaw. Local flying has enjoyed a boom since the club decided to move its flying ground to an area offering a reasonable slope soaring site and undulating moor-land recovery country for miles around. The only snag is altitude about 1,600 ft above sea level where winds are quite piercing. One feature, has been matching performance in A/2 fly-offs. The procedure is to match the *model* performance by getting the competitors to tow and/or release as close together as possible. This allows members to compare performances by watching models and not stop watches,—reported to be far more exciting.

C/L at Cambridge

At the end of October, Cambridge members turned out in force to fly in a stunt contest and the second round of combat and rat race events, these having to be run in a cunningly contrived order to keep the models in one piece, by running the least destructive events first. Malcolm Tye won stunt with a *Crusader*, far superior to the combat models that were flown in this event by others. Next came rat race, after two rounds with a lack of line tangles the finalists were Dusty Miller Frog 150 R training model flown by Pete Martin, Pete Rank's Oliver Tiger powered *Dominator* pitted by Pete Tibbets and Mike Nelson with another Oliver powered *Dominator* pitted by Mike Hobbs who is their news sheet editor. Unfortunately, the final had to be held over due to lack of candles! The Combat was a triumph for the junior element, their models and flying being equal to the seniors, it was just bad luck that one of them did not win, the finalists Pete Rank and Richard Baker were prevented from *getting at it* by darkness, yet again and Richard was flying with one arm in a sling, despite threats to make his other arm match.

RIPMAX CUP WON BY SEVENOAKS

Strictly for single channel fliers in the South Eastern Area S.M.A.E. the Ripmax Cup was flown to rules drawn up by Ashford, Canterbury, Elliots, Sevenoaks, and Tunbridge Wells at the invitation of Maidstone on September 6th. It was decided to run off the contest in two stages, on September 25th the four man team of Tunbridge Wells lost to Sevenoaks they then ousted Maidstone on November 6th to win this new Area award. This year they hope to have more clubs competing and a greater number of rounds.

PEN PALS WANTED

A keen A2 fan in the U.S.A. would like to exchange information and materials with a London-based modeller, contact R. E. Norton, 2325, Dracena, Bakersfield, California 93304, U.S.A.. A penpal is also wanted by an 18-year-old student Tariq Bashis, c/o Bashis Ahmed Supt., L.A.O. (Mes), 4 Residency, Peshawar, West Pakistan.

Margaret Marsh, wife of West Essex Secretary, Ken Marsh, is presented with a two stick "gold brick" imitation transmitter by Sid Sutherland, the Tx is a transistor radio as a reward for club work. This and several other presentations were made at W.E.A. Annual Dinner and Dance, a very good "do".

1966 WELSH RALLY

The 1966 Welsh Rally on November 20th was, in the organiser's opinion, the best ever thanks to good support from Western Area Clubs, and Croydon. South Wales clubs showed a lack of interest by their absence, only two or three entries being received from them. Conditions were perfect with approximately 100 yards drift on a max., but the waterlogged condition of the ground created a pond that collected at least four models. Results in all events were close, only 25 seconds seperating the four in the rubber flyoff. Glider scores were lower due to weak lift, several 2:30's being made but only about four maxes. The possibility of a fly off did not materialise due to early d/t-ing and engine timer troubles. **Results**: *Glider*—1, C. Haywood (Croydon) 8: 27; 2, J. Caddick (Swindon) 8: 20; 3, J. Down (South Bristol) 7: 48. *Power*—1, J. Mayes (South Bristol) 8: 40; 2, J. Bailey (Bristol and West) 8: 20; 3, J. Down (South Bristol) 8: 09. *Rubber*—1, R. Burgess (Bristol and West) 9: 00+5: 16; 2, B. Hyde (Torbay) +5: 06; 3, J. Berryman (Bristol and West) +4: 56; 4, J. Bailey (Bristol and West) 4: 51. *Chuck Glider*—1, D. Bailey (Swindon) 2: 11; 2, J. Mayes (South Bristol) 2: 0.6; 3, A. Dakin (Cardiff) 1: 39.

FLYING DISPLAY AT FOURTH DIVISION

Wrexham and District M.A.C. are not very active at the moment, though there are plenty of free lance modellers in the area, the main interests being radio control and control line aerobatics. Recent negotiations between the aeromodellers and Wrexham Association Football Club allowed them to put on a display before the game against Bradford Park Avenue. This went well with the crowds and it was in a news programme on "B.B.C. Wales T V" the same evening as they showed the "John Simmance" feature.

CONTEST DATES FOR 1967

AEROMODELLER IS NOW ACCEPTING CONTEST DATE RESERVATIONS FOR THIS SEASON. MAKE SURE YOUR CONTEST DATES, WITH VENUE, AND LIST OF EVENTS REACH OUR OFFICES AS SOON AS POSSIBLE. WE WILL CLEAR THE DATES OR INFORM YOU OF ALTERNATIVES STILL AVAILABLE. DO NOT DELAY. AERO MODELLER CONTEST CALENDAR, 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

LIVERPOOL NEWS

The Liverpool Club has been active of late with a radio and stunt contest. The radio pylon race attracted six entrants, but two were plagued with radio troubles, reducing the competitors to George Sutton, Maurice Rainford, Dave Thomas and Graham Jubb. George and Maurice both flew glider type models with the motor mounted high above the wing on a nacelle both single channel with rudder only and proportional rudder and elevator respectively. Maurice won with 2:30 for the mile Dave Thomas 2nd with 3:32 from an Elfin 1.8 powered *Gigi* biplane, George Sutton 3rd at 4:43½ and Graham Jubb crashing on his first flight as his O.S. .15 powered racers lifting section tailplane lifted a bit too much causing the model to dive in! Eight entrants arrived for the control line stunt contest where Graham Jubb this time managed a win with a 36in. span *Zilch* type model powered by a plain bearing Super Tiger .15 glow. Frank Dowling placed second, with George Swallow third. They now have the use of the Y.M.C.A. for club meetings, and the surroundings are said to be very comfortable but initial attendance has been low, less than 50 per cent of the members showing.

LONDON AREA S.M.A.E. NEWS

The London Area S.M.A.E. who meet at the John Snow Public House, Soho on the second Monday of each month are faced with a rather strange problem. The largest area in the country in terms of Club density they often have difficulty in obtaining a "quorum". Clubs are taking practically no interest in the Area. The L.D.I.C.C.C. (London District Inter Club Challenge Cup) for free flight that used to draw every club in the area now attracts six clubs at the most so the area officials are working on an inter-club single channel radio control spot landing league to be flown in rounds at club venues, as this seems the only way to revive contests. Contest wins were as heavy as ever this year and the Whitney Straight Trophy for the Area Championships flown at the Nats. was on show at the A.G.M. The area secretary is now Dave Hipperson who lives at 25 Tyrwhitt Road, Brockley, London, S.E.4. He will advise local clubs on dates and meetings. P.R.O. is Martin Dilly, Treasurer; Paul Newell, Comp. Sec.; Chris Haward and Chairman; John Franklin, for '67.

SCOTS CAUTION

Scottish Aeromodelling Edited by K. J. Johnston report an accident at their Linwood flying ground. Tony Oakley flying his usually safe *Lumpers* lost control and the model dived into the crowd of spectators hitting a young lad's head. Their rules to prevent this happening are; 1) All transmitters to be impounded. 2) Crowd to be at least 150 yards away from the point where the pilot is standing preferably in a cross wind position.

Last year's London Area S.M.A.E. Committee: John Wright, Paul Newell, Vince Taylor, Alan Dell, and Martin Dilly, with S.M.A.E.'s Whitney Straight Trophy for Area Championships.

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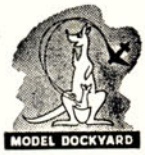

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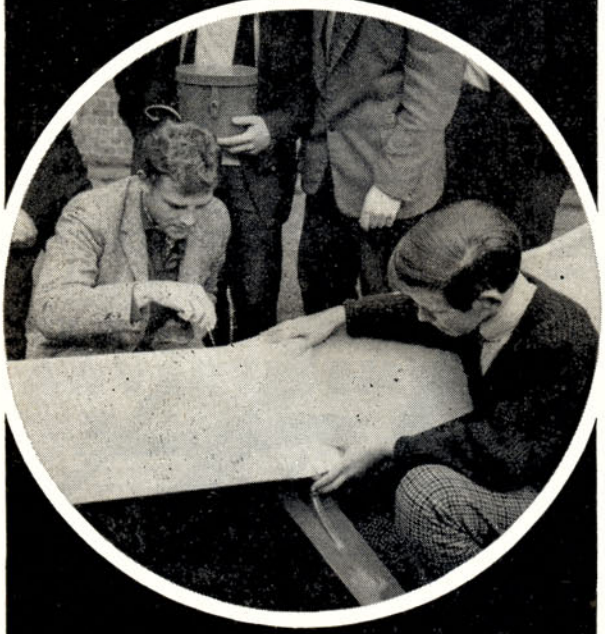

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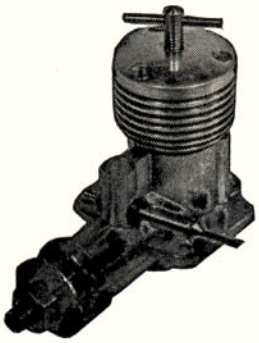

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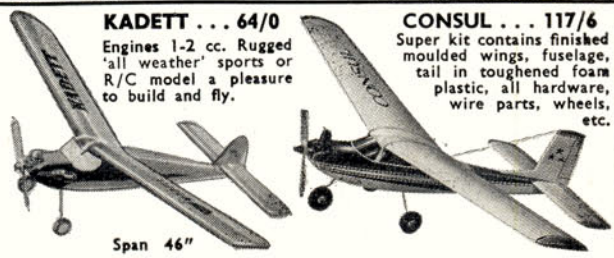

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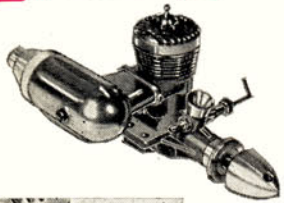

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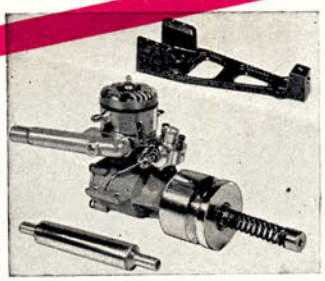

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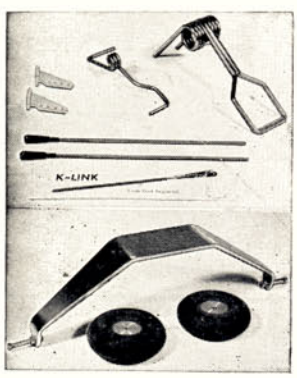

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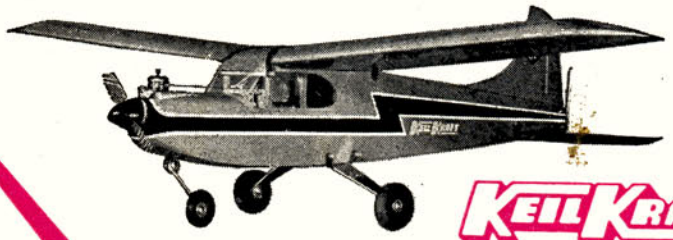

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