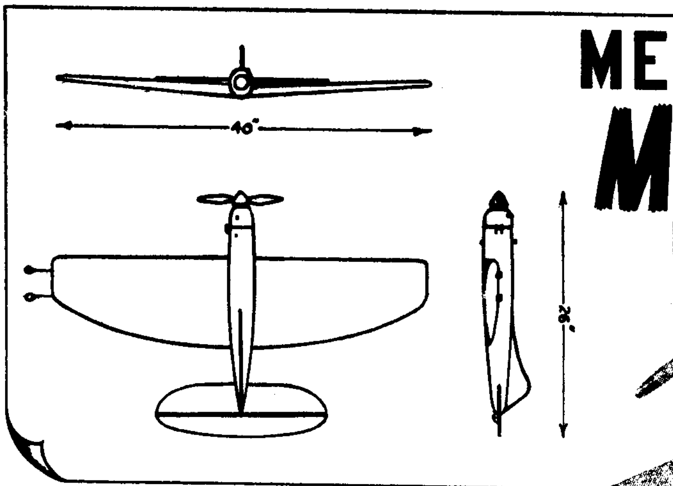
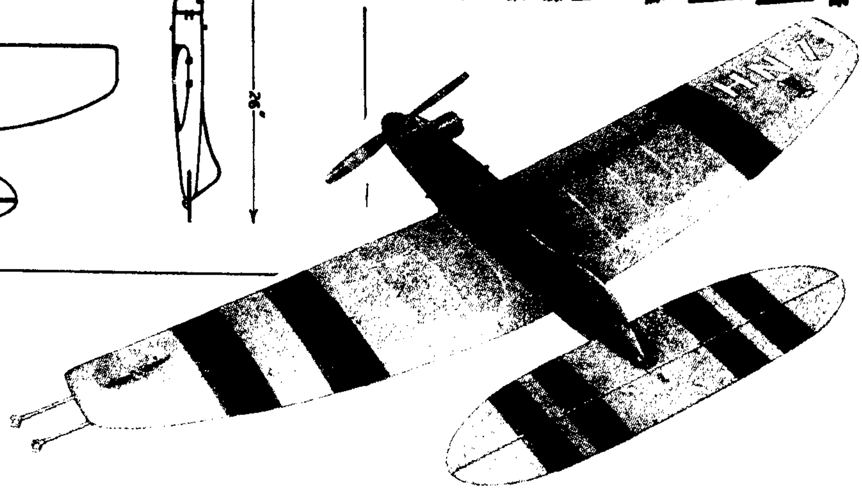
AEROMODELLER

APRIL
1950

1/3



MERCURY MUSKETEER



It's Tough!

During a preliminary test flight the up-line snapped, causing the MUSKETEER to nose-dive to earth at 80 m.p.h. Inevitably, the engine was damaged, but the fuselage remained intact and unbroken, enabling the MUSKETEER to be quickly in the air again without major structural repair or replacement.

A SUPER C/L STUNTER FOR THE FROG 500

Mercury score again with their finest C/L job to date. The Musketeer has true aerodynamic line, with thrillingly real appearance. It is a large ship, and one to do you credit wherever you fly it. This Mercury masterpiece is capable of every possible stunt, responds like a thoroughbred and will stand up to more punishment than anything you've ever flown. In fact, with the Frog 500 or Yulon 29 this is going to be your biggest thrill in line-controlled flight for years.

- ★ PRE-FABRICATED HOLLOW-LOG FUSELAGE.
- ★ NEW STYLE KEYED-IN RADIAL MOUNT.
- ★ SPUN ALUMINIUM COWLING.
- ★ DROP-OUT U/C AND DETACHABLE WING.
- ★ SPEEDS UP TO 80 m.p.h.
- ★ FULLY AEROBATIC.

MERCURY MUSKETEER — High-speed streamlined low-wing monoplane, with detachable wing, and concealed wires. Span 40 ins.; Wing Area 300 sq. ins.; Length 26 ins.; All-up weight with Frog 500 24 ozs.; Speed 80 m.p.h. on 65 foot lines.
KIT CONTENTS—*Pre-shaped and printed best quality Solarbo, Bell Crank, Wire, Hardware, Tissue, Cement, Full-size plan and detailed building instructions, and Spun Aluminium Cowling.*

19/6

IF YOU HAVE NOT YET HAD YOUR MERCURY 1950 CATALOGUE, GO TO YOUR MERCURY DEALER AND GET YOUR COPY NOW .. .. PRICE **6d.**

MERCURY No. 8

A new ready-mixed Diesel Fuel based on accurately blended proportions of paraffin oil and castor-base lubricating oil, with added anti-knock fraction. Does not require Ether to be added. **(See page 245).** Per 8 oz. Bottle. **3/-**

HIVAC GRID - CONTROLLED GAS VALVE

Sub-miniature specially developed for Radio Control work and the equivalent of R.K. 61. For immediate delivery **17/6**

TRIMSTRIP

A brilliant way to give models that professional look. Water slide transfer in 12 ins. × 1½ ins. three-colour strips (¼ in. bands) 6 different colours. **Price 6d.**

CHEQUERS

Water slide transfers in ½ in. squares, White and Black, W. and Blue, W. and Red, W. and Green. 8 in. × 4 in. **Price 6d.**

THE

Norseman NORDIC GLIDER

We are pleased to announce brief advance details of a magnificent Contest Sailplane to meet the Nordic International Class A Formula which Mercury are to release shortly. "The Norseman" is an entirely original design from Phil Guilmant in co-operation with the flying staff of Mercury Models. Beyond question, it is the most advanced sail-plane design ever to be offered in kit form, and will be available during April from your usual Mercury Stockist, who will give you price and details. Once again, Mercury are first in meeting the needs of contest flyers.

M A M W UNITAS

We now distribute the new Yulons

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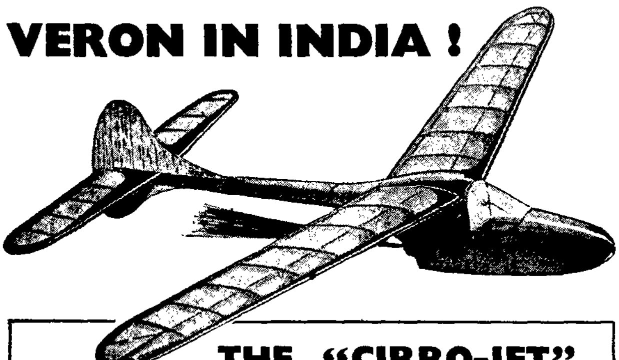
MERCURY MODEL AIRCRAFT SUPPLIES LTD., LONDON, N7.
Phone—North 4272 and 3

VERON
Champions of the air!

VERON IN INDIA !

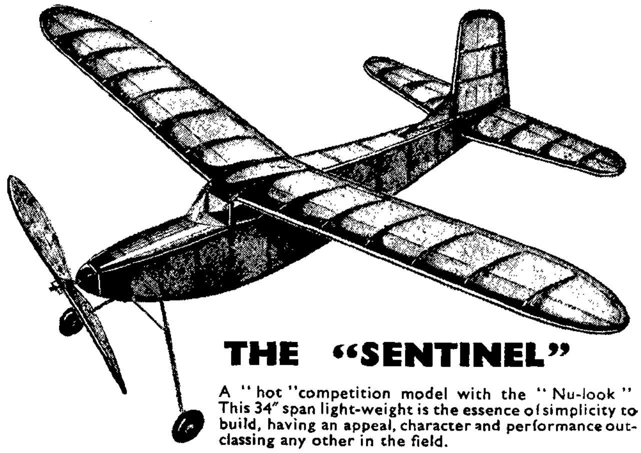


THE "CIRRO-JET"

" VERONS " graceful "CIRRO-JET" design for the Jetex 200 won the open duration contest (any type of power) at the ALL-INDIA M.A. Rally organised by the A.I.AA.. on Calcutta Race course on 18th December, 1949. Flying against Power, Pylon and Rubber types this design out-flew them all.
The " CIRRO-JET " also won the F. F. Jet contest with 3 min 5 secs. (aggregate) ABOVE the nearest competitor.

The above performance speaks for itself. This superb model is capable of many outstanding feats. Rugged strength with fine lines and appearance. Unbeatable value.

Kit Price **10/6**



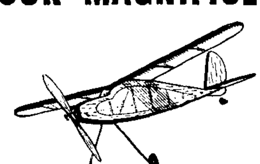
THE "SENTINEL"

A " hot "competition model with the " Nu-look " This 34" span light-weight is the essence of simplicity to build, having an appeal, character and performance out-classing any other in the field.

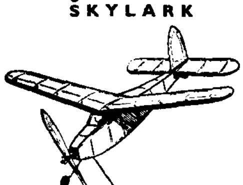
KIT CONTAINS :—Selected strip and sheet ; all ribs (N.A.C.A. 6412—The " Super-soaring " section) and shaped parts clearly printed on Balsa. Semi-finished hand carved Balsa airscrew, Dunlop Competition Rubber, free-wheeling prop-shaft and all accessories.

ALL FOR **10/-**

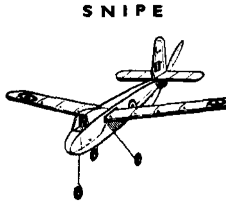
OUR MAGNIFICENT RANGE INCLUDES



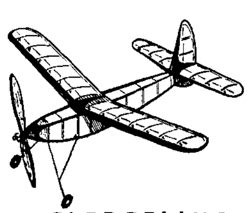
SKYLARK



SNIPE



FANTAIL

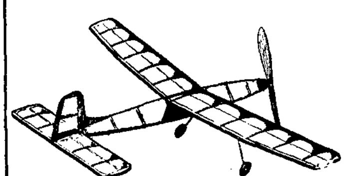


FLEDGELING

Control-line	Span	Price
Focke-Wulf 190 A3...	33¼"	19/6
Sea Fury X ...	25½"	22/6
Spitfire 22 ...	27½"	27/6
Bee-Bug ...	22"	11/6
Stunter ...	24"	19/6
Speedee ...	24"	17/6
Goshawk ...	45"	79/6
Nipper ...	17"	9/6
POWER FREE FLIGHT		
Stentorian ...	72"	69/6
Martinet ...	36"	21/-
Streaker ...	37"	19/9
RUBBER DURATION		
Skylark ...	21"	4/6
Fledgeling ...	24"	6/9
Snipe ...	20"	5/-
Fantail ...	20"	5/-
Wagtail ...	20"	5/-
Hi-Climber ...	38"	25/-

EVERYBODY'S FAVOURITES

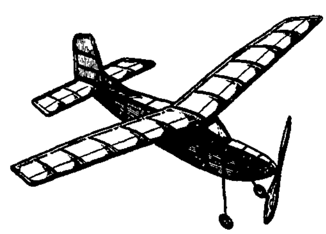
The "GOBLIN" 20 in. SPAN LIGHTWEIGHT DURATION MODEL



The ideal kit for the beginner. Flies with perfect stability. Kit contains everything you need for building and flying—including a semi-finished hand carved Balsa airscrew.

KIT PRICE **3/3**

The "RASCAL" 24 in. SPAN LIGHTWEIGHT CABIN DURATION MODEL



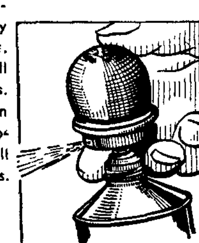
A model which has superb performance, excellent flying qualities and is designed in the "modern-trend"—its performance is excellent. Kit contains everything necessary to build and fly the model including a semi-finished hand carved Balsa prop.

KIT PRICE **4/6**

Get the New Veron Catalogue
Ask your local dealer PRICE **6D.**

THE "HANDISPRAY"
Every Aeromodellists Requisites

A compact bulb-type hand spray for your models. Adaptable to all screw top cans. Will spray thin Cellulose. Obtainable from all Veron stockists.

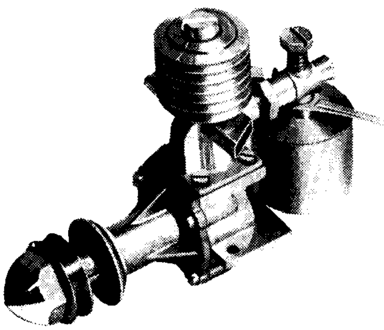


PRICE
2/6

MODEL AIRCRAFT (Bournemouth) LTD. BOURNEMOUTH

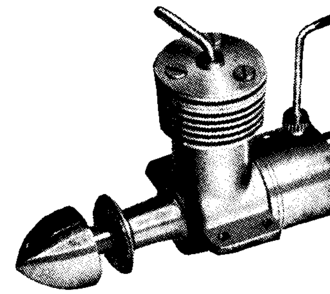
'Phone SOUTHBOURNE 2783

E.D. THE VERDICT OF THE MAJORITY



E.D. 2 c.c. Mark II

Capable of developing $\frac{1}{8}$ H.P., the total weight of this engine including airscrew is only $6\frac{1}{2}$ ozs. It gives equally satisfactory results in model boats and cars. Price £3 10 0



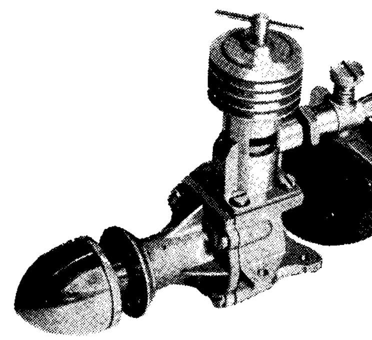
E.D. I c.c. Mark I (BEE)

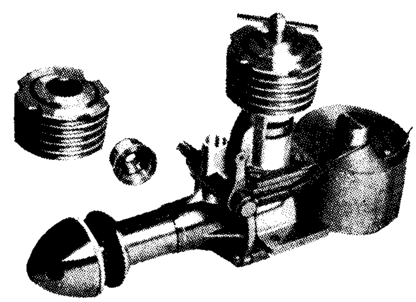
The engine with a sting; thoroughly well known and tried, this diesel has probably given more hours of pleasure to model enthusiasts than any other on the market.

Price £2 5 0

E.D. 2 c.c. COMPETITION SPECIAL

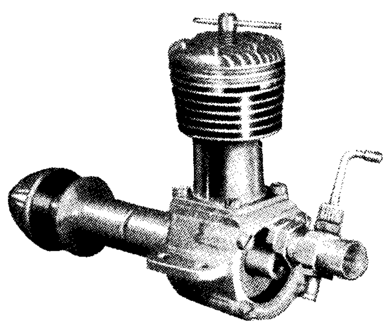
Unsurpassed for speed competitions, this diesel is the holder of the British speed record for control line flight at 89·95 m.p.h. Price £3 17 6





E.D. 2·49 c.c. Mark III

Specially designed for race cars and control line flying, this is one of the most popular diesels of the range. Holder of British speed record for "C" class cars at a speed of 50·5 m.p.h. Price £4 5 0



E.D. 3·46 c.c. Mark IV

Developing 10,000 R.P.M., the three-forty-six is one of the finest engines for control line and stunt flying. Its power is equal to any 5 c.c. engine on the market.

Price £4 12 6

ORDER FROM YOUR MODEL SHOP

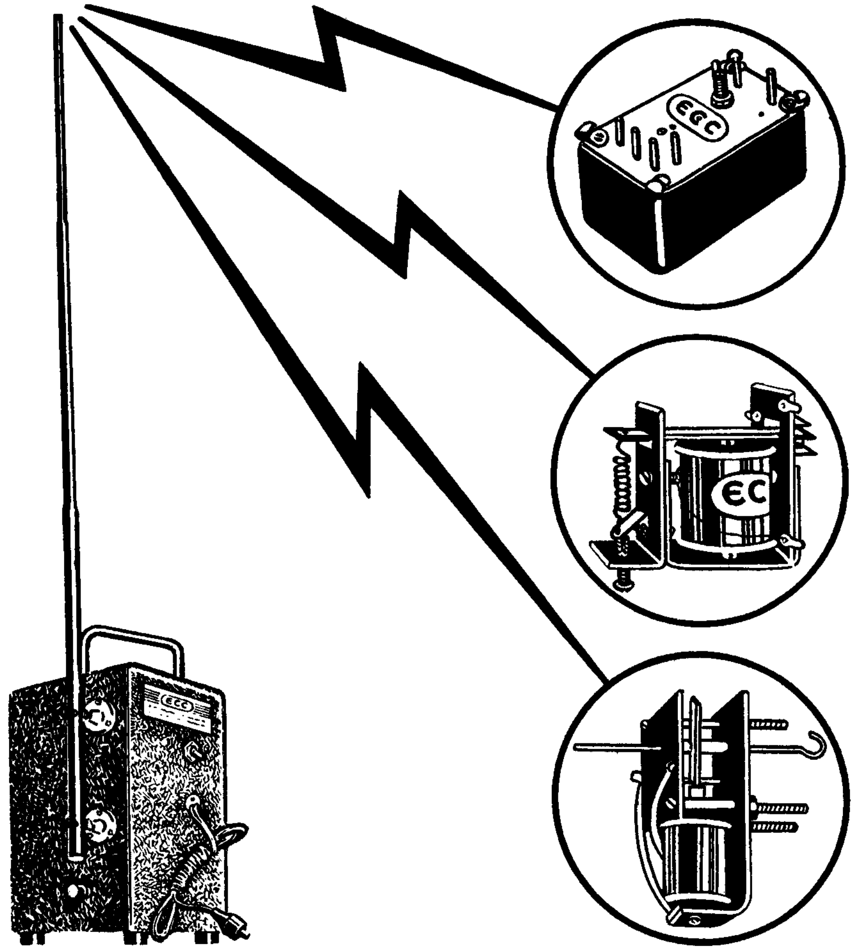
E.D. ELECTRONIC DEVELOPMENTS (SURREY) LTD

KINGSTON ON THAMES 1223

DEVELOPMENT ENGINEERS

18, VILLIERS ROAD, KINGSTON-ON-THAMES, SURREY, ENGLAND.

Tele-Commander TRIUMPH!



RECEIVER. Model 950A. Pat. App.for.

This supersensitive receiver has been designed and developed by E.C.C. and incorporates all the latest refinements. Employing the Hivac XFG I. Thyratron fitted into a miniature holder enabling simple replacement.
Features :—

- Fitted with Type 5A Relay.
- Dust iron tuning coil rendering flat and simple tuning.
- Totally enclosed case made in a low loss bakelite, small, robust, virtually unbreakable !
- Fully spark suppressed inner and outer contact connections to relay for fully proportional control systems.
- External adjustment screw for relay operating position.

SIZE :—2½ × 1½ × 1½ ins. Weight 2 oz.

Batteries :—L.T. 1.5 volt Pen cell or larger.
H.T. 45–60 volt. B122–B123 or larger.

RELAY. Type 5A. Pat. App. for.

This diminutive relay is ultra-sensitive and will operate on current changes of as small as .02 ma.

- Balanced Armature.
- Solid silver contact screws.
- Position of fall in and out variable.
- Armature constructed of special Mu-metal reducing residual magnetism to a minimum and eliminating sticking.

SIZE :—1 × 1 × ¾ ins. Weight ½ oz.

ESCAPEMENT. Type I.

This lightweight escapement is well known by Radio-controllers as the most simple and economical servo mechanism produced to date. Easy to fit—Sturdy, yet light.
Fitted with double winding and current saving device, a feature introduced to the Aeromodellers of this country by E.C.C.

SIZE :—1¾ × 1 × ¾ ins. Weight ⅞ ozs.

TRANSMITTER.

The design of our Transmitter, proved to be the best on the field, remains unchanged, with the exception of a plated carrying handle is now fitted and the telescopic aerial replaced with a sectional aerial.

This is to introduce our newest Beau,
But we regret production's slow,
Performance makes demand great,
So you may have a little wait,
For this R/C, the latest wow,
Don't delay—but order now !

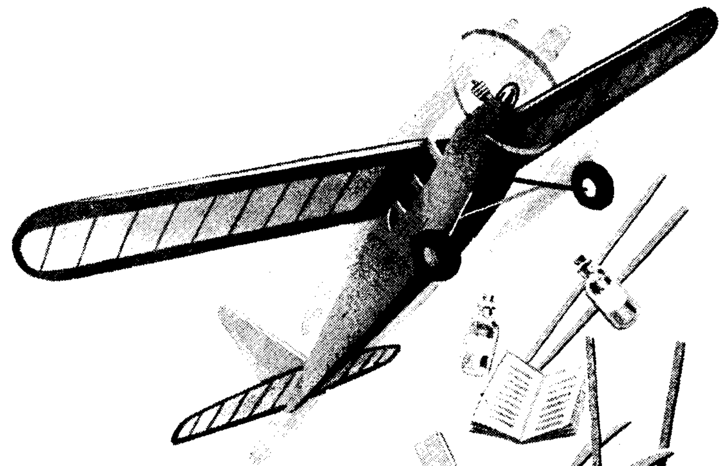
PRICES

Model 950 Receiver	£3 · 10 · 0
Transmitter ..	£5 · 9 · 0
Escapement ..	£1 · 5 · 0
Complete Outfit ..	£9 · 19 · 0

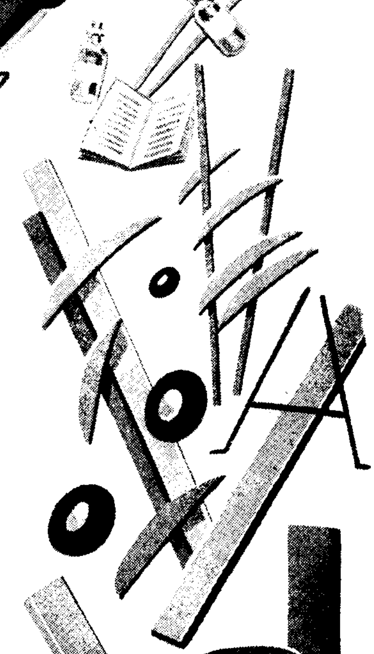
Sole Trade distributor in the United Kingdom **E. KEIL & CO.**

ECC

(ELECTRONIC CONTROL COMPONENTS) 48, Swinbrook Rd., LONDON, W.10.



Hats off to the
E.D.
"RADIO QUEEN"



This graceful 7 ft. span craft has been specially designed for the E.D. 3.46 c.c. Mark IV. Diesel and for remote control by the famous E.D. Radio Control Unit. As with all E.D. products it has been rigorously tested under the severest conditions before being offered to the public. Flights of 30 minutes duration have been obtained and a range of control of over 1½ miles has been achieved. THE "RADIO QUEEN" CAN ALSO BE FLOWN FREE FLIGHT.

The Kit is complete in every detail and includes fully detailed plan and easy-to-follow building and flying instructions. **Price Complete in strong carton . . . . . . £4.18.6. E.D. 3·46 c.c. Mark IV. Diesel** (develops power equal to any 5 c.c. engine on the market)
Price . . . . £4.12.6.
E.D. Radio Control Unit. Price . . . £14.10.0.

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DEVELOPMENT ENGINEERS
KINGSTON ON THAMES 1223 18, VILLIERS ROAD, KINGSTON-ON-THAMES, SURREY, ENGLAND.

AEROMODELLER
INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

Model Byelaws

DURING recent months there have been discussions at the Home Office in regard to the drafting of "model" byelaws which could be used by local authorities in regard to exercising suitable control over the flying of model aircraft—particularly power-driven types—in public parks, open spaces and so on. Officers of the Society of Model Aeronautical Engineers have taken part in these discussions and we ourselves have contributed information and view points to the Home Office.

We are now pleased to announce that the Home Office has just published the results of these consultations, in the form of "model byelaws."

It is stated that these model byelaws "have been drawn up by the Home Office in consultation with the Ministry of Civil Aviation, the Association of Municipal Corporations, and the Urban District Councils Association, for the guidance of local authorities making byelaws under section 164 of the Public Health Act, 1875, or section 15 of the Open Spaces Act, 1906, to regulate the flying of power-driven model aircraft." In general terms, the position is fairly described in the following words :—

"Developments in the size and speed and the recently increased availability of those types of model aircraft to which the model byelaws are expressed to apply have made them potentially dangerous, and also capable of creating a nuisance through noise, so that it may often be desirable to regulate their flying in some degree. On the other hand, local authorities will recognize that through the construction and flying of model aircraft a real contribution may be made to the science of aviation; that they help to stimulate interest in national aviation; and that, under suitable conditions, they offer to many young people a legitimate pastime and good hobby. The byelaws are not intended for the restriction of flying, but to make it possible to permit flying in areas where permission for this pastime would otherwise have to be withheld. Any restrictions should be limited, therefore, to what is really necessary under local conditions to protect the community at large from danger or nuisance."

We have printed the above paragraph in heavy type and commend it to all those Club Officials who are having difficulty in obtaining suitable flying facilities in their districts. Here is a clear indication by the appropriate authorities which is much more "positive" than "negative," i.e., they are all in favour of the flying of model aircraft and the purpose of the model byelaws is not to restrict flying but only to control it where such control is deemed necessary in the interests of the general public.

The memorandum issued by the Home Office includes the following important statement which should be noted by all Club Secretaries. "All byelaws proposed to be made should be submitted to the Home Office in draft in the first instance, accompanied by a completed form C.22A. The Secretary of State thinks it desirable that any proposal to make such byelaws should be brought to the notice of any local model aircraft clubs, and their views considered, before the draft is submitted."

The "model" byelaws themselves consist essentially of simple directions as to when and where flying may take place, together with the information that "every person who shall offend against any of these byelaws shall be liable on summary conviction to a fine not exceeding two pounds." The final clause is to the effect that "every person who shall infringe any of the foregoing byelaws may be removed from the pleasure ground by any Officer of the Council, or by any constable . . . where the infraction of the byelaw is committed within the view of an officer or constable, and the name and residence of the person infringing the byelaw are unknown and cannot be readily ascertained . . . or where there may be reasonable ground for belief that the continuance in the pleasure ground of the person infringing the byelaw may result in another infraction of a byelaw, or that the removal of such person from the pleasure ground is otherwise necessary as a security for the proper use and regulation thereof."

We are very pleased to report such a happy and sensible ending to the consultations which have recently taken place, and commend to all aeromodellers the fair, and in fact friendly attitude which has been adopted by the Home Office and Ministry of Civil Aviation in regard to the need for issuing these model byelaws.

We have had copies of the model byelaws duplicated and they may be obtained from our Head Office, at the Aerodrome, by interested parties who send in stamped addressed envelopes.

The Reason Why

Whenever we have had to make a major change in the AEROMODELLER we have given our readers a full and fair explanation of our reasons.

Back in August, 1946, it was necessary to increase the price of the AEROMODELLER from 1/- to 1/3 per copy. Since that date there have been continued increases in costs of not only paper and blocks; but there have been several wage increases in the printing and allied trades. During the past two years there have been increases totalling 8 per cent. in our printing bills alone.

Until about a year ago the number of pages in the AEROMODELLER was restricted to between an average of 40 to 48, consequent on the continued severe rationing of paper supplies.

During last year there were useful increases in the paper ration and gradually we were able to increase the number of pages until we were back to our old pre-war figure of 64 pages plus cover. However, we still had to use thin paper. Then,

Contents

VOL XV. No. 171. APRIL, 1950

SPECIAL FEATURES	Page
S.P.A.D. S.7.C.I.	206
NORDIC TERN	210
FLASH	212
AEROFOIL SECTIONS	216
WAFFLE	224
MINIATURE ENGINE FUELS	226
N.G.M. INSURANCE EXPANSION	231
MULTI-PURPOSE RADIO CONTROL METER	235

REGULAR FEATURES	
NEW ZEALAND NEWS	214
ENGINE ANALYSIS *WILDCAT MK. III*	220
MODEL NEWS	222
ESPECIALLY FOR THE BEGINNER	228
IT'S DESIGNED FOR YOU	232
AIRCRAFT DESCRIBED *THE AUSTER AUTOCAR*	236
CLUB NEWS	238

COVER PAINTING
THE S.P.A.D. Featured on page 206

THE MODEL AERONAUTICAL JOURNAL OF THE BRITISH EMPIRE

ESTABLISHED 1935

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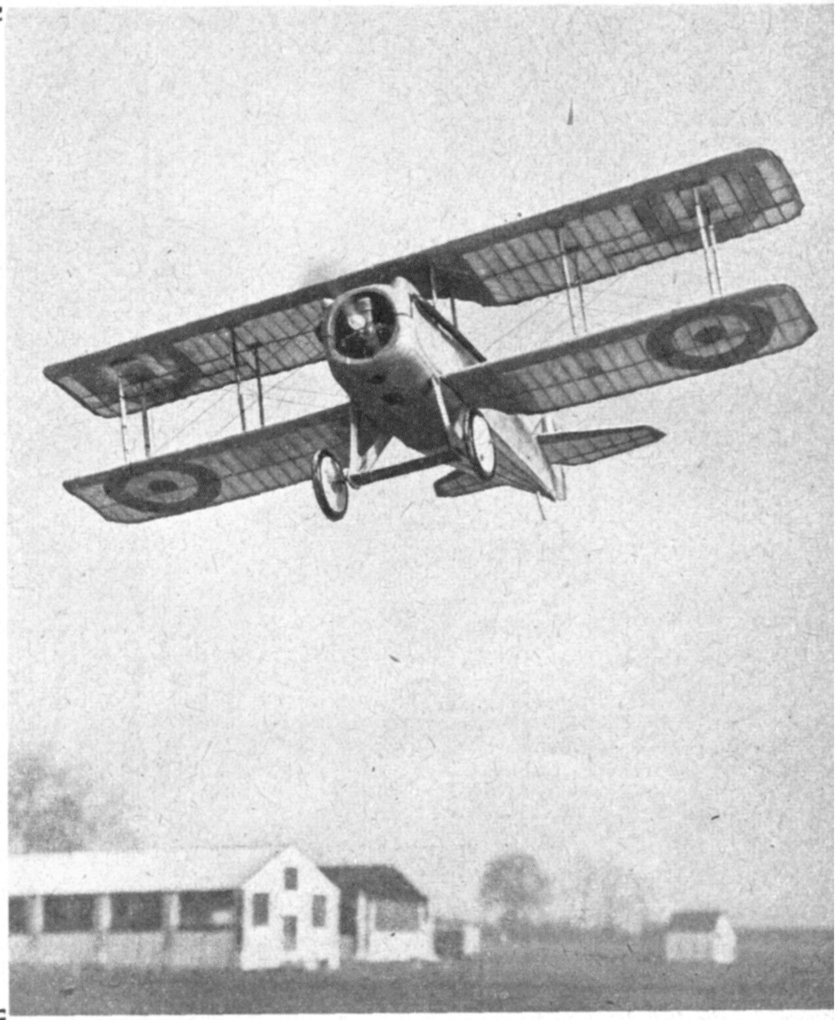


Bagley's latest. A magnificent flying scale power model of the S.P.A.D. S.7.C.I. which is featured in this issue. It utilises pendulum aileron control and is shown in flight with the buildings of Eaton Bray in the background.

in the Autumn of last year, further increases of paper supplies were allowed by the Ministry of Supply and we were able to commence using thicker paper for the text pages.

These recent increases have of course attracted considerable attention from our readers, and we have received many favourable comments, particularly on the greatly improved quality of the illustrations due to the use of thicker and higher quality paper.

Finally, with the turn of the year came the announcement that as from 1st March, 1950, paper rationing would cease and publishers could use as much paper as they wanted . . . provided of course that it was available !

Now, the stepping up of both the number of pages and the improved quality of paper has considerably increased our costs. Not only for paper and printing but also of course our editorial and block costs have increased consequent on the increased number of text pages in the magazine.

A further increase in our editorial costs have resulted from the steady expansion of our correspondence with readers in way of information, and advice ; support of club rallies ; and wider reportage of international and national meetings.

All this has brought us to the decision that some increase in the price of the AEROMODELLER is imperative if this largely increased and approved service to our readers is to be maintained on an economic basis so far as the proprietors are concerned.

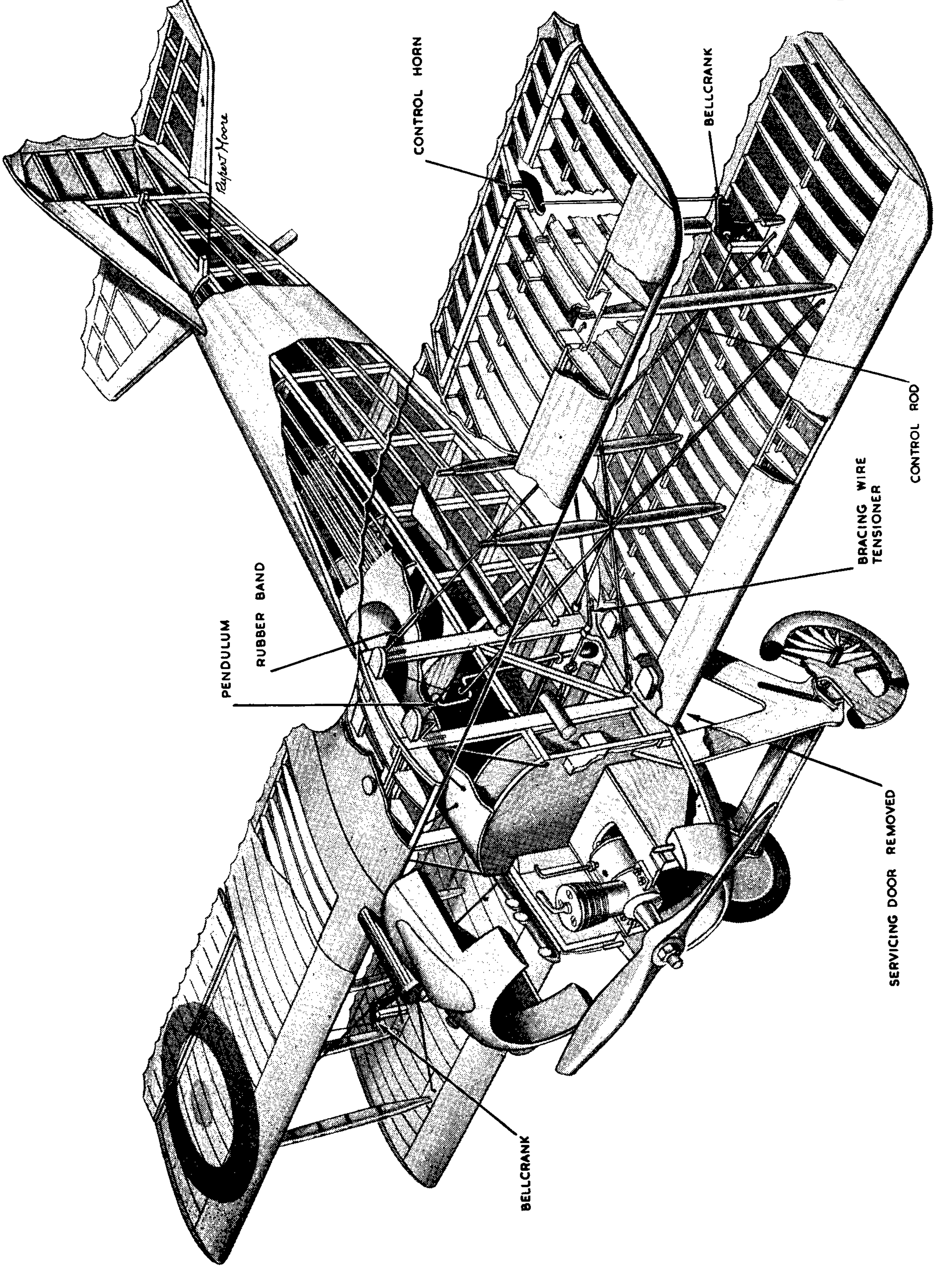
It has therefore been decided to increase the price of the AEROMODELLER as from the May issue to 1/6 per copy.

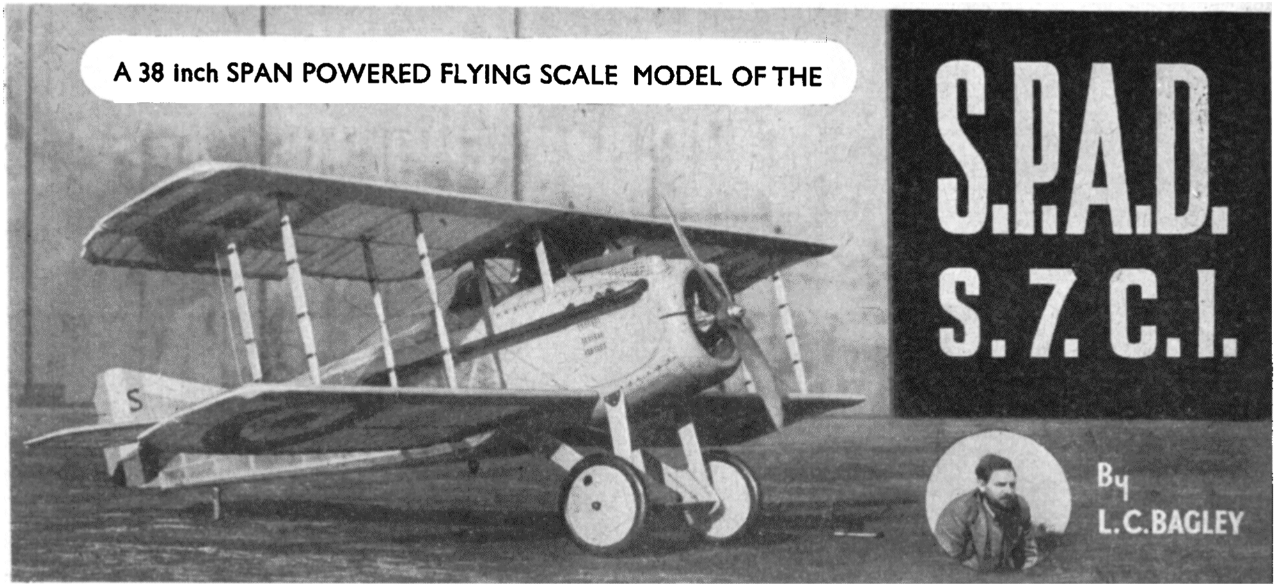
This price increase is a little more than would, strictly speaking, be necessary ; but readers will understand that it would not be convenient to increase the price to say 1/4½ or 1/5 ; and therefore, with a view to continuing to give as good a value to our readers as possible *we shall increase the size of the magazine by yet a further eight pages as from the May issue also.*

In addition, we have increased further our Editorial Staff—our latest addition being Ron Moulton—so that we can give readers an extended information and advice service, and an even wider and better reportage on international and national meetings.

To sum up : as from the May issue the published price will be 1/6 per copy. The magazine will consist of 72 pages plus 4 page cover, making a grand total of 76 pages. The whole of the pages of the magazine will be printed on the new heavy-weight high-grade text paper, on which this issue is printed. Finally, our ability to render an improved and wider service to our readers will be increased and we invite them to take every advantage of the manifold facilities available

TRACER WANTED


CONTROL HORN
BELLCRANK
CONTROL ROD
BRACING WIRE TENSIONER
RUBBER BAND
PENDULUM
SERVICING DOOR REMOVED
BELLCRANK



READERS well remember Bagley's Nieuport, particularly those who built the model and enjoyed as a result many hours of pleasureable flying. Here then is his S.P.A.D. which we found even more enjoyable in the flying sense than its forerunner. Probably, the pendulum aileron control fascinated us most, for frankly we had our doubts as to its effectiveness. The successful operation of this control was essential in view of the complete absence of dihedral and strangely enough the system worked first time, no adjustments being necessary. Trimming, however, must be carried out with the greatest of care and under calm conditions. First obtain a satisfactory glide over long grass and then commence R.O.G. tests. Start with the model underpowered and gradually increase the motor revs. with each successive flight, observing and correcting any undesirable tendencies as you progress. The ideal trim is a wide left turn with torque, which can be adjusted by right sidethrust.

Flight characteristics of the model closely follow those of the full size machine, in particular the glide which is steep, or to be more exact, the sinking speed is high. The original was a single seat scout bi-plane of French manufacture, and the version modelled by Bagley is a replica of a machine of the famous "Stork" Escadrille. Our cover painting shows a squadron of Pfalz D.3's about to be "jumped" by Spads from a French squadron over Verdun in 1917.

Fuselage.

This is built up in the conventional slab-sided manner using 3/32 in. square balsa, with the exception of the four longerons which are of the same section spruce. The cabane struts are built in at this stage, and when carefully trimmed to line up with the top surfaces of the C/S on the drawing, will automatically set the angle of incidence of the upper main plane.

When the two sides are thoroughly dry bring together by positioning and glueing bulkheads " B " and " C " and cross members at station " E ". By inverting the fuselage and so making the top longeron the datum, the structure can be kept dead true throughout the subsequent stages of construction.

Make up a laminated cowling and work to shape (leave final shaping until after assembly) ; this is now glued and pinned in position on the two sheet side pieces and former B.1. is fitted and glued. Square up and leave to set, once again by inverting the cowling, and whilst this is drying the U/C may be fitted.

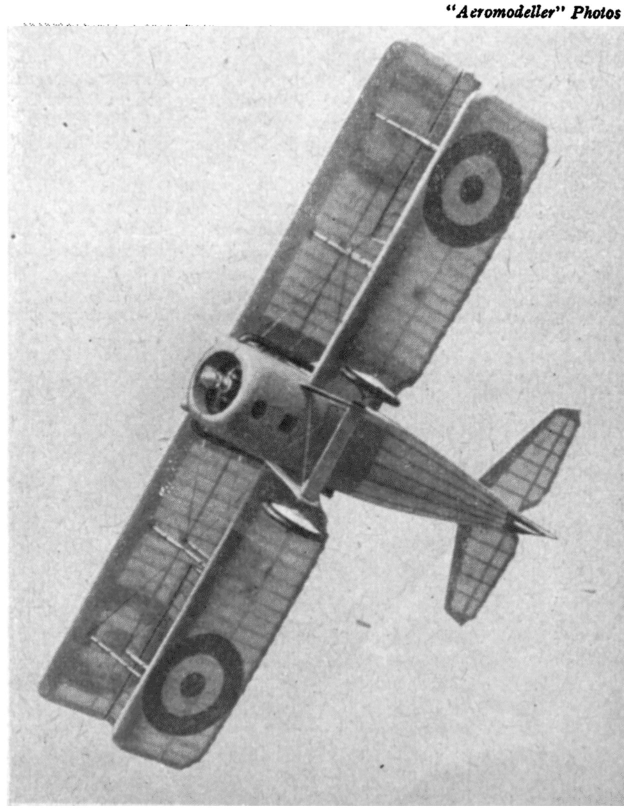
When thoroughly dry marry the cowling up to fuselage bulkhead " B " and fit the second former B.1. hard up against bulkhead " B.2." Before fitting any stringers or sheeting, check that the small details are fitted, such as the tail skid, platform, all gussets, aileron pendulum bearings, the engine bearer reinforcing pieces, etc. Fit all stringers and sheet where indicated.

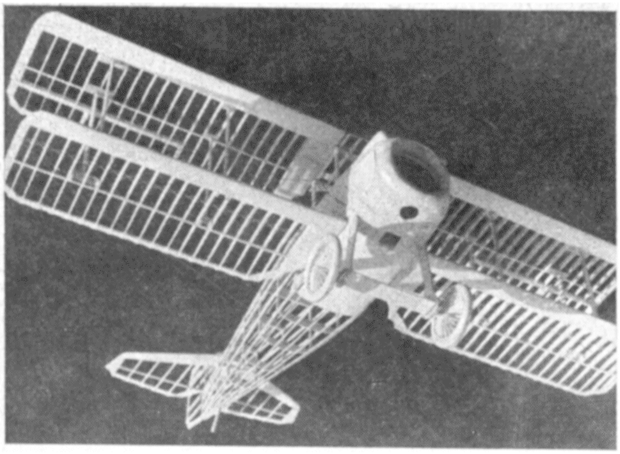
THE DESIGNER

Age 27 years . . . married . . . just become a father . . . apprentice to Airspeeds of Portsmouth . . . joined Aeromodeller as technical artist . . . now working for Admiralty in same capacity . . . hobbies painting, drawing, sailing, and of course, scale modelling.

Yes, it is a model! But it might have been full size save for the matchstick on the tarmac. Below, the S.P.A.D. shows its paces, the power unit here being an E.D. Bee.

"Aeromodeller" Photos





Wings. The construction of these is quite straightforward and requires little explanation. The scalloping of the T.E.'s is best done after sanding the T.E. to the required section to follow the aerofoil through. One point to note is that the two lower spars are well packed up before attaching the wing ribs, as otherwise the spars will protrude, and any subsequent sanding will weaken the wing panel. The ailerons are built in with the two upper main planes, as this makes for a neater job.

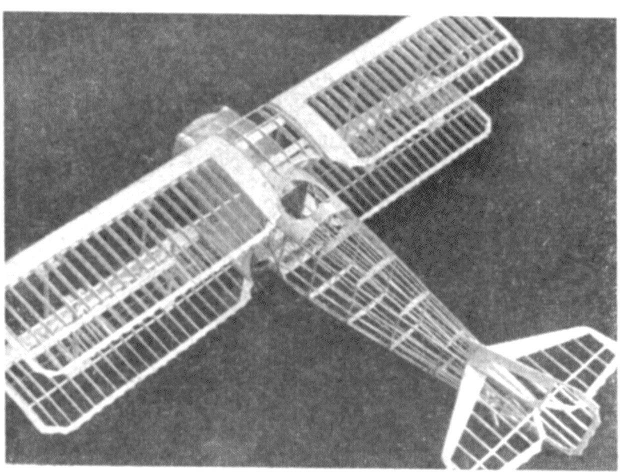
General Details. All bracing wires are of 24 s.w.g. piano wire and the control wires operating the ailerons are of 22 s.w.g wire. These are the only two points in the aileron control system which differ from the prototype; this being one of the reasons why the S.P.A.D. was chosen as a suitable type of model for aileron control.

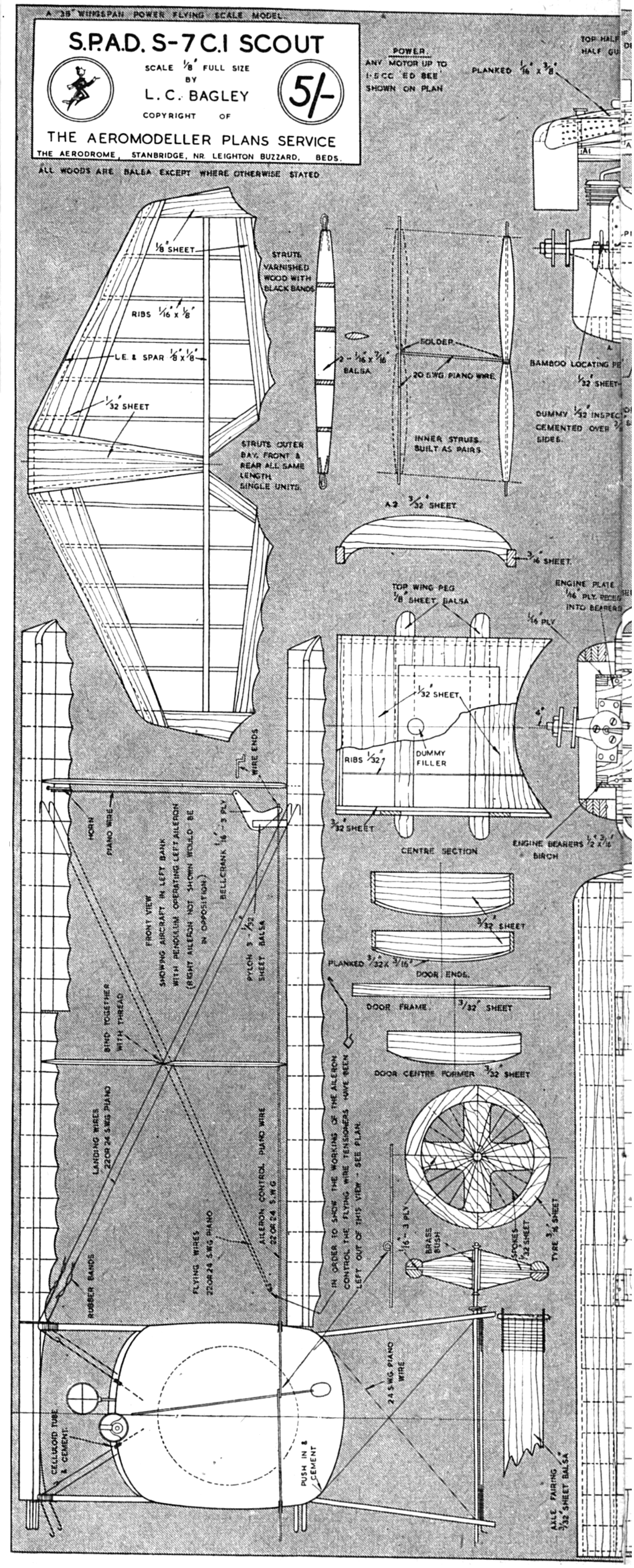
The exhaust pipes, machine gun, cylinder head fairings etc. are made from odd bits of block balsa; the ring sight is of notepaper with bamboo slivers forming the cross wires, the support being of a thicker section bamboo. It is well to see that these small details are made as strong as is compatible with scale appearance, since nothing is more irritating than to have " bits that come off in yer 'and ". At the top of the undercarriage legs will be seen what represents the main U/C attachment brackets; these are of 1/32 in. sheet, 3 pin heads representing the bolts.

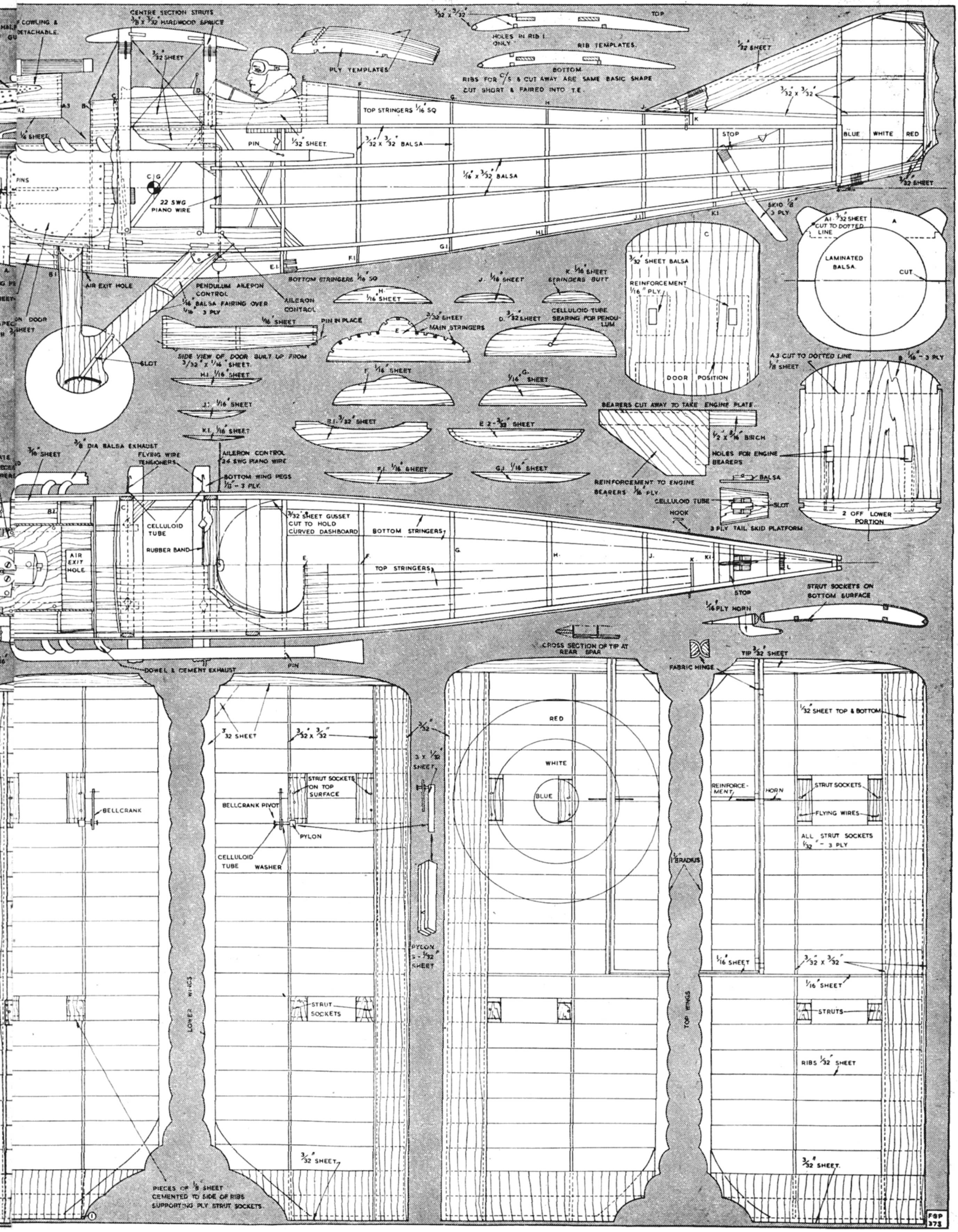
The model is covered with rag tissue, water sprayed and clear doped. The planked portion of the model represents the plywood covering, metal cowlings and inspection panels which are doped light grey. The machine gun, the sights, exhaust, filler caps etc., can be made black, together with the " tyres " and valve access holes in the wheels.

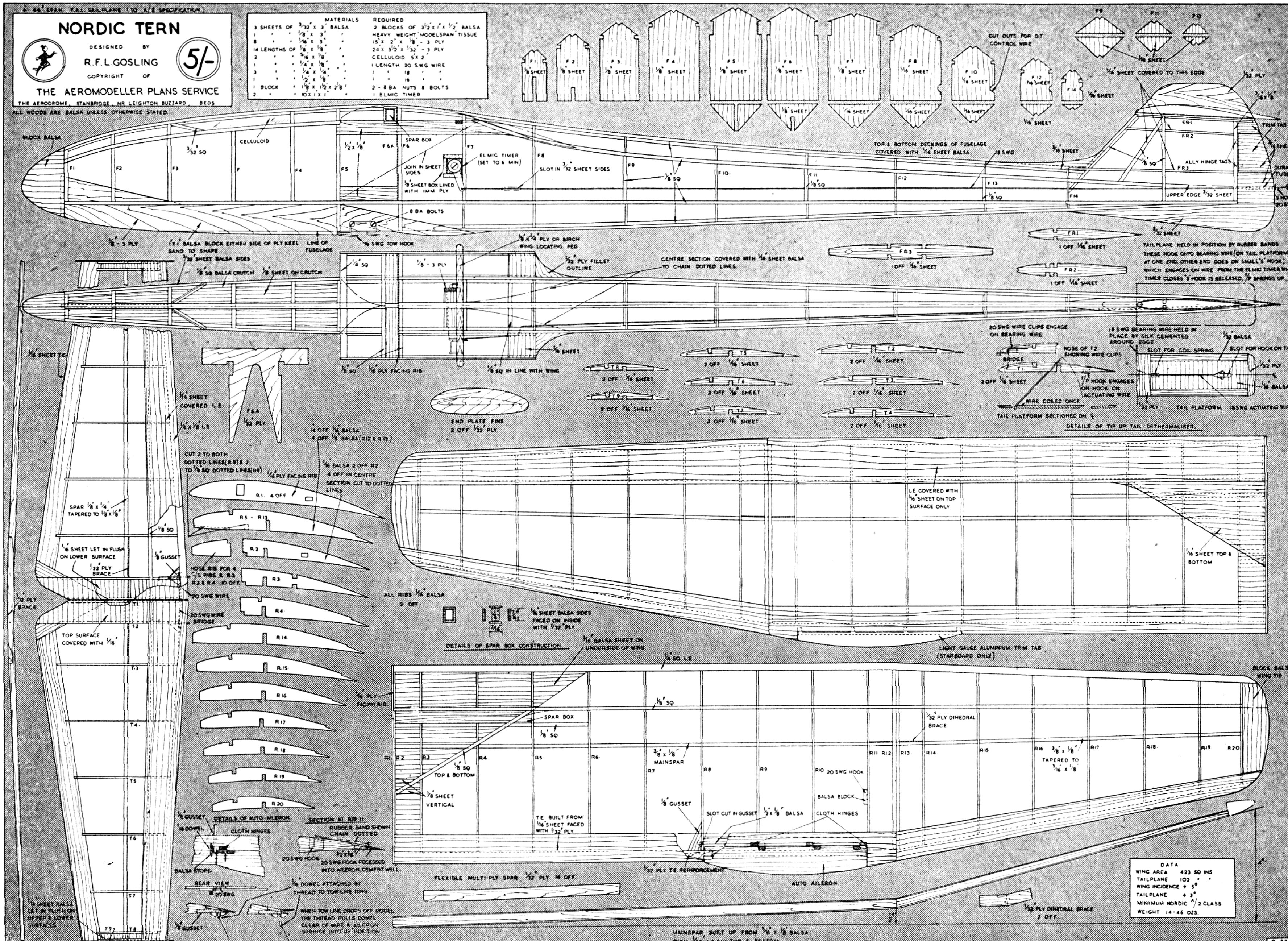
All struts are clear doped and banana oiled together with the U/C and tail skid. The roundels, stripes and the famous Stork marking, emblem of the well known Stork Escadrille, are doped on and the whole model, with the exception of the matt grey cowlings, is banana oiled.

This is a 1/4 scale reproduction of the full size plans and building instructions which are available price 5/- post free from Aeromodeller Plans Service.





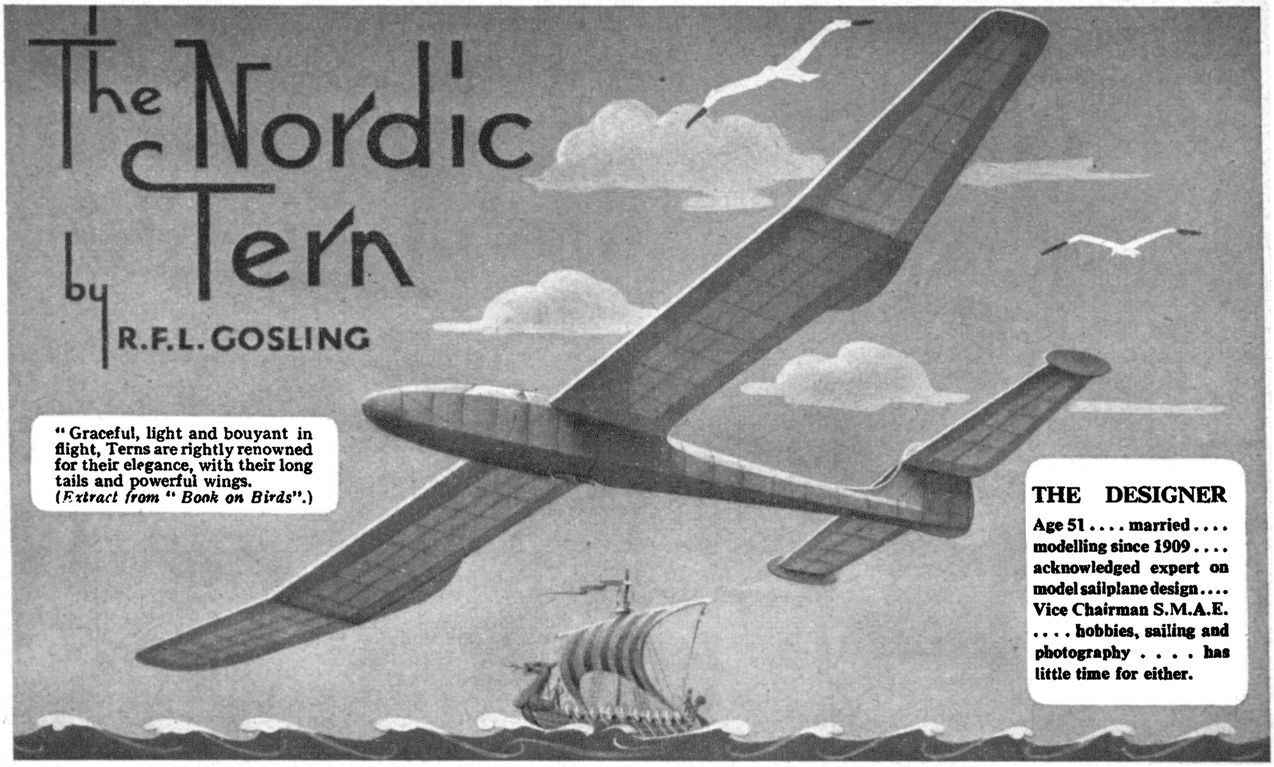

CENTRE SECTION STRUTS 3/8" x 3/32" HARDWOOD SPRUCE
COWLING & DETACHABLE
3/32" SHEET
PLY TEMPLATES
HOLES IN RIB 1 ONLY
RIB TEMPLATES
TOP
BOTTOM
RIBS FOR C/S & CUT AWAY ARE SAME BASIC SHAPE CUT SHORT & FAIRED INTO T.E.
1/32" SHEET
3/32" x 3/32"
TOP STRINGERS 1/16" SQ
1/8" SHEET
1/32" SHEET
PIN
3/32" x 3/32" BALSA
STOP
BLUE WHITE RED
PINS
C.G.
22 SWG PIANO WIRE
1/16" x 3/32" BALSA
3/32" SHEET
SKID 1/8" 3 PLY
A1 3/32" SHEET CUT TO DOTTED LINE
LAMINATED BALSA
CUT
3/32" SHEET BALSA
REINFORCEMENT 1/16" PLY
DOOR POSITION
AIR EXIT HOLE
BOTTOM STRINGERS 1/16" SQ
PENDULUM AILERON CONTROL
AILERON CONTROL
1/16" BALSA FAIRING OVER 1/16" 3 PLY
1/16" SHEET
J 1/16" SHEET
K 1/16" SHEET STRINGERS BUTT
PIN IN PLACE
3/32" SHEET
MAIN STRINGERS
D 3/32" SHEET
CELLULOID TUBE BEARING FOR PENDULUM
SLOT
SIDE VIEW OF DOOR BUILT UP FROM 3/32" x 1/16" SHEET
H.1 1/16" SHEET
F 1/16" SHEET
G 1/16" SHEET
J.1 1/16" SHEET
K.1 1/16" SHEET
B.1 3/32" SHEET
E 2 3/32" SHEET
F.1 1/16" SHEET
G.1 1/16" SHEET
A3 CUT TO DOTTED LINE 1/8" SHEET
B 1/16" 3 PLY
BEARERS CUT AWAY TO TAKE ENGINE PLATE
1/2" x 3/16" BIRCH
HOLES FOR ENGINE BEARERS
REINFORCEMENT TO ENGINE BEARERS 1/16" PLY
BALSA
CELLULOID TUBE
SLOT
HOOK
3 PLY TAIL SKID PLATFORM
2 OFF LOWER PORTION
3/16" SHEET
3/8" DIA BALSA EXHAUST
FLYING WIRE TENSIONERS
AILERON CONTROL 24 SWG PIANO WIRE
BOTTOM WING PEGS 1/8" 3 PLY
CELLULOID TUBE
RUBBER BAND
3/32" SHEET GUSSET CUT TO HOLD CURVED DASHBOARD
BOTTOM STRINGERS
TOP STRINGERS
AIR EXIT HOLE
STOP
STRUT SOCKETS ON BOTTOM SURFACE
1/16" PLY HORN
CROSS SECTION OF TIP AT REAR SPAR
FABRIC HINGE
TIP 3/32" SHEET
DOWEL & CEMENT EXHAUST
PIN
3/32" SHEET
3/32" x 3/32"
3/32"
3 x 1/32" SHEET
STRUT SOCKETS ON TOP SURFACE
BELLCRANK
BELLCRANK PIVOT
PYLON
CELLULOID TUBE
WASHER
RED
WHITE
BLUE
REINFORCEMENT
HORN
STRUT SOCKETS
FLYING WIRES
ALL STRUT SOCKETS 1/32" 3 PLY
1/32" SHEET TOP & BOTTOM
PYLON 3 - 1/32" SHEET
1/8" RADIUS
1/16" SHEET
3/32" x 3/32"
1/16" SHEET
LOWER WINGS
TOP WINGS
STRUT SOCKETS
STRUTS
RIBS 1/32" SHEET
3/32" SHEET
PIECES OF 1/8" SHEET CEMENTED TO SIDE OF RIBS SUPPORTING PLY STRUT SOCKETS
FSP 373



THIS IS A 1/5 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 5/- POST FREE FROM THE AEROMODELLER PLANS SERVICE

The Nordic Tern

by R.F.L. GOSLING



THIS year, for the first time in the history of model aeronautics, an International Glider contest is to be held, in which the size of the model is restricted to certain limits. This is something I have advocated for some time, and the Nordic countries, by specifying their A/2 Sailplane class for the 1950 International Sailplane event have, so to speak, taken the bull by the horns.

When the Nordic Contests were announced, I decided that the quickest way to get a model built to this size would be to prepare a reduced version of the " Tern II ". I found that by reducing all linear measurements by 0·8 the area would just fall into the A/2 class. I further decided to simplify the constructional methods to a certain extent without altering the outlines, and thus the " Nordic Tern " was born.

This model is not a beginner's model, any more than is a Wakefield in the rubber class, but nevertheless there is nothing difficult in its construction. A tip-up tail dethermaliser actuated by an Elmic timer is used, a further feature being the auto-aileron device causing the model to circle after casting off from the towline. A small hardwood peg holds the aileron in the neutral position while the sailplane is being towed up, this peg being connected to the tow ring by a short length of thread. At the top of the launch, as the tow ring is released the peg is pulled out and the aileron tips up, causing the model to circle without losing trim as is usual with an automatic rudder.

Fuselage. It is here that I have departed from the design of the " Tern II ", and a crutch system is introduced. The crutch forms the lower longerons of ⅛ in. square, with spacers and a front portion of ⅛ in. sheet cut to shape. Formers are then cemented into position. Cut out two sides from 3/32 in. medium sheet (a join will be necessary as the length is more than 3 ft., the usual size obtainable). Cement the top longerons onto the insides of these sheet outlines. Offer up each side in turn to the crutch with the formers in position.

Without removing the " upper fuselage " from the board, all other items can be added—wing box, centre section, fin and tailplane platform, etc., at the same time keeping careful check on measurements regarding incidence, etc. The Elmic timer and actuating wire are fitted, and finally the top is sheeted in with 1/16 sheet.

After removing from the board, the ply keel complete with tow hooks is added, also nose block and lower formers. The rear portion is then covered with 1/16 sheet. Balsa block is cemented to either side of the keel and carved to shape.

The whole fuselage can be well sanded down, as the 3/32 in. sides allow for this. The result is a very strong fuselage of pleasing lines which can be finished in any fashion the builder desires. (I personally favour a natural trim—but you have to be sure your construction is perfect for this kind of finish.)

Wings. These are more or less straightforward except for the *inner* main spar which is built up of a piece of 5/16 in. balsa with strips of 1/32 in. ply ⅛ in. wide cemented to top and bottom. Trailing edge is also built up; sand one edge of the 1/16 in. balsa strip till it just takes the piece of 1/32 in. ply, and cement in place. This makes an exceptionally strong and warp-free T.E.

The setting of the wing box which takes the flexible pegs of multiple 1/32 in. ply will require special attention to see that the dihedral angle is correct. Also the rear locating peg and the fitting of the 3-ply facing ribs at wing joints need care.

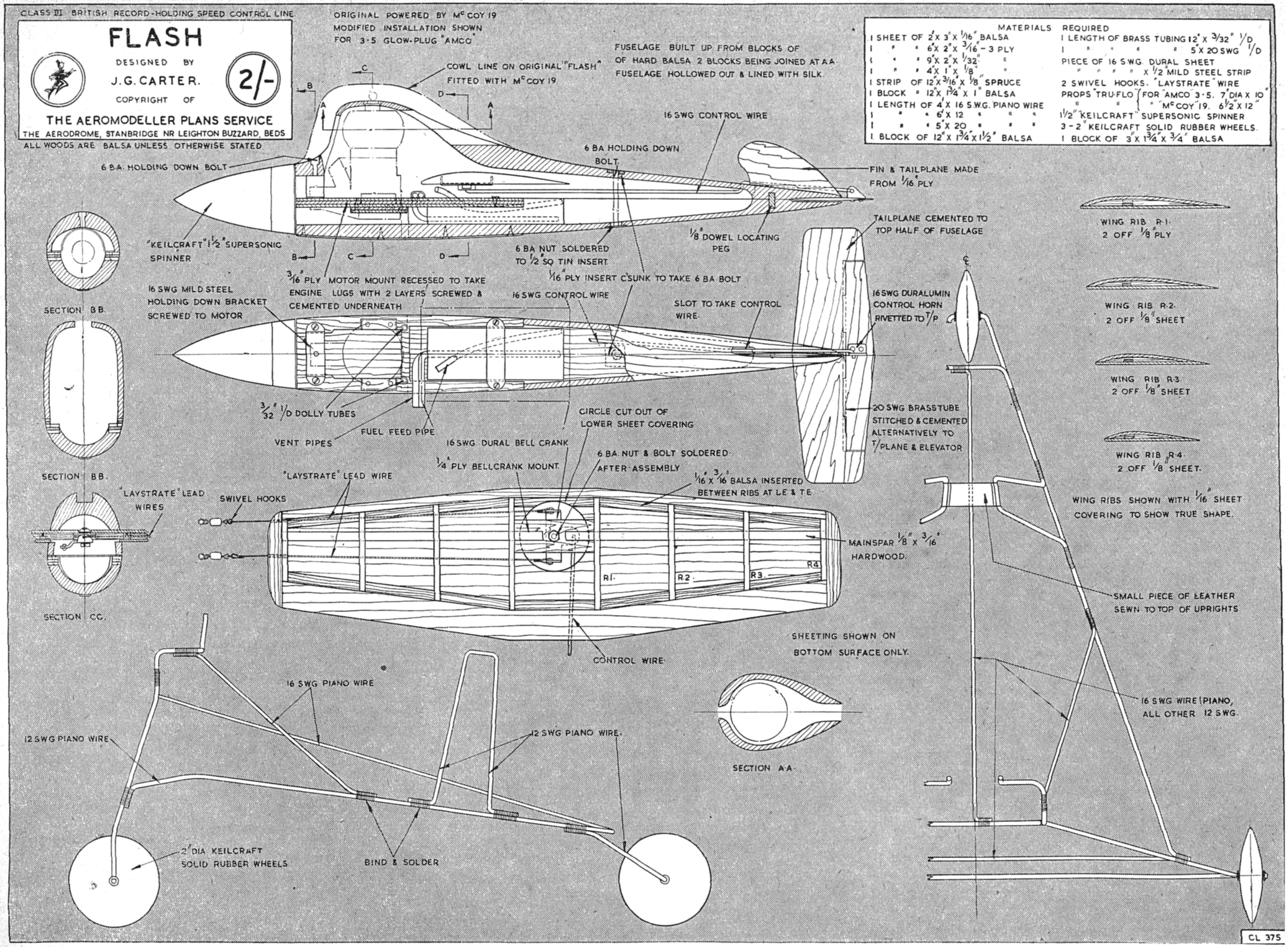
The aileron is quite simple, hinges being of cotton tape as on control liners. The position of the stops on the lower surface will have to be found by experiment, also the amount of upward movement. The other aileron is merely a trim tab and is used solely for this purpose.

Tail. Quite straightforward and should present no difficulties. Make sure that the hooks on the leading edge are well secured, and that they clip on the tail in alignment with the mainplanes. It will be noted that there is a hook on the undersurface of the tailplane, this engaging in the spade actuating the tip-up tail, and at the same time acts as a stop to prevent the tail going too far.

Covering. Heavy-weight " Modelspan " or a similar material.

Trimming. Hand launch with a peg in the aileron holding it in the neutral position: adjust by adding or taking weight from the weight box until it is just short of the stall. Then try on towline—still with peg maintaining neutral aileron, when, if all is well, she will go up like a bird, at the same time you can try out the dethermaliser, setting for about a minute.

Finally, tow up with peg attached to the ring, and on release watch how she turns. By adjustment of the stop you can control the turns to whatever you desire.

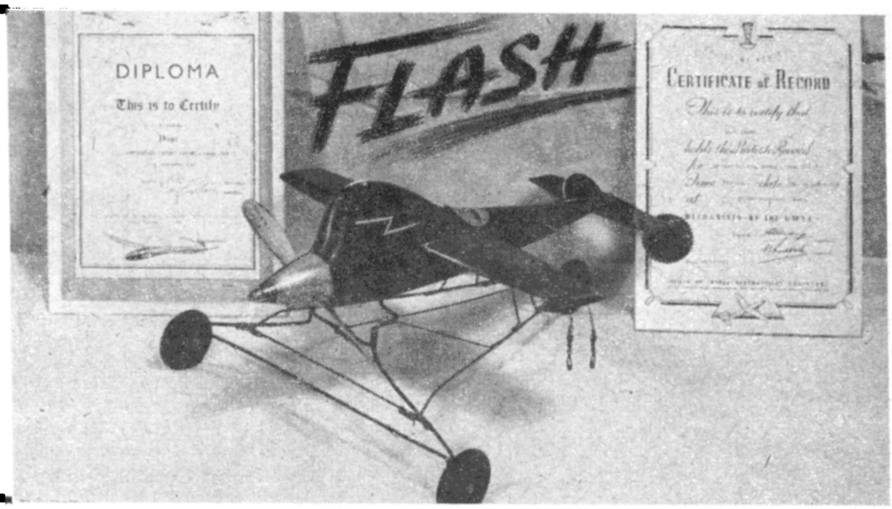


THIS IS A 1/3 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 2/- POST FREE FROM THE AEROMODELLER PLANS SERVICE

A CLASS III BRITISH RECORD HOLDING SPEED MODEL

By J. G. CARTER

34 years old . . . . . member of Croydon M.A.C. . . fitter charge-hand . . . . married with young son age 18 months . . . . main aeromodelling interests, Wakefields, flying scale and speed . . . • other hobby model race cars.



THIS model was the result of its designer having been bitten by the speed bug, after seeing a good performance put up at Dover last Easter.

Various modifications have been made since the original layout, such as the addition of a fin owing to a tendency for rolling in on the lines and alteration of the wing area, until near perfection has been reached, although, as the designer puts it, nothing is ever perfect especially with speed models. The best speed to date has been 110·7 m.p.h. timed over 8 laps with three time-keepers, and although this was not a competition flight, it proved that the layout was sound. "Flash's" contest record, flown by the designer in each case, includes the British National Record in class IIIA speed at Fairlop last September, and the Croydon and District M.A.C. Speed record of 99·4 m.p.h.

Constructional Notes.

"Flash" follows orthodox speed model construction, that is hollow log, and care should be taken in selecting the hardest balsa you can find. The three fuselage blocks are lightly cemented together and the fuselage outline traced on to them. Following this, the rough shape can be cut out with a fretsaw and then trimmed to near limits with a rasp, leaving about 1/16 in. all round for final shaping. This is done with a razor blade and very fine sandpaper, after which the centre lines of the top and sides should be marked on. Now, this marking is most important, as it will assist in lining up the blocks again after separation for hollowing out. Follow the lines given on the plan as limits when hollowing out, after which the motor mount of 3/16 in. ply can be fitted. To be quite certain of a really sound job, at this point, the cement should be allowed at least 12 hours to set.

After cement has set, mount the motor and test top fuselage block for fit, and likewise helmet block, after which these two can be cemented together. Now cut the air inlet and outlet as shown on the plan, the former to be ¼ in. wide and 1¼ ins. long. and the latter ⅜ in. wide and 1¾ ins. long. The shoulder wing fixing is now carefully marked and cut out. The top and bottom halves are then separated again, the motor removed and the inside of the fuselage lined with cotton gauze cemented in. Now, bolt on the landing skid.

To commence construction of the wing, the outline must be traced on to 1/16 in. medium hard balsa sheet, identical pieces being made for top and bottom. The ribs are as shown on the plan and are in pairs ; numbers 1, 2 and 3 from ⅛ in. balsa, number 4 from ⅛ in. ply. Check the centre line of the wings on top and bottom, and mark the position of the ribs and main spar on the bottom sheet. Now cut and notch main spar and bell-crank mount and commence assembly by cementing the former in position held with pins until set. With leading and trailing edges packed up to the correct position, the ribs and bell-crank mount are cemented in and the whole job pinned to a level board until set.

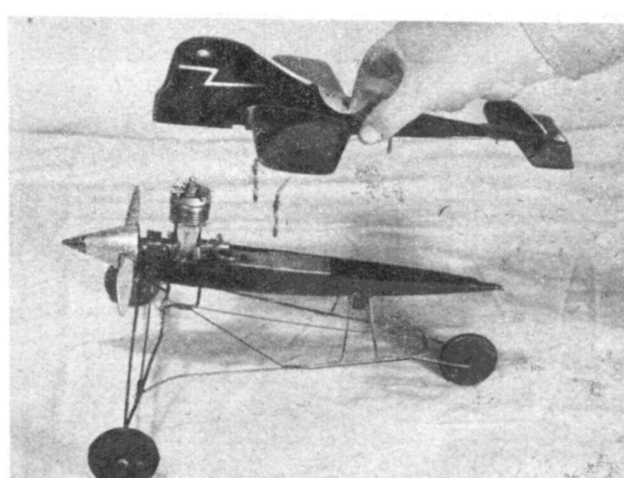
When satisfied with the completed constructional work, remove the motor and give the model a final rub over with very fine sandpaper. Follow this with two coats of sanding sealer, allow to dry and sandpaper again. Four coats of clear dope are applied, rubbed down with wet and dry paper between each coat. Apply the colour dope with a spray if possible, another four coats, again using wet and dry paper.

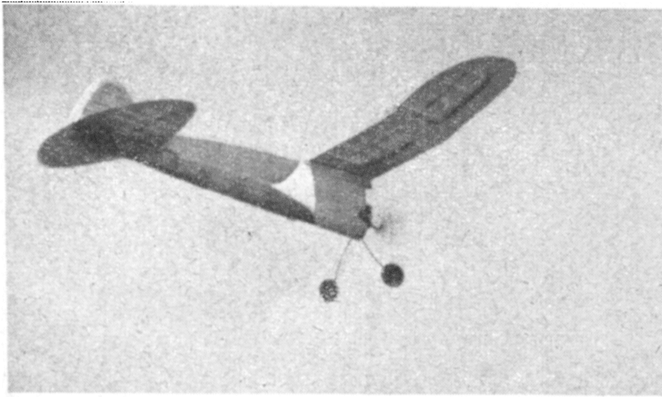
To obtain a high gloss finish use Titanine "Hendon C" polish, and if a gloplug motor is to be used, finish off with three coats of clear hot-fuel proofer, but don't "wet and dry" between these last three coats. After allowing 12 hours for everything to dry out perfectly, a final finish is obtained by again using "Hendon C" followed by "Hendon W," resulting in a perfect glass-like finish so essential with speed models.

Flying Notes.

Check for correct tracking on "dolly" and fly on the regulation 52½ ft. lines. A quarter full tank will be sufficient for take-off and a couple of test laps before cutting out. The first flight should be made with the motor rather rich and the take-off with neutral rudder ; *up elevator with this model on take-off is fatal.* "Flash" should clear the dolly in 25 feet and if held at neutral all the way, will be no trouble to fly, having no vicious tendencies. The designer suggests that after one or two flights to get the feel of the speed, check a flight with a stop watch and the motor "flat out", then put "Flash" away for competitions only.

The designer's suggestions for props to use with "Flash" are 6½ in. × 10 ins. with an Amco 3·5 c.c., 7 ins. × 8 ins. with an Elfin 2·49 c.c., and 6½ ins. × 12 ins. with a McCoy 19.

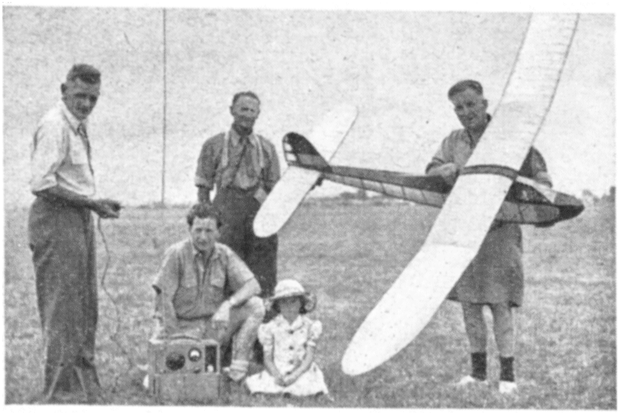


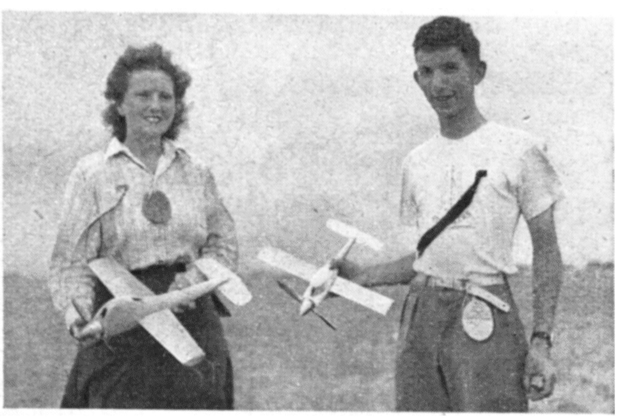


NEW ZEALAND NEWS

FRANK BETHWAITE DESCRIBES THE SECOND

NATIONALS





CHIEF news from New Zealand this month is the report of the second Nationals, held in Hamilton, in ideal weather, from December 28th, 1949, to January 3rd, 1950.

Nearly 200 modellers, from all over the country, came to enjoy the fine holiday and annual get-together, and they put up some of the best flying yet seen here. The value of the trophies offered totalled some £500, and they were of course also accompanied by substantial awards of merchandise.

Registration and billeting were accomplished fairly smoothly on the 28th, and flying commenced in glorious, hot, fairly calm weather on Thursday, 29th December. On that day Spar H.L. Towline Glider (3 ozs./100 sq. ins., 100 ft. line) and C.L. Speed Classes I, II, III, (I—up to ·16 cu. ins., 35 ft. lines; II—up to ·30 cu. ins., 52½ ft. lines; III—up to ·60 cu. ins., 70 ft. lines, all with 20g. pull test) were flown.

The Spar event was won with a flight of 9 mins. 12 secs. o.o.s. by B. Marsh, with a conventional 200 sq. ins. model (Eiffel 400 wing section, single blade folding prop.).

The writer managed to carry off the tow-line glider event with a rather interesting 500 sq. ins. model of 82 ins. span, 6 ins. chord, L.D.C. 2 all sheeted wing, with tow line hook at the C.G. position and an automatic rudder which permits very tight circling (only 100 ft. line, remember), without the possibility of a spiral dive. The wings and tail are painted jet black underneath for maximum visibility. This model made 12 mins. o.o.s. into a cloud. Unofficially, it reappeared a minute or so later and was still in sight after 38 mins. when it went into another cloud miles away. That black paid off!

In the Speed Class III, Ira Pepperill won with a motor of his own manufacture and a model of his own design at 126·79 m.p.h. Second place went to M. McCrorie with a stock American motor at 115·33 m.p.h. (It is of interest to know that Pepperill's model, not on a pylon and, therefore, not officially, is reported to have flown considerably faster.)

Speed Class II was won by D. Wallace with an E.T.A. "29" at 112·28 m.p.h., and second was Mrs. P. M. McCrorie, also with an E.T.A. "29", at 107·0 m.p.h.

Class III was taken by a small diesel at 59·11 m.p.h.

Friday 30th was fine and hot at first, followed later by cold breeze. Fuselage R.O.G. (3 ozs./100 sq. ins. and cross section L2/100) was won at 10 mins. 35·4 secs. o.o.s. by W. Craven. Glider, hand-launched (2 ozs./100 sq. ins.) went to a junior, J. Woodley, at 3 mins. 07·8 secs. Gas Class "A" (20 sec. motor run, R.O.G.) went to F. McNatty with a low time of 2 mins. 32·4 secs. The boys should have flown in the morning!

Any report of this meeting would be incomplete without mention of the exhibition flights made by Mr. L. N. Wright with his radio controlled Sailplane. Les Wright had radio control going in 1939 and has kept hard at it ever since (radio is his business, anyhow). For the first two days of these

Heading photo shows M. Hewittson's winning aggregate model in flight. Motor is a Pepperill diesel of about 2 c.c.
Other pictures from top to bottom are:—1. L. H. Wright holding sailplane with various helpers and transmitter. 2. D. Wallace and Mrs. P. M. McCrorie, 1st and 2nd in the Class II speed event. 3. Ira Pepperill with his Class III speed winner which clocked 126·79 m.p.h. He and his father (dark shirt on left) make the Pepperill motors, one of which, a ·60 gloplug, powered the model shown.

Nationals that ship was seldom out of the air. If anyone wanted to " have a go ", Les just hauled the big model up on about 600 feet of line and turned them loose on the key. Otherwise he, or one of his party, just flew it anyhow, sometimes thermal soaring for half an hour at a time and bringing it back and down when it was lunch time. That ship took several really hard landings (clueless control by beginners) and various other abuses, but there was never the slightest fault with the radio gear. For an example of sheer workability and reliability that demonstration, lasting two full days, could not have been better.

Saturday afternoon saw the Stunt Contest and the new Prototype Class made its début. Aerobatics were frankly not up to the standard seen in England by the writer during the 1949 season—the manœuvres are there but the polish is lacking. Alf Leong won the keenly contested event.

The prototype contest brought out some of the most attractive models that it has ever been my pleasure to see. Beautifully built, finished and painted, they flew in a most realistic manner—from a walking speed for a scale army co-operation job, to 90 m.p.h. plus with half lap take-offs and landings for a scale racer. This latter machine, by the way, broke off the lines during a later exhibition flight, climbed to about 150 feet, cut, glided down and landed with no more damage than a broken prop. Quite frankly, such high speeds had not been anticipated and in future, all prototype models go through the 20g. pull test, as for speed models. This new class is most definitely successful and here to stay. R. Nansen won the event with a scale Cessna.

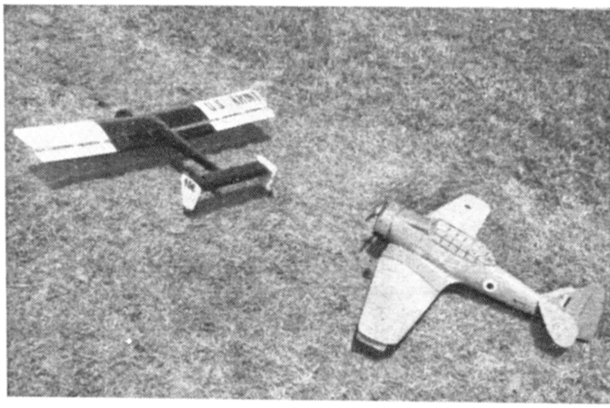
Indoor Open and R.T.P. were flown on Sunday afternoon. The Open (free flight) was won at 5 mins. 07·2 secs. by A. Leong. It was most regrettable that one or two flights which promised to be much longer should finish among the rafters or the light fixtures, but such seems to be the fate of all indoor contests. The present N.Z. record for indoor spar H.L. stands at well over 13 mins.

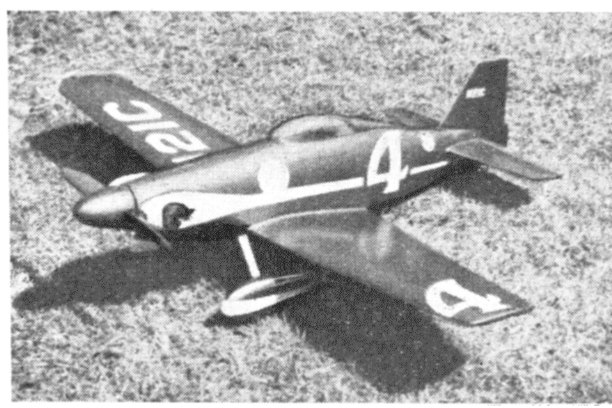
Round-the-pole showed much more interesting and less hazardous competition with R. Hewittson winning at 5 mins. 21·4 secs., the second place tied for 5 mins. 12·0 secs., and fourth at 4 mins. 17·8 secs. These times too, seem to be up to English standard. Models are all conventional indoor microfilm ships slightly modified for R.T.P. work—several still use built-up microfilm props, etc.

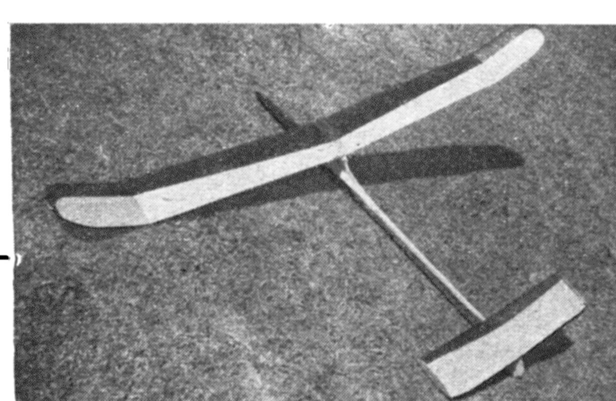
Monday, another glorious hot day, finished the Nationals with Wakefield, Pan American P.A.A. load event, and Gas Aggregate. Bryan Marsh, using a new development of his well-known Wakefield, won that event with 5.00 mins., 2 mins. 26·2 secs. and 5.00 mins. His actual times were 13 mins. 12 secs. o.o.s. (D.T. fuse dropped out, but model later recovered), 2 mins. 26·2 secs. and 9 mins odd. This ship is *good*. The P.A.A. load, a ratio event (motor run/glide) while carrying a load, was won by A. Carmine with the remarkable ratio of 35·5. The actual flight was 15 mins. 24·3 secs.

All other events were discontinued from 1.30–3.30 p.m. for the Gas Aggregate, which was certainly the highlight of the Nationals from the spectator's point of view. N. Hewittson won it with 31 flights of between 30 secs. and 3 minutes, totalling 40 mins. 07·7 secs. in the 2-hour period. That's reliability. Hewittson used a fair climb with a D.T. to bring the ship down out of possible (and frequent) thermals, and recovered it by prodigious effort and fast running. The second place winner, R. Handley made 32 flights totalling 35 mins. 52·7 secs. He used a ship so throttled down that it made a huge circle each flight, at about 10 ft. altitude and theoretically returned to the feet of its owner. In fact, he was much upset by frequent variable puffs of wind, and on one occasion, was unaccountably seen over the far side of the field.

A few last minute flights and P.A.A. load late-comers, furious work by the recorders and processors and the Nationals was over.







Brian Marsh with his new Wakefield which features an Eiffel 400 section and a lifting tail. Note the magnificent cumuli in the background.
Two prototypes, a Boeing L-15 Army Co-operation and a Harrad II.
One of the outstanding prototype machines, J. Hanlon's near scale " Cosmic Wind " powered by a small gloplug McCoy.
F. Bethwaites' winning towline sailplane. Note the small cross section of the fuselage, there being no requirements in this direction in New Zealand.

AEROFOIL SECTIONS

The 12 aerofoil sections described here complete the present series of sections already available to readers through the A.P.S. General constructional notes are given for each section of which 36 different sorts 4 to 12 ins. chord are available. The total range of 48 sections embraces the most popular and useful model sections available and will be added to as and when new sections prove their worth.

NACA 0018.

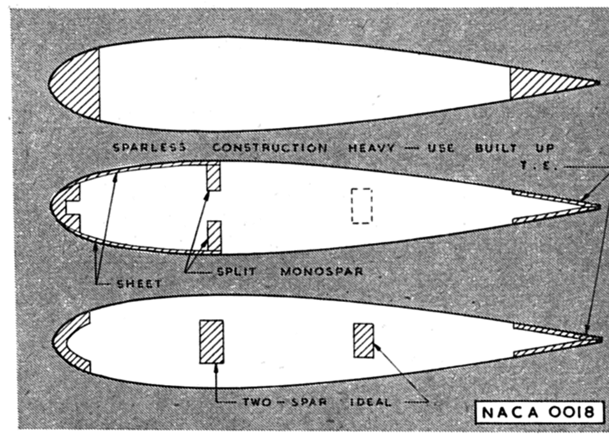
THE modern trend in stunt control line is to use relatively thick symmetrical sections. Symmetrical sections, as such, came into widespread use about 1948 in America, and somewhat later in this country, when it was realised that for inverted manœuvres the normal Clark Y type of aerofoil was unsatisfactory since, to get lift in the inverted position, it had to be held at a considerable positive angle of attack. A symmetrical section, with zero lift line corresponding to zero angle of attack, gives identical characteristics upright and inverted and makes for easier control.

The original De Bolt " Bipe " was a typical example of a stunt model with a flat undersurface section which could be flown inverted quite successfully but was not readily manœuvred from that position. The new " Bipe " was produced as a replacement, with a bi-convex section.

However, most of the early symmetrical sections were relatively thin and it was left to J. C. Yates and Bob Palmer (with Madman and Go Devil designs, respectively) to prove that the thicker section gave very good results, although many designers still appear reluctant to approach their figure of 18 per cent. chord thickness.

Although this section looks thick, it has very little more drag than a comparable 15 per cent. thickness section, for example, and probably less drag than a badly proportioned 15 per cent. section. Structurally it has the great advantage of permitting the use of very deep spars for maximum strength—a feature particularly useful in large spans. The depth of section permits almost any type of spar system to be used, probably one of the best being the modified two-spar type where the front spar is split into top and bottom spars, with the rear spar inset through the ribs. Sheeting around the nose of the aerofoil would then give an extremely strong, as well as a very efficient, aerofoil and the front spars can be webbed at highly stressed stations for even greater strength (*e.g.* across the centre section to take crash-landing shocks). The adequate depth of section at the rear also permits the use of a built-up trailing edge section, for further lightness.

There are a whole series of NACA symmetrical sections, where the last two numbers of the section give the thickness expressed as a percentage of the chord. 0012, for example, is 12 per cent. thick ; 0015, fifteen per cent. thick, and so on. Ordinates for 0018 can therefore be factored, as required, to obtain corresponding ordinates for any other thickness of symmetrical section in this NACA series. Alternatively, ordinates for the whole series can be expressed in the form of a table as below. To plot any NACA symmetrical aerofoil from these figures, first decide the thickness ratio required and then multiply each of the ordinate figures by this number. Then proceed in the usual manner by calculating required ordinates at each station for the chord length selected.



ORDINATES FOR NACA 0001

Station ...	0	1.25	2.5	5	7.5	10	15	20	30	40	50	60	70	80	90	100
Ordinates	0	.15	.22	.30	.35	.39	.44	.48	.50	.48	.44	.39	.31	.22	.12	0

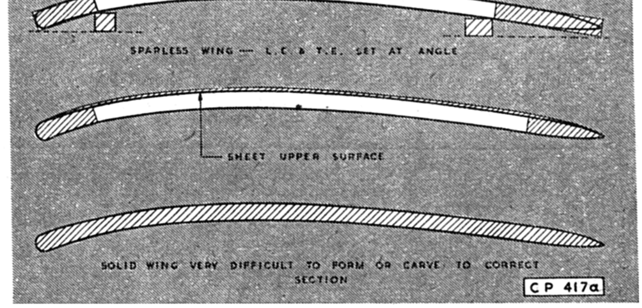
First multiply ordinates by required thickness ; e.g., for 10% thick symmetrical section multiply by 10, for 12% section multiply by 12, etc.

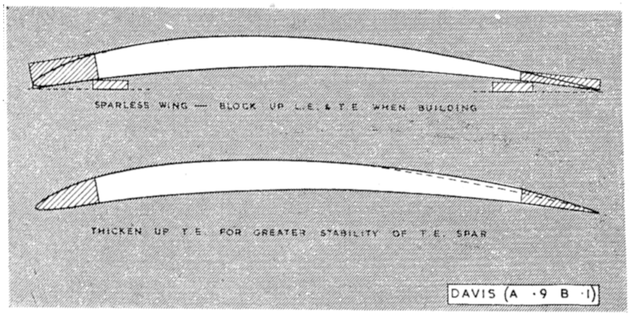
CURVED PLATE 417a.

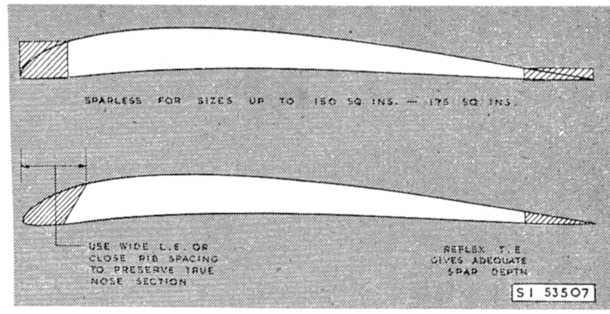
One of the most outstanding sections for lightweight rubber models has been the Marquardt S-2 designed by a leading American modeller of the mid-1930's. He is now president of a full-size aircraft factory specialising in jet propulsion units. In the indoor model field the McBride B-7 earned a similar reputation, although it does not appear to be commonly realised that the McBride single surface aerofoil is simply the upper surface ordinates of the Marquardt.

However, the point is that these heavily cambered, very thin, almost bird-like sections have proved particularly suitable for small, ultra-lightweight models. These models must be relatively small, for the shape of the section gives virtually no spar depth, and about the only suitable form of wing is sparless construction. This is not economic in sizes much above 150 sq. in. and becomes definitely weak above about 250 sq. in.

Within the last eight years, considerable attention has been given to the theoretical design of aerofoil section for models, it being generally known that, at low speeds, the efficiency of a scale aerofoil is very much lower than that of its full scale counterpart. Scale effect, as this is known, is a function of the Reynolds Number. Now the Reynolds Number, or R.N. is simply an *aerodynamic scale*. To get the same airflow conditions over aerofoils of different size (*i.e.* the same characteristics) it has been proved that the same *quantity* of air must be dealt with in each case. This means, quite simply, that if one aerofoil is exactly half the size of another of the same section, it must fly at (or air must be blown past at) exactly







twice the speed. If not, the characteristics will differ.

The R.N. which is simply a scale against which to measure this difference, is proportional to the airspeed times the length (chord) of the section. Model R.N.'s are very low by comparison with full scale practice, for both speed and size is so much smaller. Hence a standard section, say RAF 32, used on a model has different characteristics to an RAF 32 section used on a full scale aircraft. As a general rule, the lower the R.N., the poorer the characteristics of the aerofoil.

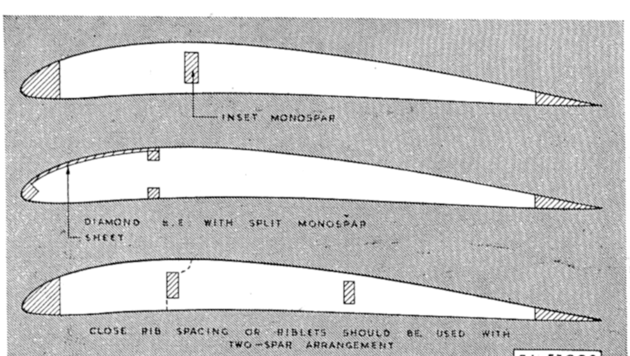
The theoretical investigations carried out by such people as N. K. Walker, P. R. Payne and R. W. Annenberg were all directed to one end—to produce aerofoils with good characteristics at low R.N., and they have backed their theoretical claims by wind tunnel tests at model speeds.

Without elaborating on this theme, we can say that the Curved Plate 417a aerofoil is, virtually, a Marquardt type aerofoil designed to operate specifically at model speeds and sizes, whence it should have a marked superiority over hitherto conventional sections in the same range. The critical R.N. factor (product of wing chord x model speed) is given as about 6, which means that it should behave very satisfactorily down to this figure—and this corresponds to quite a small model flying at average speed.

However, there is considerable doubt in the practical field as to whether or not these sections are any better than conventional aerofoils, particularly as no positive proof of their superiority has been forthcoming in the nature of contest results. They are attractive, therefore, to the aeromodeller with an enquiring turn of mind, who might care to prove or disprove this point himself, regarding the CP 417a as a Marquardt substitute and directly comparing results. Structurally, the same difficulties arise, indeed even more so, for sparless construction (or a solid wing) is virtually the only solution, and the leading edge will need to be set at an angle to get any suitable depth or width of section.

DAVIS (A=·9 : B=·1).

A further section, in the same category as the two above, is the thin Davis, which is based on a series of aerofoils of different thickness/chord ratios calculated by the writer from the original Davis formulæ, with camber selected as best suited to model work. The original Davis formulæ can give rise to an infinite number of sections, all being based on laminar flow (*i.e.* high efficiency) under full scale conditions.



No claims are made for their superiority in the model field. The original series, first published in 1944, were simply calculated as being directly comparable with conventional sections as used for models, and of particular interest, at that time, due to the publicity given to Davis aerofoils in general. The three calculated sections were intended to cover ultra-lightweight, lightweight and heavyweight use in the sphere of gliders and rubber models; all have been used with considerable success.

Structurally, this thin Davis is no better than the CP 417a, and the trailing edge in particular is very difficult for it thins down so finely. This means a relatively wide trailing edge spar section to get any stability in the structure, but even this will not give sufficient depth of spar to prevent warping being troublesome. The Marquardt is the best of the three in this respect, allowing the maximum trailing edge *depth* for a given chord.

SIGURD ISACSON 53009.

Contemporary with the British L.S.A.R.A. low speed aerofoil developments, similar progress has been made on the Continent and further series have appeared claiming low R.N. efficiencies in advance of conventional sections. Quite the most prolific of these have been the Isacson sections, greatly favoured by the Scandinavian countries. In appearance these sections are quite orthodox and are characterised by a very small nose radius, this being an essential of the claim for low critical R.N. By direct comparison, many of the L.D.C. sections emphasise large nose radius for virtually the same reason.

The S.I. 53009 has the proportions of a medium-size model section and should be directly comparable with an 80 per cent RAF 32, or the medium-weight Davis. On account of its relatively heavy undercamber, it would probably be best suited to gliders of almost any size from 250 sq. in. area up.

Structurally, it should be well suited to any form of spar arrangement, for there is adequate depth of section and the trailing edge section is not too thin. The leading edge would need to be reasonably wide, in order to get the small radius entry and still " back up " between the ribs. The upper camber sweeps up sharply from the leading edge and covering would tend to sag badly between ribs and spoil the section if only a very small leading edge were used. The S.I. 53009 is also one of those annoying sections, from the constructor's point of view, where it is impossible to build with any one spar flush with the plan. Some sections conveniently have their lowest point at a position roughly corresponding to the mainspar position. The S.I. 53009 has not, so failing threading the spars through the ribs, each spar would have to be blocked off the plan during building.

S.I. 53507.

A thinner section in the Isacson series, the S.I. 53507 should be particulerly suited to the smaller models where the choice of section comes mid-way between the Marquardt type and the conventional RAF 32, etc., although there is still very little depth available for spars and sparless construction would probably be best.

Lightweight rubber models might well use this section, where it should give all the characteristics of the familiar Marquardt with possibly less drag, but it would not give such good results with heavier loadings. It is comparable

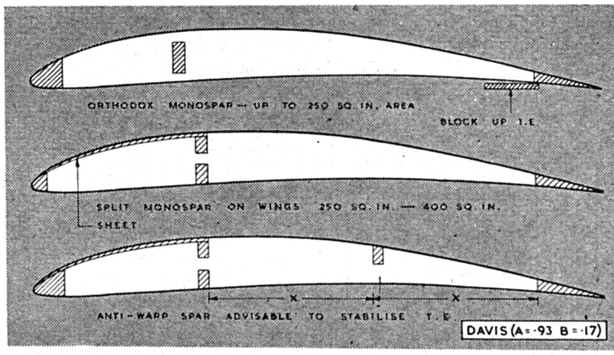
with the medium weight Davis, for example (about 1·5 per cent. thinner), and the Davis has been rejected for Wakefield use as it was found to produce too fast a glide. Once loadings go up, it has been found that the thicker section produced best glide characteristics. The thinner section can give a faster climb, but the overall performance is inferior. The writer's original 1946 Wakefield used the medium weight Davis and had a very poor glide compared with the 1948 and 1949 machines, when thicker wing sections were used.

DAVIS (A=·93 : B=·17).

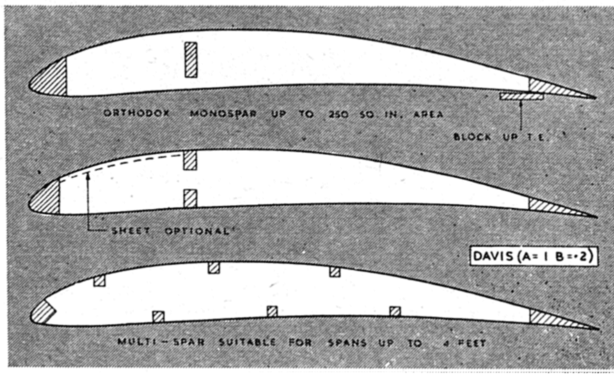
With the limitations discussed above this section is still, nevertheless, a very good one for a model where the wing loading does not exceed about 3 ounces per 100 sq. ins. wing area, and it has been used to good effect on ultra-lightweight models, instead of Marquardt or thin Davis, where built-up rather than sparless construction was desired. There is room for a reasonable depth of mainspar, although excellent results have also been obtained with multi-spar construction. For gliders, a really strong wing results from split monospar with sheeted leading edge. This sheeting need only be applied to the upper surface of the wing.

DAVIS (A=1·0 : B=·2).

The heavyweight Davis, last of the three original Davis series, has given excellent results on Wakefields, having the desired thickness ratio to slow the glide, yet with a low drag figure so that a rapid climb is possible. Section depth is adequate to allow any form of spar arrangement to be employed, and the trailing edge section is not critically thin, so that sparless wings (plug-in type for shoulder-wing Wakefields) still have adequate depth of T.E. spar section. It is an interesting alternative to RAF 32, Joukowski, NACA 6412, etc.



DAVIS (A=·93 B=·17)



DAVIS (A=1 B=·2)

JOUKOWSKI.

This is the section the writer now favours for Wakefields, after experimenting through various forms of the Davis series, RAF 32 and modified sections and flat-undersurface sections. Direct comparisons were possible on the same model, since, with the tongue-and-box shoulder-wing layout, one set of wings could be simply substituted for another.

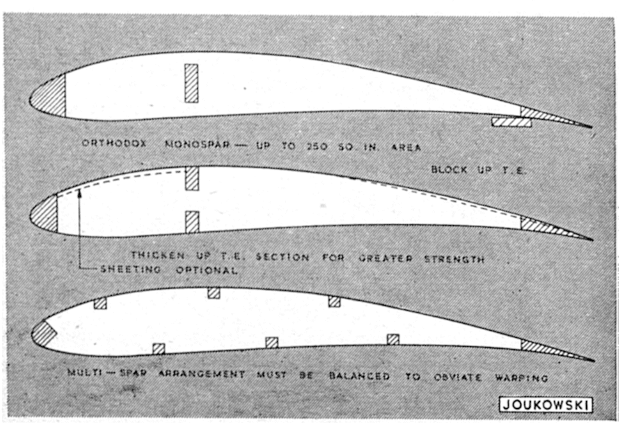
The Joukowski section was originally designed in 1915 and published in December of that year. About the first time it appeared in any model publication was in the AEROMODELLER, July 1939. Since that date, a number of well known modellers have used and liked it, particularly for rubber models of similar loading to Wakefields and FAI gliders of all sizes.

Structurally, it has one disadvantage; the trailing edge of the section is very thin. Hence, not only is it difficult to get adequate depth of spar to prevent warping, but ribs have a tendency to break where they join the trailing edge. On a Wakefield, for example, 1/32nd in. thick ribs are only about 1/16th in. deep at this point. However, there should be no objection to thickening up the *upper surfaces* of this aerofoil, from about the 60 per cent. station back. Separation will have occurred before this and aerodynamic properties will not be adversely affected. The same treatment, too, might well be applied to other similar sections.

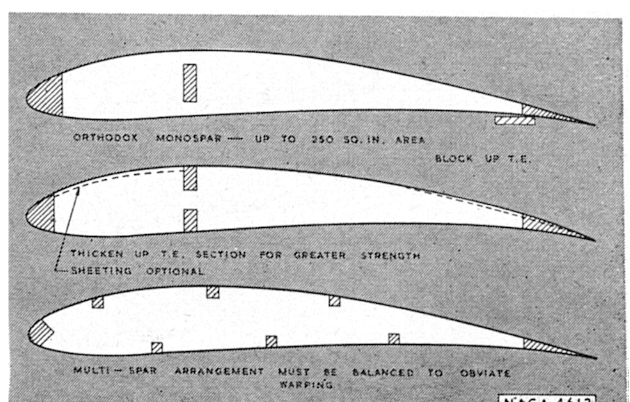
NACA 4612.

This is another of the NACA series of aerofoils which is now being used for Wakefields, particularly in America, similar in many respects to NACA 6412. The main difference is that, although the thickness is identical, the amount of camber has been reduced and the point of maximum camber moved farther aft, in keeping with the modern theory that better low speed characteristics are obtained where the maximum camber occurs at 50 per cent. chord, or farther aft.

The series numbers of the NACA aerofoils define their geometric characteristics. Each aerofoil is built up by adding a symmetrical body or fairing around a centre line. The total thickness of this body, *i.e.* the overall thickness of the section, is expressed by the last two figures of the aerofoil number. Both NACA 6412 and 4612 are, therefore, 12 per cent. thick. The other two numbers define the amount of camber and the point of maximum camber of the centre line. The first digit gives the mean camber of the centre line, expressed as a percentage of the chord. 4612, therefore, has



JOUKOWSKI



NACA 4612

less camber than 6412. The second digit gives the location of the point of maximum camber, expressed in 1/10th chord lengths. Thus in 6412, the point of maximum camber is at 60 per cent. chord. 4812 would have the point of maximum camber at 80 per cent. chord, and so on. All of the four figure series of NACA aerofoils can be analysed in this manner.

LDC-2.

Here we have another low- speed aerofoil, designed specifically for small and medium-sized models. The L.D.C-2 is probably the best known of the laminar flow (model) section and has been used on many successful models.

The aim of this, and other similar sections in the same series, is to preserve a laminar airflow over the upper surface. One of the main reasons why model aerofoils compare poorly with full size aerofoils of identical section, is that the airflow breaks away from the upper surface at some early point at low Reynolds Number, reducing the possible lift and increasing the drag by giving a bigger wake. By moving the point of maximum camber well back and re-designing the nose entry, the LDC-2 attempts to delay this break-away of the airflow, or separation of the airstream from the aerofoil, back to a point comparable with a conventional full-scale aerofoil operating at full scale R.N. Provided this can be achieved, of course, better lift and lower drag characteristics are the results.

Models with the LDC-2 section are, without doubt, capable of flying-well, but so far it has been impossible to detect any marked superiority over a conventional section of comparable thickness. But again, here is an interesting medium for experiment for the modeller who would like to find the answers himself.

Structurally the section presents no special difficulties although, in common with all other laminar flow sections, it is emphasised that close rib spacing is essential and that no spars should deform the covering by being mounted flush with the surface. All spars, therefore, should be inset to get the fullest advantage from an aerofoil of this type.

60 per cent CLARK Y.

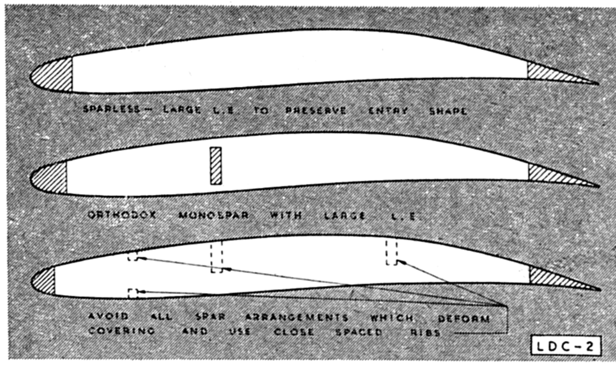
One of the remaining sections to be dealt with is that which is almost the " universal " tailplane section. Tailplane sections are broadly grouped into two types—" lifting" and " non-lifting "—which is popular terminology, but incorrect. Whatever the section of the tailplane, it is called upon to "lift" at certain times, and may even be rigged to supply a certain proportion of the lift all the time. A symmetrical section " lifts " just as well at a small angle of attack as a thin, flat undersurface section.

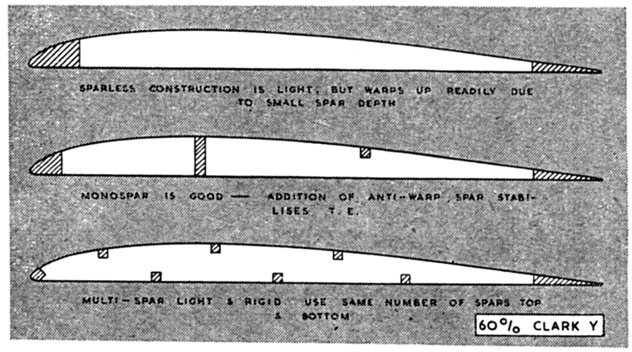
As a matter of convenience, a flat undersurface section for the tailplane is much to be preferred. It is easier to build for it can be laid out flat over the plan, and can be pinned or held down readily, when drying after doping to prevent warping. Then, being flat, is far easier to mount on the fuselage and check for rigging incidence than a bi-convex section.

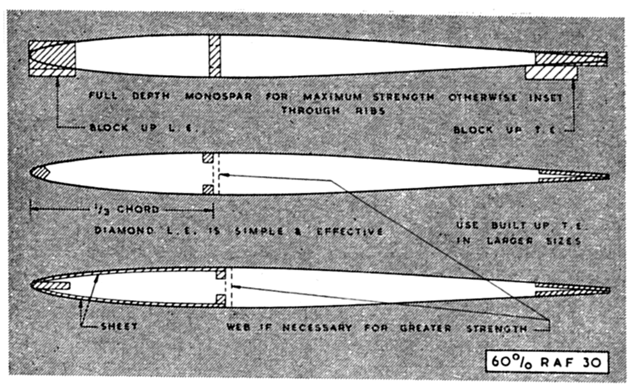
Even if the tailplane is to be rigged to contribute a proportion of the total lift of the model, it does not need a particularly efficient lifting section. Thus, a simple Clark Y type is more than adequate, but Clark Y itself is rather thicker than necessary. The tailplane section should never be as thick as the wing section, to avoid possible stability troubles, added to the fact that, the thicker the section the greater the drag.

Thus, taking the ordinates of standard Clark Y and thinning them down to 60 per cent. of their original value gives a tailplane section well suited for almost any type of model. Structurally, this still leaves just enough spar depth for a full-depth mainspar located about one third chord back, with reasonable leading and trailing edge spar depths. As an added precaution a small anti-warp spar can be added on the top surface, mid-way between the mainspar and the trailing edge. Slight distortion of the section, where the covering sags over these spars, will not matter at all.

A 60 per cent. Clark Y gives a maximum thickness of just under 7 per cent. which is about the best figure for any tailplane section. RAF 15 has been tried as an alternative, this being an undercambered section of similar thickness, but there is no appreciable difference, even when rigged as a definite lifting tailplane. Where a symmetrical section tailplane is required, the same thickness figure can be adopted so that the final section approximates to NACA 0007.



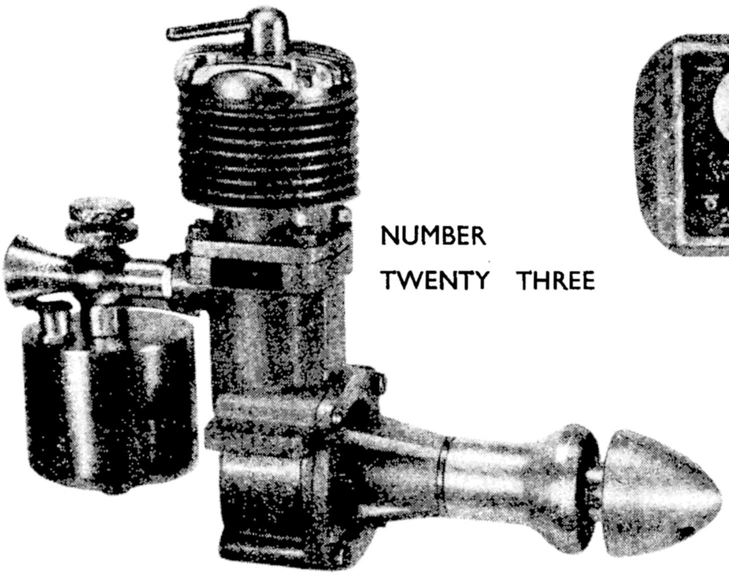




RAF 30.

RAF 30 is one of the older type symmetrical sections, which has been used both for tailplane and for wings in full scale practice. For model work, where a so-called " non-lifting " tailplane is called for, it is too thick in its original form and a much more useful section results from thinning it down to 60 per cent. of its original thickness. The main objection to a symmetrical tailplane section is purely practical. It is easier to build a tailplane with a flat undersurface. However from the point of view of stability and efficiency it does not pay, at times, to use a symmetrical section, particularly with power duration models where the tailplane area is large and may even be as much as 45 per cent. of the wing area. At very low angles of attack, the drag is extremely low, and lift at any angle above zero is very nearly the same as that of a thin cambered section. Choice of the particular section, generally lies between the 60% RAF 30 and a similar NACA symmetrical aerofoil—say NACA 0008 ; shape is not particularly critical.

To offset the fact that a true symmetrical tailplane is somewhat harder to build, the very shape of the section does permit a perfectly balanced spar system and so any tendencies to warp should be minimised.



NUMBER TWENTY THREE

The "WILDCAT"

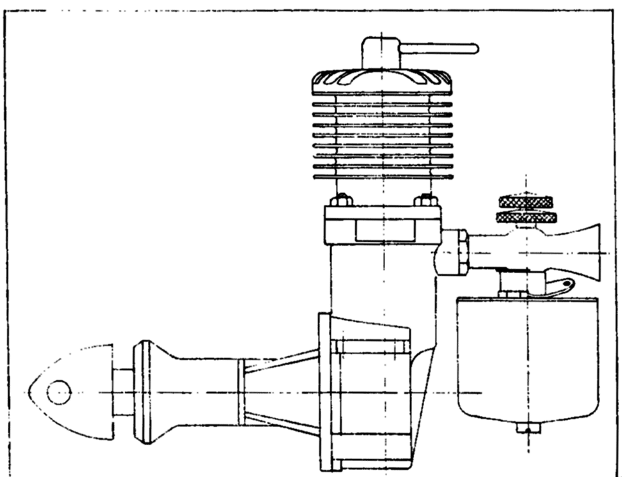
MARK III 5 c.c. DIESEL ENGINE

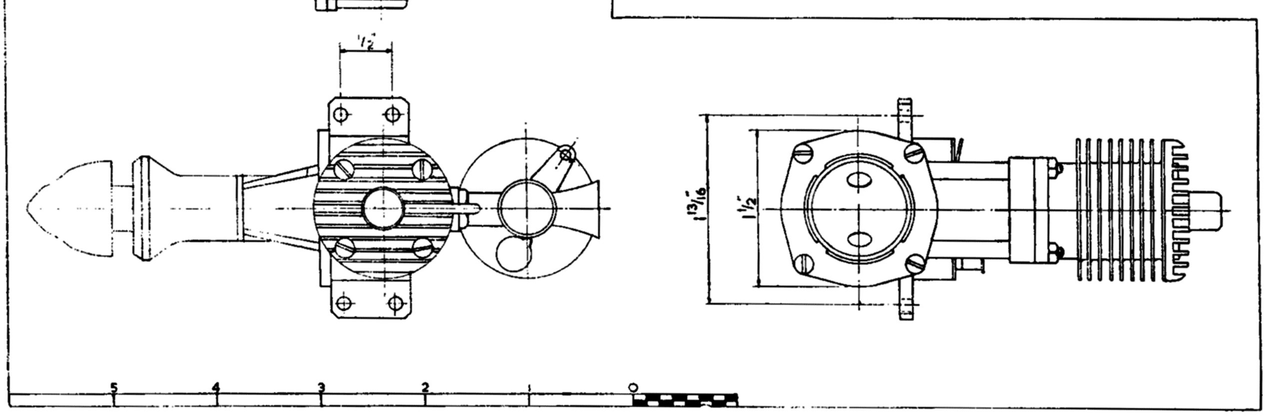
IN comparing the modern miniature engine with those of a few years ago one cannot help but remark on the greatly improved appearance which the latest engines possess. It is obvious that British manufacturers have really got down to the job, and that a very great deal of money has been invested in dies, jigs, and precision equipment, in order that their products may have an appearance to match the improved performance. The use of die-castings has been chiefly responsible for the modern good looks; in fact, some of the modern die-cast components are little short of works of art. Before the end of the war the Americans were the acknowledged masters of die-casting, but to-day many of the British die-cast parts which are seen on these small engines are, if possible, superior to anything which the U.S.A. produce.

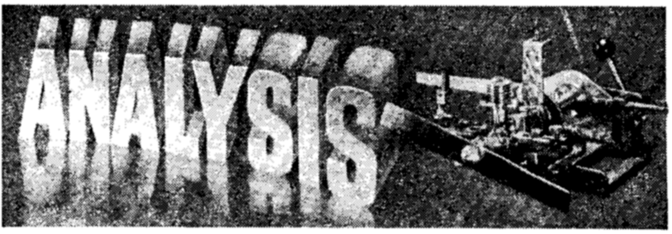
In the "Wildcat" 5 c.c. Diesel engine we see an example of how good die-casting may give a most pleasing and modern appearance to an engine of quite orthodox design, retaining the well-known two-port exhaust system and direct-entry inlet. The advantages of this standard lay-out are that it usually produces an engine which is dead reliable, sturdy, and with a good power output at the medium speed ranges. We thus get an engine which is not exceptionally fast, as speeds go to-day, but which will develop a useful power output somewhere around the 9,000 to 10,000 mark. In comparison with full-sized aero and car engines, this speed is still incredibly high; that is, about twice or three times as great, but as some of the modern miniatures do not start to "do their stuff" until about 12,000 to 14,000 r.p.m. has been reached, revs. of around 10,000 must be considered to be in the higher-medium range.

Engines of the sturdy "Wildcat" type are usually free from the petty annoyances and failures which are so often encountered in the super-speed jobs, and make their greatest appeal to those modellers interested in reliable, "straight flight" aeroplanes, rather than in the record breaking brick-bats at the end of a control line.

The test of the "Wildcat" engine showed that it did, indeed, possess all the virtues associated with the type; that







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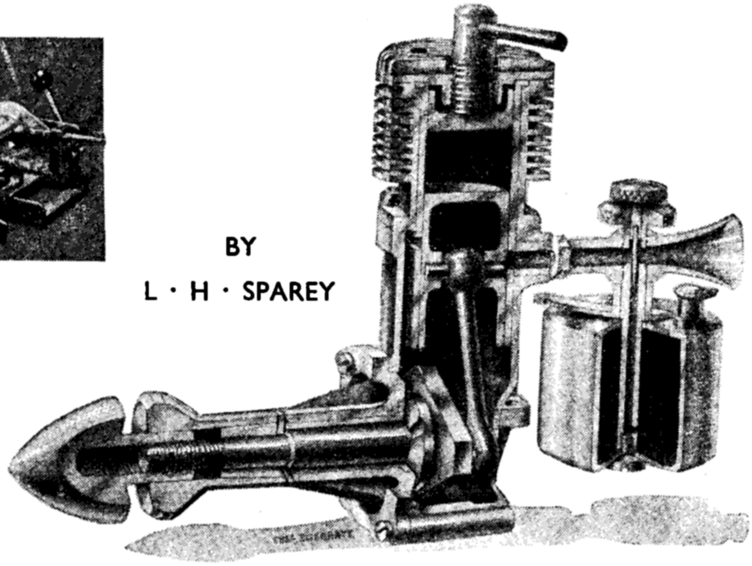


is, good starting, freedom from trouble, and high power at medium revs. The engine seemed well-balanced, and ran smoothly at all tested speeds, but it was found difficult to persuade it to exceed about 11,000 r.p.m. As the power output was falling rapidly at this speed there seemed little point in pushing it beyond the speeds intended by the design.

TEST

Engine : Wildcat Mk. III 5 c.c. Diesel.

Fuel : As recommended by the manufacturers.

Starting : Exceptionally good at all times. Pulley and chord used for convenience of tests, but experimental hand-starting used from time to time.

Running : Consistent at all speeds within the test range. The engine is rather sensitive to carburettor-needle setting, and careful adjustment is needed to ensure the best results. The carburettor is well-placed and easy to handle, so that correct adjustment was simple. The useful range of speeds seemed to lie between about 4,000 and 10,000 r.p.m.

B.H.P. : The power curve flattens considerably at the peak, so that maximum b.h.p. output of approx. ·340 was found to lie at about 10,000 to 10,300 r.p.m. Actual maximum figure was ·341 b.h.p. at 10,050 r.p.m., but an increase of only 400 r.p.m. reduced the output figure to ·330 b.h.p. Further speed increase lowered the figures rapidly, until, at 11,100 r.p.m. output was down by about ·120 b.h.p. Peak output was obtained without fuss or bother, and may be considered to be excellent.

Checked Weight : 9·2 ozs. including tank.

Power/Weight Ratio : ·592 b.h.p./lb.

Remarks : This engine was run-in for 1½ hours at 4,000 r.p.m., and no trouble was encountered throughout the tests. The engine is well made and well finished, and should provide a reliable general purpose unit.

Mounting : Beam, upright and inverted.

Recommended Airscrew : 13 ins. × 6 ins.

Flywheel : 2¼ ins. dia. × ½ in. width. Brass or cast iron.

Bore : ·6875 ins. **Stroke :** ·875.

Cylinder : Aluminium with meehanite liner. Attached to crankcase by 4 screws.

Cylinder Head : Finned aluminium. Attached to cylinder by 4 screws.

Crankcase : Die-cast. D.T.D. 424.

Piston : Flat top. No rings.

Connecting Rod : Duralumin.

Crankpin Bearing : Plain.

Crankshaft : One piece, hardened ground and lapped in high tensile steel.

Main Bearing : Meehanite Bush.

Little End Bearing : Plain.

Cylinder Liner : Meehanite.

Special Features : Designed to give easy starting and easy handling characteristics, under all conditions.

GENERAL CONSTRUCTIONAL DATA

Name : "Wildcat"

Manufacturers : Davies Charlton & Co., 13 Rainhall Road, Barnoldswick.

Retail Price : £3 17s. 6d.

Delivery : Ex-stock.

Spares : All spares by return of post.

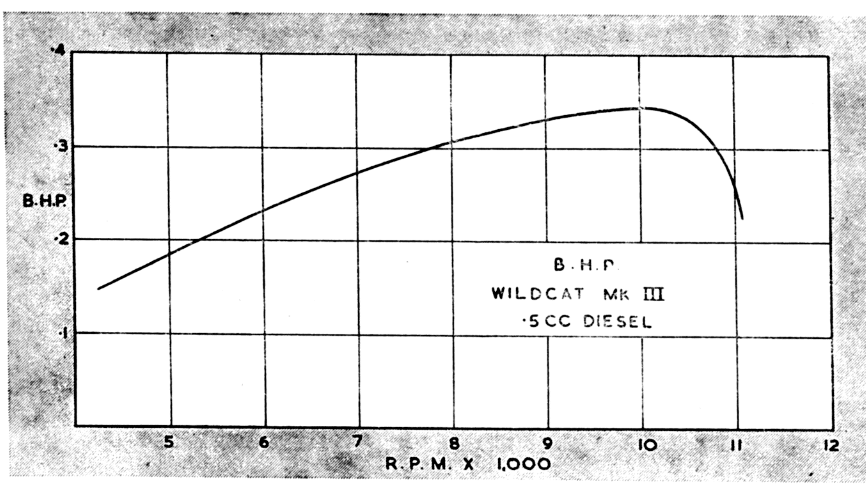
Type : Diesel.

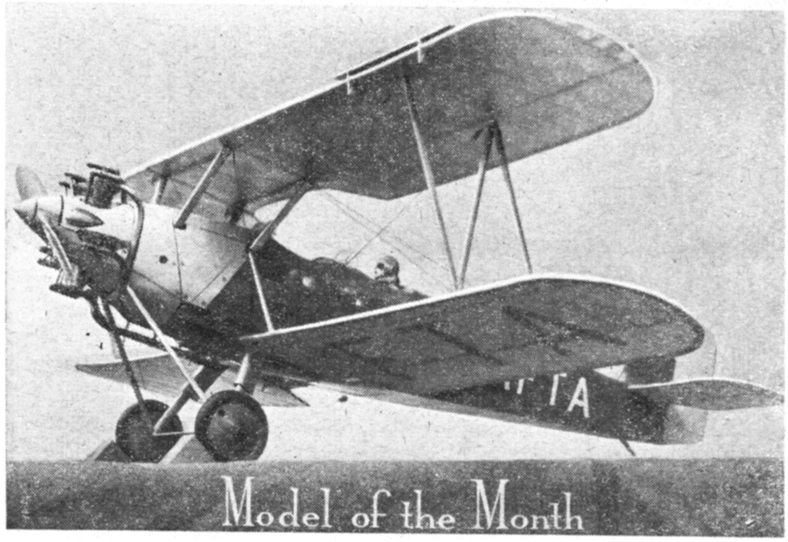
Specified Fuel : 10% Castor Oil, 40% Diesel Oil, 50% Ether.

Capacity : 5·24 c.c., ·32 cu. ins.

Weight (bare) : 7¾ ozs. (Excluding Ext. Hub and Spinner).

Compression Ratio : 18 : 1.





THIS month, forsaking the rudder for the udder, so to speak, Fliar Phil presents his Cowshed Special, designed and built in camera at Eaton Bray Studios. Although the design is retrograde according to present day concepts in that it employs an undercarriage, the following details may (or may not) be of interest :—

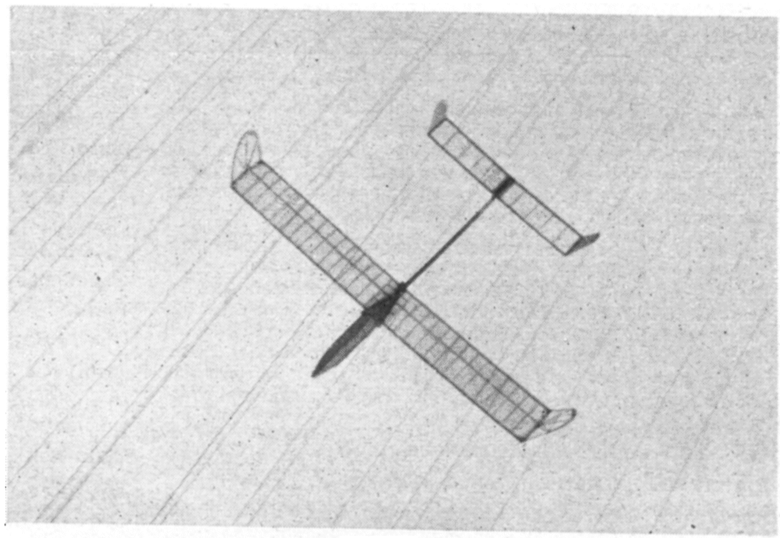
Power : Revolving stage superheated Mindthejet Mark One (it will too, if you don't look out). Span : About 15 hands. Speed : 3 knots (knot fast enough . . . etc.). Wing Section : NACA (yard) Flat Plate T. & G. Control : Very little. The machine as reported in the Tooting " Bugle ", has now gone to Camberwell for modifications to the wing section.

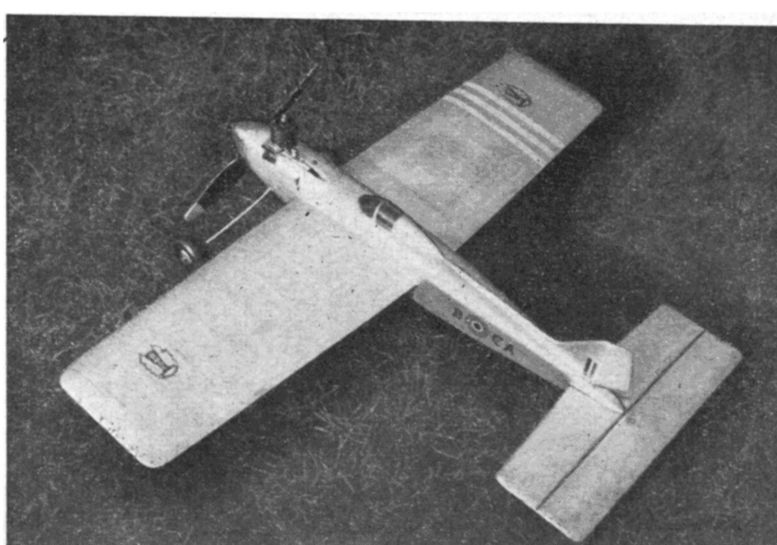
Model of the Month : Fliar Phil has great pleasure in awarding Aeromodellers' Laurels to J. M. Greenland of Radlett for his fine 1/8 scale powered flying model of the Hawker Tomtit. John Greenland's prowess as a model builder of outstanding merit is well-known to our readers already, and the machine shown here is correct down to the last detail. The top four " pots " of the dummy Armstrong - Siddeley Mongoose radial engine are detachable in one piece, the bottom one being a Mills 1·3 c.c. Diesel disguised with rocker boxes and push rods as per the original.

Construction is almost entirely of hard balsa covered with rag tissue and the undercarriage really does " oleo ", a feature which, in conjunction with the rubber-sprung front radius rods has proved remarkably successful in ironing out really hard knocks.

" Wind in the Wires "—up Derbyshire way, comes from N. C. Wilson of Youlgrave near Bakewell. This method of posing a model for photography would seem to have its merits, but Fliar Phil doubts whether the G.P.O. would co-operate—willingly ! The model is a 34-in. span lightweight glider of reader Wilson's own design and based on the Sunnanvind layout. The prototype was built away back in 1948, but was lost shortly after its first flight when it stalled off the line at 50 ft., made a flight of 8 minutes o.o.s. and was never seen again.

At lower left we have a nicely finished





stunt control liner by R. Cooke of East Dene, Rotherham, who says that it is his first attempt at designing a machine of this nature. It was originally tried out with a B.M.P. 3·5 c.c. and later with a Movo 2·0 c.c. The present motor is an Ohlsson 60 glow-plug unit, the wing area is 275 sq. inches and the all-up weight 27 ozs.

Next we have a 3½ ins. to the foot scale Kirby Cadet glider, built by A. E. Wiles, of R.A.F. Station St. Athan, Glamorganshire. The wing span is 11 ft. and it weighs 8 lbs. The model has built up wing ribs, sheet covered fuselage, and all flying surfaces are covered with full-size glider fabric. Yes, it looks as if we're mighty proud of our 'Bert back at the buildings!

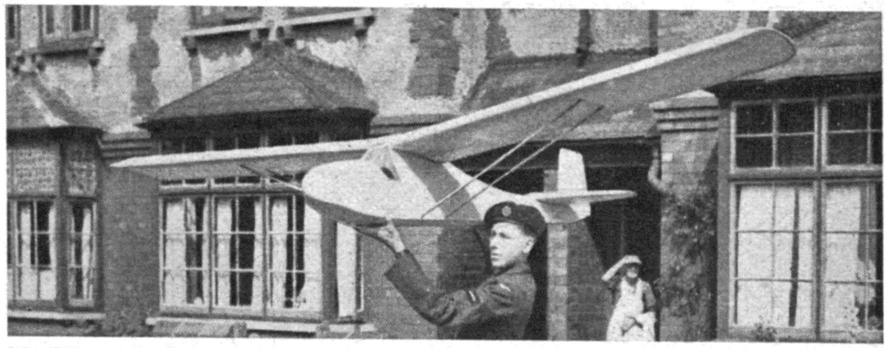
Photo No. 5 shows N. G. Taylor of Wimbledon with a free-lance semi-scale model of his own design.

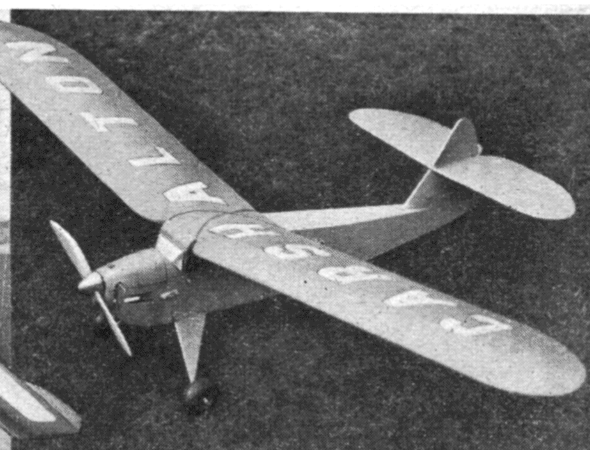
The gentleman holding the tail-less model is R. C. Poad of Darlington, who sends us the following details:—Span 44 ins., weight 10 ozs., "Home-baked" wing section, power unit: 1 c.c. E.D.Bee. The machine has clocked 60–90 secs. on a 20–25 sec. engine run on several occasions, and had not domestic affairs intervened, reader Poad would have made an attempt on the British Tailless record at Baildon Moor in June 1949.

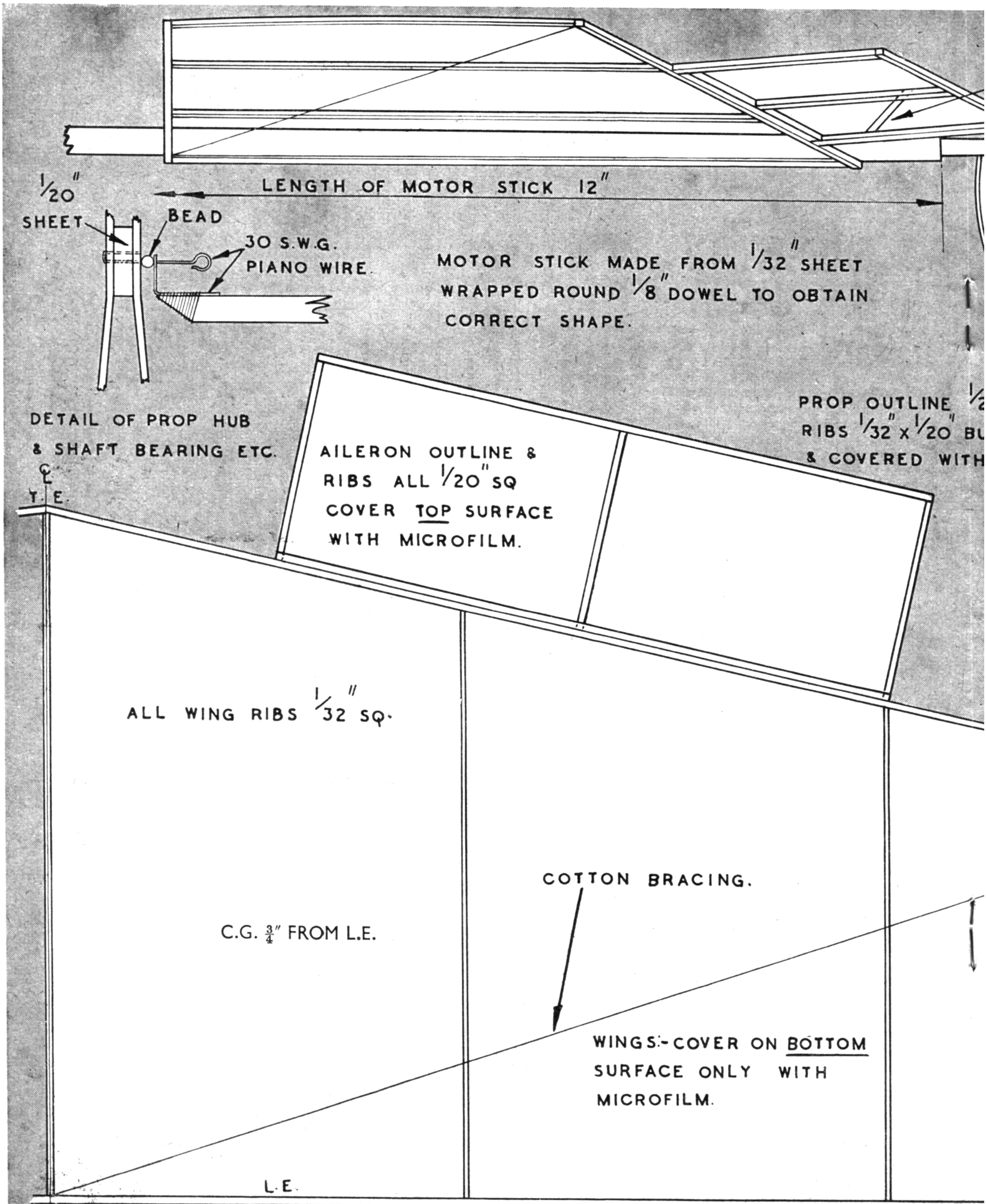
The next photograph, by P. Cameron of Sutton, shows a free-lance design by Dennis White of the Carshalton & District M.A.C. This model, superbly finished in grey with black and white etceteras, is powered by a Gwyn-Aero 7·5 c.c. spark ignition engine, the wing span being 72 ins. and the weight 3½ lbs.

Lastly a smart-looking flying scale Piper Cub, complete with Belgian registration and built from scaled-up 1/72 drawings (Yes, but what about that dihedral—F.P.) by B. R. Newman of Lyneham, near Chippenham. The model has a wing span of 51½ ins., weighs 10½ ozs. and is powered by a Mills Mk. II diesel.

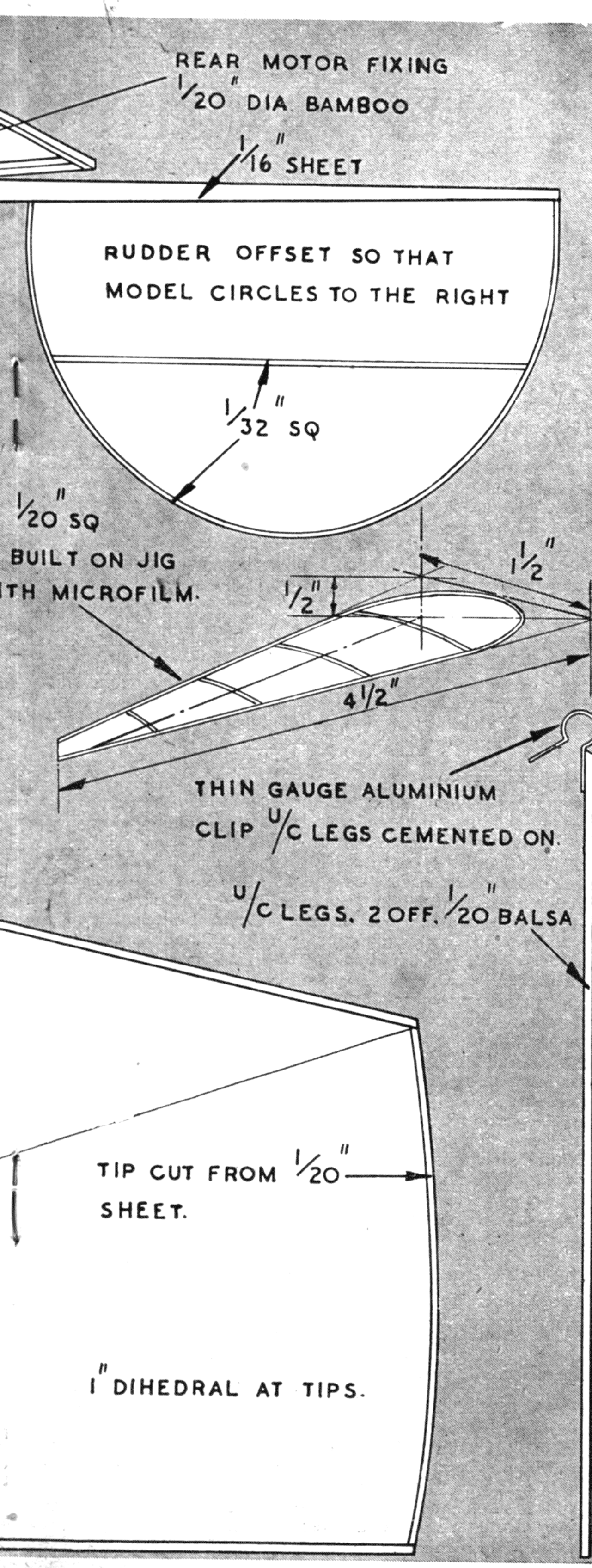
The colour scheme is cream all over with red trimmings, and reader Newman tells us that it took him eight hours to blow the cream dope on—with a mouth spray! So far the machine has carried off two concours successes, and has well over an hour's flying time to its credit. Readers will be interested to know that Mr. Newman is only fifteen years old, having been at the game since he was seven. The photograph, taken by a friend, is an example of what photography should be, and was taken on a desk top by daylight. In conclusion Fliar Phil hopes that this fine example will spur other readers of the same age to similar efforts.





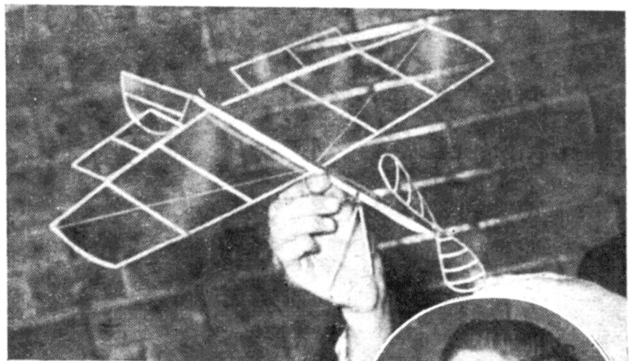


LENGTH OF MOTOR STICK 12"
1/20" SHEET
BEAD
30 S.W.G. PIANO WIRE.
MOTOR STICK MADE FROM 1/32" SHEET WRAPPED ROUND 1/8" DOWEL TO OBTAIN CORRECT SHAPE.
DETAIL OF PROP HUB & SHAFT BEARING ETC.
PROP OUTLINE
RIBS 1/32" x 1/20"
& COVERED WITH
C L
T.E.
AILERON OUTLINE & RIBS ALL 1/20" SQ COVER TOP SURFACE WITH MICROFILM.
ALL WING RIBS 1/32" SQ.
COTTON BRACING.
C.G. ¾" FROM L.E.
WINGS:- COVER ON BOTTOM SURFACE ONLY WITH MICROFILM.
L.E.



WAFFLE

BRITISH RECORD HOLDING INDOOR TAILLESS MODEL



By M. THOMAS

18 years of age . . . . engineering draughtsman by profession . . . . member of Oldham & District M.A.C. . . . . interested in Art . . . . an all rounder at aeromodelling with a preference for gliders.

WING plan shape is the first consideration in the designing of a model of this type. Many different shapes have been tried—swept-back wing, swept-back L.E., D shape, flying plank, and swept forward T.E. This latter has proved most successful to date. Washout, of course, varies with the C.G. and the wing section. This section should be one with very little C.P. movement, and if a single surface wing is to be used, it will have to be a flat plate. If a curved, single surface airfoil is used, the model will tend to do an inside loop onto the floor! To counteract any mushing or stalling tendencies, the motor stick is above the wing, thereby raising the thrust line above the wing.

CONSTRUCTION

Motor Stick : This is made from 1/32 in. sheet, sanded down After soaking in water, bend round a 3/16 in. dia. dowel, bind with bandage, and place in the oven. When it is taken out, it will retain its shape, and can be cemented down the seam. A small paper tube, cemented at the rear end of the stick forms the fixing for the fin boom.

Propellor : The prop shaft and bearing are bent from 30 s.w.g. piano wire, the bearing wire being bound and cemented to the motor stick. A small bead forms the bearing. The prop is made from 1/20 in. sq. outline, with 1/32 in. sheet ribs cut by a template to a thickness of 1/20 in. It is made on a wooden jig, and covered with microfilm on one side.

Wing : The wing construction is very simple, consisting of a 1/20 in. sq. outline, with 1/32 in. sq. ribs. The tips are cut from 1/20 in. sheet cut by a template. To stop the wing warping in flight it is necessary to brace it with fine cotton as shown in the plan. The wing is then covered with microfilm on the *under side*, and then the motor stick is cemented onto the top of the wing.

Ailerons : These are also made of 1/20 in. sq. and covered with microfilm on the *top* surface, and then cemented to the T.E. of the wing, in the position shown on the plan.

Fin : This is made from 1/32 in. sq., with one 1/32 in. sq. rib. The fin is built directly onto the 1/16 in. sheet boom and then covered on one surface with microfilm.

Undercarriage : The undercarriage which was used for R.O.G. flights was built of two 1/20 in. sq. balsa legs, bound and cemented to a piece of very thin sheet aluminium, which clips over the motor stick. This can be used for adjusting the C.G. by moving it up or down the motor stick.

Trimming : The ailerons and fin are adjusted till a steady circle of six feet dia. is obtained. The model is very stable in flight, and holds the British records for R.O.G. and H.L. and consistently turns in from 1 min. 10 secs. to 1 min. 25 secs.

MINIATURE ENGINE FUELS

Part 2 by

F. C. B. MARSHALL, Ph.D., D.I.C., B.Sc., F.R.I.C.

Spark Ignition Fuels

THE USUAL FUEL for an ordinary spark plug engine is "Petrol". A motor spirit which is a simple "cut" from the distillation of natural petroleum—what is known in U.S.A. as a "straight-run gasoline"—consists mainly of paraffinic and naphthenic hydrocarbons boiling over the range 40°–190°C. Because of its high paraffinic content it has a fairly low S.I.T. and tends to "knock" or "pink" badly in a modern high-compression automobile engine. Its low Octane Value is raised by either of two methods. The first is to incorporate a small amount of a dope having precisely the opposite effect of a diesel dope, in order to *suppress* pre-ignition, i.e. to *raise* the S.I.T. Lead Tetra-Ethyl is pre-eminent for this purpose, although when used alone it has the disadvantage of giving hard deposits of lead oxide inside the engine. Modern "Ethyl Fluid" contains ethylene dibromide to minimise this trouble. The second method is to enrich the straight-run fuel by additions of benzene (benzole), toluene, other hydrocarbons of high Octane Value (high S.I.T.), or alcohols. The high octane hydrocarbons may be obtained from coal-tar distillation or from the gasoline itself by various high-pressure high-temperature "cracking" processes known as "aromatisation", "preforming", "alkylation", etc.

Alcohol blends containing methyl and ethyl alcohols may also be used satisfactorily in spark ignition engines. They perform best in engines with high compression ratios and are therefore most suited to motor-cycles and racing cars, where their high S.I.T.'s ensure immunity from "knocking". Such blends are, of course, eminently suited to miniature spark-ignition engines, castor oil lubricant being incorporated for two-stroke engines. The relatively low calorific values of alcohol blends, and their higher price, makes their use for ordinary purposes uneconomic if hydrocarbon fuels are available. But the increased volume of fuel that has to be flooded into the cylinders in order to obtain comparable power output tends to keep the engine moderately cool at high speeds, an important consideration with racing engines. The calorific value of methanol blends may be increased by replacement of part of the methanol by Methylal, the di-ether already referred to above, which is not prohibitive in cost for specialised fuels. Methylal can be used alone as a motor fuel.

The higher the compression ratio of an engine the higher must be the Octane Value of its fuel. But the spark-ignition engine possesses a certain measure of tolerance for poor fuels resulting from the ability to vary the ignition timing—retarding for starting and with fuels of low rating, and advancing for high speeds and with high octane fuels. This flexibility is lacking with glo-plug motors.

Glo-Plug Motor Fuels

THE GLO-PLUG ENGINE is without ignition control, and fuel formulation might therefore be expected to be more critical than for spark ignition engines. For maximum racing performance this is undoubtedly true, yet it is surprising on how many weird and wonderful concoctions the average glo-motor will run passably well. A good general-purpose fuel on which any glo-plug engine will run is a simple mixture of

CASTOR OIL	30%
METHANOL	70%

but performance may not be outstanding. The castor oil proportion may with advantage be increased for some engines for the preliminary running-in; it should seldom be reduced below 20% even with well seasoned engines. Methanol does not have the natural inherent oiliness of diesel oil, and glo-fuels must have a higher oil content than diesel fuels. In order to develop the high revs of which it is capable the glo-engine must be fairly "sloppy", and to ensure adequate compression for starting a fairly oily viscous fuel is needed. Castor oil, and not a blended lubricant like Castrol "R", is to be preferred since it does not contain additives insoluble in methanol and therefore yields a clear fuel without sediment.

A very large number of substances have been suggested from time to time as useful additives to simple Castor Oil/Methanol blends in order to give increased performance. This list includes Amyl Acetate, Ethyl and Amyl Nitrates, Acetone, various cellulose solvents, Nitrobenzene, and many more. Extensive experiments in the Author's laboratory with these, and a host of other materials have led to the conclusion that whilst one or two may have a slight effect in glo-plug engines of early type, most of them are valueless in a modern glo-engine. In work with, for example, the latest type "Yulon", replacement of part of the methanol in a methanol/castor oil blend by

Ethyl Nitrate
Amyl Nitrate and Nitrite
Amyl, Butyl, Ethyl and Isopropyl Ethers
Ethyl and Amyl Acetates
Paraldehyde
Acetaldehyde
Nitrobenzene

and many other solvents was found to have *little or no useful effect*, even when added in quite substantial quantities. It is true that in some instances the engine developed a very satisfying staccato note suggestive of increased revs, a very potent exhaust flavour, or both, but in no case was any significant speed improvement recorded by the instruments.

An approach to the problem of improving simple methanol blends can be made by replacing part of the methanol by a fuel of higher calorific value such as benzene, toluene, acetone, ethyl alcohol or methylal. In some cases these materials effect a slight improvement, but usually more in the direction of improved fuel consumption than in increased speed. In any case there is a limit to the proportion of such substances that can be added since, without exception, they have narrower Explosive Limits than methanol; after quite a small percentage has been added the throttle setting may become too critical for reasonably easy control. Furthermore, excess of some of these compounds of high calorific value can cause an engine to run very hot indeed and to eject showers of red sparks, so that risk of seizure becomes very real. Acetone was invariably found to give erratic running, which is surprising.

METHANOL. Some straight methanol castor oil blends have been found to run more smoothly than others. Modellers would be well advised to purchase only the purest methanol. Methyl and Ethyl alcohols come on the market in various "Proof" strengths, i.e., containing varying proportions of water and for best results only 74° over-proof methanol should be used (this contains over 99% of methanol).

METHANOL/CASTOR OIL RATIO. Unlike diesel fuels, the speed is not greatly influenced by variations in the base-fuel/oil ratio. If a particular engine is adequately lubricated by, say, 20% of oil and 80% of methanol, there is no significant loss of speed when the ratio is altered to 30 : 70. On the other hand, if the former mixture is somewhat under-lubricating the engine, there may be a substantial increase in r.p.m. when the oil ratio is raised.

NITROPARAFFINS.

Whilst most of the substances so far discussed are without any profound effect on the speed of a glo-engine, this is certainly not true of the nitroparaffins. Replacement of part of the methanol in a Methanol/castor oil blend by Nitromethane, Nitroethane or Nitropropane may increase engine speed by between 1,000 and 2,000 r.p.m. In this respect the nitroparaffins appear to be unique—and are indispensable for really high speed work. Unfortunately, they have not hitherto been readily available in this country, they have been fantastically expensive, and except in carefully balanced fuel formulation they involve high fuel consumption. However, the outlook is improving; nitromethane and at least two proprietary nitroparaffin fuels are now on the British market, and nitropropane is on its way.

Just why nitroparaffins are so effective is not clear. They have very low energy contents, as reference to their Calorific Values in TABLE IV will show. Nitromethane, for example, has only half the Calorific Value of Methanol and a nitromethane fuel might more logically, in fact, be described as a " cool " fuel than a " hot " fuel. Their effectiveness would seem to lie not in their intrinsic energy contents (which are very low) but rather in the extreme rapidity with which this energy can apparently be liberated. In their effectiveness, Nitromethane and the Nitropropanes are closely similar on the test-bench, nitropropane possibly giving a slightly more stable mixture under flight conditions. They would appear to be interchangeable in glo-fuel formulations, the choice depending mainly on price and availability. Nitroparaffin blends require a slightly wider throttle setting than non-nitrated blends, and are hence a little less economical in use.

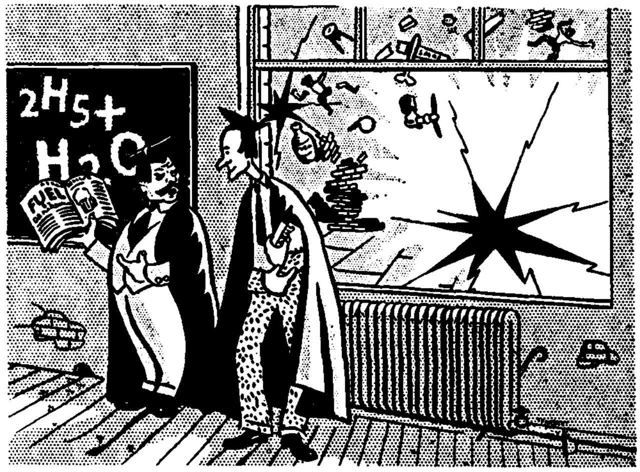
With regard to the *amount* of nitromethane or nitropropane to include in a glo-fuel formulation, it is the Author's considered opinion that the proportions sometimes advocated are excessive. A fuel with 25% to 40% of nitromethane, apart from its exhorbitant cost, usually seems to kill off glo-plugs with fair rapidity. Secondly, careful speed tests on a number of engines have shown that at first there is a considerable speed increase when nitromethane is added, but that the effect gets progressively less with each further addition until it becomes insignificant. The experimenter is recommended to start off with a fairly small percentage of nitroparaffin in his fuel mixture and to carry out several speed determinations on his engine. Another mixture should then be prepared with the same base-fuel/oil ratio, but with a few per cent. more nitromethane, and further speed readings taken. This process should be repeated with small nitroparaffin increases until there is no further speed increase measurable. In this way the most effective, and at the same time most economical, fuel will be worked out with the minimum waste of expensive materials. It will often be found by trials of this sort that 20% of nitromethane is just as useful as 30%.

The response of an engine to changes in fuel composition depends to a very considerable extent on the design of the engine, particularly as regards timing, porting and compression ratio. One engine may be found on test to be very much faster on a nitroparaffin blend than on a straight castor oil/methanol, whilst the performance of another engine may be found to be almost identical on either fuel. The moral is, clearly, do not run on expensive nitroparaffin blends if a non-nitrated racing methanol blend will give as good results. And equally, a commercial fuel should not be condemned because it does not improve the performance of *your* engine; it may be giving your friend another 1,000 revs on his engine of identical make. Engine manufacturers are constantly experimenting and incorporating minor design changes so that two apparently similar engines may, in fact, differ noticeably in compression ratio, timing, or both.

Finally, there is ample scope for studying the effect of combining nitroparaffins with other additives like amyl acetate etc., which are ineffective by themselves. The guiding principle in all such work always being to make only one change at a time, and to make the changes small gradual ones.

FUEL TESTING

Smoothness of running the absence of " missing " etc. can be tested fairly well with a critical ear—although an electronic stroboscope is better if you can borrow one. Adequacy of lubrication can be checked by feeling the crankshaft bearing (not the head !), by holding a plate behind the engine when it is running and noting how much oil is ejected, by noting whether the engine slows of its own accord when hot even with correct throttle and compression settings, and by seeing whether the engine runs any better when a few per cent. more oil is added to the fuel.



Who is this Doctor Marshall?

But **SPEED** cannot be checked by ear—USE INSTRUMENTS. An electronic stroboscope, if available, is the ideal instrument since it puts no load on the engine and since it shows *variations* in speed from second to second as well as overall average speed. Failing this, use a good Revolution Counter and watch, or Tachometer. The vibrating reed type of Revolution Indicator, if properly calibrated and carefully used, is capable of detecting reasonable variations in r.p.m. at the slower speeds, but is not capable of showing up small speed differences. It is suitable, therefore, for the preliminary experiments with diesel fuels, but is too insensitive at the higher revs to be of much value in glo-fuel development. In all cases the engine should be reasonably flexibly mounted; a well balanced engine fitted with a properly balanced prop, if firmly clamped in a vice, seldom gives a reading at all on a reed indicator.

In conclusion, do not be satisfied with a single speed reading—take half a dozen and average them. It is surprising what a difference $\frac{1}{16}$ of a throttle turn can make to a precision engine running near its flat-out maximum speed. And check back from time to time the values of your earlier fuel mixtures—the apparent increases in speed you have been getting with the later mixtures may be due to the engine loosening up with prolonged running. Elementary, but it happens every day.

ESPECIALLY FOR THE BEGINNER

PART IV.
BY REV. F. CALLON

HERE we are at last on the final stage in the construction of a model glider—covering of the framework.

And before we go any further, let's get one point straight. I said last month that the covering of a model was the easiest part of the whole job, and I still say so. Once you have finished the balsa framework, all the real difficulties are over. BUT—there always seems to be a 'but', doesn't there?—there remains just one big danger to be avoided. This danger is due to the very fact that covering is so easy, and partly too, to the fact that it is the last process to be finished before flying commences. It is the danger of *rushing* in order to finish quickly. When covering, let your motto be TAKE YOUR TIME. Careless covering looks bad, often makes the model weak, and is the biggest cause of warped surfaces—the enemy of good flying. On the other hand, even if you have not made a very neat job of the construction but cover it carefully, the model will still look a hundred pounds. So take your time!

Equipment for Covering.

It is always a good idea when doing any job to start by collecting all the things you are going to need. For covering a model glider we will want the following:

1. A small tube of tissue cement. This is like balsa cement but slightly thinner and takes longer to dry.

A jar or tin of tissue *paste*. Ordinary office paste—Grip-fix or the like—is ideal; you know the stuff—looks like stiff ice-cream and smells like bitter almonds.

3. A pair of *sharp* scissors.
4. The usual razor blade, drawing pins, straight pins, grease-proof paper and flat workboard.
5. Covering tissue, coloured or white according to taste.
6. Scent-spray or large *soft* brush for damping the tissue.
7. Small bottle or tin of banana oil (and/or clear dope).
8. Large soft brush for applying same.
9. Small tin of thinners (solvent for dope or banana oil) for cleaning the brush after use.

First, a word about the type of tissue to choose. Most modern kits seem to be supplying English rag tissue as a covering material. This tissue is composed of loosely interwoven fibres and is quite porous (full of little holes or spaces), so much so that you can blow through it and feel your breath coming through on the other side. It is like very thin, fragile blotting paper; so fragile that it is far too easy for a beginner to poke a finger through the odd panel, or when using a brush to damp a covered wing surface, to wipe away a chunk of tissue on the brush. Time and time again I have seen this sort of thing happen to beginners.

Now please don't get me (or the kit manufacturers) wrong. Rag tissue, when correctly applied and doped, is the strongest and most efficient tissue covering on the market today. But up to the time when the first coat of dope has dried on it, rag tissue is in my opinion too delicate a material for the use of the average beginner. So even if it means a special journey to the local model shop, I strongly advise you to get hold of a sheet or two of the smooth, non-porous type of tissue. Norwegian tissue is of this kind. Ask for the nearest thing to Japanese tissue and you will not go far wrong.

Next, a word about the soft brushes. These should be really soft—camel or squirrel hair. The sort of large soft brush that the sister uses for slopping water around generally over big areas in her painting book. The ones I'm thinking of cost about 1/3 from most model or art shops—unless you know where the sister keeps hers!

Covering the Fuselage.

The method which I am going to describe is only one of several. I do not maintain that it is necessarily the best of all methods—and it certainly is not the quickest. What I do maintain is that it is the ideal method for a beginner, and will result in a strong, clean looking job. I have seen a 'first model' covered this way which could scarcely be bettered.

And now for your fuselage. Thank heaven you chose a slab-sider. Start by laying it on one of its slab sides over a sheet of tissue, and cut out a piece big enough to cover the whole of this side with a safety margin of about an inch all the way round. You can cut it out straight away with your scissors, or pencil the outline first, remove the fuselage and then cut it out. Pick the piece up and lay it over the side of the fuselage to make sure that it really does cover everywhere. You will not be covering the noseblock, so trim the tissue off to lie along the last spacer of the fuselage—just touching the edge of the nose-block. Now fold back the last couple of inches of tissue away from the nose, and paste round the four sides of the front panel. If it is sheeted in, paste all over it. Next fold back the tissue onto the end panel, and smooth it down with your thumbs.

Now fold back the tissue in the opposite direction (i.e. back over the panel you have just covered, and towards the nose of the model) and paste round the second panel from the front. (Fig. 1.) Fold the tissue back again, and smooth it down into position. (Fig 2.) Carry on in this way to the end of the fuselage. Do not try to put on the tissue tightly, but to try to keep it smooth add free from sags or large wrinkles.

You now have one side covered, with an overlap of about an inch all the way round. Use a razor-blade or a small pair of scissors to trim off ALL this overlap. (Fig. 3.) Cover the opposite side in the same way, and once again trim off all the overlap. By now you should be getting into your stride properly, so covering the top and bottom will not take quite so long. There is one difference here; instead of trimming off *all* the overlap, use scissors to leave a neat margin 1/8 in. all the way round; paste this margin, and smooth it down onto the sides with your thumb.

Various minor snags may arise when covering the fuselage, and these will differ from one model to another. For instance, there may be a cabin to negotiate when doing the sides. There may also be wires sticking up towards the wing supports. The best plan in cases such as these, is to cut the tissue as accurately as you can to fit snugly round the obstacles, and paste these parts first of all, working your way forwards and backwards from them towards the nose and tail respectively. With tow-hooks it is simplest to push the wire through the tissue before you start pasting, and slide it (the tissue) down the wire into position against the underside of the fuselage. Start pasting from this point.

Tailplane.

First cut out a piece of tissue slightly larger than the tailplane. We will be covering the underside first. In the case of small tailplanes, paste over the *whole* of the underside at once—ribs, T.E., L.E., and under-spar if there is one. Put plenty of paste on; you may have to go over it twice, since it is essential that all of this area should be wet at the same time. Have your piece of tissue lying ready on a flat surface, and as soon as you have pasted everywhere, press the entire tailplane (butter side down!) onto the tissue. (Fig. 4.) When you pick it up again, the tissue will be sticking quite evenly to it, so that all you have to do is to smooth along the joints with a finger or thumb. Then trim off all the overlap. (Fig. 5.)

In the case of larger tailplanes it is rather difficult to make sure that the whole of one side remains damp at the time when

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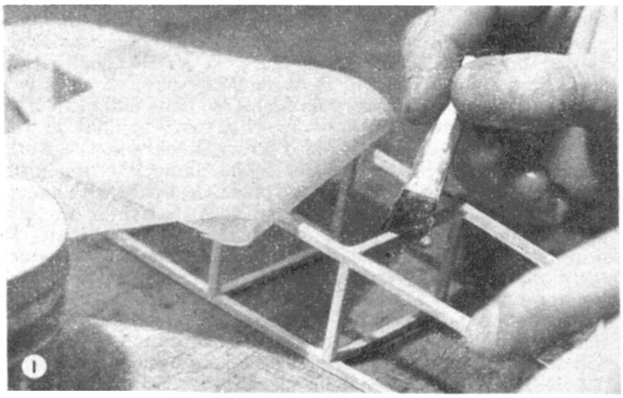
Fig. 1. Covering the first side of the fuselage. The first two panels from the nose are already covered; the strip of tissue is here seen folded back out of the way, and paste is being applied to the framework of the third panel with a small brush.
Fig. 2. The strip of tissue is here folded back over the pasted panel and being smoothed onto the framework with the thumbs. Note the generous amount of overlap in the tissue. The cut-away portion has been trimmed accurately before pasting round the edges of the simple cabin.
Fig. 3. The overlap of tissue being trimmed off the fuselage side with a razor-blade. Note that **all** *the overlap is trimmed from the two sides, but scissors must be used when trimming the* **top and bottom** *in order to leave a strip of tissue 1/8 inch wide on either edge. This is then pasted and folded down over the sides.*
Fig. 4. Covering the underside of the tailplane. A rectangle of tissue is cut out, slightly larger than the tailplane and laid onto the workboard. The underside of the tailplane is here seen pasted all over and pressed down flat onto the tissue. It must now be picked up and the tissue smoothed into proper contact with the framework.
Fig. 5. All the overlap is here being trimmed from the underside of the tailplane.
Fig. 6. The top of the tailplane has been covered, and the overlap trimmed down to about 1/4 inch. This photograph shows the overlap after pasting being smoothed and folded round onto the underside of the trailing edge.
Fig. 7. Water-shrinking the wing. Water is here being brushed lightly onto the starboard half of a wing. The underside has just been damped, and the top is being dealt with. The damp part of the tissue starts from the dihedral joint.
Fig. 8. The damp half wing pinned down to dry.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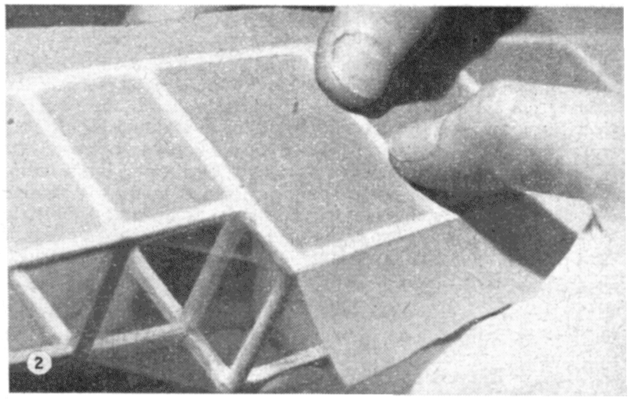
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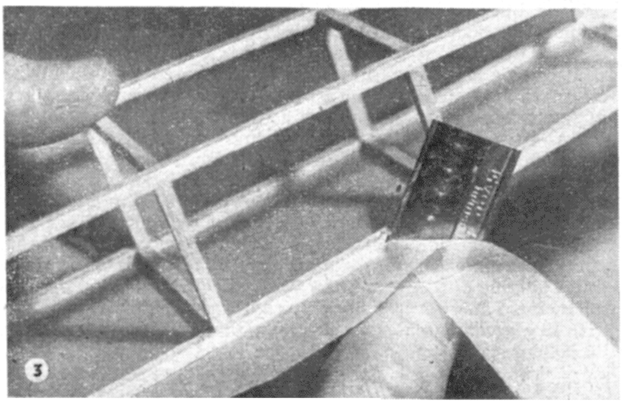
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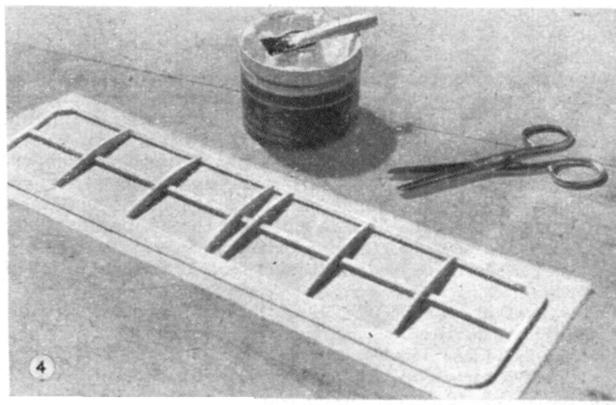
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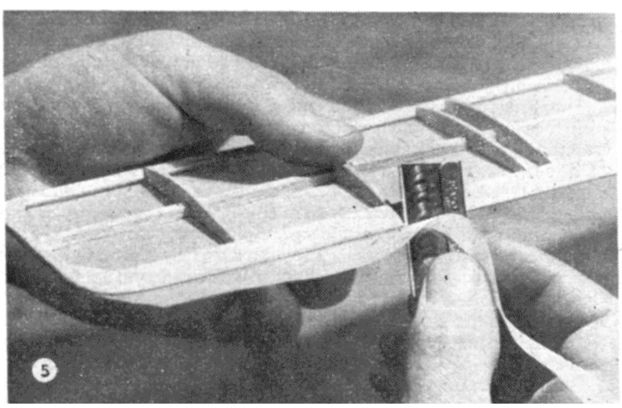
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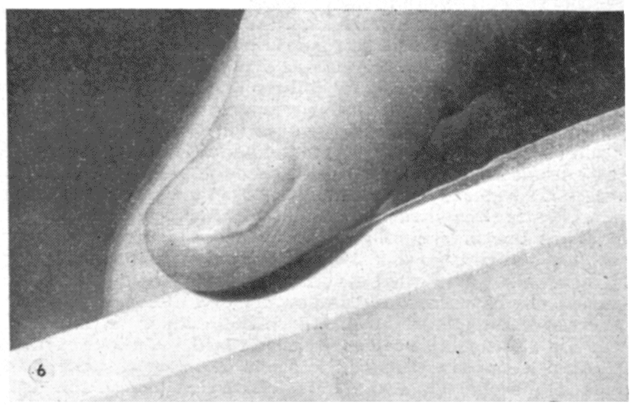
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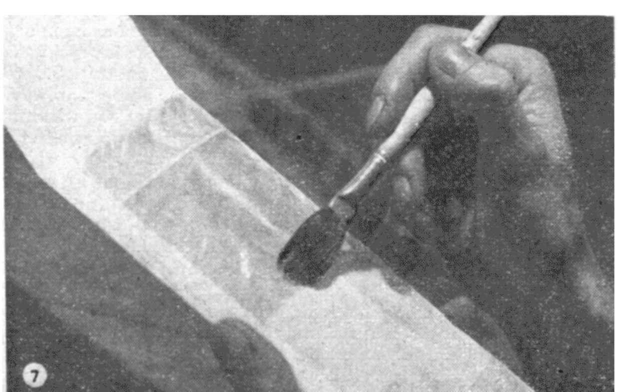
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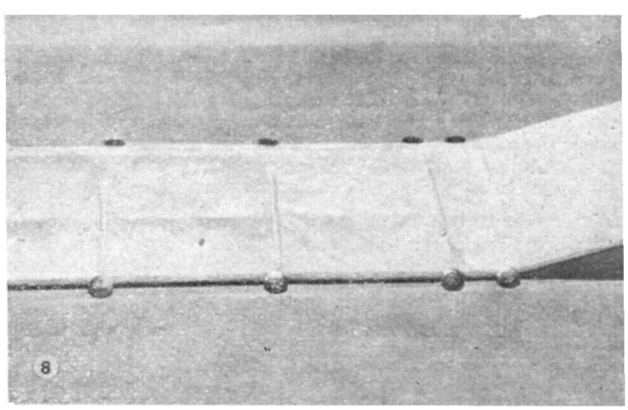
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it is to be placed down on the cut out piece of tissue. In this case the slower panel-by-panel method has to be used as we did with the fuselage.

Cover the top in the same way. If yours is a small tailplane, then paste over the whole framework and press it onto the tissue, this time with a rocking or rolling motion, and smooth over the joints. If it is a large job, then work along step by step from half way between one pair of ribs to halfway between the next pair. Trim off to leave a margin of about ½ inch along both L.E. and T.E.; paste this, and fold it smoothly under. (Fig. 6). If the wing-tips are rounded, cut a number of little V's every ½ inch or so all round the curve in the overlap of tissue, otherwise it will be impossible to fold it under smoothly.

The Fin.

This should if possible be covered before it is attached to the fuselage or tailplane as the case may be. Treat it as a small tailplane; i.e., paste over the whole of one side and press or roll it onto the piece of tissue. Trim off all the overlap from the first side to be covered, and leave about ½ inch round the second side to be turned under.

The Wing.

This is where we are going to need the tissue *cement*. We start by covering the underside of the wing, and we will need a separate piece of tissue for every section or ' level ' which the wing has. This means that if the wing is a simple dihedral —one dihedral joint in the middle—there will be two ' levels ' (one for each half of the wing) and so two pieces of tissue will have to be cut ready for covering the underside. If it is a polyhedral wing it may have two dihedral joints, giving *three* different ' levels '; and so we will need three separate pieces of tissue. Three dihedral joints will give four ' levels '—four pieces of tissue. No, you won't meet more than three joints in one wing!

The next question is whether your wing is an undercambered one or not, i.e. are the ribs flat underneath, or are they slightly hollow? If they are *flat*, use paste to attach the tissue. If they are hollow (undercambered), you will have to use tissue *cement*. Otherwise when the tissue tightens up during the shrinking process it will tend to pull away from the underside of the ribs, which would never do.

Right! Now we can start covering the underside. Using paste or cement according to the type of wing section, work your way from the dihedral joint to the wing tip, panel by panel, and then trim off all the overlap. If the wing is a polyhedral one, then in at least one section you will be working from one dihedral joint to another dihedral joint. In this case be careful to cut the piece of tissue to the exact length necessary to reach between the two ribs in question, before you start pasting or cementing. You don't want any overlap here.

When the underside has been covered and trimmed, cover the top and trim off to leave an all-round overlap of just over ½ inch. Use paste when covering the top of a wing *except* on the rib or ribs where a dihedral occurs. At these points where there is an angle in the wing, the tissue tends to be pulled off the top of the rib, so cement must be used. And once again, be sure to cut the ends of the pieces of tissue accurately to length and shape where they are attached over a dihedral joint. The end of the tissue will not be quite a straight edge here, but slightly curved, for it is meeting the curved top of a rib at a slight angle. If the wing tips are rounded, then it is a good idea to cut a separate piece of tissue for covering the space between the last rib and the wing tip if wrinkles are to be avoided. With square shaped wing-tips this is often not necessary. When you have covered all the top of the wing, paste the overlap round the underside all the way round. And that's the lot. Attaboy! Where's Sister Sue's Scent Spray for the next Step, Stage, Scene or Section?

Water Shrinking.

In order to tighten the covering tissue we now damp it, and as it dries again it will also shrink. Start with the fuselage. Fill your scent spray with water and use it so that the tissue is damp all over without being sopping wet. If you are using a soft brush, ' paint ' on the water very carefully, as it is very easy to rip damp tissue. Put the fuselage out of the way to dry—in a really warm room this should only take about an hour. There is no question of pinning down the fuselage, since its sturdy, four square construction will not twist or warp under the shrinking process. Damp both sides of the fin in the same way. This too will not normally need to be pinned down to dry, unless it is a very large one or of fragile construction.

Tailplane and wing will most certainly have to be pinned down. First, the tailplane; damp all over the underside first, to give it a chance to begin to dry, then carry straight on with the upper surface. If you pin it down direct onto the workboard there will be a danger of the damped tissue paste sticking to the wood as it dries, so cover the board with a piece of grease-proof paper. Another point is that when the tailplane is pinned flat onto this non-absorbent surface, the underside will take slightly longer to dry than the top surface which is exposed to the air, so do not pin it down right away. Watch the appearance of the underside tissue. First it will be shiny with moisture. In a couple of minutes the shine goes, leaving the tissue dull and limp. Next, as the shrinking begins, you will see little lines of parallel wrinkles appearing across the panels—stress lines. As soon as these start to tighten, pin down the tailplane, using drawing pins all the way round, and leave it pinned down until at least half an hour after the top surface has become quite dry and drum-tight all over. If you can leave the job to dry out overnight, so much the better.

The wing is damped in just the same way as the tailplane, except that each ' level ' must be damped and pinned down to dry separately. In a simple dihedral wing there will be two stages—one for each half of the wing. In a polyhedral wing there should be more, though I must admit that on occasion, when the last ' level ' up to the wing tip has been a short one, I have sometimes damped this along with the larger section reaching up to the centre of the wing and pinned down just this larger section. But this is not to be recommended. If you are using a spray for damping, the best way to stop the water getting onto the next section (where it didn't oughter) is to cover up this part of the wing right up to the dihedral joint with a piece of grease-proof paper; just hold it there; don't stick it or anything.

Doping.

When the tissue is quite dry and tight you will notice how much firmer and stronger the framework of the model feels. This strength will be more than doubled when the whole is covered by a thin film of celluloid. That is what dope or banana oil does.

I might just as well have headed this paragraph ' banana oiling ', for I really think that you would do better to use banana oil rather than dope for a first model. The advantages of dope are that it gives *slightly* more strength in so far as it shrinks the tissue even more, and makes it tighter than you will ever get by just water-shrinking. Can you see from this what the chief disadvantage is? Whenever wings and tailplanes are being tightened, they have to be pinned down to prevent warps. So the wing has to be doped one section at a time and pinned down until dry—a matter of about an hour. If you decide to do this, then dope the underside first, and (as with the water-shrinking) don't pin it down onto the grease-proof paper until the stress-marks begin to appear.

Banana oil, on the other hand, does not affect the tightness of the tissue, so you merely paint away and put at one side to dry. But it has its disadvantages too. Small holes and rips in the covering are very easy to patch up if dope has been used (c.f. a later article on patching), but it is not so easy to patch over banana oil. Again, if you want to paint on any coloured dope on small areas such as wing tips, this is an easy job over dope, but does not take well over banana oil; so you will have to remember to paint any coloured dope onto the tissue before you banana oil it.

You cannot paint clear dope over banana oil, but an undercoat of clear dope takes banana oil very well. So what I suggest is this: use banana oil on the wings and tailplane and fin. If you have any clear dope, give the fuselage one coat of this, and when quite dry, follow up with another coat of banana oil.

And one final thing to remember: if the coat of dope or banana oil is to look anything like, then keep your brush moving. Work along panel by panel, and don't go back over areas already done; it will only roughen them. Try it just once if you like, and see.

NATIONAL GUILD OF MODELLERS

1950 INSURANCE EXPANSION

SINCE its formation, in 1939, under the name of The National Guild of Aeromodellers, for whose benefit it was originally established, this insurance organization has, from time to time, broadened its scope and changed its name, in order to include a steadily expanding range of models. However, within the past year the interest and activity in all fields of modelling has so increased that, to meet popular demand, the scheme has, once again, been enlarged!

In its new form, it goes well beyond anything that has ever been offered before, and modellers will find that a much wider range of contingencies are now provided for, with no increase on the original premiums. For a few shillings, indeed in certain cases, for a few coppers, modellers can be easy in their minds that, if the unexpected should happen, any unfortunate consequences will be well covered. The principle is the same with the motorist, or the man who takes out life insurance; neither of them insure because they expect to have an accident, but because it's "better to be safe than sorry". However careful and conscientious one may be, it must be remembered that neither man nor model is infallible and however rigid the precautions taken to ensure safety, the most experienced modeller will agree that odd things do happen.

As the majority of Power Model Aircraft enthusiasts will know, the S.M.A.E. insists on third party cover from all entrants to its contests, and suggests that all Power models, Control Line or Free Flight, should be flown under the same condition. Local Authorities granting permission for flying in parks and other public places, often insist upon Third Party Insurance, which is a fair and reasonable precaution.

Since the growth of Control Line Flying in this country, with its attendant need of convenient and suitable flying grounds, the general public have shown an increased interest in this branch of the hobby, and are found in large numbers in the vicinity of this type of flying. In these circumstances, it is more than ever important that the Public, the Model Aircraft Movement and the individual modeller, should be protected in every way possible.

The same Third Party cover now applies to powered models of all types, be they cars, boats or locomotives.

In the case of Model Cars, members of the British Model Car Club are covered by their membership, and the Club recommends all other exponents to avail themselves of the same safeguards.

The foregoing has touched upon only one aspect of N.G.M. Insurance. Loss by flying away, fire, theft, and accidental damage can now all be covered for small additional premiums, and the maximum indemnity has been raised from £2 to £20, so even Radio Control models are now covered.

The new, enlarged scheme has been in operation since the 1st of February of this year, the Third Party cover coming under three categories, as follows :—

(1) Includes rubber-powered model aircraft, sailplanes, gliders and model sailing boats, irrespective of size and type. Premium 9d. per member.

(2) Includes model aircraft, model cars, model boats and locomotives driven by mechanical motors, i.e. internal combustion engines of petrol or diesel type, irrespective of size, or type. Premium 2/6 per member.

(3) Includes model aircraft, model cars, model boats and locomotives driven by any kind of rocket, jet or steam propulsion and irrespective of size and type. Premium 5/- per member.

Insurance in any of the above three categories is for the period of one year from the date of the registration/payment of premium.

Third party insurance for all three categories extends up to the limit of £5,000 for any one claim, with an unlimited number of claims in any year.

The above insurances are effected on behalf of the member, while those which follow apply to individual models, a separate premium being necessary for each model insured.

(1) **FLYING AWAY—OUT OF SIGHT LOSS:** Indemnity is now offered to make good to members capital loss, i.e., cost of materials, accessories and components, but excluding cost of labour in building the model. Insurance can be effected for the minimum cover of £2, increasing by multiples of £2 to a maximum of £20. The premium is now adjusted to 2/6 for every £2 cover per model, for any type of model aircraft, for one year.

(2) **FIRE, THEFT, ACCIDENTAL DAMAGE AND THIRD PARTY LIABILITY:** This is offered for any type of model in any of the three categories, whilst the model is in transit to and from, and whilst at any exhibition, anywhere in the United Kingdom. Cover is effected for a period of one month, but may be renewed on a monthly basis. The premium is 4/- for cover up to £10 per model, or 8/- for cover up to £20 per model.

(3) **FIRE, THEFT, ACCIDENTAL DAMAGE AND THIRD PARTY LIABILITY (AND FOR MODEL AIRCRAFT LOST BY FLYING AWAY):** Whilst the model is with the insured member anywhere in Europe and Eire, for the purpose of exhibition, demonstration, or private flying (either competition or on holiday). (The following are excluded from the above: Soviet Russia and the zones controlled by her in Austria and Germany; Poland, Czechoslovakia, Jugoslavia, Albania, Roumania, Bulgaria and Greece.) Premiums for any type of model, other than model aircraft, are 4/- up to £10 per model and 8/- up to £20 per model. For any type of model aircraft: one premium of 12/6 up to £20 per model. In each case premiums are for a period of one month, but may be renewed on a monthly basis.

As there are certain insurance restrictions in force in Eire, which prevent any kind of insurance being effected by members domiciled in that country, all the above facilities apply only to members resident in Great Britain, Northern Ireland, Isle of Man and the Channel Isles. However, the cover under (3) above does operate for members normally resident in the United Kingdom, who go to Eire for a holiday or send their models to be exhibited in that country.

Existing members of the N.G.M. will appreciate the vast increases in cover made by the new scheme and the obvious advantages resulting therefrom, and the attention of those who have not yet availed themselves of these logical and inexpensive safety measures, is drawn to the motto of the Guild—" Vola cum cura "—Fly with Care.

Black and gold transfers for attachment to models, and lapel badges in the same colours and bearing the well-known aeroplane emblem, are to be seen wherever model aircraft are flown, and these are available to members at nominal charges. They play their part in making modellers insurance conscious, as those who use them are invariably asked what they are for, and the enquirer is pleasantly surprised, and extremely interested, to hear of the foresight and good sense of the modeller who considers his hobby worthy of an insurance scheme.

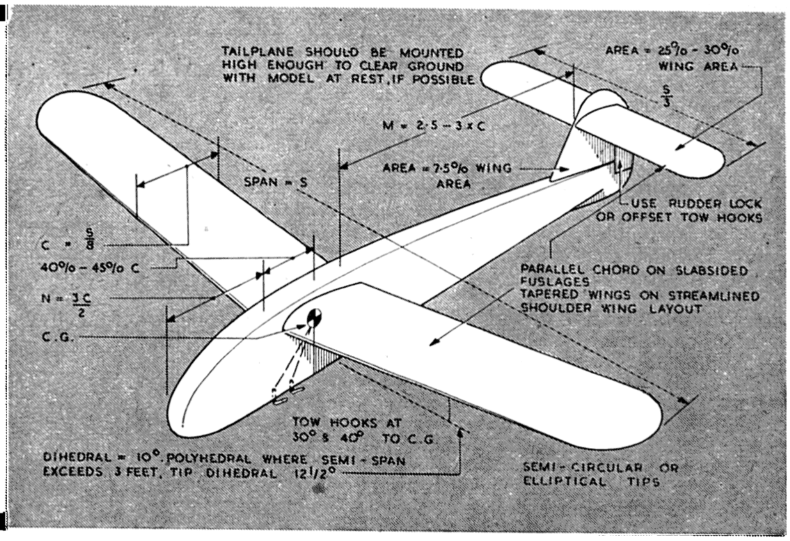
Full details of the N.G.M. Insurances can be obtained from the National Guild of Modellers, Allen House, Newarke Street, Leicester, by sending a stamped, addressed envelope, and all correspondence on this subject is dealt with at that office.

The 1950 flying season is just around the corner, so NOW is the time to prepare for it. Insure NOW with the N.G.M. and you can be satisfied that you have joined the ranks of the modellers with a sense of responsibility and public spirit. At the same time you will be placing yourself in a position to benefit when, through no fault of your own, that favourite model is stolen, damaged or lost. That premium will be a worthwhile investment, however you look at it.

It's DESIGNED for YOU!

NUMBER TWO — PART ONE

GLIDERS



GLIDER design is comparatively straightforward, for flight stability problems are minimised. Almost any combination of wings, tailplane and fuselage can be made to glide, even if some of the components are badly proportioned. As a typical example, let us take fin area. For normal gliding flight a fin of only three or four per cent. of the wing area is adequate for stability on the glide with orthodox rigging and layout, but such a fin will be found far too small for *towline stability* in conditions other than a flat calm. It is *towline stability*, in fact, which becomes one of the major aerodynamic factors affecting design.

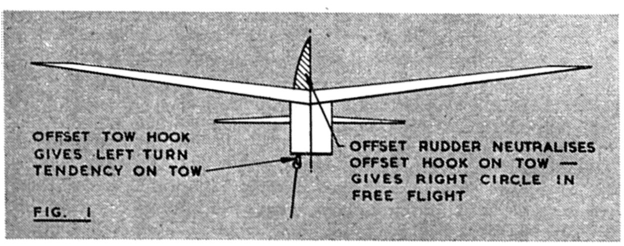


FIG. 1

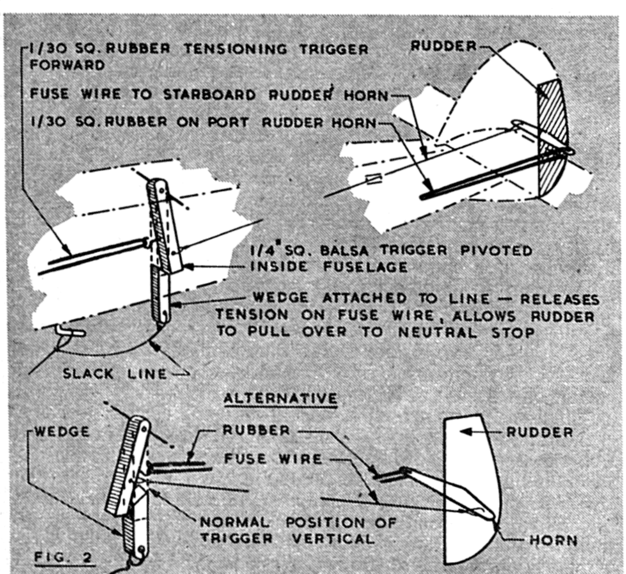


FIG. 2

The problem is somewhat complex. Theoretical analysis of towline stability has been presented in the form of L.S.A.R.A. Reports, but these are not entirely satisfactory. Nor does the purely practical approach always give good results; any given design may be either stable or unstable under tow, depending on how it is rigged.

Fin area alone is no guarantee of towline stability; a large fin which should give exceptional weathercock stability does not necessarily give a straight tow, even if the model is rigged to fly in a dead straight line. However, it is far better to have too much, rather than too little, fin. Even such devices as a drogue towed behind the model during towing and released with the towline, does not *guarantee* a straight tow launch under all conditions. The real solution is aerodynamic, that is, correct proportions and rigging.

Basically, it would appear from numerous practical tests, that any model which is stable under tow can be made *unstable* by moving the centre of gravity back, even though the free flight trim may be adjusted to give excellent results with this new C.G. position. Conversely, some models which have proved *unstable* under tow have been made stable by re-trimming with the C.G. farther forward. The critical point for the C.G. position on a normal high wing layout, appears to be between 40 and 45 per cent. chord.

Instability of any sort is aggravated by speeding up the model. Thus, a model which has only marginal towline stability, may prove quite satisfactory in still air conditions, where the actual airspeed during the launch can be kept low. The same model, however, in gusty or windy conditions can become quite unstable on the line, since, as soon as the airspeed is allowed to build up for any reason, instability sets in and is usually progressive. That is to say, once the model has started behaving in an unstable manner, this generally gets worse and may be impossible to correct by controlling the launching speed from the operator's end.

Obviously, then, it is no good having a glider which is only stable on tow under calm conditions. Nor is it safe to assume that any model *is* stable under tow until it has been tested under rough weather conditions.

Some confusion has arisen in defining the various instabilities associated with the model on the towline; what some people term "spiral instability" others call "directional instability", and the theorists' "oscillatory instability" is often called "spiral instability" by the practical man. Both agree, however, that there are two major forms of instability.

The first is where the model under tow turns off to one side and, if held on the line, continues to sideslip down until it strikes the ground. This can arise from bad design proportions, generally with too much fin area, too little dihedral, or a combination of both, and can normally be eliminated by following successful design proportions. *It also happens*

TABLE I AERODYNAMIC DATA

Size	Area	Span	Chord	Aspect Ratio	Wing Section	TAILPLANE				FUSELAGE			Required weight for F.A.I. Loading*
						Span	Chord	Area	Section	N	M	LOA	
Non-Contest	200	40	5	8·0	Marquardt Clark Y	14½	4½	65	Flat	7½	15	32½	Build light as possible
Small	300	50	6	8·3	Marquardt RAF 32	18	5	90	Thin Lift	10	18	40	10⅞
Nordic	392	56	7	8·0	Joukowski LDC 2 & similar	22	5½	121	„ ϕ	12½	22	48	14¼
Medium	576	72	8	9·0	„	24	6	144	„ ϕ	13½	25	54	19⅝
Large	1440	120	12	10·0	„	45	8	360	„ ϕ	15	35	72	49½ oz.

ϕ or symmetrical *To nearest ⅛ oz.

with a perfectly stable model, if adjusted for a free flight circle without compensation for a straight tow launch.

Directional instability due to offset rudder (or other free flight turn trim) can be countered by mechanical means, and there are two basic ways of doing this. The first, and simplest, is to offset the tow hooks to one side of the fuselage, so that the pull on the line tends to turn the model in one direction. This is counteracted, for a straight tow, by offset rudder, which, once the model is released, gives circling glide in free flight which is highly desirable—Fig. 1.

Any degree of rudder offset will act against the turn under tow, induced by the offset hooks. Control is then entirely in the hands of the launcher, who adjusts the towing speed to suit the conditions prevailing and thus maintain a straight tow up. It is a good, simple method, but needs skill to operate successfully under all conditions.

The second method utilises a mechanical form of rudder adjustment which holds the rudder central for a straight tow and then, as soon as the model is off the line, allows the rudder to move over a predetermined amount for a circling (free flight) glide. In other words, the aerodynamic set up is such that, with straight trim (i.e. rudder central) the model has adequate towline stability and the onus for a successful launch lies in the design of the model, rather than in the skill of the launcher.

The original auto-rudder method, developed by Ron Warring (and, quite independently, and at roughly the same time, a similar scheme by R. F. L. Gosling) worked off a pivoted tow hook. With the line in position the tow hook is pulled forward, which movement is used to pull the rudder straight. Once the line is released, the tow hook is spring loaded to move back, releasing the rudder which then moves over to give circling gliding flight. Schemes essentially similar to this are still in wide use to-day, although the more modern *rudder lock* is generally considered to be much more reliable.

This, also, was developed by Ron Warring some five years ago, but does not appear to be widely known outside of the *Zombies* club. The basis of the scheme is sketched in Fig. 2. Here rudder movement is controlled by a pivoted arm called the " trigger " which is normally tensioned to rest against a forward stop; this corresponds to offset rudder for free flight conditions. For tow launching, a wedge of balsa is tied to the line and inserted in the fuselage between the trigger and its stop, moving the trigger to a new position. This allows the rudder to move over against its centre stop, giving straight rudder for the tow launch. When the line falls free it pulls out the wedge and the rudder snaps over for circling flight at once. An alternative, somewhat simplified hook-up is also shown.

The great advantage of this system is that it is absolutely positive from the time the wedge is inserted to the time the towline drops off the model. In other words, varying line tension, which may cause trouble on the original auto-rudder system, has no effect at all. Nor is any failure likely, due to the wedge jamming in position, provided that the line joining it to the towline is, at least, as strong as the towline. In practice, failure is more likely to occur if the wedge is too loose a fit, so that it drops out of its own accord under tow.

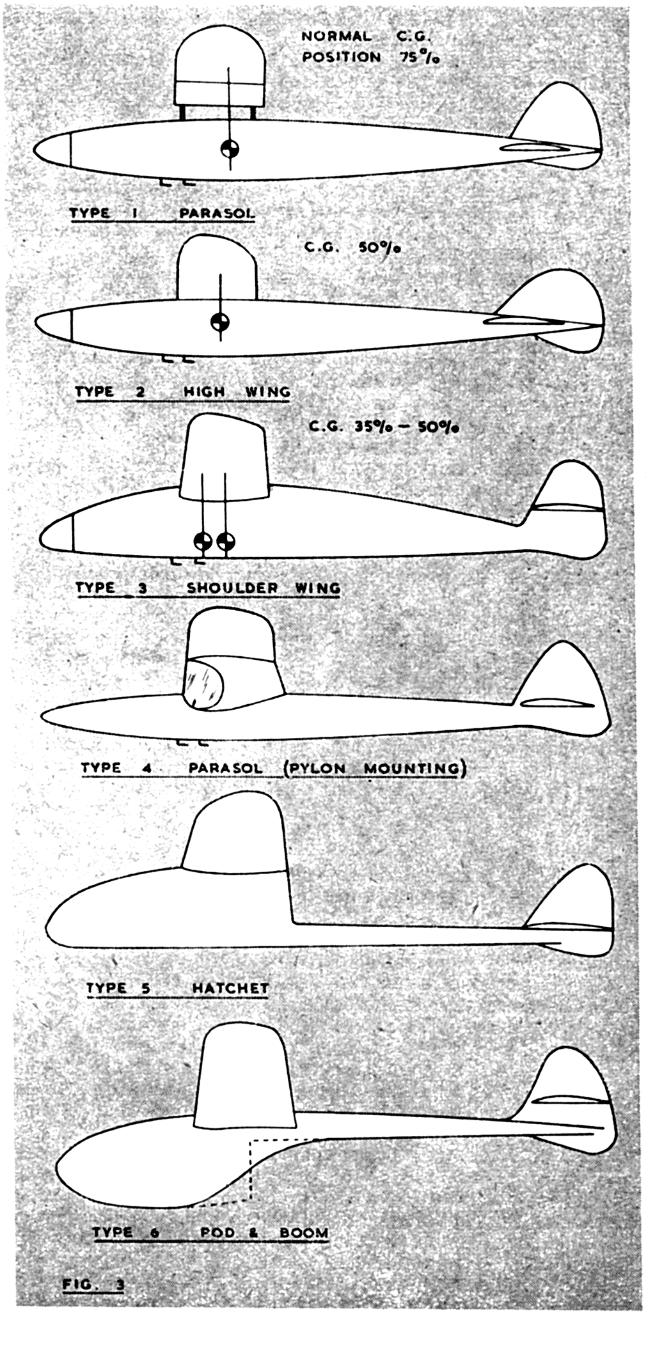


FIG. 3

The other form of towline instability is also aerodynamic in origin, and can therefore be discussed very briefly, before going on to deal with specific design layouts for gliders of all types. This is "hunting", where the model swings from side to side under tow, each swing generally getting worse than the one before it, until the model may even turn right round and become completely uncontrollable. This, in fact, is the dangerous form of towline instability which is often extremely hard to cure. Small fin areas, excessive dihedral and aft C.G. positions are three possible causes. Tow hook position, also, has an effect, for the farther aft the point of line attachment the greater the tendency for the glider to "wander" on the line, but this should not be considered as a major factor. To get maximum height under tow it is necessary to get the tow hook reasonably far aft. Instability under tow should be cured *in the design itself* rather than by using a forward tow hook position. This will only be effective in mild cases of instability (if originally within the accepted limits), and will in any case result in loss of initial height during the launch. It is no good, for example, using a forward hook position to get a reasonably stable tow, and then find that it is only possible to get about 150 feet of initial height from 300 ft. of line with that hook position. It is quite common to find that models like this, of F.A.I. or heavier loading, just cannot be towed up during calm conditions. Quite a heavy model however, which has a generous reserve of towline stability, can use a tow hook position well aft under such conditions, and be towed up to the full height of the line without the launcher having to run unduly fast.

Six basic types are shown in Fig. 3. The simple parasol arrangement is much favoured, with slabsided or box fuselage, probably on the principle that the parasol wing layout is generally the most stable for almost any type of model. But although excellent results can, and have been achieved with parasol wing gliders, it is the one type on which the inexperienced are most likely to go wrong.

Parasol models are almost invariably rigged with the tailplane lifting and contributing a part of the total lift. That is, the centre of gravity is rigged behind the centre of lift of the wings. An aft C.G. position, as we have noted above, can lead to towline instability and therefore *the whole design becomes more critical.* Unless the layout is such that a generous reserve of towline stability is present, the set-up may become unstable in anything but relatively calm conditions. Unfortunately, it is not possible to boil down the design requirements for towline stability to a few simple proportions.

Where a simple, orthodox, functional design is required, the normal high wing layout is probably better, for this is easier to trim with a forward C.G. position, if found necessary. A more "refined" design is the shoulder wing model, where the wing remains at roughly the same position as on the high wing layout. The fuselage deck line is humped so that the wings actually plug into the fuselage sides, in the shoulder position. This gives a neat and effective combination for a streamlined fuselage, but has also been adopted on many of the large and very large models, with a slabsided fuselage. Once the span of the model exceeds about four to five feet, the wings have to be made in two (or more) pieces, in any case. It is then probably simpler, and quite as effective, to plug each wing half into the fuselage with a shoulder wing layout, rather than plug them together and then lash them on top of the fuselage.

Some very successful designs, in these orthodox forms, have used a lengthened nose with good effect on towline stability. Briefly, the effect is that a forward mounted fin (in these cases increased forward fuselage side area) has proved particularly effective in giving good towline stability. Consequently, a narrow, rather deep fuselage with a fairly generous nose length, is generally, better in this respect than a slim fuselage design with little or no nose area.

This may account, in part at least, for the undoubted success of parasol models of type (iv), where the wing is carried on a cabin-type superstructure which is, in effect, a forward fin. The remainder of the fuselage is then very slim, usually diamond section, or fully streamlined, reducing wetted area to a minimum.

Further, more unorthodox layouts also incorporate "forward fin" effect, e.g. the "hatchet" type and "pod-and-boom" fuselages. These have proved particularly effective in the small and medium class range.

Probably the size of the finished model has more influence on the design layout than many people appear to realise. Where the model is intended for regular flying, such as contest work, the larger the actual size of the model the more the tendency to adopt a simplified layout. In the very largest class of gliders, of around eleven to twelve feet span, we find that box fuselages are almost the universal rule. From aerodynamic considerations however, one would expect that, to utilise the increased aerodynamic efficiency of the larger models to the fullest advantage, full streamlining would be applied to the fuselage.

There is not the slightest doubt that, all other things being equal, the larger model will beat the smaller model under almost all conditions. Therefore, for contest work in particular, the larger the model you can afford to build (both in material, cost and time) the better. The prospect of having an International glider class—the Nordic specification—is both timely and welcome. The limiting of competitions to models of a definite size will be fairer all round, although there will still remain plenty of scope for all sizes in the "open" competitions, whether to F.A.I. loading or not.

Actually the significance of the wing loading rule tends to disappear as size increases. Above about 3-500 sq. in. wing area, a glider of F.A.I. loading will generally out-perform a more lightly loaded model of the same size, mainly because it has better penetration. The lightly loaded glider makes little or no headway and tends to sink straight down in any slight breeze and, in fact, about the only time that it does show a possible advantage is in absolute dead air conditions.

For contest work, any glider of below about 300 sq. in. wing area is now considered too small. At the other end of the scale, a figure of nearly 1,600 sq. in. has been reached and, on an overall average basis, models with wing area exceeding 1,000 sq. in. have placed consistently in major glider contests during the past two or three years. The exception still crops up, where the smaller glider has a lucky break and makes three excellent thermal flights to top the list, but the trend is for more and more of the competition places to go to the larger models.

The proposed new "Nordic" class comes at the lower end of the contest scale, as regards size. With conventional tailplane area this specification corresponds to a wing area of about 400 sq. in. A handy size for building and carrying about, this is at the same time, large enough to prove a good contest model when competing with models of larger size in "open" events. After all, model size alone is no criterion of performance : results are obtained, primarily, by good design, and then through careful and intelligent trimming. Of the three, trimming is by far the greatest single factor.

The Nordic class represents about the upper limit of size, where all the forms of fuselage layout detailed in Fig. 3 are still practicable. With larger models, the pod-and-boom and hatchet types tend to become structurally weak, being particularly vulnerable where the relatively thin boom joins the main fuselage nacelle. One could summarise the useful application of these various designs under class sizes as under :—

Up to 300 sq. in. wing area. Relatively useless for serious competition work. All types practicable, but the smaller models (150–200 sq. in. area) should have slabsided fuselages for minimum structural weight.

300–400 sq. in. wing area. All types practicable, but preference should be given to the more streamlined layouts, either by using streamlined section fuselages or reducing fuselage wetted area.

400–750 sq. in. High, shoulder-wing, or cabin-pylon types are all well suited to this range, preferably with the fuselage streamlined as far as possible.

1,000 sq. in. and over. Here, complex fuselage construction is generally abandoned and simple, slabsided types are general with either high or shoulder-wing mounting.

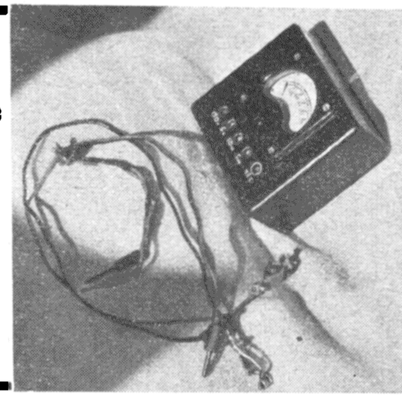
Leading design proportions are summarised in diagrammatic form for ease of reference, when the following general notes can be applied. None of the factors given is particularly critical.

(*To be continued.*)

A Multi-Purpose Radio Control Meter

BY

R. BAYER.



THE meter described here was designed and built to fill the need for a cheap, portable instrument for field work. It covers the following four ranges :

(1) 0–5 ma.—for receiver tuning. (2) 0–50 ma.—for checking the transmitter. (3)· 0–5 volts—for checking L.T. and similar batteries. (4) 0–150 volts—for checking H.T. supplies.

The circuit used enables each of these four ranges to be selected merely by inserting one wander plug in the appropriate socket and another in the common Negative socket. To forestall the critics, I would point out that an error of minus ·81% arises in all ranges, e.g., when your meter reads 3 ma. it should read 3·024 ma.; hardly an appreciable difference when reading from the meter scale.

The basis of the instrument is a 5 ma. moving coil meter, which can be obtained from a Government Surplus stockist for something between 5/– and 7/6. The sockets can be had from the same source or from a radio dealer. It is advisable to use some care when buying the resistances, as the accuracy of the finished product depends on these. Resistances with a gold band or gold spot on the body have a closer tolerance rating (+5%) than the ordinary types. Even so, it is as well to check them with an ohm-meter.

The value of the 110 ohms resistance is more critical than the others, so it should be made up as follows : buy a 100 ohms resistance (carbon or wire wound) and a 20 ohms resistance (wire wound). Now make up the circuit as shown, with the 100 ohms and the 20 ohms resistances wired in series, in place of that of 110 ohms. Connect the 50 ma. range in series with a meter which can read up to that figure. With a variable resistance and a battery, pass a current of about 40 ma. (by the known meter) through the two. Now reduce the number of turns on the 20 ohms resistance until the two meters show the same reading, after which the reduced 20 ohms resistance is soldered permanently in place. The front panel of the meter is a piece of ⅛ in. three-ply, cut out as shown in the drawing. The dimensions given are those of the designer's meter, but they may have to be varied in accordance to the size of the 5 ma. meter the reader may be able to obtain.

The wiring up should be clear enough from the diagrams, and it is advisable to check the finished job against a known standard, before completing the final stages. When this has been done, the meter may be boxed up as shown, hard balsa being quite strong enough for the job. It can be glued together permanently, as there should be no need to touch the wiring after this. The corners can be rounded off, the whole given a coat of black dope and the markings added, as shown.

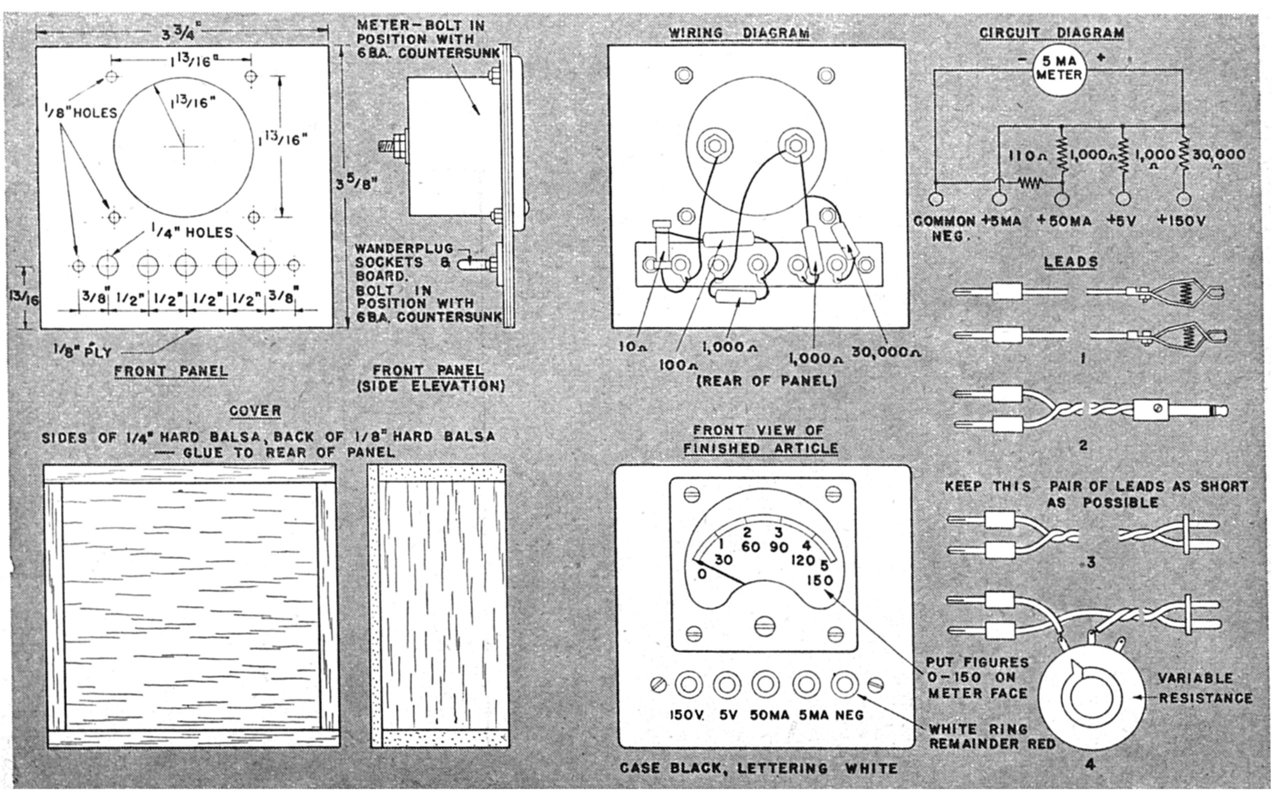
Four sets of leads are used :—

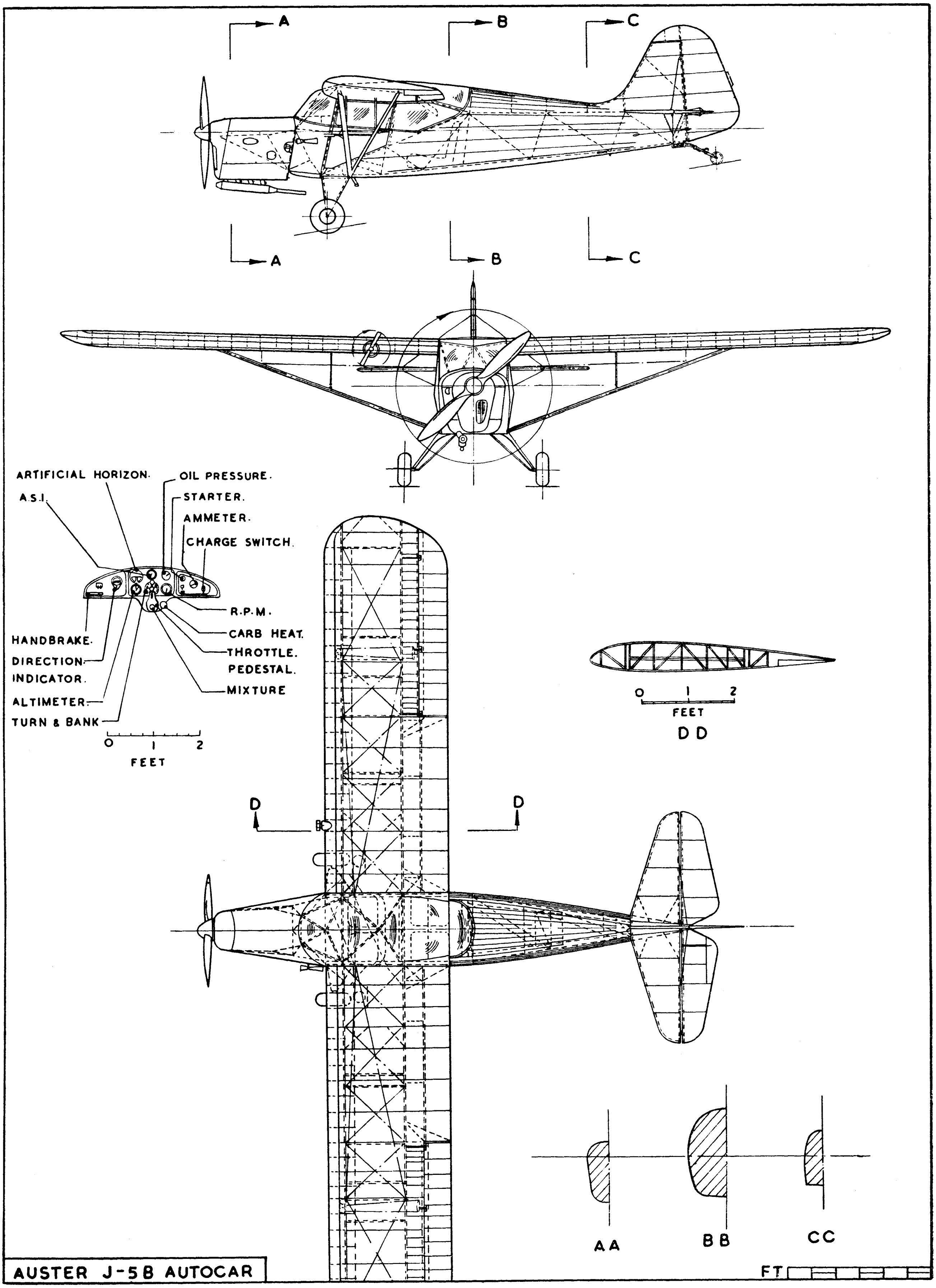
(1) These are terminated with small bull-dog clips (ex Woolworths), which give the best grip for voltage tests.

(2) This pair terminates with a jack plug which plugs into the same jack as the transmitter key, used for reading transmitter current. The designer's Cossor Mk.1 Tx gives about 25 ma., but this varies with the conductivity of the material on which it is standing.

(3) These terminate with a polarised two pin plug for receiver tuning.

(4) This last pair have a two pin plug as in 3, but in this case, there is a 50,000 ohms resistance in the positive lead. This set can be used to vary the anode current of the receiver and so check the relay settings. If the constructor desires to do so, the 50 ma. range may be omitted.





AUSTER J-5B AUTOCAR

AIRCRAFT DESCRIBED No. 30 BY E. J. RIDING

THE AUSTER J5b AUTOCAR

LATEST entrant to the light aeroplane market in Great Britain is the Autocar, recently produced by Auster Aircraft Ltd. of Rearsby, near Leicester.

Following closely along the lines of the famous Autocrat, the Autocar utilises many components of that aircraft, and outwardly the machine differs in that the fuselage, as well as being about 8½ ins. wider in the region of the rear seats, is now faired to a more or less oval cross section by means of plywood formers and a system of spruce stringers running down the back and sides. Since the machine's debut at Farnborough last year, the rudder and fin have been re-designed, presumably to counteract the effect of the raised fuselage decking. The Autocar carries four persons including the pilot, the seating arrangements being rather like those of the early Austin Seven cars. The front seats have been raised slightly, thus improving the range of forward vision. The view from the rear seats is such that the occupants can see over the wing as well as beneath it.

Although the two-door layout has been retained, the front seats have been designed to tip up, thus providing a more graceful entrance and exit to the rear seats. A steerable tail-wheel has been incorporated, and standard equipment includes dual control, an exhaust silencer, wind driven generator on the starboard wing leading edge, and ample luggage space behind the rear seats. The re-positioning of the fuel tanks in the wing roots is a further notable feature. Each wing tank holds sixteen gallons of fuel, an arrangement whereby with both tanks in use and carrying a pilot and two passengers a range of 522 miles can be obtained. The range with four persons on board and one tank in use is 260 miles.

The substitution of the D.H. Gipsy Major 10 engine should make the machine an economical proposition from the commercial operator's point of view on account of the long period allowed between overhauls (1,500 hours). At the time of writing two Autocars are flying—the firm's demonstrator, seen at last year's S.B.A.C. show at Farnborough, and G–AJYM the first production machine, delivered last January to the Mitchell Engineering Co. Ltd. of Peterborough, and stationed at Spalding Aerodrome, Lincs.

Construction : Fuselage : Welded steel tubular construction consisting of four longerons and the usual cross struts and diagonal members familiar on all Auster designs. Wings : Two spruce main spars with light alloy ribs and leading edge covering, the remainder being fabric covered. Wing Section NACA.23012. Tailplane, elevators, rudder and fin are all of steel tubular construction with fabric covering. Autocrat-type split flaps, having three stage operation are manually controlled from the cockpit. The tailplane and fin are braced with streamlined tie-rods. Power plant : One 145 h.p. D.H. Gipsy Major 10 four-cylinder inverted in-line aircooled engine driving a fixed pitch metal airscrew.

Colour : G–AJYK. Aluminium all over with crimson fuselage flash and registration letters on fuselage and wings. G–AJYM. Dark blue all over with green flash and registration letters. Following standard American practice, the letters on the wings are painted on the upper and lower surfaces of the starboard wing only with the tops of the letters adjacent to the leading edge.

Specification :

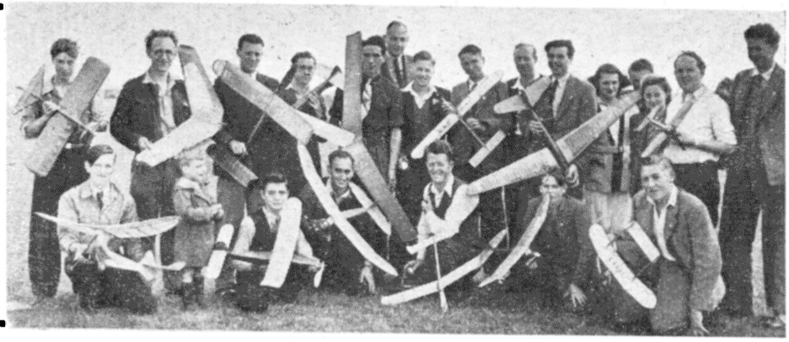
Length 23 ft. 8½ ins. Span 36 ft. Height 8 ft. 3 ins. Wing Area: 185 sq. ft. Tare Weight 1,334 lbs. Loaded Weight 2,300 lbs. Max. Speed 118 m.p.h.: Cruising Speed 106 m.p.h. Stalling Speed 38 m.p.h. Service Ceiling 11,000 ft. Range 260 or 522 miles depending on tankage. Price ex. works 1,500.

¼ in. to 1 ft. reproductions of the G.A. drawing may be obtained price 1/– from A.P.S. Copies of the photographs from Eaton Bray Studios at the usual prices.

Aeromodeller Photos.

CLUB NEWS

BY CLUBMAN



Smiling faces and a variety of models are predominant in this photograph of the Chichester and District M.A.C.

SEEMS like I missed a good thing by not going up to Manchester this year. The annual Indoor Rally staged by the Manchester clubs under the sponsorship of the " Daily Dispatch " is one of the very few meetings organised these days for the r.t.p. and microfilm boys, till this year held in the Holdsworth Hall, a fairly large space, but nowhere ideal for the free-flight followers.

This year, a new venue was found at the Manchester Corn Exchange, a roomy place some 100 feet high, plus a dome—and no hanging lights ! The competitors took advantage of the facilities to such good purpose that no less than four British Indoor Records went by the board. As Reg Parham says, " the Manchester people really have an indoor enthusiast's heaven in the Corn Exchange, and with good trimming and the necessary luck, flights of 10–12 minutes should be obtainable ".

Early in the day Parham made an attempt on the Freeflight Fuselage R.O.G. record, which has stood since long before the war to the credit of D. Gilbert with a time of 4 : 33. Parham's time was 6 : 42—no mean feat under cold conditions. Later he tried for the H.L. Fuselage record, and put up a fine flight of 6 : 55, exceeding the previous record (also in Gilbert's name) by 11 seconds. S. A. Ward, of Wolverhampton, made two attempts on the Indoor Helicopter record, and returned a best flight of 2 minutes, thus beating Ron Mackenzie's old-standing figure of 1 : 33. To round off the record aspect, A. Jolley, of Warrington, clocked 42·83 m.p.h. with his r.t.p. speed model, thus handsomely beating A. F. Young's 37·75 m.p.h. made last November.

Apart from all this activity, much good flying was witnessed in the contests, the Sheffield contingent still showing their superiority by winning the Inter-Area contest for the second year running; also winning the r.t.p. and free-flight events. Full resutts were :—

Class "A" R.T.P.	**E. C. Muxlow**	**(Sheffield)**	**15 : 33·5 aggr.**
	R. Parsons	**(Sheffield)**	**11 : 36·5 ,,**
	H. Tubbs	**(Leeds)**	**11 : 06·5 ,,**
Free-flight	**E. C. Muxlow**	**(Sheffield)**	**18 : 31 aggr.**
	R. T. Parham	**(Worcester)**	**17 : 29 ,,**
	N. E. Davies	**(Liverpool)**	**15 : 54·6 ,,**
R.T.P. Speed	**A. Jolley**	**(Warrington)**	**41·95 m.p.h.**
	W. Eden	**(Warrington)**	**40·2 ,,**
	J. West	**(Warrington)**	**37·3 ,,**

Now for a suggestion. Why not run a full scale Indoor Rally in the SUMMER ? The high times we expect from American contests are all put up during the hot weather, and I am sure we could substantially raise some of our native records at the Corn Exchange with a bit of lift in the air. When one considers that all British records to date have been put up in relatively small halls under COLD conditions, the figures are not at all bad, but I am sure indoor flying and model building would receive a much-needed fillip if a proper meeting was organised during a summer week-end. What about it, North Western Area ? Why not stage a two-day affair—one day reserved for record attacks alone. If you do I promise to bring my old record holder—(yes, still in one piece, though the microfilm looks a bit moth eaten)—and if that's not enough incentive I don't know what is. Or will that put them off altogether !!

The **NORTH-WESTERN AREA** P.R.O. is a bit hot under the collar anent a leader in " Model Aircraft " criticising the inactivity of some Areas. He somewhat naturally claims that his Area is anything but recumbent—but need I say the remarks were not directed at the N.W. or any other Area that is pulling its weight. Those whom the cap fits know well enough, and I sincerely trust they can soon remedy the situation, and settle their difficulties or differences—whichever of the two is holding up progress. I refuse to believe that one or two Areas have all the able workers required to carry out the Area scheme properly—so, Digitis Elimini you blokes, and let's see all Areas on a level footing.

The **NORTHERN AREA** reports that the Area Rally will now take place on September 10th to avoid clashing with other affairs on the 3rd. The venue will again be Baildon Moor—and I trust it's a bit warmer and less windy in 1950 than 1949. Took me a week to get my feet thawed out again ! Donations from Clubs towards the cost of a Trophy for inter-club competition are now coming in, and the draw will be made in East-West sections in order to avoid travelling as much as possible.

Mr. F. H. Boxall, of 5 Greatpin Croft, Fittleworth, Sussex, advises us that an E.D.-powered model " Outlaw " was found near his residence, and will be handed over to the owner on presentation of suitable identification. The model is coloured blue and white, with a black Truflex prop. Naturally, the machine carried no identification of owner's name and address. You deserve to lose it, whoever you are !!

Two very important items that cropped up during deliberations at the recent Area Officers' Conference were (a) that Merit Certificate Awards be made available for flights with one type of model only instead of two as in the past, and no specification restrictions be made other than F.A.I. fuselage system for measurement. (This will not, of course, apply to the " C " certificate, which is to remain at International standards.)

The second point was the desirability of holding some form of eliminator for the Control Line Stunt contest at the annual " Nationals ". To this end it is proposed that an Area C/L eliminator be scheduled before the date of the Nationals each year, the best men qualifying for the finals. This will cut out the shambles evidenced in the past, where the hard-working judges are at it all day weeding out " rabbits ", and have to run the finals in the dark !

Well, it appears history repeats itself ever. Just con this extract from the South African paper " Pacemaker ", and see just how parallel the aeromodelling game seems to be all over the world. In the Editorial the following appears :—

" What is it about aeromodellers ? What is it that keeps them from speaking up on something connected with modelling, on which they have been asked and even begged to comment, yet sends them off pop and brings floods of moans and groans when somebody, despairing of ever getting any help from them, goes ahead and does the best he can anyway?

Destructive criticism is just that—destructive. It achieves nothing and merely ruffles tempers. Constructive criticism is better in that it at least tries to suggest alternatives for what it wishes to remove. Yet even constructive criticism suffers from a serious defect, in that it takes place after *some action has taken place. Once a thing is done it is always more difficult to change it and substitute something else than it would have been to do the something else in the first place.*

Would it not be far better if everyone concerned could give his views in the first place ? Then, when those who have to do some-

thing came to do it, they would be in a position to reconcile all the different views as best they could by working out some acceptable compromise. The compromise would, in all probability, not suit everyone entirely, but should certainly suit the majority in most respects. That is all one can ever hope for in anything involving human relations.

Yet the one thing that most South African (read also English) modellers appear to be determined to do is to refuse to give their views on anything before *something is done. Afterwards they are only too eager* ".

Well, it seems we may get over this stumbling block in England this time by carrying out the scheme now under way with the S.M.A.E., whereby all clubs hold a special meeting to discuss their preferences, etc., for 1951 during March 1950, this to be followed up by Area discussion of the club findings. This again will be followed by a full Council discussion on the suggestions sifted out by the Areas, and will give some indication well in time for those who will have the job of preparing next year's programme. I speak feelingly on this subject, as it is following my proposal that this method is being tried, and I only trust that all those people who are vitally concerned will take the opportunity of expressing their views before, and not AFTER the list has been prepared.

The **Northern Heights M.F.C.** are pleased to announce that their Annual Gala will again be held at Langley Airfield on July 2nd, 1950. Contest programme will be for all types of models, and will feature the Queen's Cup to the same rules as previosly; i.e. Wing area 300 sq. ins., min. weight 12 ozs., 33% tail area. All aeromodellers will be welcome. (Incidentally we owe this club an apology for the mix-up in their report last month. Due to an error in making up copy, a large section of their report was omitted, and the result made curious reading, with their Comp. Sec.-cum-Chairman etc.! Val Turner has relinquished Secretaryship after many years of service, his place being taken by A. G. Bell, 70 Nelson Road, Hornsey, N.8.)

The **SWINDON M.A.C.** are proud to announce the acquisition of one of the largest dromes in the West country—i.e. R.A.F. Wroughton, Wiltshire (complete with club hut!) as a regular flying ground, the field being a mere 15 minutes bus ride from the town. This has been brought about by the combined efforts of the S.M.A.E. and the C/O of the drome. It is hoped that this concession will considerably increase membership, which fell off following the loss of their former airfield, now under cultivation. Permission has also been obtained to fly C/L models in three local parks, the usual demonstration being given to the local committees. The club's flying activities during the past two years have created keen public interest in and around Swindon, to such an extent that other organisations are booking them for half-day outdoor displays, and six-day indoor exhibitions (and paying for it!).

The winter season of the **READING & D.M.A.C.** appropriately opened with the Annual Dinner, presided over by Mr. Houlberg. The indoor comps. have been changed from straight duration to precision, as the draughty conditions mean o.o.s. with microfilmies every time! The loss of Aldermaston Aerodrome last year has brought about an inevitable concentration on C/L, but several Wakefields and A/2 gliders are under way.

Johnny Ross, of the **WINCHESTER M.A.S.** placed top in the 1949 club championship, with Bill Childs runner up, some 7 points behind. This group has just completed a very worthwhile exhibition of their handiwork in a local window display, the resultant publicity reacting to their advantage.

With an almost complete change round in the official chairs, (shades of the recent Elections!) the **FIVE TOWNS M.A.C.** lads are really getting down to it with an ambitious building programme for the coming season. (Sorry I can't publish all those details—think what would happen if they all did it!). Indoor models are shunned, probably owing to lack of a suitable space to fly them, but their outdoor reputation will not suffer. These chaps wish to publicly thank all the clubs who organised the successful rallies which they had the pleasure of supporting last year.

The **ASHTON M.A.C.** put on a highly successful exhibition recently, about 180 models being on show, ranging from a display of 1/72nd scale jobs to radio control. An interesting point was the large proportion of flying scale models—most of which have flown well. Rubber models were definitely scarce, but there was a good selection of gliders. The most encouraging feature was the very high standard of workmanship in all sections. The club dinner—which I had the privilege of attending—was an enjoyable affair, but all were sorry that it was a farewell affair for Bill Titterington, who retired from the post of secretary after ten years' service. Bill goes to Scotland, and promises advance weather gen for the members, using the fine barometer presented to him at the dinner.

The **UPTON M.F.C.** will stage an exhibition on the 7th April from 7–10 p.m., and on the 8th from 3–9 p.m. at the Plaistow Y.M.C.A., Red Triangle Club. A number of interesting aircraft will be on show, also a radio controlled boat. Demonstrations of various types of indoor flying models will take place throughout the course of the show.

As the contest season approaches, the **WAKEFIELD (Yorks.) M.F.C.** members are coming out of their hibernation. Despite poor weather conditions, flight times have been good, two in February being 3 : 43 by B. Isaac's " Rapier ", and 3 : 14 by K. Leathiland's " Gilli-chopper ".

Last year proved to be the most successful for the **YEOVIL & D.S.M.** since its formation. Four long-distance flights (29 minutes with a sailplane, 13 : 00 power, and 16 : 00 and 8 : 00 rubber) created much local interest. At the club's A.G.M. the treasurer reported a balance of over £16, a portion of which will help to defray bus fares to away comps. Mr. Harold Penrose gave a most interesting talk recently on old time and present day flying, this proving most interesting to the members.

After leading rather a quiet existence in its first year, the **MALVERN M.F.C.** is now coming along nicely, and with an active membership running into double figures, the club has arranged a series of monthly competitions. The latest venture is a " Rudder Bug ", built by Doug Woodman, and electrics by Ron Smith. Biggest headache at the moment is lack of a clubroom, but the local Council has been approached and fingers are kept crossed.

The usual moving-in riot having at last subsided, the new clubroom of the **BELFAST M.F.C.** has assumed more peaceful aspects, and frantic building is now going ahead. Two R/C models are under way, and more are likely to follow since a mysterious supply of R.K.61's has appeared from nowhere in particular! They announce with deepest regret that their worthy Hon. Sec. Norman Osbourne (remember him in the Irish Wakefield Team last year?) is about to take unto himself the rather doubtful joys of matrimony. Best of luck, Norman, and we'll send the rice in a basin—ready cooked.

The Annual Gala Day of the **SEVENOAKS & D.M.A.C.** will take place at Rye Lane, Dunton Green, near Sevenoaks, Kent, on the 16th July, 1950.

Following an increased bank balance, the **LEEDS M.F.C.** is purchasing two new trophies for annual competition, being awarded on a points basis. Two R/C jobs are nearing completion, one being a true-to-scale " Chrislea Ace " built by 17-year-old Alan Archer, with Cossor equipment. The other is similar to the " Rudder Bug " layout, and built by Vic Dubery.

Free-flight activities are on the increase with the **MIDDLETON ST. GEORGE M.F.C.**, coming as a welcome change after so much concentration on C/Lining. An unusual incident is well worth recording. This took place when a Jetex 100 powered model climbed steeply, then spun in. Running across to the prang, the owner lifted the model with his boot, when out of the wreckage flew the jet unit on its ownsome. It climbed away nicely with a beautiful exhaust trailing along behind, but when the power had expended itself, the lack of glide was rather noticeable! The lone unit made a flight of some 80 yards unaided. (We'll do away with the airframes altogether soon!!)

Attending the Indoor Rally at Manchester, Norman Davies of the **LIVERPOOL M.A.S.** placed third in the free flight contest, with times of 4 : 27, 7 : 20 and 4 : 07. His model had 100 sq. ins. of wing area, and used a 14× 18 prop. Bare weight was ·085 ozs. Brian Stephenson is developing a new type of R/C actuator with only one moving part, which is showing great promise, and is a great advance on present practice.

With the 1950 contest season looming ahead, the **FORESTERS M.F.C.** are busy at work on "Damage Cup" potentials and " Pilcher Cup " hopes. Hon. Sec. Dick Noble is actually building a 6 ft. span glider, after a long succession of C/Liners. It takes a bit of a struggle to remember not to put on movable elevators with 45° up and down ! R/C has also hit this bunch, and Doug Bolton of the West Bridgeford brigade is the first to get cracking with a 7 ft. span glider which is claimed to be Radio (partial) control.

The **CHESTER M.F.C.** repeated their last year's successful dinner, the Mayor and Mayoress of Chester being in attendance. Junior member Mike Chidley won the " Bowyer Challenge Cup " for the highest number of contest points in the 1949 season, and a new trophy for the ladies was received. Like most clubs, a busy building session is in progress, though the flying is not neglected in the process. D. Cave has raised the club r.t.p. record to 2 : 58, while E. C. Martin's C/L speed job recently clocked 98 m.p.h.—with a plastic prop.

It appears that at long last stunt flying is taking a back seat with the **WEST ESSEX AEROMODELLERS.** R/C flying is a regular feature each Sunday, and rubber is beginning to appear. Nevertheless, a strong contingent of the C/L boys are promised for the Brighton "do". The recent acquisition of a cine camera (on loan) has started a rash of filmitis, as witness the following from the W.E. newsheet :—

Pylon Power & Ann Tenna
in
" MY FRIEND SLICKER "
A saga of the Wild West Essex.

" This moving story of a boy torn between devotion to his trusted model and his love for a local Beauty Queen will pluck your heartstrings until you feel like a zither '. Every scene in this tremendous epic has been shot in natural surroundings—so, too, have the actors ".

The Evening Glues—". . . this picture is a must—in fact it's the mustiest film we've seen ".

The Daily Dope—" Take the whole family to see this film—why suffer alone !"

The Fairlop Fulminator—" Sitting through this film was a most tender experience—well, its a darn painful place to have a boil ".

W.E. Newsheet—" . . . the flying sequences are simply earth shattering ".

The **ENFIELD & D.M.A.C.** put on a most successful C/L show in the car park of the local cinema, plus a model show in the foyer, all this in aid of the film " Task Force ". Just who got the most publicity, the cinema or the club, is hard to say, but they do know that of all the shows they have staged in the past three years, this was by far the best attended ! The boys soon had the crowd excited by competent stunting, followed by streamer cutting, dog-fighting, etc. The success was mainly due to the intrepid ground crews who continuously risked getting an Elfin or Super Tiger in the back of the neck whilst restarting the engines !

The **BRIGHTON D.M.A.C.** announce that the date for their annual South Coast Gala is the 13th August. The recently completed A.G.M. and highly successful dinner makes them confident for the coming season, which starts with a bang at Easter with the big C/L meeting. Let's hope for a fine day after all that effort.

The inclusion of free-flight power in the Plugge Cup contest has led to the inevitable bout of " pylonitis " in the **CROYDON & D.M.A.C.,** and even the hardened rubber and glider fans are being converted to the new way of life. (Or death, as the case may be !) Typical of the design trend is Norman Marcus' latest, 475 sq. ins. of wing followed by a tailplane nearly as big, all hanging on like grim death behind an Elfin. Best flight to date is 5 : 42 o.o.s. on a 4 seconds motor run. Yes—he did get it back !

The **TROWBRIDGE & D.M.A.C.** have introduced a good thing in their club following a recent snap questionnaire as to who knew his engine's number. No one did, so a club engine and model log book is being maintained, which will make the arranging of the season's contests much easier, reference to the book showing the most popular type of model.

The **SOUTH BRISTOL M.A.C.** are now getting ready for the 1950 season, models under construction including three large gliders in the " Sunbug " class. Ron Hillman is busy developing (?) a rubber job affectionately known as " Bebop II ". The club recently gave an exhibition of models and engines, when D. Redman gave a hair-raising display of C/L flying with a Falcon powered stunter of his own design. Flying on 11 ft. lines in a small hall 24 ft. by 45 ft. can be very hectic—but who cares as long as the audience liked it !

In spite of the weather, flying still continues by the **SALISBURY & D.M.E.S.** boys at Old Sarum Aerodrome. Following the success of their last East Rally, they intend to organise a larger meeting this year at Old Sarum, and details will be sent to all surrounding clubs.

The current trend towards scale models was well exemplified at the exhibition staged by the **BARKING M.A.C.** on February 18th. Champion of the show was a 1/7 scale model of a Hawker Demon, radio controlled, and powered by and ETA 29. Builder was R. S. Martin, who was also involved in the construction of last year's winning model—a Dyna-jet powered C/L Vampire. Other prize winners included P. W. Barrett's power job " Vixen ", A. W. Arbers' 3·5 Amco powered Team Racer, and J. Willmot's " Powerhouse ". An Amco powered " Chrislea Ace " won the Junior Championship for G. R. Parker.

Well, with the exception of Robert Arehart of 4726 Delaware, Gary, Indiana, U.S.A., who wants a pen pal around his own age of 20, that's the lot for this month. No "Tall Story" of sufficient merit has been forwarded so we miss out this time, and look forward to some more interesting ones next time. So good luck with your trimming, and here's to another fine flying season.

The Clubman.

NEW CLUBS

SEATON (Devon) M.F.C.
A. E. Trott, 12, Mooracre, Seaton, Devon.
EXMOUTH & D.M.C.
R. D. N. Salisbury, 32, Chapel Street, Exmouth.
LANGDON HILLS M.C.
W. Banstead, 2 Sqdn. 1 A/A (M) Sig. Regt., Langdon Hills, Laindon, Essex.
DOVER & D.M.F.C.
P. T. Taylor, 3, Laureston Place. Dover, Kent.

SECRETARIAL CHANGES.

ABERDEEN & D.M.F.C.
G. P. Whitehead, 14, Albert Street, Aberdeen.
EALING & D.M.F.C.
L. R. Friend, 21, Felix Road, Ealing, W.13.
FIVE TOWNS M.A.C.
E. Wain, 386, Waterloo Road, Cobridge, Stoke-on-Trent.
ASHTON M.A.C.
F. D. Ward, 25, Bromley Crescent, Ashton-under-Lyne, Lancs.
ILKESTON M.A.C.
K. W. Tatham, 57, Graham Street, Ilkeston, Derbys.
APSLEY M.F.C.
W. P. Holland, Caswell, Bargrove Ave., Boxmoor, Hemel Hempstead.
TROWBRIDGE & D.M.A.C.
M. S. Wootten, 17, Church Street, Bradford-on-Avon, Wilts.
YEOVIL & D.M.A.C.
D. Steele, 20, Westfield Grove, Yeovil, Som.
WORCESTER M.A.C.
A. J. Harrison, 25, Diglis Road, Worcester.
SOUTHPORT M. & E.C.
B. Rush, 35a, Chambres Road, Southport.
GUILDFORD & D.M.A.C.
P. M. Evans, " Glynde ", Madrid Road, Guildford, Surrey.
ICARIANS M.A.C.
J. W. Coasby, No. 1 Caravan, Castle Hill Road, Totternhoe, Nr. Dunstable, Beds.
NORTH WOOLWICH & D.M.A.C.
K. Witsey, 49 Woodman Street, North Woolwich, E.16.
NEWPORT PAGNELL M.F.C.
R. Barnard, 93, Newport Road, New Bradwell, Wolverton, Bucks.
BUSHEY PARK M.F.C.
R. F. Green, 189, French Street. Sunbury-on-Thames, Middlesex.
PHOENIX M.F.C.
H. Palmer, 89 High Street, Kingswood, Bristol.
OLD HILL & D.M.A.C.
I. Teesdale, 13, Park Street, Blackheath, Nr. Birmingham.

TRUCUT PROPELLERS

In the article "Power Prop Review" in our March issue, the depth at the tip for the Trucut propeller is given as T/2. Messrs. Progress Aero Works have asked us to point out that this should read T/3.

TALKING FUELS— No. 2.

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Nitrated Methanol Racing Fuel

MERCURY No. 7 is a genuine Methanol Castor Base Racing Fuel specially blended for use in Glow-plug and Spark-ignition Motors for the average conditions prevailing in this country.

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No. 7 as sold to you is correct for use in engines with compression ratios up to 10.5:1 where the humidity does not exceed 40%. If your motor has a higher compression than this or the atmosphere is damper, then the proportion of nitromethane should be reduced by blending with No. 2 which is also a Methanol-Castor fuel. Genuine enquirers sending in full particulars of their engine will be sent a blending table for varying degrees of humidity on receipt of a stamped addressed envelope. Compression ratio and the R.P.M. at which the motor is operating under racing conditions must be stated.

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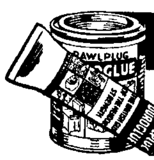

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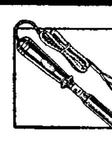

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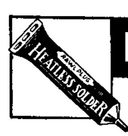

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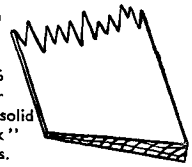

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1/16″×1/4″	2/– doz.
1/16″×3/8″	2/6 doz.
1/8″ sq.	1/– doz.
1/8″×3/16″	1/6 doz.
1/8″×1/4″	2/– doz.
1/8″×3/8″	3/– doz.
1/8″×1/2″	4/– doz.
3/16″ sq.	2/– doz.
3/16″×1/4″	3/– doz.
3/16″×3/8″	3/6 doz.
3/16″×1/2″	4/– doz.
1/4″ sq.	3/6 doz.
1/4″×1/2″	5/– doz.
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1/16″×3/16″	2/9 doz.
1/16″×1/4″	3/– doz.
3/32″ sq.	2/9 doz.
3/32″×1/4″	3/– doz.
3/32″×3/8″	3/3 doz.
1/8″ sq.	2/9 doz.
1/8″×3/32″	3/– doz.
1/8″×1/4″	3/3 doz.
1/8″×3/8″	3/9 doz.
3/16″ sq.	4/– doz.
3/16″×1/4″	4/9 doz.
3/16″×3/8″	4/9 doz.
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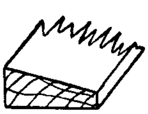

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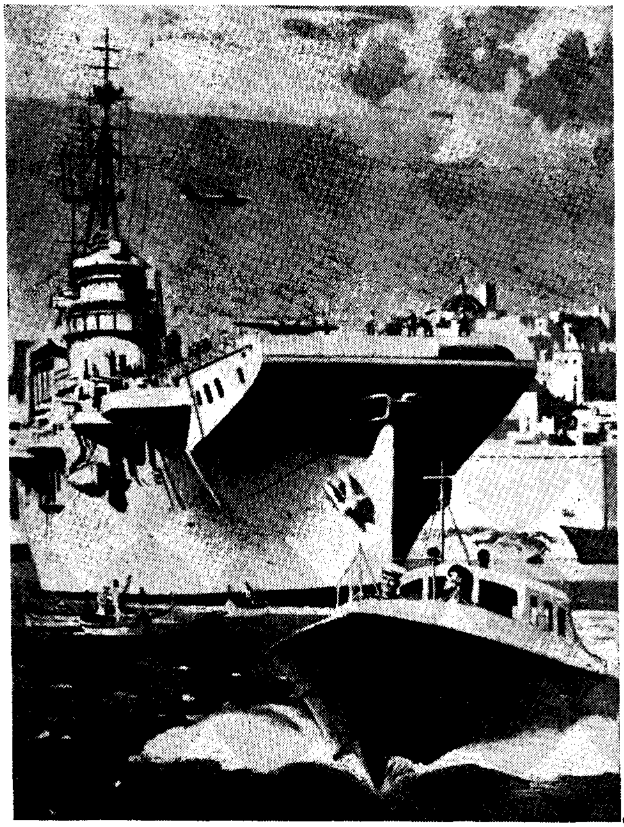

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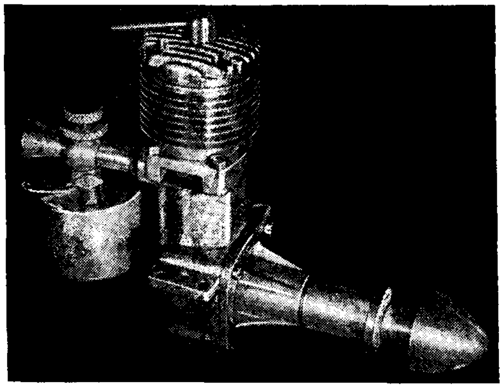

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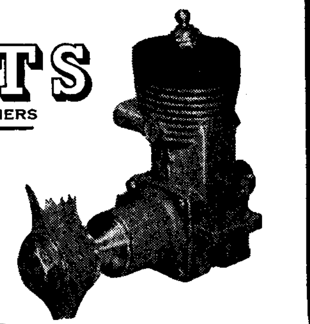

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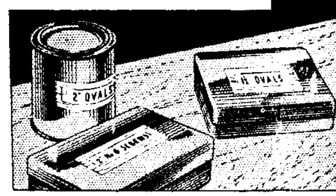

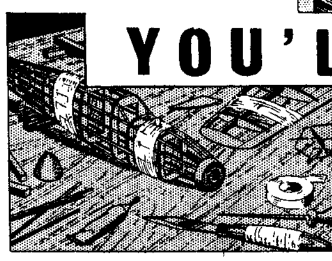

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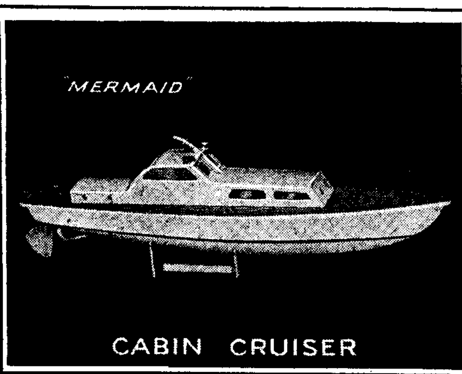

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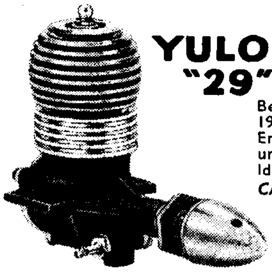

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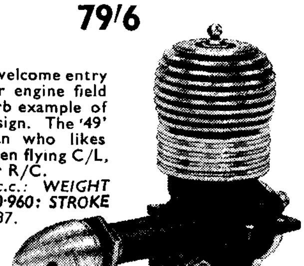

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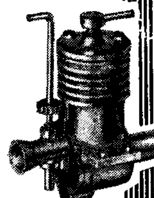

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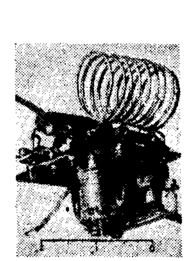

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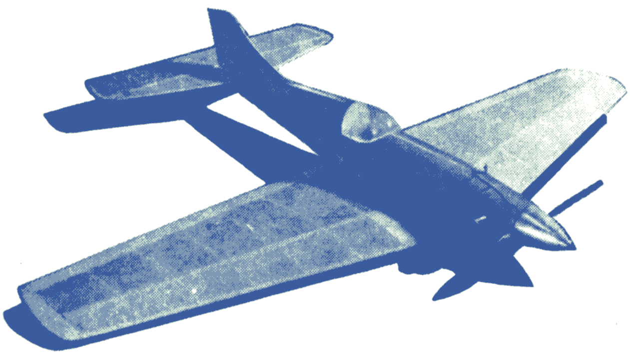

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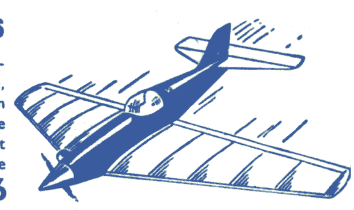

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