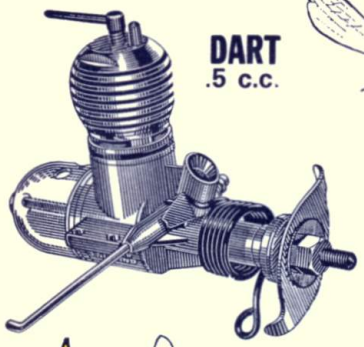
Aero Modeller

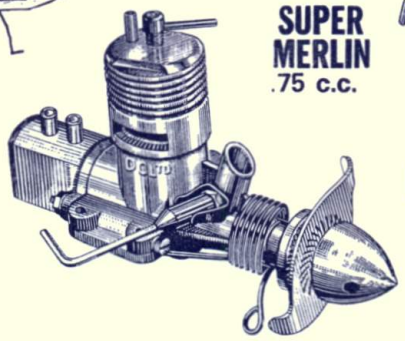
April 1973
15p
U.S.A. & Canada 75c.

INCORPORATING
MODEL AIRCRAFT

MAP HOBBY MAGAZINE



DART
.5 c.c.



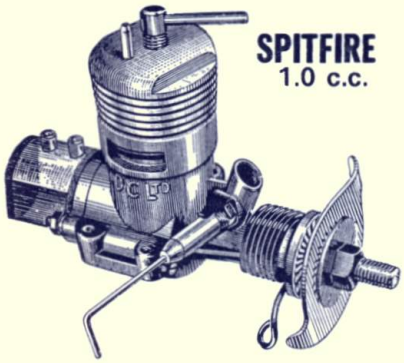
SUPER
MERLIN
.75 c.c.

WASP
.049 cu. in.

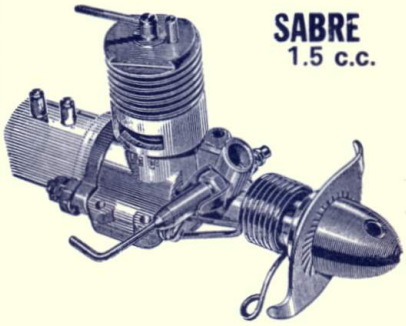
at your model shop !

QUICKSTART

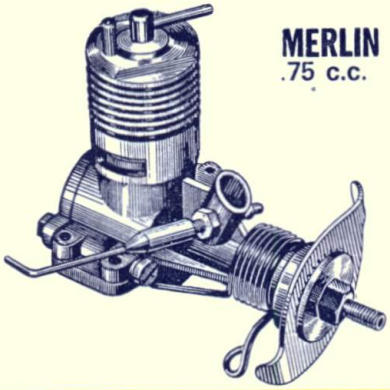
THE GREATEST RANGE OF SPORTS FLYERS' ENGINES



SPITFIRE
1.0 c.c.



SABRE
1.5 c.c.



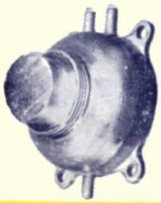
MERLIN
.75 c.c.

No spares-backing worries – if you have a Quickstart you can be sure of full and continuous use of your engine

Quality
Reliability
Economy

Full range of special accessories for QUICKSTART engines

Radial Tank/Mount

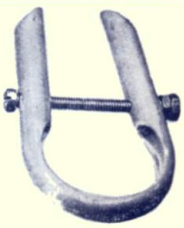


General Purpose Tank

Quick Glow Clip

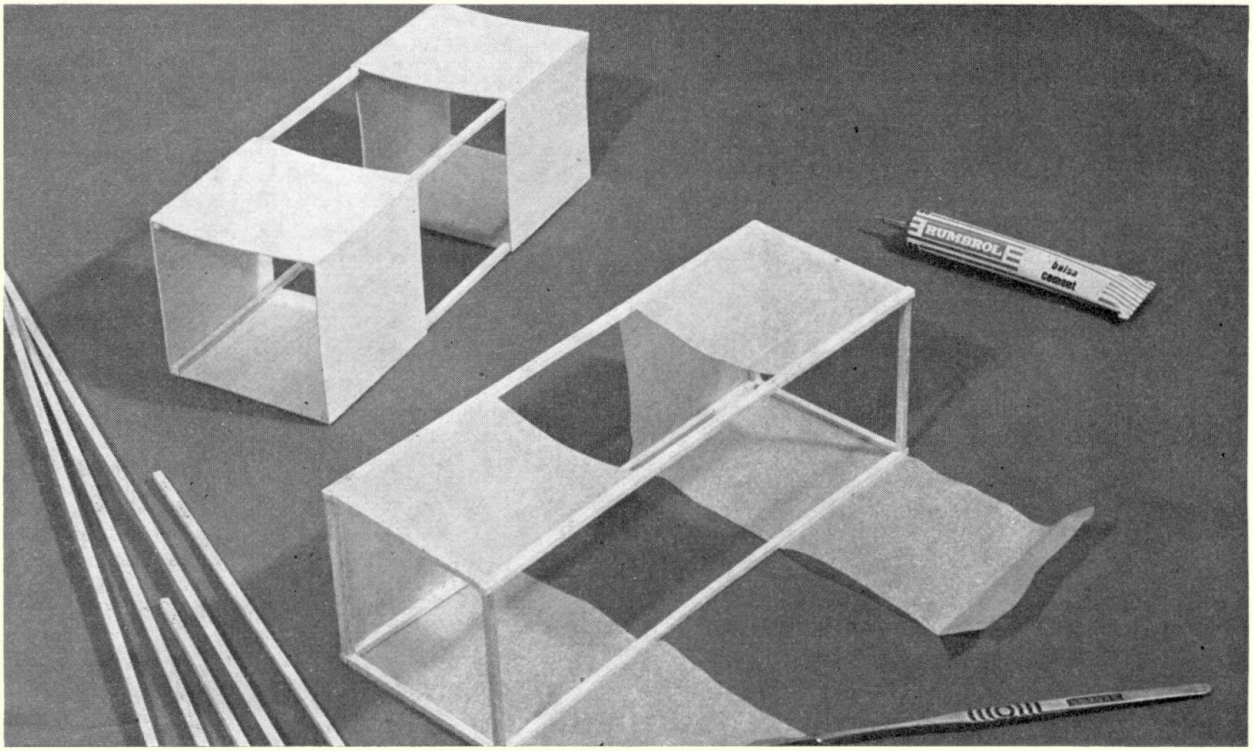
Special Wasp Spanner

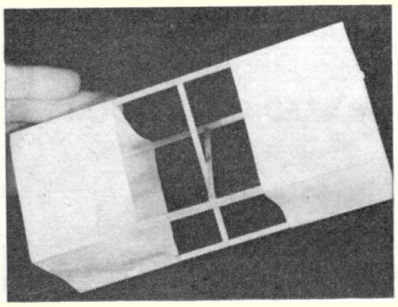
Exhaust Manifold (comes with collector)



DAVIES-CHARLTON LTD. HILLS MEADOW DOUGLAS, Isle of Man

SOLARBO





Waiting for the wind to drop? Have fun flying a little box kite, before risking that new sports model. They can be knocked up in a few minutes, in any size. An all-sheet version which you can build on the field – or a tissue version for lighter construction. The former can have cell panels anything from 1 inch square to 3 inch square, in 1/32 sheet. Use a cotton or thin thread line for flying, attached to one of the sticks just behind a cell.

Basis for an 'open' contest here. Longest line out wins – regardless of kite size. That means picking your balsa for best performance – just as with any flying model. We must take *our* new model maker to task here for not using quarter-grain on his all-sheet model! The *big* difference comes from using Solarbo Balsa for all your models. But the little details also count. He'll learn!

Solarbo BALSA

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SOLARBO LTD.,
COMMERCE WAY, LANCING, SUSSEX

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The FOURNIER RF5 72" SPAN MOTEUR – PLANEUR

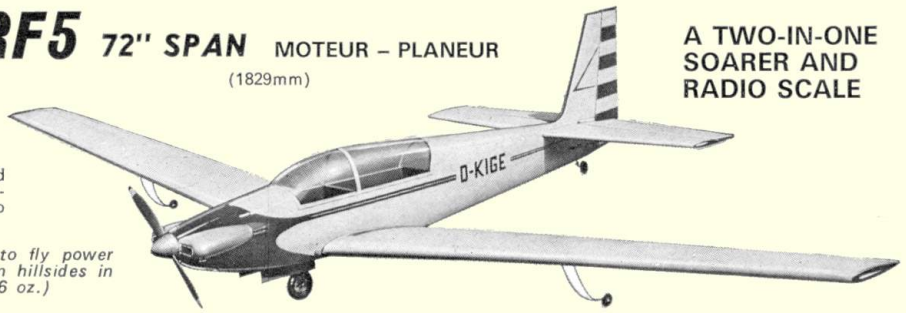
(1829mm)

A TWO-IN-ONE SOARER AND RADIO SCALE

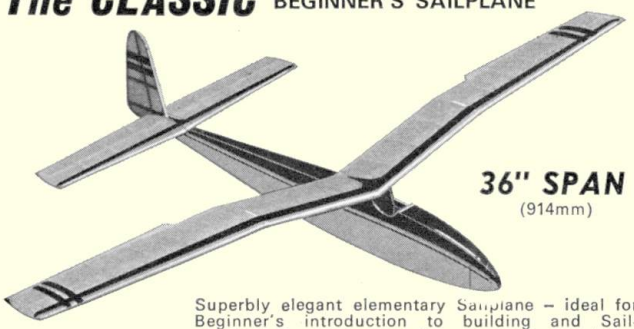
FOR ENGINES 1.49 to 2.49 RACING DIESEL OR GLOW (0.09 to 0.15 cu. in.)

Very-near-to-scale Auxiliary Powered Soarer and Sport Plane for Intermediate 2-Channel Proportional Radio on Rudder and Elevator only.

Ideal for Hillside Soarers who like to fly power when the wind drops. Flown best on hillsides in moderate to strong winds! (loading 16 oz.)



The CLASSIC BEGINNER'S SAILPLANE



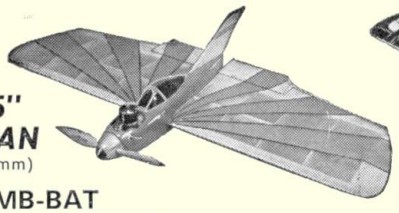
36" SPAN
(914mm)

Superbly elegant elementary Sailplane – ideal for Beginner's introduction to building and Sailplaning! Complete kit of parts – die-cut balsa formers and ribs. Full layout plans.

COLT CONTROL-LINE TRAINER

19" SPAN
(483mm)

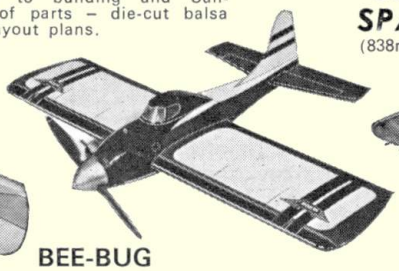
Fully pre-fabbed all-Balsa part. For 1 to 1.4 motors on C/Line!



25" SPAN
(635mm)

BOMB-BAT

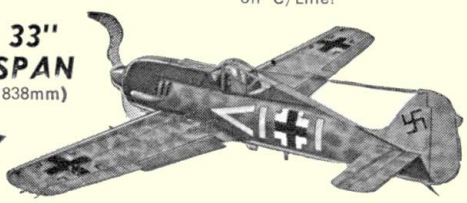
Bat-wing Lightweight Stunter for combat or Stunt. Ideal for Webra 'Record' or 'Sport-Glo'.



BEE-BUG

Snappy Stunter for 1 c.c. motors.

33" SPAN
(838mm)

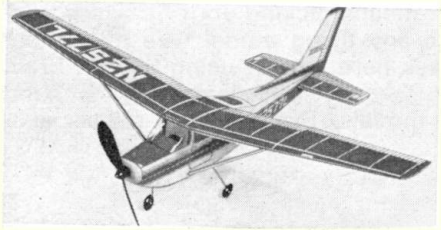


F.W. 190 A3

Combined Flap and Elevator Scale Stunter for 3-5 c.c. motors. Ideal for 'Glo-star'.

See these super Veron kits at your dealer and check their latest list prices during tax changeover!

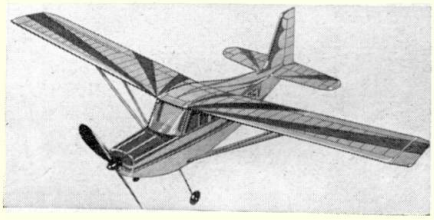
TWO KWIK-FIX PRE-DECORATED FLYING SCALE



CESSNA SKYWAGON
23" SPAN (584mm)

All die-cut and decorated parts! Dead easy to build! Plastic Prop. Pre-shaped Undercart with fitted Wheels. Rubber Motor. Pictorial Plans. Realistic performance.

CHAMPION CITABRIA
22" SPAN (559mm)
EASY-TO-BUILD, FUN-TO-FLY!



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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

April 1973 Volume XXXVIII No. 447

CONTENTS

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COMMENT

By the end of February, membership of the Society of Model Aeronautical Engineers had reached 1,600, approximately half that at the termination of the previous year. By normal expectations, renewals and new memberships should reach 2,500 by the time of the National Championships at the end of May. This indicates a drop-out of approximately 750. We are sorry for the drop-outs. To the outsider the trauma which has beset the British Model Club movement since the S.M.A.E. was obliged to relinquish its insurance scheme is baffling, even sadly ironic. For years the S.M.A.E. carried the finest insurance cover obtainable for any aeromodeller. Because it protected the modeller from many liabilities it became a loss operation for the insurers. When the Annual General Meeting of the Society refused to elevate subscription rates and the insurers applied a large increase of premium in mid year, the S.M.A.E. had no option but to terminate its insurance scheme. Result? Aggravation and confusion.

Obliged to provide their own cover, clubs have been split assunder by blinkered belligerants – in many cases those same people who failed to foresee that an earlier increase in fees would have obviated any need for a change in policy. Some have engaged inadequate insurance, meeting neither the terms of membership or the Ministry requirements for use of its airfields.

The simple facts are that as the National body for aeromodelling the S.M.A.E. has to protect the interests of itself and those with whom it negotiates by requiring specific insurance. It also pays £500 so that modellers can use Ministry property – provided they have individual cover. Those who do not comply simply cannot expect to use the facilities and like the foolish virgins will soon find their fuel tanks dry!

on the cover

Superb model of the Ansaldo S.V.A. 4 by Don Hague of the Whakatane Club, which took first place in the control-line section at the New Zealand Nationals – built from Aero Modeller *plans (MA/359, price 50p).* (Photograph by David Hope-Cross).

next month

Plans for Eric Herbert's **Firebrand** control-line Carrier Deck Landing model; advice on trimming for the **beginner** plus a little of the theory as to how and why a glider flys; more on the **Jupiter** man-powered aircraft. Practical hints and tips for the control-line enthusiast, plus all the regular features in the May issue, on sale April 20th.

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MR 30 and MR 40 MINIMAC
Fully pretuned sub-miniature superregen receivers for the smaller budget where interference from other modellers is not a problem.
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MR230 Powermac Tx and Minimac Relayless	£11.95

** Includes matched pair of superhet crystals (extra crystals £2.75).*

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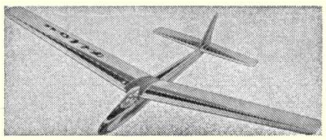
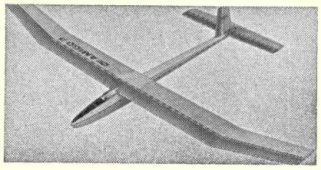


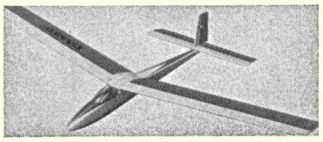
FILOU SAILPLANE £4.85

50" span sports-type sailplane which converts to auxiliary power (pylon mount 92p extra). Kit contains quickbuild plan, printed and die-cut sheets of balsa and ply, canopy, wire parts, tissue covering, decals and miscellaneous items. Model also recommended for R/C flying.

AMIGO 2 £8.30

Here is a real contest-type sailplane, 78¾" span and total area 694 sq. in. Extensively prefabricated, the kit includes die-cut and printed balsa and ply parts, milled and slotted stripwood, ready-formed tow hook, canopy, tissue covering, decals, etc. etc. The Amigo 2 also adapts readily to pylon power and is ideal for R/C (R/C installation plan included).



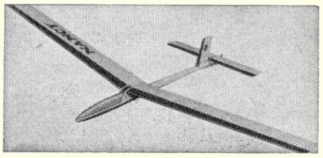


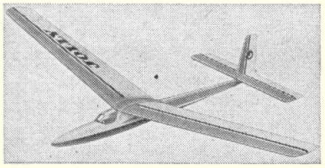
DANDY £6.90

A kit designed for rapid assembly with die-cut sheet, preshaped fuselage parts, milled and slotted stripwood, canopy, cement, tissue covering, decals, etc. Span 63" Total area 540 sq. in. Can be converted into a powered glider with pylon mount (92p) and 049 engine.

NANCY £4.15

Another design in the popular A1 class. Span 48¾". Kit includes milled fuselage nose section, die-cut sheets, milled stripwood, preshaped wire parts, tissue, adhesives, decals, etc., plus a two-colour exploded drawing and plan. Quality of the prefabrication is exceptional! The Nancy is also complete with auto-rudder and dethermaliser.



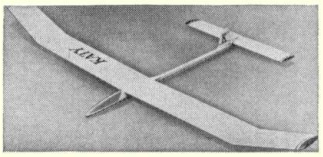


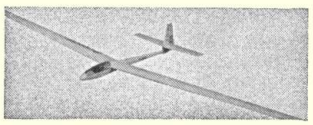
JOLLY A1 £3.55

A 45" span Quickie model. This kit is extensively prefabricated and very complete Model takes pylon mount for conversion to power. (Recommended motor Cox Pee Wee.) Kit contains quickbuild plan, printed and die-cut balsa, ply parts, strip, dowel, wire parts, tissue, cement, decals, etc. Pylon mount kit is 92p extra.

KATY A2 £8.15

Ultra modern towline contest glider. Quickie kit includes milled fuselage nose, wing fairings and other parts moulded in plastic, die-cut balsa parts and all other items needed to complete this super high-performance model quickly and easily. Conforms to A2 specification and includes all the latest ideas in design. Wingspan 67¼". Length 39". A very complete and recommended kit.



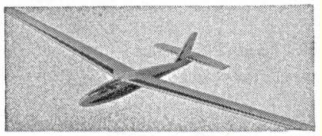


CIRRUS £18.75

Giant 118" span. A fabulous kit with finished fuselage mouldings in ABS plastic, precut wood parts, complete hardware, moulded canopy, control horn, cement, covering material, etc., etc.
Also **CUMULUS 2800** £41.60
110" span. Injection moulded parts. Ideal for R/C!

FOKA (SCALE GLIDER) £14.80

Wingspan 102". This outstanding kit includes a Finished One Piece Fuselage moulded in high-impact plastic with other parts in balsa and ply (mostly fully shaped). Also prefabricated wire parts, canopy, hardware, adhesives, covering material, decals, etc. Detailed plan plus an Overlay Plan showing R/C. installation.



ALSO

BEGINNER 38" span £2.70
UHU Mark III 43" span ... £2.80
FOUGA SYLPHE (Jetex) ... £1.78

Graupner Tow Handle & Line 38p
Tempo Geared Winch £3.90
Full-length Pilot Doll 96p
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Electronic Rev Counter £17.65

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Graupner

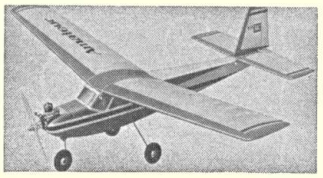
BO 209 MONSUN ... £2.95

All-sheet 21½" span scale model for rubber power. Complete kit. One of the latest additions to the Graupner range featuring the latest ideas in prefabrication.

ALSO

MINI-PIPER Quickie ... £5.90

Diecut all-sheet model. 29" span.

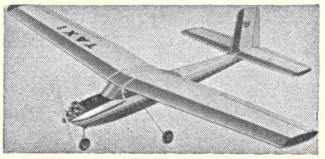


AMATEUR ... £7.65

43¼" span. Kit includes full-length diecut balsa fuselage sides, diecut sheet and ply, shaped wire parts, wheels, hardware, etc. Takes engines up to 1.5 c.c. for free-flight or radio control. One of the best sports-type power models available today, with semi-scale appearance and a proven flying performance. Ideal as an R/C trainer.

TAXI £12.80

Kit includes die-cut balsa-ply and ply parts, preshaped engine mount, bulkheads and fairings, milled stripwood, shaped wire parts, scale-type wheels, cement, covering material, decals, etc. . . . 'Quick-build' plan and separate R/C INSTALLATION PLAN. Wingspan 59". Engines .15 to .35. Ideal for 2- to 8-channel R/C.

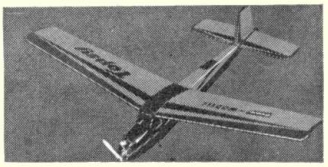


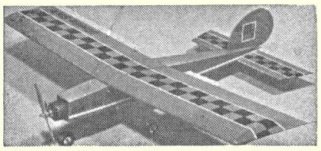
CESSNA 177 CARDINAL £29.40

A truly SUPERB prefabricated kit with injection moulded plastic fuselage, foam wings and tail. Span 61" for 5-6 c.c. motors. This kit is an outstanding example of modern design and use of mixed materials – plastic, foam-plastic and wood – with all parts fully shaped. The most advanced production of its type!

TOPSY 32" span £3.45

Topsy is a long-time favourite in the Graupner range for free-flight sports with engines up to 0.5 c.c., but is equally suitable for rudder-only R/C (engines up to 0.8 c.c.). Kit contains quickbuild plan, printed and die-cut balsa and ply, shaped wire undercarriage, RECORD wheels, tissue, cement, decals and miscellaneous parts



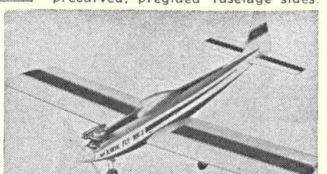


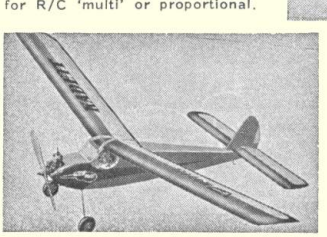
MIDDLESTICK ... £15.65

Wing span 55". Length 38¾" overall. Wing area 611 sq. in. Tail area 124 sq. in. Weight approx. 3¾ lb. (up to 5 lb. with radio). Suitable for .40 engines. Assembly time is reduced to a minimum with plenty of precut parts, including precurved, preglued fuselage sides.

KWIK FLY Mk. III £19.65

This kit makes an authentic duplicate of Phil Kraft's WORLD CHAMPIONSHIP winner. Kit includes glued and curved fuselage sides, shaped wood parts, diecut balsa and ply sheets, formed undercarriage wheels, canopy, hardware, etc. 59½" wingspan. Wing area 657 sq. in. Engines up to .61. Acclaimed as the Finest Kit yet for R/C 'multi' or proportional.





KADETT £5.40

High wing F/F sports model, in the traditional style. Kit is complete down to hardware, wheels, adhesives, decals, etc. A popular favourite for 'Sunday flying'.

NEW GRAUPNER KITS

TERRY 41½" span power £9.85 and the magnificent 90½" span ASK14 SAILPLANE – the most advanced kit of its type yet produced! (Price £41.60.) Check both at your local model shop!

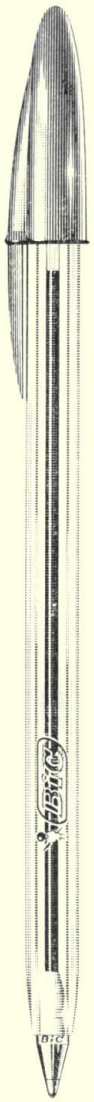
Don't throw away that old

BIC

Regd. Trade Mark

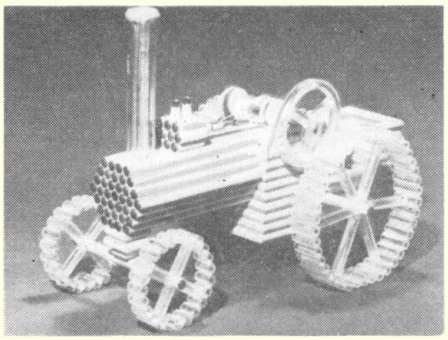
CRYSTAL BALLPEN

Don't throw away your old Bic Crystal ballpens, collect them from your home or office. Cut them, glue them, bend them and fuse them to make even more fantastic models for 1973. With a little imagination you can convert a used pen into the holiday of a lifetime.



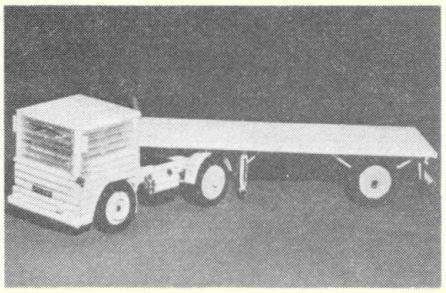
Mr. L. Burrows of South London didn't and won **£250** and the Bic National Trophy.

Entry: The Bic Traction Engine



Mr. A. Brooks of Lancashire didn't and won another cash prize.

Entry: The Bic Leyland Lorry



THIS YEAR YOU COULD WIN A 14 DAY HOLIDAY FOR TWO IN TUNISIA

Yes, Tunisia* on the North African Coast with three prizes of a weekend for two in Paris* for the runners-up.

*Or the cash equivalent.

Imagine yourself in the mysterious markets of North Africa, camel treks and miles of white sands — all yours for a few old pens and a little ingenuity.

The Bic Model-Making Competition is divided into two half-yearly prize events.

Entries for the first half-year must be received by May 31st, 1973. Competition rules available on request.

Send your models to the BIC Model Making Competition

Regd. Trade Mark

c/o Montague House, 23 Woodside Road, Amersham, Bucks.

Heard at the HANGAR DOORS

KEMPTON PARK Racecourse, on Saturday and Sunday, April 7th-8th, will once more be the venue for the Esher and District M.F.C's. *1973 Radio Control Symposium* where some 18 exhibitors will be displaying the latest in equipment, while model flying displays will take place continuously.

With ample parking, refreshments and bar available in the covered accommodation and an admission charge of just 30p, this promises to be an event well worth visiting. The racecourse is situated at Sunbury-on-Thames on the A308 between Staines and Hampton Court.

A COMPLAINT from the Civil Aviation Authority regarding the flying of model aircraft at Mill Hill, Shoreham, Sussex, was discussed by a committee meeting of the South Eastern Area of the S.M.A.E. It was decided that the Area's Vice-Chairman should meet the S.A.T.C.O. at Shoreham to discuss the complaint and to seek suggestions as how best to improve the situation. In the meantime, modellers are requested *not to fly* from this site until negotiations are complete. It is certainly **not** the Area's intention or desire to permanently deprive aeromodellers of this excellent site, but their co-operation in this way is needed to show the Area's responsibility, and help towards the discussions taking place. Urgent consideration is being given towards the negotiations, and further information will be provided when available.

CLUB SECRETARIES, we need your help! With the present upheaval in club structures, and because our records are probably out of date, we intend to compile a new directory of all the clubs in this country – so please send us your names and addresses to help us make an accurate file. You too will benefit, as we can then be better equipped to pass the relevant details on to prospective members.

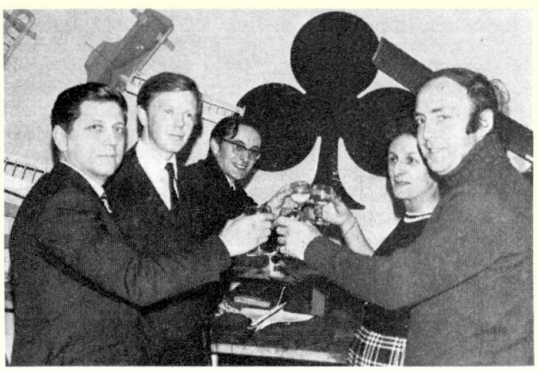
THE SOCIETY OF FRIENDS of the Royal Air Force Museum has been founded to foster an interest in the history of the R.A.F., to acquire and maintain exhibits for the Museum and to further the work and interests of the Royal Air Force Museum in all possible ways. All profits from the *Society of Friends* will be used for the benefit of the Museum.

Membership Diplomas are issued to all Friends, and ties are available at £1.20 each. Special events will be organised for Friends including private views of exhibitions, film programmes, an Annual Genera Meeting in the Museum, etc.

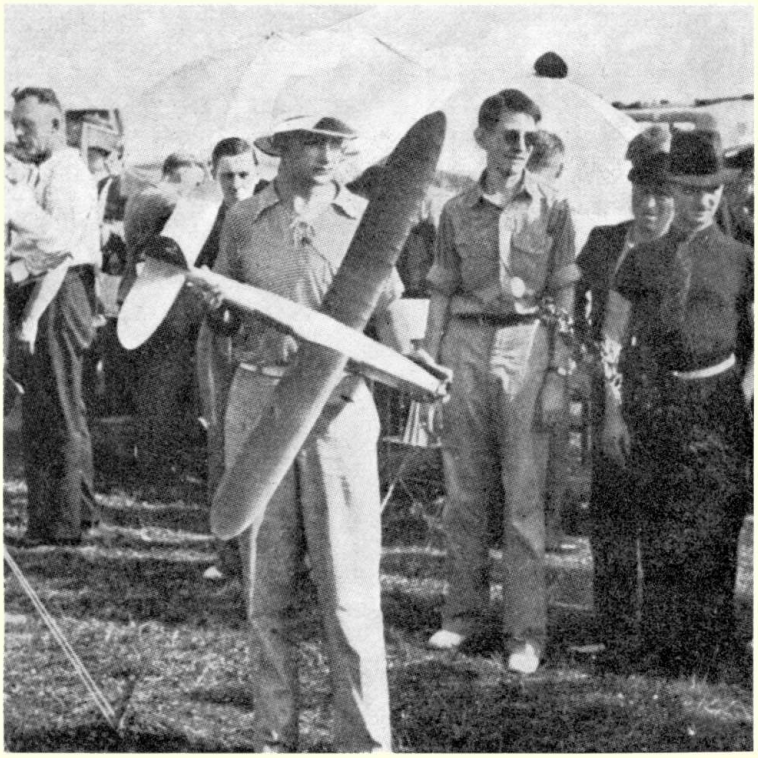
If admission charges are introduced for National Museums, it is hoped to obtain Government permission for members to be admitted free. Individual membership costs £2 per year and life membership £25. Membership forms can be obtained from the Royal Air Force Museum, Hendon NW9 5LL.

29th COUPE D'HIVER at le Plessis-Belleville near Paris on February 25th was the most eventful ever for the *Aeromodeller* party. A French Air Traffic Control strike was circumnavigated by car/B.A.C. 1-11/coach travel, but as the weekend progressed, air travel return became impossible and three of the team members had to return by boat without even unpacking models, in order to get back to work! Originally there were 18 British entries, of whom 11 made the event. A total of 189 entries represented five Nations and for the first time the trophy has gone outside of France. Illustrated report comes next month, meanwhile here are the leading results and British placings.

1. Guilio Gastaldo (Italy) 357. 2. A. Meritte (F) 330+359. 3. B. Boutillier (F) 330+267. 4. J. O'Donnel (U.K.) 330+85. 5. M. Mailfert (F) 325. 6. G. Cognet (F) 325. 7. R. Garrigou (F) 319. 8. J.-C. Souveton (F) 312. 8. J. Griveau (F) 213. 8. C. Menget (F) 312. **Others** 19th F. Monts (U.S.A. Proxy H. Tubbs) 298. 22nd M. Fantham (U.K.) 293. 31st H. Tubbs (U.K.) 277. 43rd R. Coleman (U.K.) 252. 54th J. Dowsett (U.K.) 225. 58th P. Coleman (U.K.) 222. 62nd R. Firth (U.K.) 217. 65th F. Elton (U.K.) 215. 95th Major Lindsey Smith (U.K.) 154. 100th D. Goodwin (U.K.) 144. 101st D. Tipper (U.K.) 136, etc., etc. (prizes to 120th place!).



Formal opening of the permanent clubroom at Holmanleaze, Maidenhead, on January 26th for members of the Maidenhead Club was the culmination of years of negotiation with the local authority. This modern hall, with work benches and kitchen, has been leased exclusively to the club by the Council. Above, the combat flying members 'on parade', at left, the officials celebrate.



35 Year FLASHBACK

Jim Cahill's 1938 WAKEFIELD CLODHOPPER

Red fin with white 2; red wings and band around natural finish balsa planked fuselage on Jim Cahill's thermal hunting Wakefield, which made history at the French contest. Jim was a leading protagonist for the streamlined form and the single blade folding propeller. Our plan is of the kitted version with two-blade prop and does not have the castellated tail cone joints as in the original, seen in Le Modele Reduit d'Avion plans of September 1938. The plan is taken from the simplified version produced by Comet (U.S.A.), to whom acknowledgement is due.

SO AMERICA regains the Wakefield Trophy – by means of one flight, timed by the use of binoculars – and one in which the model at the end of the motor run came within a few feet of the ground and then was lucky enough to strike at the edge of the 'drome a thermal on which it soared to a height of some thousands of feet and eventually passed out of sight! Well, it was all according to the rules, and none can grudge Cahill his win. We congratulate him and the whole American team on their entries. Cahill's model was mainly interesting because of the single-blade folding propeller; whilst well made, it was easily bettered by a number of other competitors' models as regards general neatness of workmanship and attention to detail.

And France organised the competition. . . . Well, we think France's reputation will stand the strain. . . .

THUS REMARKED the Editorial page of the September 1938 *Aero Modeller* commenting on the Wakefield International event staged at Guyancourt on July 31st of that year. The August issue of *Model Aeroplane Constructor* likewise carried an account of the meeting, but in this journal the writer was more concerned with the organisational side of the affairs, not commenting at all on Mr. Cahill's fortunes, and reported thus:

On arrival at the aerodrome, the teams found small enclosures allocated to them, and a short time was given for test flying, during this period two gas-filled balloons were released for testing wind speed, but they rose absolutely vertically.

At 11.30 the competition was started.

There were six timekeepers with over 70 models to time. The weather was so ideal that the risk of damage and bad flights was almost nil. This meant that over 200 flights in all probability would be made.

The first thermal flight was made by Mr. E. Chasteneuf of England, with a flight of over ten minutes, quickly followed by Mr. Ross, flying for Canada, with a flight of 17 minutes and Mr. Cahill of U.S.A. with a flight of 33 minutes. It was then discovered that three of the timekeepers were using binoculars, and in some cases only one timekeeper had been clocking flights.

At 3 o'clock only about 15 flights had been timed, and in an endeavour to hurry the proceedings, a meeting was called. the aid of more timekeepers enlisted, and the use of binoculars discontinued.

The competition then appeared to move along in a more satisfactory manner.

Undoubtedly, Cahill's success on that occasion was favoured by Lady Luck, but it would be unfair to dismiss this designer and *Clodhopper II*, quite so lightly; it was obviously a successful thermal riding machine. It was also a departure from the normal American approach of using 'square' or 'box' fuselages – indeed he followed the British line of thought in building a 'streamliner'. Even experts such as Korda still used the box type of Wakefield – believing that under the then current rules (whereby contests were won by the best out of three official flights), a competitor only had to *depend* on one good flight. With abundant thermals present in their part of the U.S., it seemed that the extra effort involved in building a 'streamliner' was unnecessary, as the chance of flying in absolutely 'dead-air' was remote. We British however, living in a far less favoured area – weatherwise – had for many years been following a lonely trail along the 'low drag' path, and the Americans conceded that in still air, the British models had a superiority of approximately one minute.

Rushed to completion in June 1937, it was first test flown on the morning of the *Moffet and Wakefield Eliminations*, and on its second flight, late in the afternoon recorded a time of 13 : 45 to earn a place on the American team. The very next day it flew out of sight after 15 : 05 and was lost, to be recovered some four months later. Extensively repaired and recovered, it was then flown in a local contest where a 6 : 30 time from its first flight in cloudy weather secured first place. At the Nationals of next year, Jim needed a second flight to record another o.o.s. flight, this time the model being watched for 22 : 10! A month later he recorded that lucky flight of 32.01 in France.

He was less fortunate in the next *National Wakefield Eliminatory*, when following two repairs to the wing in previous flights, he eventually recorded 8 : 15. Thus the net result of six contests was four first places, one sixth and one seventh – not a bad achievement particularly as he was only forced to make a second flight on two occasions!

The last competition which Jim contested with *Clodhopper II* was the *Scripps Howard Nationals*, when

during a short test a thermal snatched the model from an altitude of 50 ft., and 15 minutes later the designer had his last ever glimpse of the model which had served him so well.

As for the design itself, this was the first model which Cahill built to the then new 'eight ounce' rule, so he had little idea of how such a model would climb or glide. He decided to concentrate on perfecting the latter aspect. From experiences of his fellow club members, he reckoned that short moment-arm gliders flew better in thermals, so he decided on a short fuselage, putting slack in the motor if a longer power run was found necessary. A deep fuselage was employed to aid visibility, while the wing was mounted through the fuselage, not on top, in order to gain more effective wing area from the specifications. The wing was in fact mounted as low as possible without fouling the rubber motor. Viewed from the front, his aim was to have the wing, tail and centre of resistance as close together as possible, believing this to make for the best soaring qualities.

The rules required a certain minimum fuselage cross-section, so the belly was stretched downwards in order to make the landing gear as short as possible, both for structural and drag-reducing reasons. Also in aid of reducing drag, a piano wire undercarriage was substituted in lieu of the commonly employed bamboo.

Aft of this 'bulge' in the fuselage, the tail portion was reduced as far as possible in order to save weight, although it had to be large enough to accommodate large knots of rubber motor. A planked balsa fuselage with varying sizes of formers seemed the only answer to this problem, and great care was taken to select really soft, light, wood for this task – in fact the finished weight of the fuselage was only marginally more than its traditional 'stick and tissue' counterpart, while the strength was considerably better. The fuselage was finished with one coat of grain filler, two coats of dope and was then wax polished to make it as smooth as possible.

Jim wanted the wing to be both easily adjustable for incidence, plus able to absorb landing shocks while buried inside the fuselage, so a sheet aluminium fairing, retained by adhesive tape, was fitted over the wing: later bonded paper was used as it was easier to handle and replace. Wing and tail surfaces themselves were straight with long elliptical tips as he deemed it more important to obtain a good uniform airfoil than to worry about efficient plan shapes.

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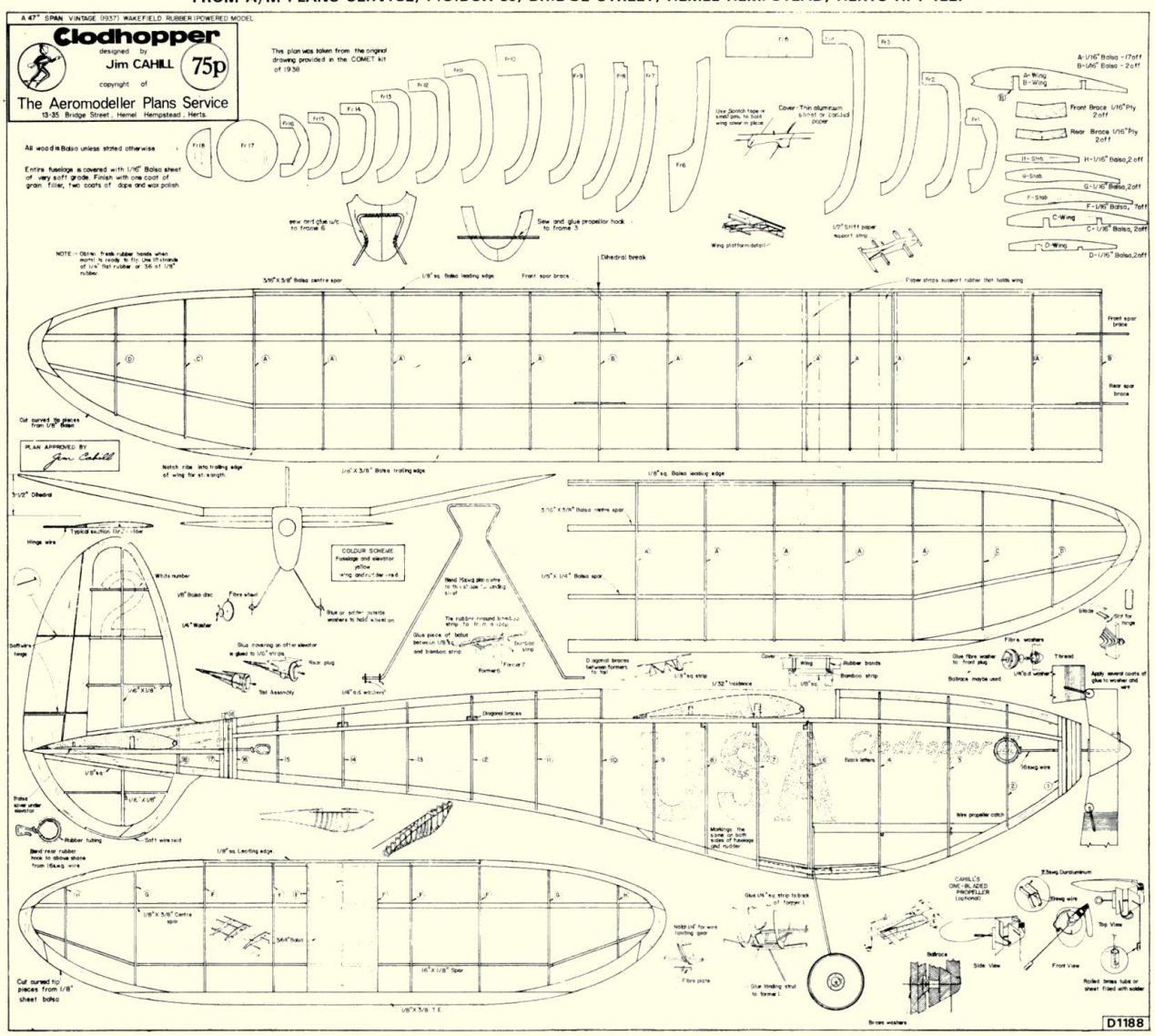
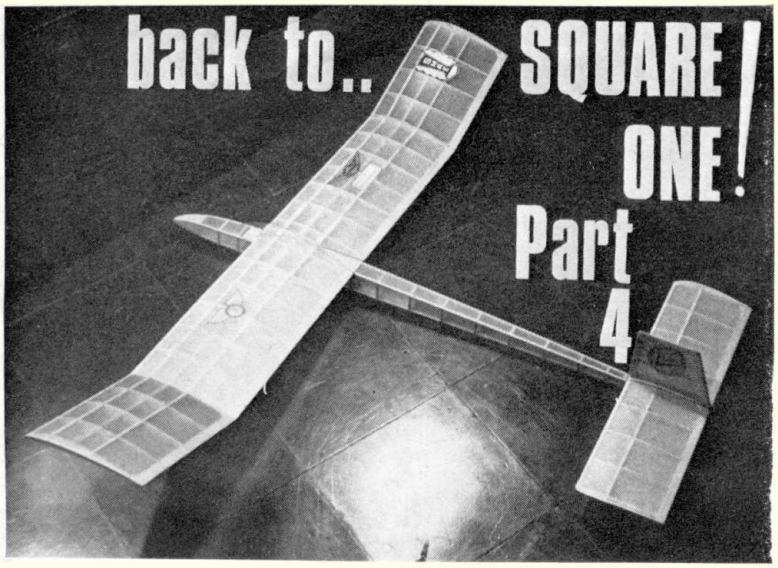




in which we deal with the novices' most common stumbling blocks—covering and doping

The completed model, practically ready for the flying field – but the final necessary steps will be dealt with next month. We used both orange and white tissue to obtain a colour contrast – do not apply colour paint to achieve this, the extra weight which this adds would upset the performance.

COVERING a model aircraft structure is often one of the major obstacles facing the newcomer to the hobby – and yet this is a task which is in fact quite easy, provided that it is tackled in a logical fashion and no attempt is made to 'rush' the operation. Certainly the covering can make or mar a model's final appearance – nothing looks worse than a model resembling the surface of a prune!

It should be remembered that while the following comments apply to virtually all similar models, whether they are to be covered in lightweight or heavyweight tissue (normally sold by model shops under the trade name 'Modelspan') the techniques employed may well differ from those which other people use, or have been described in other publications. The reason is simple – everyone has their own ideas on all modelling topics and the methods which will be described are simply those that your author prefers. The process described works – as indeed do other methods – and we can only recommend that once you find success with one particular technique, then you should keep to it. There is no definite 'right' or 'wrong' way – each have their merits, and their devotees.

Firstly, we tackled the **Mercury** *Swan's* fuselage, as this is probably the easiest part to cover and gives the newcomer an insight into what will be involved with the slightly trickier components yet to come.

The tissue supplied with our kit was lightweight and orange in colour, although this does tend to vary between kits. Obviously just sticking tissue onto the bare woodwork would not be satisfactory as it would not be very taut nor strong. The dope which will be applied later will cause the tissue to shrink, but unless the tissue is applied evenly it will not be pulled equally taut in all directions, thus wrinkles would appear. One method which some people employ is to stick the tissue to the framework first, then to dampen it with water to make it shrink, and then to apply the dope which would cause it to shrink even more, so that the resulting finish is drum tight. A quite satisfactory method, but our personal preference, wherever possible, is to apply the tissue wet, pulling it smooth as it is stuck to the framework. This way, when the water has evaporated the covering will be quite taut and the ensuing coats of dope will hardly be required to shrink the covering at all.

After soaking the tissue, hang over the edge of a table to allow the excess water to drain off. Spread-out the tissue as shown to ease its application.

Ideally, one should use as few pieces of tissue as possible to cover any component, as this saves overlapping the joints of tissue as well as economising on time. However, in the case of this fuselage we needed some seven different pieces, as described. Commercial tissue paste, obtainable from any model shop, was used as the adhesive.

We began with the fuselage side, and realised here that it would be possible to cover half the underside of the sheeted forward section at the same time – the whole of the underside could not be covered in one piece due to the double curvature shape of the piece concerned. Tissue paper cannot negotiate complex curves or angles very well. A piece of the covering material was therefore cut out, allowing a generous safety margin all round, and was then held under a cold-water tap in order to get it thoroughly wet. Do not crumple it up, as the edges will fold-back and it becomes difficult to straighten it out. Instead, hold the edges apart, and then leave hanging over the edge of a table to allow the excess water to drain off. Now, apply the tissue paste fairly generously along the perimeter of the section to be covered – i.e. the top and bottom longerons, along the 'point' of the fuselage keel and around the nose, *not* to the vertical spacers. As the tissue is not long enough to cover the complete side in one operation, apply paste to the gusseted vertical brace at the tail end. Lay the fuselage on a flat, clean surface, and then lightly add the tissue – first at the nose, then spreading the tissue carefully, pull it to the full length of the fuselage so that there are no wrinkles left. Continuously smooth the tissue chordwise with the thumbs so that it is pulled taut and even across the framework without tearing the tissue. When satisfied, ease the tissue over the sheeted area of the keel – nick the tissue with a pair of scissors or razor blade at the rear of the sheeted section and around the nose area in order to allow for the change in section. All the time, smooth the tissue out carefully as no slack or wrinkles must remain. When perfect, leave aside to dry.

When the water has evaporated, the excess must be trimmed away – two tools are needed here, a razor blade and our old friend the sanding block. The razor blade should be snapped in half lengthways, and then the cutting edge should be snapped away at approximately 45° to provide a sharp point. This cannot be done to a stainless steel blade – the 'old fashioned' variety must be used. A new blade in the modelling knife could be used, but tissue paper blunts a blade rapidly and thus it is cheaper to use a razor blade – the 'old' point may be snapped off as it becomes dulled. The sanding block should have a fine grade of glass paper

adhered to it.

When trimming off tissue along a 'sharp' edge, such as the longerons, a quick 'wipe' with the sanding block will swiftly and neatly remove the excess, but along the keel the razor blade must be used lightly. Remember only a light cut is necessary to cut through the tissue – do not slice through the balsa as well!

Repeat exactly for the second side, then in the same way add the remainder of the underside. Sand off the tissue excess as before and add the top covering, followed by the two short pieces at the tail end to make up for the shortness when the side pieces were added. Finally, apply tissue to the forward part of the fuselage in front of the cockpit area. Where the tissue abuts former F2, fold a slight lip and glue this to the former. Paste the tissue securely around the nose block, making sure that no 'white' wood is left exposed.

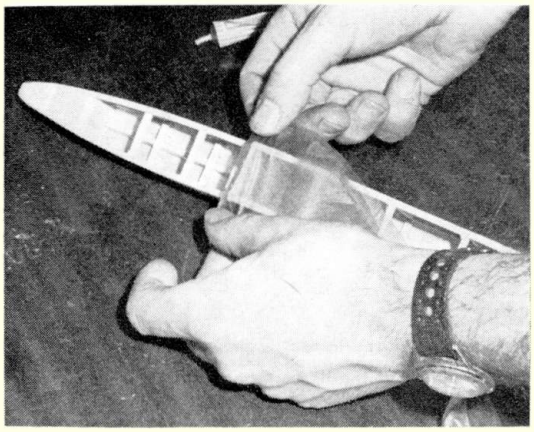
With the excess tissue trimmed away, the fuselage is now complete – notice how much stiffer it seems due to the 'stressed skin' effect of the tissue. Lay to one side, and tackle the tailplane as this is another 'easy' subject. The process is exactly the same. Firstly, the tissue is soaked (we used white tissue, readily obtained from the model shop, for a colour contrast) hung to dry out a little, then the perimeter of the underside of the framework is pasted and the damp tissue laid in place, and pulled gently until taut. Allow to dry off, trim the trailing edge and tips with the sandpaper block and use the razor blade once more on the leading edge. Repeat identically for the top surface. The fin is dealt with in exactly the same way, and is even easier due to its small size!

Now for the wing – and for a different approach. The bottom of the wing has a concave (undercambered) section, and thus our previously described method will not work as the tissue would be pulled straight across from L.E. to T.E. without following the contours of the ribs – thus the 'dry' method is now employed.

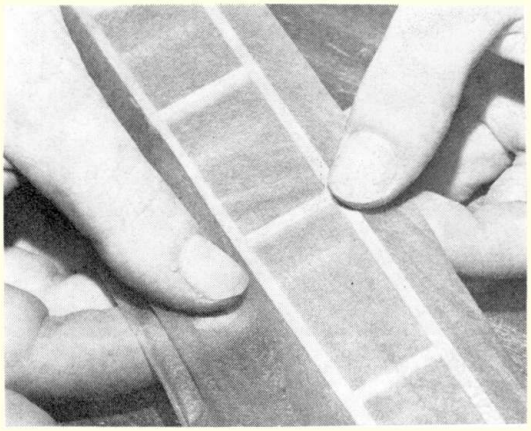
Firstly, the underside of the centre section is covered (we used white tissue here) so a sufficiently large piece of the covering material is cut out, again allowing for at least a 1 in. margin all round. Start from one end of the section (i.e. at one of the dihedral breaks) and apply tissue paste along the leading and trailing edges *plus the underside of the ribs* for 3-4 rib bays. Be generous with the paste on the ribs. Take the tissue (dry remember) and carefully smooth it in place over these rib bays. Try to make the covering as taut as possible, but concentrate chiefly on avoiding potential wrinkles caused by unevenness. Rub your finger along the length of each rib to ensure that the paste has adhered securely – it will appear moist when the contact is good. Fold back the remainder of the tissue, add paste for another 3-4 bays and repeat. Continue this process until the centre section is covered. When the paste has dried, trim off the excess tissue and cover the tips in a like manner – we used orange tissue in the aid of colour contrast. Again, trim off all round.

The result should be a rather slack but smoothly covered surface. Now to water shrink the tissue to make it all taut, like the tail and fuselage. For this you need some form of spray, such as a disused perfume bottle with a rubber bulb 'squeezer' – or an artist's 'spray diffuser' – a very simple device consisting of two hinged tubes, which meet at right-angles so that when one end is placed in a jar of water and you blow down the other, water is sprayed out. Very simple, cheap, but hard on the lungs! These are available from most art shops.

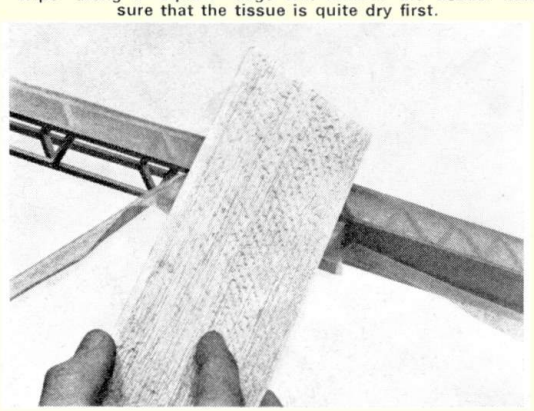
Applying the moist tissue to the pre-pasted woodwork. Attach at one end, spread out the tissue and pull taut to the far end. Clean work bench is essential, otherwise dust will be adhered to the tissue.



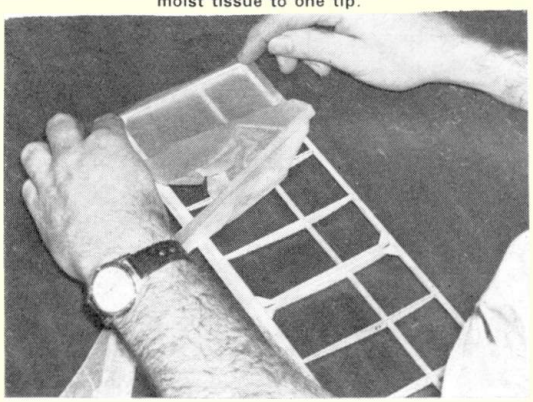
With the tissue applied to the length of the fuselage side, gently pull the tissue out sideways with the thumbs to remove all the wrinkles. Do not pull too hard for fear of tearing the tissue.

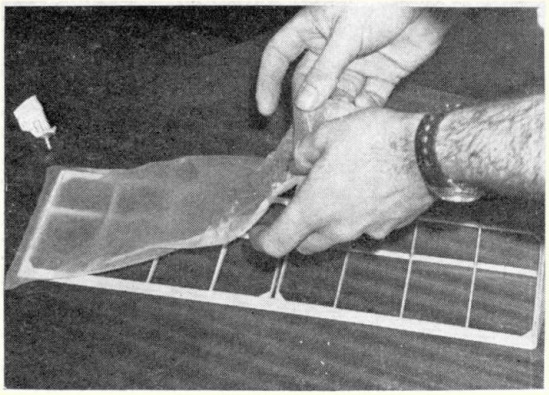


The sanding block comes in useful once more for trimming off excess tissue. Use only a fine grade, when a quick 'wipe' along a 'square' edge will remove the tissue. Make sure that the tissue is quite dry first.

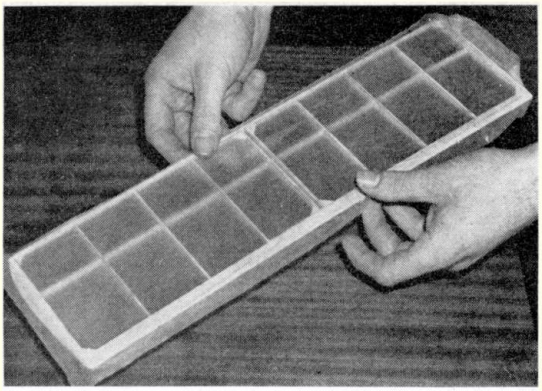


After the fuselage, the tailplane is the next easiest piece to tackle. Start on the underside, and once more have the tissue drying out whilst the paste is applied, then fix the moist tissue to one tip.





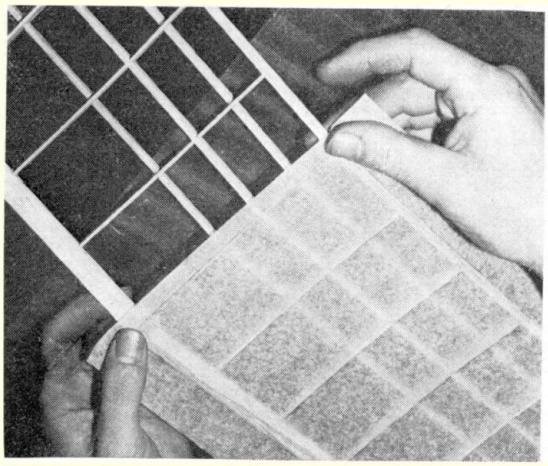
Above: next stage is to 'unfurl' the ends of the tissue, lifting it clear of the remainder of the framework. Roughly stretch out and lay over the tailplane. Paste can be applied to the centre ribs (but only these) as the covering will later be cut away to accept the fin.



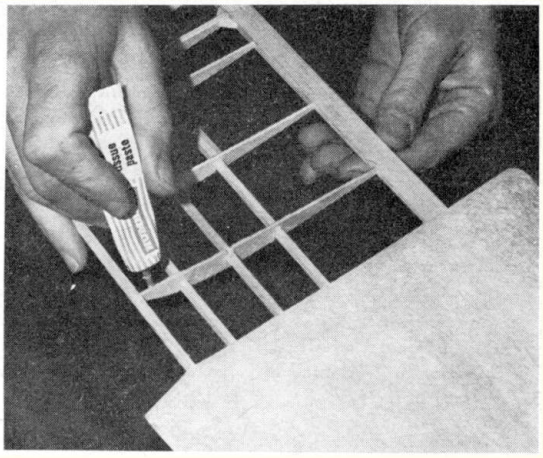
Above: with the tissue in position, once more carefully remove the wrinkles by easing chordwise with the thumbs – do not grip the tissue between thumb and finger to pull, as this is likely to cause a tear. Do not be satisfied until the tissue is taut and smooth.

Below: covering the underside of the wing, starting with the centre section. This time the tissue is applied dry in order to allow for the undercambered section. Apply a generous amount of tissue paste to the underside of the first 3-4 ribs, plus the corresponding leading and trailing edges. Add tissue, making sure that it has adhered well to the structure.

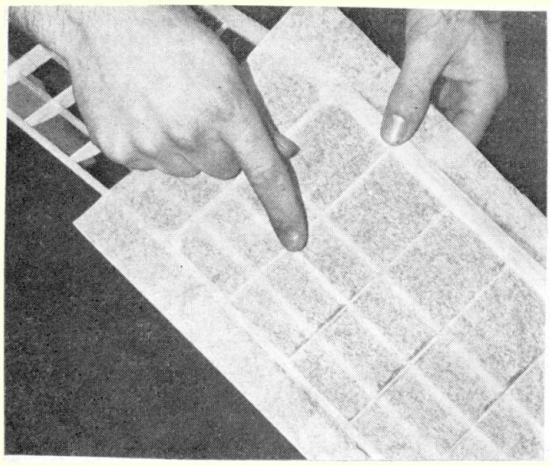
Below: with the tissue firmly stuck to the first 3-4 rib bays, fold back the unused portion, apply paste to the next 3-4 section as before, then repeat the covering technique. Be careful not to allow any wrinkles to remain – smoothness is more important than tautness. Continue this process until the underside of the centre section is completed.

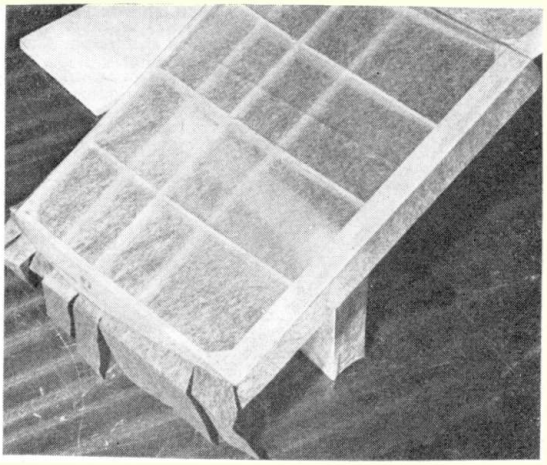


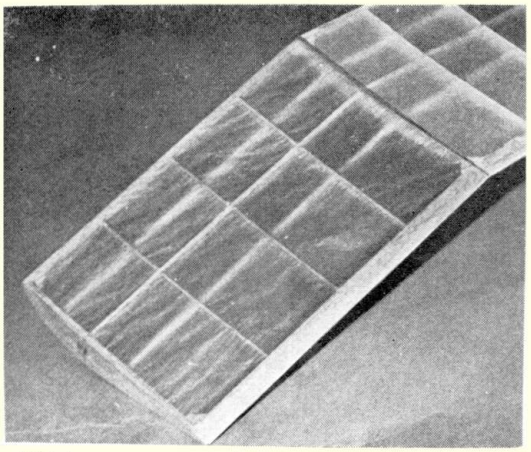
Note how the tissue is being carefully rubbed down onto each rib individually to ensure good contact – note also the 'damp' patches which reveal that there is adequate paste for the job. If the tissue does not stick to the ribs properly, then the ensuing shinking processes would pull it off, destroying the wings proper section.

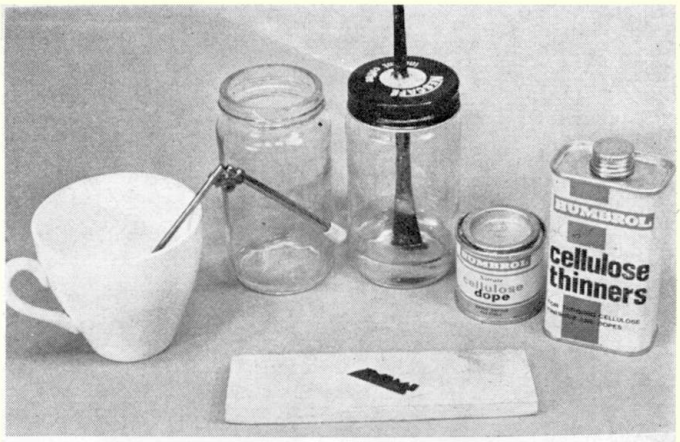


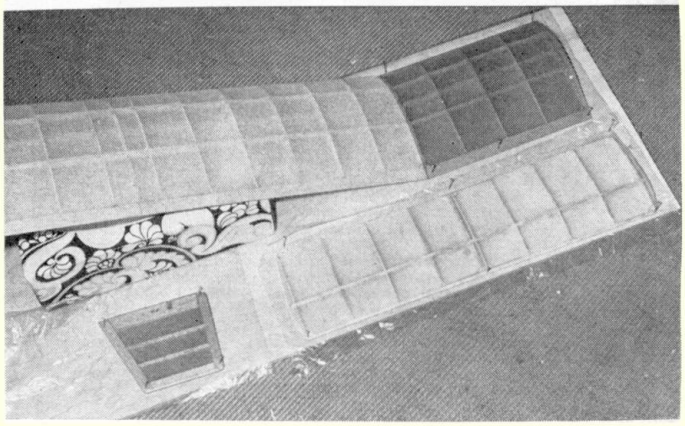
The tips are covered in exactly the same fashion, but at the actual tip the tissue must be taken around the tip-plate. Careful slitting of the tissue with a razor blade or scissors will enable it to negotiate complex curves or angles – experience will soon show the best methods of doing this. Trim off all tissue at the trailing edge with sandpaper.











Top left shows how the tissue initially slackens off after water-spraying, although it will later shrink drum-tight. Above top shows the 'equipment' necessary for covering. Note in particular the spray-diffuser (in cup), the brush supported in the thinners by the lid of a coffee jar, and the way in which the razor blade has been snapped. Above the various parts are pinned down whilst the dope 'cures', to prevent warps. Be sure to support the wing whilst the tips are pinned flat.

Whichever spray method you use, saturate the tissue with water and allow to dry – whereupon you will be greeted (hopefully!) with another nice neat covering job. If the tissue has pulled away from any of the ribs, this can be overcome by smearing paste through the tissue onto the rib – as the undercamber is slight this 'bodge' will work, but do not rely upon it in future! The upper surfaces may be covered in the same way (but *do not* add paste to the ribs – just the perimeter) or you may revert to the 'wet' method once more. Our only deviation here concerned trimming away of the orange tissue. Use of the sanding block on the trailing edge does leave a narrow strip of 'white' wood – and to hide this we trimmed the tissue $\frac{1}{4}$ in. oversize then wrapped and pasted this around the T.E. A small point, but it is neater.

All that remains now is to 'dope' the model, that is to coat it with a clear cellulose shrinking dope (obtainable from any model shop) in order to tauten the tissue – although this should hardly be necessary if you have made a reasonable job of covering – waterproof it, and above all, to 'air-proof' it. A wing will not provide lift if the air can pass straight through it! At the same time as you buy the dope, buy a tin of thinners – cellulose thinners; do not attempt to mix dope with any other form of thinners as the result will be tragic! You will also need a brush, which your model shop owner will be pleased to supply, these ranging in price from 6p to 50p. As with all things, you get what you pay for – do not expect the cheap brush to be as soft (or as 'hair free') as the more expensive variety, although they will suffice for the job in hand. Our own personal choice is to visit the art shop once again and purchase a squirrel haired mop, made by a reputable company, which retails from 75p to £1.25 depending on size. These brushes are far less prone to shedding hairs, and if looked after, will last for years of good service.

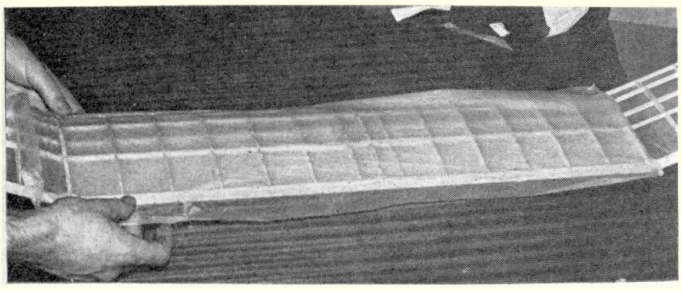
Take a screw topped jar and pour in a quantity of dope, then an equal quantity of thinners – this will make the dope very 'thin' and easy to apply, and will not shrink very much, which helps in avoiding warps, the major hazard when doping. Doping the fuselage is straightforward – just apply three coats to the entire structure, leaving to dry between coats. The flying surfaces are just a little more awkward due to warp prevention being necessary. Starting with the wings, dope both surfaces of the centre section, then as soon as finger dry (i.e. dry to the touch) pin to the building board which should be covered in polythene. It is best to dope the underside first so that this section will be nearly dry by the time the top is doped. Leave for 2-3 hours (depending on room temperature), remove from the board, then dope one tip panel, pinning this to the board in due course before repeating for the opposite tip. This pinning down is to hold the surface flat while the dope dries out thoroughly – it continues to shrink for some time after it appears to be dry, hence these precautions. After the final coats, leave pinned down at least overnight, preferably longer. The same goes for the tailplane and fin.

When applying dope, do not use too much of a brush full, wipe the brush on the edge of the jar to remove the excess otherwise the dope will tend to 'run through' the tissue causing unsightly runs on the underside of the tissue. Also, brush the wing panels across the chord – if dope is applied along the length of the wing then blobs of dope will run down along the edges of the ribs, causing more runs on the underside of the covering. Doping along the length of the ribs overcomes this problem.

Incidentally, when dope is applied the tissue will slacken right off but will tighten up again as it dries – this is quite normal. Between coats of dope it is not necessary to clean the brush properly – we leave it suspended in a jar of thinners to keep 'fresh'. To do this simply push the handle through either the tin lid, or a piece of card, so that the brush dangles approximately $\frac{1}{4}$ in. from the base of the jar. Do not stand in the jar itself as the hairs will be permanently 'bent' into a curl, which makes future doping difficult. Any hairs that are left on the surface should be removed immediately before they become permanently embedded – use the brush itself to remove them. After three coats of dope the tissue should become quite transparent – a sign that the pores of the material are filled properly. If the tissue is still opaque, then add a further coat.

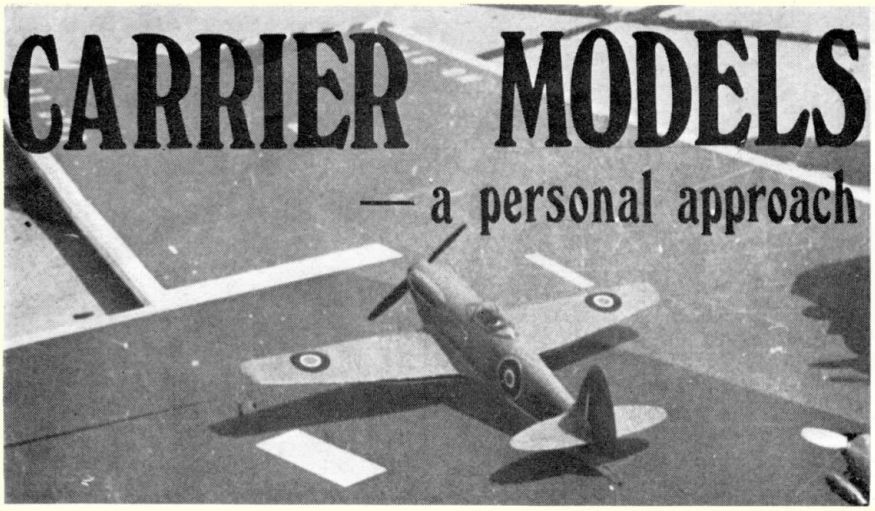
When the finishing process is complete, clean the brush thoroughly in thinners, wipe dry on tissue paper, and then store in a dust-free area. Now the wing-retaining dowels and cockpit are added, and the model is complete – ready for the flying field . . . or is it?

Next month: *Trimming.*



The top surfaces of the wing are covered in the 'wet' method as described for the tailplane and fuselage. Again, cover the tips separately. Try to prevent water from dripping onto the recently water-shrunk underside.

CARRIER MODELS — a personal approach



The author's Merco 61-powered version of the Supermarine Seafang awaits the order to 'scramble' from the flight-deck of H.M.S. Flycatcher.

by ERIC HERBERT

FOR MANY years, indeed since the American Rules were first published around 1950, I had been going to build a Carrier model, but the motivation was not sufficiently strong until I heard that such a contest was to be held at the Yeovil Nationals in 1968.

At that time no one in this country had any experience of the event, and although I had read virtually every American article written on the subject, upon arrival at Yeovil it soon became obvious that due to the acceptance of the American rules *in toto*, but with a 'pocket' aircraft carrier I had the wrong type of model. As the *Aeromodeller* report said, my *Seafang* was 'fast but hairy'. In fact this was its first flight, and not having flown anything but stunt models for several years previously, it took me several laps to catch up with the model! The *Seafang* certainly had the highest potential at the contest, indeed on one official flight recorded a score more than double that of the winning model – it would, in fact, have been a respectable score in the American Nationals of that year. I lost really through lack of contest experience and insufficient practice so I resolved that my next model would be more suited to the British carrier, and the likely opposition. I therefore designed and built the *Firebrand*, the plan and description of which forms the second part of this article. This, unfortunately, has never been flown in competition since I was bitten with the radio scale bug shortly after completion which has taken up all available time.

In this article, I hope to pass on my views of the basic design requirements for a satisfactory model, and discuss the ways in which these can best be fulfilled.

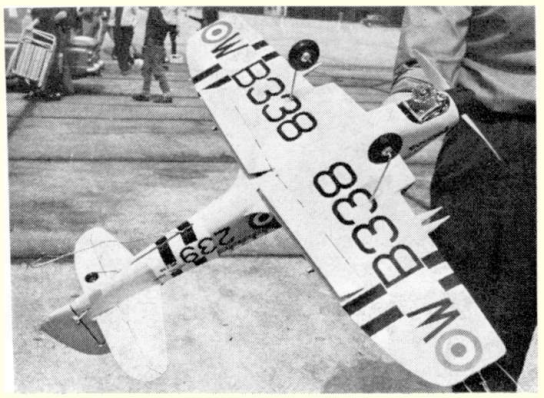
A drawing of the original *Seafang* is included for reference only, although with changes to the undercarriage mounting method, and a longer carrier to land on, this could be quite successful, although the *Firebrand* is much more suited to British conditions and met its end only recently when sports flying over grass.

Engine

To date, virtually all contests held in this country have been won by simply landing on the deck with a reasonable scale model. However, this position will doubtless change with increased competition; and a higher powered engine will, as in other speed classes, become more important. As there is no limit to capacity (*yes, that is true – see the rulebook, Ed*) there are two possibilities, either a low output, big engine, or a high performance, small engine. My *Seafang* uses a Merco 61 Mk II, the *Firebrand* an O.S. 40 R.R. Power was much the same in each case, as was top speed. The OS model is much lighter and providing that other criteria are equal this is the better solution. The Merco was run on suction feed with its R/C carb removed, but using its own exhaust restrictor and with an intake 'clapper'. This is possible as only two speeds are used, and the low speed must be set high enough to keep the model airborne. Only two problems were encountered; firstly the engine picked up speed as the tank emptied, and more important, the original exhaust baffle fixing screw invariably vibrated loose; these faults were quite easily overcome, by using a flatter tank and a little *Loctite* respectively.

It was surprising, by the way, just how much r.p.m. the Merco picked up by simply removing the radio carb and silencer. Suction is perfectly adequate with a wide open intake and low speed performance was quite good for the job.

The O.S. I used in the *Firebrand* was run on crankcase low pressure feed, and was fitted with an OS butterfly type exhaust restrictor and a fuel metering valve. *(See Fig. 1)*. This system was first developed by Clarence Lee and now seems standard in American models. There have been several other systems developed for throttling a high performance engine, for instance, a pressure cut off valve can be used (Fig. 2 and 3) which allows the engine to run on suction for low speed and pressure for high speed. Also various twin needle systems have been tried. The Lee system certainly works, and is very simple to make. The idea that high performance 40s won't throttle on racing propellers, by the way, is propaganda put out by the pylon racing crowd, it saves them from obeying the rules. Actually out-dated pylon engines are excellent for carrier models and can often be bought very cheaply. An intake clapper may be required with the metering valve, and I initially fitted one to the O.S. although removing it caused



Beautifully made Veco 35-powered Fairey Firefly by Alan Dorrel at the '68 Nationals. Underside view reveals the operating flaps, rudder, and lowered arrester hook. Scale models receive a bonus 100 points, but if you thing that you can overcome this handicap by superior piloting skill, then build a profile model by all means.

no practical difference. A very low speed is not required, 3-4,000 r.p.m. on the bench seems about right.

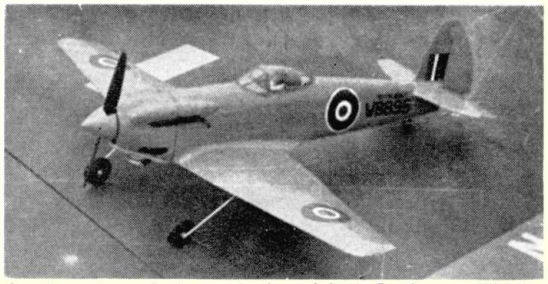
Prototype

Choice of a suitable aircraft is vital. It must firstly be an aircraft that can be proved to have landed on a carrier, so that the full scale (100) marks can be obtained. This narrows the field down considerably. Secondly, a 'strike' type is preferred as these tend to have larger wing areas in relation to fuselage size with usually large flaps, and tail area. This again narrows the field down and final choice can be made on the basis for adequate three view, ease of construction, suitable moments and clean design.

I picked the *Firebrand*, other suitable prototypes are the *Blackburn YA39, Fairy Spearfish, Westland Wyvern*: all having been described in *Aeromodeller* 'Aircraft Described' series, reprints of which are available.

Design and Construction

A suitable scale should be picked to give adequate but not excessive room around the engine/tank and control system; at this time; it is better to err on the large side and remember that the clearance around the protruding parts must not exceed $\frac{1}{4}$ in. Construction should be kept as simple as possible, remembering that a five per cent divergence from scale outline is allowed, and this *should be used* to simplify outlines, and particularly fuselage cross sections so that the 'thick sheet' type of fuselage can be used. Flat bottom wings seem quite satisfactory and simplify flaps and undercarriage attachment; they are still usually within the five per cent. Do not get carried away and make a true scale model, you still won't get more than 100 points. U/C legs must start from the scale position but should be swept forward to just behind the propeller to stop the model tipping over on landing and thus losing points. The model should also stand as low as possible to reduce 'P' effect (explained later). Flaps and rudder may only be the same size as on the prototype, although the 'inside' aileron may be used as flap: this, however, is not usually worth the extra complication. As far as I know there is no ruling on whether 'Fowler' flaps may be kept out for high speed, or whether simple flaps may be substituted for split types of the same area. Strength must be adequate to withstand a 20 g. pull test which means that the way which the model is 'held' whilst undergoing this test must be considered: I secured the



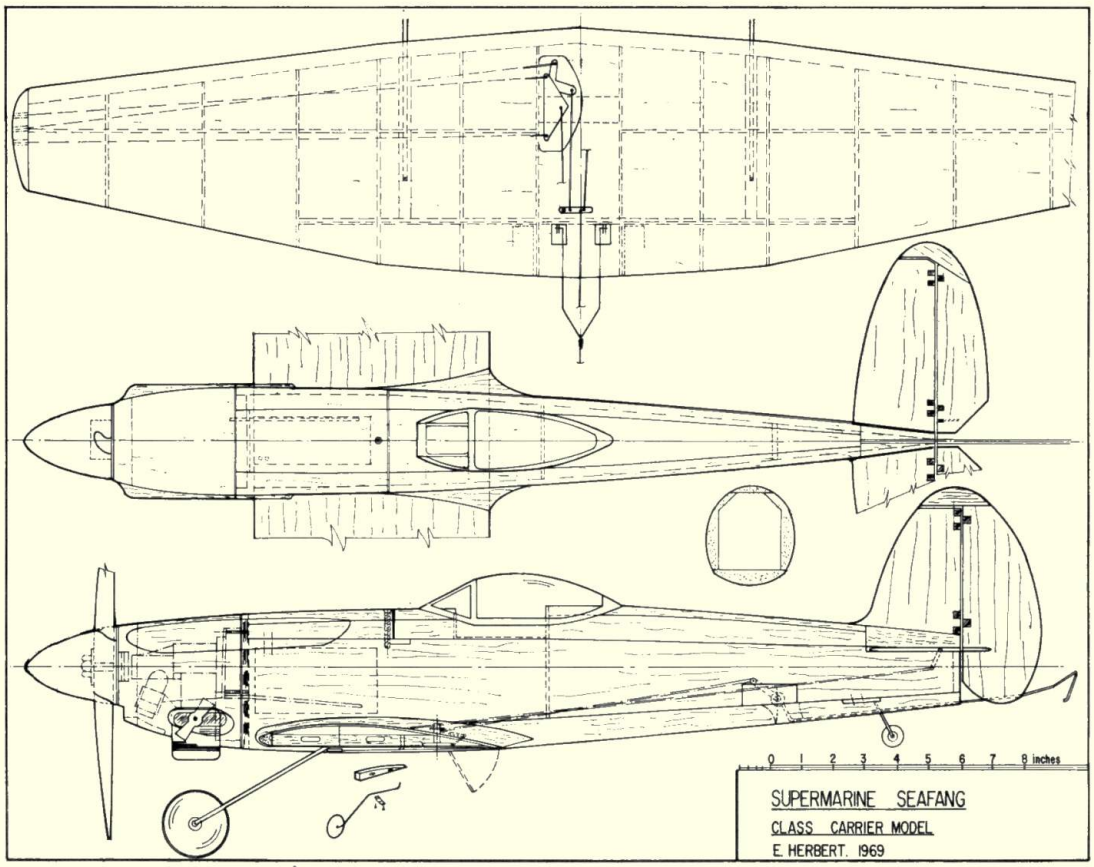
Another view of the author's original Carrier model, the Seafang, **which is shown drawn out below. Next month we will be publishing plans of Eric's** Firebrand. **Digest this article, build the** Firebrand **and enter the Nats!**

U/C to the same ply spar as the control system, and held the inside wheel leg and the inside wing tip; don't allow some judge to pull your wings off by holding the fuselage each side of the wing! The model must also be strong enough to withstand repeated crash landings from a fairly slow speed, the undercarriage takes a tremendous battering and the facility of being able to replace torn off undercarriage legs is most important. Legs should be fairly weakly attached by nylon or aluminium brackets that can be replaced as necessary without a major rebuild. A glass-fibre cowling is well worth making.

Control System

The old standard 'Roberts' Flight Control System was not really man enough for a fast carrier aircraft, but the current version is a 'heavy duty' item and is fine for this application. Alternatively, a floating bellcrank system is not hard to make (as described in several previous *Aeromodeller* articles) while details of the one I use will be given on the *Firebrand* drawing next month.

A special control handle is not essential, just some means of shortening the third line relative to the control lines, with one hand. I have always pulled the third line for slow speed and found no difficulty in this, but some prefer to pull the third line for high speed.



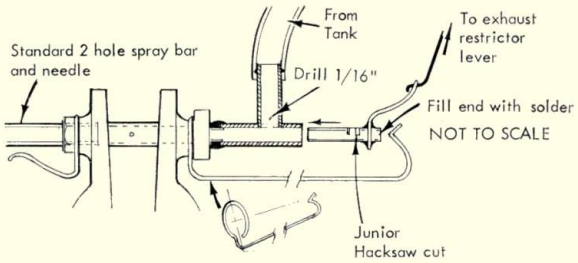


Fig. 1 – Fuel Metering Valve

To adjust, set spraybar and linkage so that flow is reduced at 'slow' (check by blowing through pipe). Adjust by rotating spraybar slightly to give best low speed running and immediate pick-up to full throttle.

Fig. 2 – Pressure Shut-off Valve

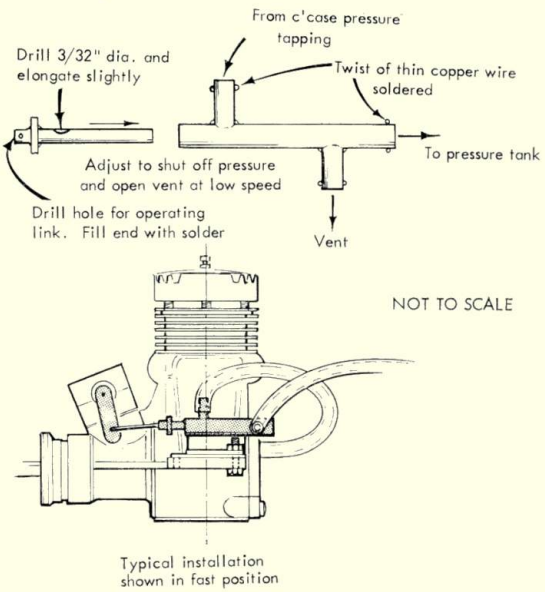
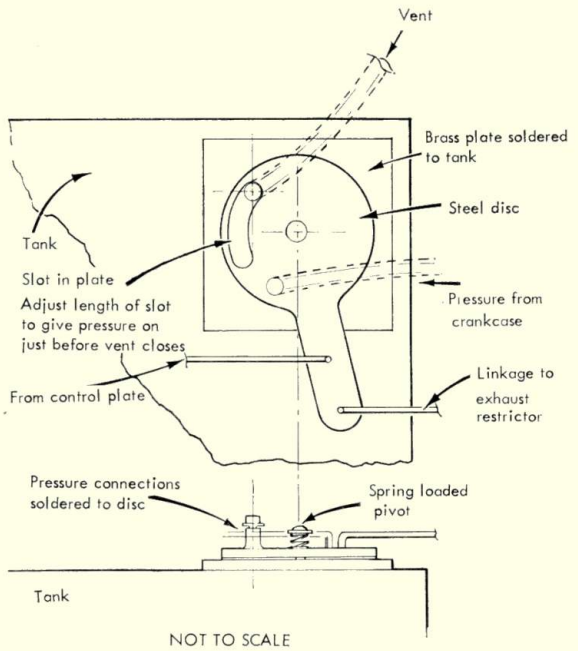


Fig. 3 – Pressure Cut-off Valve Mounted on Tank



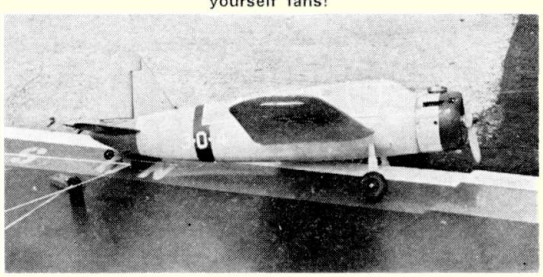
The carrier hook should be just under one third of the total model length and should drop at least 60°, while it must be firmly spring loaded down or it will bounce off the deck. I first tried hook release from the throttle control but was plagued by the hook dropping when not required and, therefore, later changed to dropping it on full 'down' elevator, a system which has worked well. The hook, flaps and rudder are all interconnected and the throttle only is worked from the third line which is useful as the throttle can be tested before the hook is dropped. Flaps should drop to about 60°, and the rudder should move as far right as possible; its main function is to act as an air brake, and to yaw the model as much as possible to create drag. Linkages should all be piano wire except for the throttle link and the hook should be at least 14 s.w.g. for models up to 21 lb. in weight, 12 s.w.g. above this. The hook pivot should be *very* strong but free, and the hook should be able to move all control services under its own weight. Fabric hinges still seem best for control line, and I have had some unhappy results with proprietory hinges made for radio models which don't stand up to the very high vibration of such a small model. Mylar sheet hinges will not last one flight; use nylon fabrics and be safe, or alternatively, the tube and wire type.

Flying

Do your own pull test before flying – this need not be 20 g, but should be enough to cause kinked wires or poor connections to break. Take off only from a hard surface as while it is possible to take off from grass, it is not recommended as the hook and lines tend to catch and you will be literally faced with a rapidly accelerating free flight model. I know! A good hand launch is safer but remember that a good carrier model will have faster acceleration than any other type of model so be ready for the high speed. Both the *Seafang* and *Firebrand* have a top speed of about 100 m.p.h. with an 8 in. pitch prop and on straight fuel and at present it is rather unnecessary to improve on this as it is well up to the opposition. Be ready also to step back smartly. A relatively large wing tip weight is required to overcome 'P' effect (the inwards yawing caused by gyroscopic precession as the tail comes up), and the high torque at the lower engine speed before the prop unloads also tends to roll the model inwards. Once airborne, the models are usually quite easy to fly – line pull should be quite light, similar to a team racer: if not the lead-outs need moving forward slightly while the rudder may also be slightly inset. Try the throttle at a low altitude first, and if all is well drop the flaps and hook; again at a low altitude (about 6-10 ft.) since the carrier models don't glide. You will probably find that as the model slows down more 'up' will be needed and under full flap the models assume quite a nose high altitude. Only two speeds are required, the low speed should be set so that a model will just maintain 6 feet or so altitude. Having seen other people trying to keep a model flying by blipping the throttle, or by trying to maintain a setting in the air on a windy day, I would not recommend this method, especially as the *average* speed is invariably higher than a model with a set low position, and one can concentrate far more on flying. The 'low' engine speed will be found to be quite high since the prop is very inefficient at low speeds, and the drag under full flap and rudder very high. Pick up with a properly adjusted pressure system is instantaneous.

Like any other event it is most important to practise, but a carrier is not necessary for this. Arrester wires can be made from a length of window cord passed through two meat skewers and tied to two plastic bags filled with sand. Two of these set across wind are quite sufficient for practice or even local competition use.

Er . . . that does not quite qualify for maximum landing points! B. D. Perry's 'Vought Kingfisher' is arrested just short of falling into the 'drink'. A wide variety of prototypes are suitable for this event, and no one type has been promoted as the 'best'. Plenty of scope for the design-it-yourself fans!



'Go that-away!' John indicates the intended flightpath of his open rubber 'Maxine' design – a model which carries a lot of rubber in a lightish airframe.

John O'Donnell's

FREE FLIGHT COMMENT

ONE OF THE pre-requisites of any form of competition is a set of suitable rules and regulations. The intent of such legislation is to provide targets for the competitors, criteria for the judges, and usually some measure of equal opportunity for the participants. The difficulty comes in getting the relevant ideas down on paper in such a way as to give the desired end-product. *'Getting round the rules'* is an attitude common to most of mankind – aeromodellers included! The inevitable controversies invariably bring mention of the nebulous *'spirit of the rules'* – but, even at best, this can be but a poor substitute for properly conceived and explicitly phrased regulations. After all, the 'law-maker' has both the initiative and the power to say what he wants! Nonetheless there is always a long (and usually permanent) procession of amendments intended to plug the holes and provide the explanations that hard experience has shown to be necessary.

A further need for up-dating the rules of any viable competition stems from the rising standards of its adherents. As people strive to out perform each other, they get better; the process is a continuous one – even if subject to the (natural) 'law of diminishing returns'. Moreover in an activity such as aeromodelling, purely technical innovations can alter the whole level of performance and hence necessitate a major rule appraisal. To mention but one obvious example, model engine developments have brought dramatic increases in available horse-power which in turn gave greater model performance which was very soon reflected in more restricted rules as regards weight requirements and/or permitted engine runs for free-flight duration models.

'Progress' also brings ideas for new events – and the whole process starts off again on another cycle! I could go on at length with general speculations as to what the future might have in store for us, however, it will be of much more immediate use if I discuss some of the latest rule revisions that will affect free-flight in the coming season.

It is appropriate to commence with the domestic scene. Last autumn the F/F Technical Committee of the S.M.A.E. prepared a list of proposed rule changes. These were circulated round the Areas prior to being tabled at the S.M.A.E. Council Meeting of 21st October 1972. So far, the procedure could hardly be faulted. However, at the actual meeting the *origin* of the proposals had an undue effect upon the decisions that were made. Objections by Areas (of which mine, at least, had spent considerable time and effort debating the proposals) were dismissed simply because the sub-committee had recommended the proposed changes. In fact, *all* the proposals were passed – and the official minutes of the meeting devote less than five lines to the whole affair. Furthermore, at the time of writing, the S.M.A.E. have yet to make any adequate announcement of the revisions – even though they appear to *apply* for 1973.

The situation is one I find disturbing – especially when the sub-committee chairman Dave Tipper admits that some of the proposals were intended to 'sound-out' opinions as distinct from being hard and fast recommendations from a fully committed body. The technique is common enough, even if prone to 'backfire' like the one being discussed. Total acceptance of the sub-committee proposals is clearly a little embarrassing to its chairman, who must be wondering if he has a much bigger job than he anticipated. After all if this experience is any precedent for the future then the system must undergo a radical change. The F/F sub-committee will need to accept the responsibility of soliciting and evaluating both Area and individual opinions *prior* to its making any 'advances' to the S.M.A.E. Simultaneously the modellers themselves need to be aware of who is really 'holding the reins' and to take some interest in their appointment. The sub-committees are growing in influence and should be treated accordingly. Conversely the process could too easily 'widen the gulf' between the different branches of aeromodelling, and fragment the hobby.

Now for the rule changes themselves. I do not intend to spell out the revisions word for word – as this is really a job for the S.M.A.E. to do via its *Model Flying* newsletter. However, I will point out some of the implications as well as giving my opinions on the changes. It may be thought that I should have expanded these viewpoints prior to the decisions being taken – well I did, through my Area in the prescribed democratic (but ineffective) manner.

The Area-centralised events make a convenient starting point. Prospective entrants being in remote locations now have the option of competing 'on their own' without being obliged to travel more than 100 miles to an Area venue. Apart from the decline of interest in the 'pukka' decentralised events that caused them to disappear some years ago, and the lack of response to 'postal' events ever since, I wonder just who is going to be eligible for this concession. Taking the 100 miles 'as the crow flies' then only those living in Lands End or in Scotland can qualify. North of the Border no longer seems to be part of the National scene. Years ago I knew the road to Abbotswich just as well as that to Chobham – now the S.M.A.E's own publicity map of affiliated clubs shows only England and Wales!

Furthermore the Area events must now start at 10 o'clock instead of 'after eight'. This removes the advantage enjoyed by those able to get out of bed in time to fly before the wind freshens in mid-morning, and follows the present-day attitude of reducing everything to the lowest common denominator. There's enough trouble with airfields, and criticism of the current idea of going for 'lift' rather than performance, without forcing the modeller to fly when wind and thermals are most prevalent!

The final change in the Area events is that F.A.I. power will no longer have an 'unlimited' flyoff as do all other categories. Instead the F.I.C. event will be flown-off using a four second run and a three minute max – and repeated until a score of under three minutes is recorded. In effect this is going straight to the final critical stage of the F.A.I.'s own flyoff system. The reasons advanced for the new procedure are the high still air performance and high cost of F.A.I. power models. The former consideration applies even more to open rubber and power – so it would seem that the financial aspect is the critical one! Perhaps I have an unusual set of values, but the cost of the engine is the *last* thing I worry about in losing a model. The time to build and trim another aeroplane is much harder to find than the price of another motor. Even 25 years ago when I was an impecunious junior I decided that I wasn't likely to win contests with any model that I was afraid of losing every time I threw it up in the air! The other criticism of the four second run is that it makes the flyoff into an 'experts-only' affair – and probably the occasion for producing a special F/O model, trimmed for short runs only.

Timekeeping regulations have been relaxed to permit power models to be timed by one person using two watches (or a split action one) so as to time both engine and total flight. It should be noted that the option of using only a single timer for any category is still subject to the discre-

Jean Galston with Frank Mont's 'Chicken Coupe' which John O'Donnell has proxy flown in Paris at the annual International Coupe d'Hiver meetings on several occasions. Nicely trimmed.

tion of the contest controller. If he insists on two timekeepers then *two* are needed. This might sound like a small point – but it should be remembered that the 'one-timer' concession only came into being (in 1972 and effectively only for rubber and glider) to legalise the existing situation. Over recent years an increasing number of competitors had systematically cheated (and I use the word deliberately) by ignoring the rules and operating with but one timer – quite often with the acquiescence of the official(s) in charge. Even when two signatures on the flight card were demanded, they were often obtained by competitors countersigning each other's cards. As anyone obliged to 'snatch round' for timekeepers will agree, it is *much* easier to find one person willing to time (and wait about for lift) than two! Perhaps it is advisable to stress at this stage that the all important flyoffs still require the services of two timekeepers and that there is no provision for this to be waived.

Even more sweeping, and just as badly needed, is the present decision that anyone affiliated to the S.M.A.E. or *anyone* else approved by the contest controller, may time. Apart from allowing a competitor to be timed by one of his own club, this means that many potential timekeepers are now available. This is particularly valuable since, with the recent changes in S.M.A.E. membership fees and insurance requirements, I cannot forsee many society members among the non-participants on the contest field. There are obvious dangers in allowing any casual passer-by to act as timekeeper, and the power now given to the contest controller to restrict a flier's choice of timer (so long as an alternative is available) is a very sensible precaution.

Concern over the 'gamesmanship' play of deliberately crossing glider towlines in mass launches (so as to gain the chance to refly if a max is not obtained) has brought in repercussions. From now on only accidental crossings will qualify for the 'second chance' or even third or fourth etc! 'Deliberate' crossings are now another matter, but their treatment is left undefined.

After years of spasmodic debate, some positive action has been taken to revive interest in the British Senior and Junior F/F Championships. Minor variations on the system of totalling the duration accumulated in stipulated contest has failed to interest more than a handful of modellers. With 'everything' eligible contributing to the overall total, the Championships were often regarded as little more than an endurance test. Missing a single contest could affect one's total more than a mediocre performance in several others.

The most popular suggestion offered as an alternative was to count only a contender's best performance out of a number of contests. There are many possible variations on this theme, and a number of obvious difficulties. Combining Open and F.A.I. events, flown to differing numbers of flights (and hence possible scores) is the first problem. Another is that of weather variations across the country in the Area-centralised meetings. Conversely not everyone has the time and opportunity to tour the length and breadth of England to attend all the centralised meetings.

What has been decided is to total the points gained in the best seven out of 15 stipulated events – all at centralised venues. There is some vagueness about involving the Northern and/or Southern Galas, but every F.A.I. and Open rubber/glider/power event at the other three centralised meetings is known to count for the Senior title. This arrangement gives an unbalanced selection of more eligible F.A.I. events than Open. The Junior Championship is based on a similar selection from the same Open events, plus the ½A power, A/1 glider, and Coupe d'Hiver classes at the Nationals.

To equate the F.A.I. and Open results, a 'Plugge' points system is to be used rather than the actual scores involved. In essence points are awarded on the basis of 100 for a win, and then at equal intervals all the way down to zero for the lowest score. Unfortunately the formula used in the calculations looks forbidding to the non-mathematician – and in any case demands knowledge of one's position in the contest. Apart from the top few, positions are seldom available in advance of publication of the full results.

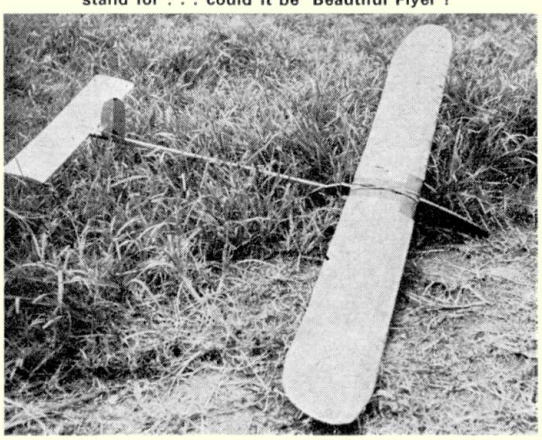
Contenders for the title are required to claim in writing by the 1st of October – and this requirement was confirmed for 1973. It should be obvious that interested parties will need at least their positions and most probably their points before they can submit more than a general claim. The S.M.A.E. itself has still not resolved its policy as regards publishing full contest results in the future. Furthermore one of the two eligible two-day F.A.I. meetings, plus *both* the Northern and Southern Galas, are being held after the closing date for claims. At least this is one oversight that shouldn't be too hard to correct!

Last but not least of the rule revisions is no less than than a model *specifications* change – apparently effective long before this appears in print. Class affected is the A/1 glider class, now being bought into line with the F.A.I. ideas – purely in order to conform and without much regard for whether a better model results. Changes are to increase the required all-up-weight from 142 to 220 grams i.e. from 5.08 to 7.76 oz. As an aside I would point out that the sub-committee's figure of 7.72 oz is in error. Scoring is altered from three flights with a three minute max to five flights and a two minute max. Towline length is unaltered except for the insistance on a pull test of three kilogrammes – just the same as for A/2.

I cannot pretend to like these changes. They make the A/1 into a heavy glider as well as a small one – with all the snags that this combination possesses. A 50 per cent increase in weight must have a significant effect on flying speed, and consequent susceptibility to damage on 'landing' in obstructions! As soon as a weight requirement is defined the modeller is prone to build 'up' to weight – and soon complains that he can't produce a light enough airframe!

Having an ancient A/1 that needed ballasting to meet the 5.08 oz requirement I did wonder where I could put all the extra lead. Finally I thought of an alternative. Years ago when polystyrene foam was the latest modelling material, I made up a sheet-surface-foam-core wing panel to see it it were practical for a Wakefield. The panel proved to be

India's Prasanta Banerjee flies this very simple but practical A/1 glider, known as 'BF-1'. Don't know what those initials stand for . . . could it be 'Beautiful Flyer'?



much too heavy for its intended application, as the complete wing would have been around 3½ oz or so. For a 'new A/1 this is hardly excessive, so I might yet finish the wing! At least it justified my contention that any component that is too heavy for present rules will become useful if kept long enough!

* * *

News from the C.I.A.M. Meeting, held in Paris from 30th November to 1st December 1972, has been fragmentary in the extreme. I am a member of the F.I. F/F Sub-committee which means that my opinion is sought regarding some of the *more* minor proposals known to be on the agenda. For details of the outcome and a report of the meeting and its decisions I have to rely on a variety of unofficial newsletters and the like!

It appears that the basic definition of a model aeroplane has been altered to permit variable geometry layouts as from 1st January 1974. Although designs featuring folding (or even telescope) wings or variable sweep will then be legal, they will still have to conform to the appropriate area and loading restrictions in their extreme configurations.

Consequently power models offer the most scope for such experimentation as Wakefield and A/2 are defined very tightly as regards area. In any case it is the conflictions of a short fast high-speed climb and a long slow glider that make variable geometry potentially attractive.

Some preliminary work is known to have been done on folding wing models by Jack McGillivray (Canada) and Eugene Verbitsky (U.S.S.R.). Both used the technique of hinging the wingtip panels at the dihedral break, so that they folded underneath the inner panels so as to reduce area and drag on the climb. McGillivray at least has developed his design to the stage of it being a practical model that has achieved worthwhile *contest* success. His design climbs as a symmetrical sectioned 3ft.-span projectile, and turns into an A/2 size and shape model when the engine cuts. It would seem that this approach has even more to offer than flaps – to the few who are willing to take enough trouble to prefect just the engineering and then the trimming technique.

Even conventional F.A.I. power models are considered to have too much performance for the present rules – and the 19-way flyoff at Säve is cited often enough. The F.A.I. sub-committee have suggested that the run be reduced to seven seconds, but are far from unanimous on the matter. Personally I consider that the suggested run *is* suitable for the World Championship where the standard is unquestionably high – but that its use on the domestic front could be a very different story.

From what appears in *Model Flying* it would seem that the C.I.A.M. have referred the question of reduced engine run back to the sub-committee for 'further consideration'. Presumably this should include appraisal of all the alternative model specifications that people are apt to suggest. What doesn't seem to be appreciated is that any specification involving a power loading in some shape or form is *bound* to result in a power race. Furthermore the higher the loading the worse this becomes!

To give a definite example I would quote the most 'extreme' of the low-powered suggestions. This is the Motor-Segler specification which demands an A/2 size model with a 1 c.c. motor. It only takes a casual perusal of European contest results for this class to realise that a Schlosser diesel (preferably tuned) is a pre-requisite for success. In short there is no getting away from the need for a 'special' engine and its associated expense.

The other implication of a low-powered and low performance specification is that it is liable to give yet another thermal-catching contest. There *is* a place in aeromodelling for such events – but we hardly need any more.

If it were possible to begin again without the current F.A.I. preoccupations with *numerical* restrictions I think I would opt for 'open' power flown on a very short (say four or five seconds) engine run. This would provide plenty of alternatives to engine tuning, and should give an event in which trimming ability is more important than engineering resources.

The only other tit-bit worth mentioning from the C.I.A.M. Meeting is the decision to permit 'uncontrolled' as well as magnet steered models in slope-soaring events. Should anyone not remember my views on this type of combined event I would refer them back to any of my reports on the annual Clwyd slope-soaring rally.

* * *

Having spent all my allowance this month on discussing rules it might be fitting to end with a few remarks regarding their enforcement. We live in what is often described as the 'Permissive Society' and it has become obvious that the attitude has permeated into aeromodelling. Rules are disregarded almost openly – especially in matters of detail – and few people seem bothered. The only 'crime' seems to be that of complaining in the proper fashion by making an 'official protest' on some matter. I only wish I could quote a recent New Zealand *South Island News* in which Paul Lagan made this point very explicitly and in very strong terms. Having seen many arguments on and off the flying field I can only repeat the old adage that 'Hard cases make bad laws'.

SPECIFICATION SUMMARY

Refer to S.M.A.E. and F.A.I. Rule Books for complete requirements and exact wording

Specifications are written in metric units

Class	Size (Area)	Minimum Weight	Max. Engine Size or Rubber Weight	Launch	Scoring (No. Flights x Max. in Minutes)	Special Requirements
F1 A A/2 Glider	32-34 sq.dm. 496-527 sq.in.	410 gm. 14·46 oz.	—	Towline 50 metres with 2 Kg. pull	7 x 3	
F1 B Wakefield	17-19 sq.dm. 263·5-294·5 sq.in.	230 gm. 8·11 oz.	40 gm. 1·41 oz.	Hand launch	7 x 3	
F1 C F.A.I. Power	Implied by loading requirements	300 gms./cc. 20-50 gm./sq.dm. 6·55-16·38 oz./sq.ft.	2·5 cc. 0·1526 cu.in.	10-second run Hand launch	7 x 3	
F1 D F.A.I. Indoor	—	1 gm. airframe 0·035 oz.	—	Hand launch	Best 2 from 6	Max. span 65 cc. 25·6 in.
F1 E Slope Soaring	Max. 150 sq.dm. Max. 16·15 sq.ft.	—	—	Hand launch	5 x 5	Magnet-steered or uncontrolled
A/1 Glider	Max. 18 sq.dm. Max. 279 sq.in.	220 gm. 7·76 oz.	—	Towline 50 metres with 2 Kg. pull	5 x 2	
Coupe d'Hiver		100 gm. 3·53 oz.	10 gm. 0·352 oz.	Hand launch	5 x 2	Min. cross section 20 sq.cm. 3·1 sq.in.
½A Power (S.M.A.E.)	—	—	0·85 cc. 0·052 cu.in.	10-second run Hand launch	3 x 3	Note: American ½A is up to 0·050 cu.in.

25th ANNIVERSARY NEW ZEALAND NATIONALS

reported by
PAUL LAGAN

HELD ONCE MORE at the Feilding site in the North Island, this year's National Championships enjoyed generally good weather for each of the five full flying days from 28th December 1972 to 1st January 1973. It was only on one morning that the wind exceeded 15 m.p.h. which rather spoiled the Payload, Open Rubber and 'Rudder-Only' Radio classes and forced the postponement of the new Thermal Soaring event, but apart from this the 145 contestants had little to complain about from a weather viewpoint.

This meet was to be the last to be conducted by an Auckland-based Council, headed by Angus Macdonald, and for the next few years Council will be based in Wellington under the chairmanship of Brian Roots. Over 25 years the N.Z. Nationals have developed into an almost unique aeromodelling occasion that have doubtless been the reason for the continuing good following, and high standard of aeromodelling in this country. The majority of flyers bring their families to the Nats, camping in tents or caravans, providing the atmosphere of a summer holiday rather than a cut-throat contest – an aspect most treasured by regular Nats participants.

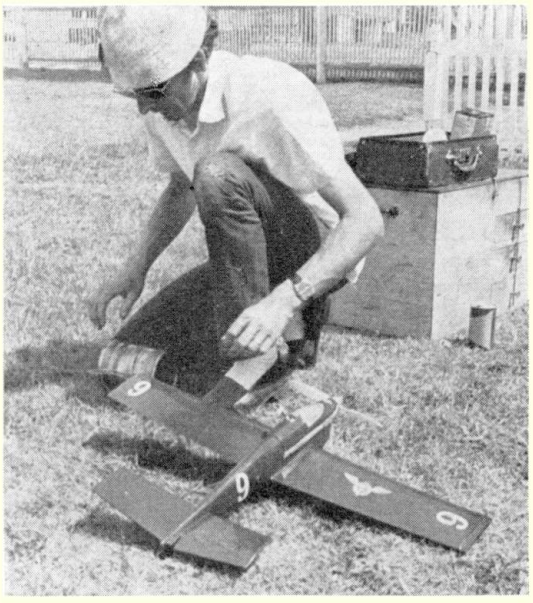
Free-Flight

The small Taonui aerodrome used for the F/F and Radio events was far from ideal, with the retrieving areas off the aerodrome being cursed with crops and trees in most directions. In addition, difficulties were increased in the first two mornings when models were drifting on to the property of a *very* unco-operative farmer who threatened trespass summons on some modellers and confiscated the models of others! These retrieving problems often caused flyers to miss rounds or to lose their models completely and some dropped from top places in this manner unless they had reserve models to call upon.

Traditionally, the events are held with a 5.30 a.m. start, which usually ensures relatively calm and naturally rather unhelpful air for the first two rounds. By the end of the morning's activities the weather is typical summer air, with often a good breeze and violent thermals. Such a mixture of weather makes for excellent contests and it is only rarely that full maximum scores appear in the 'restricted' events. Alan McDonald and John Malkin were very patient flyers in Wakefield and A/2 respectively, and each made perfect scores using very topical models – Alan had a torque-actuated variable incidence tailplane on his all-sheet Wakefield, and John made N.Z. history by being the first person to win a major glider event in this country using a Russian-type circling tow. John's hook was built to Gary Burrow's design, and he was one of three to use such a device in A/2.

Bill McGarvey had a successful return to the contest scene and showed his 'British-weather' training by winning Open Rubber in the strong wind, using a Wakefield. True 'open' models did not do very well in either Rubber or Power, reflecting the Kiwi's interest in F.A.I. rather than Open classes. Paul Lagan used his F.A.I. *Teuton* to reach the Open Power fly-off and then lost a venerable old F.A.I. *18 Tons* in the fly-off in a massive thermal, during which the model D/T'd at eight minutes and flew a further 12 minutes before going out of sight to retrievers with binoculars! The *18 Tons* had won F.A.I. Power the previous day in an event marked for the number of crashes which occurred.

Payload remains the only rise-off-ground event flown, and with VTO launches prohibited there was a great deal of prangery near the take-off strip in the strong wind. Small (TD.049) models are preferred by most, and this year the relatively large *Payhopper* excelled, giving Grenville Thompson his second win and a nice prize donated by Pan Am. Chuck Glider and the two towline glider events attracted over 50 entries each. In 'chuckie', low-level turbulance caused a lot of strife, but Ron Judge's *Flash* flew really well to win easily. A/1 was marked by the success of juniors Mike Bundock and Gary Prohm, while Paul Lagan's *Sinner 3* design was used by five of the top



Heading picture shows the Open Power fly-off contestants. In the foreground is Grenville Thompson with his Tee Dee 09 powered 'Sloworm' while behind is Paul Lagan with '18 Tons' F.A.I. model. Both used electric starters and were airborne almost simultaneously.

Maurice Baker's model was in 50 pieces only minutes later. Very fast, and powered by a Super Tigre G21/29 RV, this class 'B' racer suffered a fractured wing during a pit stop and pranged at speed shortly after.

ten in this event. The Aggregate event remains an event for the fit, and Gary Prohm ran very well retrieving his Doonside Mills-powered model.

The most competitive Indoor event was Chuck Glider where, under a 22 ft. usable ceiling, 30 seconds was exceeded by the top three in practice but not in the actual contest due to the turbulance produced by all the warm bodies. In the two Indoor rubber classes it was microfilmed 'Easy B' types that were to the fore, although the standard was down a little on previous years.

Radio Control

The 'feature' R/C event at this Nats was Thermal Soaring, which attracted 30 entries and which was observed by many interested modellers. Won by Tom Charlesworth's *Cirrus* and flown on a 150 metre hand-tow lines with a six-minute maximum, it was a resounding success and will no doubt gain support from both the Radio and the F/F fraternity in the coming months. The sight of six large gliders thermalling together at over 200 metres was a joy to behold.

Don Putt dominated Radio events with fine wins in Class B (rudder/elevator) and F.A.I. pattern, and Paul Lagan surprised some in these events with his recently acquired piloting ability. The Pylon event was a procession of *Minnows*, and Alf Leong's version became the first N.Z. model to beat two minutes. Class A (Rudder only) was spoiled by a strong wind causing much damage, and it was Warren King's fine piloting that won him this event.

Control Line

There was a continued increasing interest in C/L Aerobatics, and in this and indeed in all three Team Race events, quite a lot of new blood burst on to the scene (literally, in some cases). The good old Kiwi trend of flying in each and every class seems to have faded a little in recent years and quite a few 'specialists' are now emerging who are forcing the all-rounder himself to specialise to remain competitive. This trend is pronounced in C/L where very few modellers fly in other categories these days.

Peter Wheeler reinforced his claims as top Stunt flyer with a fine performance, and Steve Townley used the ubiquitous *Dominator* to win Combat – an event which has been dominated *(sic)* by this design and by tall (over 6 ft.) flyers at Nationals in past years. Team Race times were as good as

Bill Forbes warms up his Eta Elite in the F.A.I. team race. That just can't be a grass circle they're flying off . . . is it? Finally finished third, although a minute behind the winner.

usual, and although the times in the F.A.I. event are not of World Class, the enthusiasm is high and thanks mainly to the efforts of the *Kaiapoi Club* the standard is fast improving. *Kaiapoi* hope to initiate an International C/L event with Australia in 1974 with F.A.I. team race being one of the classes to be flown. The club has always provided the winner for F.A.I., and this year it was Bruce Turner's turn using a high aspect ratio model and a much-modified Eta Elite. The Super Tigre G21/29RV has taken over from the OSH29 and the Enyas and Etas as top Class B team race engine in N.Z. with the best doing over 110 m.p.h. for 50 laps on the .016 in. diameter, 60 ft. lines. ½A T/R was an all-Oliver Club, all-*New Plymouth* club final.

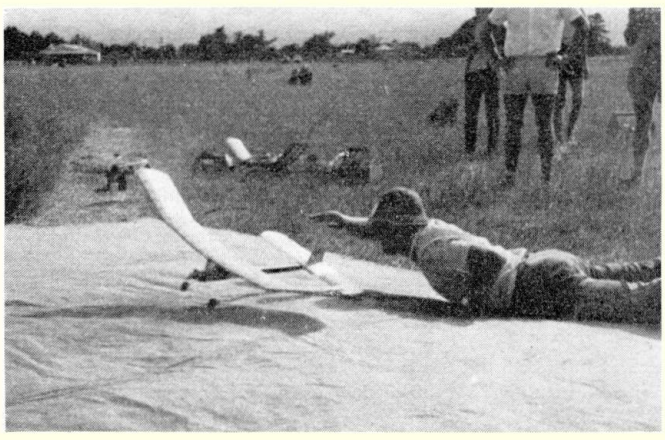
Best speed performance came from Harvey Westland who won the 2.5 c.c. and the 5 c.c. classes with his own design three-port engines. Quite a few N.Z'ers have now obtained Westland .15s for F.A.I. power and for Speed use, their performance usually exceeds that of stock, commercially available, .15s. Although good C/L engines are scarcer than hen's teeth in N.Z., this side of the hobby still manages a good, enthusiastic following.

Scale (by David Hope-Cross)

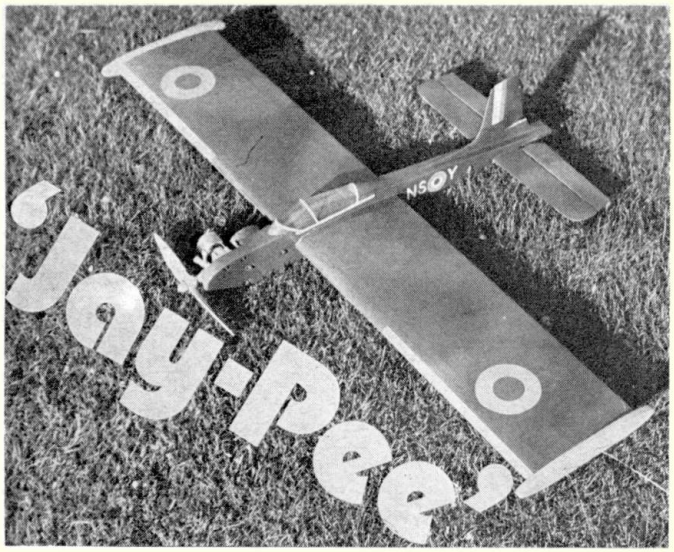
Free-Flight Scale is always held early in case of poor weather forcing a delay. The field this year was smaller than last and the flying standard lower in fact, indeed the daily newspaper published by the Championship committee, and known as the *Fielding Flypaper*, put it as follows: *'. . . an entertaining evening! . . . it would be almost indecent for the Scale Flyer to have a well-trimmed model and an easy starting, good running engine'*. Last year threequarters of the field qualified but this year it was down to half. Well-known modellers such as Doug Marsh, with his fine *Heston Phoenix*, and Laurie Akroyd with his *Beaver*, and a previous winner, a *Fieseler Storch* flown by Phil Staples, were absent from the static judging. The winners, however, flew well, as did the winner of the Junior prize, Mathew Spencer and his *Tiger Moth*.

Radio Scale is the 'glamour' event and the flying was shown on the National Television Network. As usual the most ambitious model on the field was produced by APS *Hawker Hind* designer Doug Marsh. He had a *Saab 21* pusher with retract gear, but chose to enter his *Avro Vulcan* instead. Ewan Galloway's *Fletcher* made most realistic 'top dressing' runs; Bob Milne flew his P51D in a most realistic manner, but once again the designer of the APS *Southern Cross* and *Piper Commanche*, Laurie Akroyd, stole the show with his fine *Tiger Moth*. Three models lost heavily on static points for failing to state the scale of the model – this certainly cost one model a place, and another would have placed higher if the three-views submitted had been as accurate as the model obviously was!

The Control Line event has declined a little in popularity over previous years, but the high standards continue. Worthy of note were models produced by Phil Staples of Wanganui – a successful version of the *Lockheed Loadstar* used in New Zealand for top dressing – and which dusted the judges with superphosphate as well! Noel Morris's perennial *Hawker Hurricane*, which is an accurate model of Sqdn. Ldr. Stanford Tuck's machine; Laurie Akroyd's successful *Piper Commanche*, complete with retract gear, flaps, throttles, etc., and available through the *Aeromodeller Plans Service*. Whakatane modeller Don Hague, however, showed the way with his superb *Ansaldo SVA*, and his excellent flying technique which even included the taxiing procedure out to the take-off point on the control line circuit.



Brian Roots 'gets down to it' to release his Pay-loader entry, the aptly named 'Pay Hopper'. Same design placed first in Grenville Thompson's hands, but Brian had to be content with third place, being 90 seconds behind.



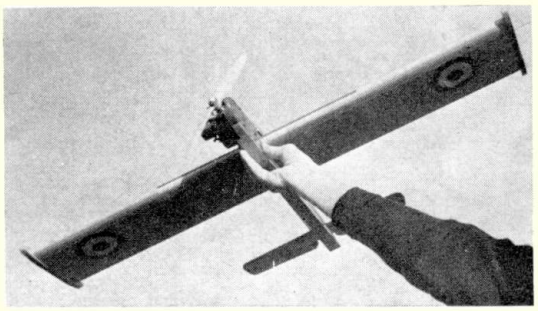
30 in. span control line stunter for sport flying with a 2.5 c.c. engine

by JACK MUNCASTER
and JOHN McALROY

YOUR TWO

INTENDED TO resemble the *Jet Provost Trainer*, the original version of this model was built by Jack Muncaster, perhaps better known as the pipe-smoking pit man half of the Muncaster/Langworth team race duo, and was designed as a stunt/sport/display model for the ubiquitous Oliver Tiger. Not having the time available to draw up the plans, etc., Jack arranged with John McAlroy to 'do the necessary', at the same time suggesting that the lads from the Rothwell Secondary School, where John teaches, might like to 'have a go' at building the *Jay Pee* in the same way in which they adapted the *Rainbow* glider (John's own design published in the July 1972 issue). Accordingly, five or six were built and all proved delightful to fly and were easily built. The semi-scale shape also allowed for several different colour schemes to be tried, ranging from actual *Provost* white and red, to British/German/Finnish-type colours for simulated 'dog-fights' in display work.

The construction is simple enough for a beginner to tackle and since Jack based the design on stock sizes, acquiring the materials should prove no bother. Begin with the wing, which is both strong and light. First cut out the 3/32 in. ribs, either individually or by the sandwich method, using two 1/16 in. ply templates. Remember to leave the middle three ribs (R1) 1/16 in. smaller to allow for the centre-section sheeting. Cut holes for the lead-outs in the inboard ribs, taking special notice of the slightly unusual shape and position of the bellcrank assembly. The two trailing edge pieces are then cut from $\frac{1}{8}$ in. sheet and laid aside while you sand the $\frac{1}{2}$in. $\times$ $\frac{1}{2}$in. leading edge to shape (a commercially shaped L.E. can be used, but be sure that the rear is squared off at 90 degrees to the nose of the strip.) Now you are ready to assemble the wing. Pin the bottom $\frac{1}{8}$in. $\times$ $\frac{3}{8}$ in. spruce



spar flat on the board and glue the two tip ribs in position, then adding the L.E. plus bottom and top T.E. pieces, making sure that the whole construction is exactly square. Five-minute epoxy is very useful here and saves considerable time. When this has cured you can add the rest of the ribs followed by the L.E. $\frac{1}{2}$in. $\times$ $\frac{1}{8}$ in. pieces.

Make up the bellcrank assembly, either cutting a bellcrank from steel or adapting a commercial one and using bowden cable or 7-strand Laystrate for the lead-outs. Epoxy the ply bellcrank mounts to the bottom spar and thread the lead-outs through the holes in the ribs. Now add the top spar and epoxy to the top bellcrank mount. When dry add the 14 swg pushrod, leaving sufficient length to allow for the bend to the elevator horn. Finally ensure that the controls are running smoothly and sheet in the centre section with 1/16 in. balsa, add the gussets and the wing can be put aside for the moment.

Begin the fuselage by cutting out two identical sides from hard $\frac{1}{8}$ in. sheet, and one nose doubler from 1/16 in. ply. Lay one side down on the plan at a time and cut out the wing and tailplane sections. Now lay the inboard side down and epoxy the ply doubler to it, when dry epoxy the $\frac{3}{8}$in. $\times$ $\frac{1}{2}$ in. beech engine bearers to the ply, leaving whatever space is needed for your particular engine between them. Fill in between the bearers with scrap sheet back to the front of the wing. When dry add the $\frac{1}{4}$ in. sheet back to the position shown then add the other fuselage side.

Cut one fuselage top from $\frac{1}{8}$ in. sheet and one bottom from 3/32 in. sheet, then glue to top of the fuselage sides to form a box-shape. When completely dry sand the edges to a smooth contour. Now is the time to drill the engine bearers to suit your engine or to fit mounting blocks of $\frac{1}{8}$ in. steel (fully recommended). Which ever you choose, now fill in behind the bearers with scrap $\frac{1}{2}$ in. balsa to form a 'nose' round the engine.

When dry, slide the fuselage down the wing from the inboard side until it is right on the centre line and glue, using epoxy again (later a $\frac{1}{2}$ in. wide bandage soaked in balsa cement can be used to strengthen this join if desired). Now make the tips from soft balsa and sand to a streamlined section. Glue to the end ribs with epoxy, first gluing $\frac{1}{2}$ oz. of lead in the outboard tip and two brass tube lead out guides in the inboard tip.

Next shape the 3/16 in. sheet tailplane and fin then sand to the section shown on the plan. The hinging

Continued on page 208

Delightful 'Peanut Scale' version of this unusual aircraft, featuring all sheet construction and rubber power

by J. FERGUSSON

FREE PLANS!

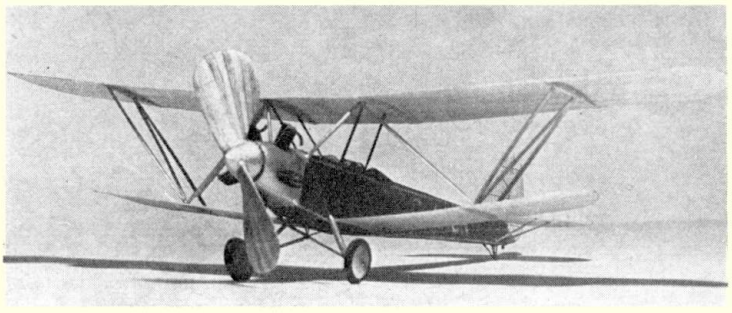
FOR MANY YEARS, more than I care to remember' I have been intrigued by a peculiarly named biplane the *Gugnunc,* or H.P.39 as it is more correctly titled. A fascinatingly ugly, splendidly proportioned, rigidly braced sesquiplane, ideal for model flying purposes. I had suitable three-view drawings, and around 1956 drew up a one-twelfth scale prototype for a 0.8 c.c. diesel motor, but due to business and other commitments I had to give up active modelling shortly afterwards. I still have the unfinished fuselage with centre section and tail-plane fitted! Articles by Ken McDonough and Doug McHard inspired me, during a recent illness, to dig out my old drawing and re-scale it as an indoor rubber model. Built to Ken's $\frac{1}{32}$ scale all-sheet principle it has proved to be a very good flyer and as tough as they come. To date it has had about a hundred flights both with realistic take-offs from the ground and hand-launches, many flights being 'disturbed' by banging off walls, concrete floors, and all manner of like model-wreckers. Sole damage to date has been a split rudder through falling back on to the floor after striking a wall. Ken's construction methods are fully proven and in the *Gugnunc* allied to Handley Page's 'W' style of bracing, it really pays off.

Outdoor weather so far has not been suitable for flying such a small model, but at 11.45 p.m. the other night I did take it out to test it on a patch of grass of about 50 yds. square opposite our house. The *Gugnunc* performed a beautifully stable half circuit and landed in the middle of the road just as a car came around the corner into our Avenue. I haven't run so fast in years!

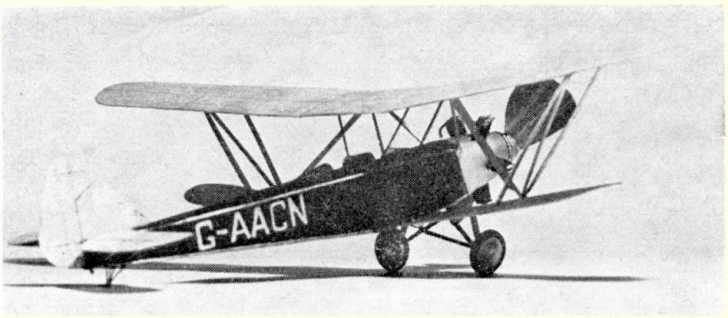
The full size machine was built in 1929-30 specially to compete in the *Guggenheim Foundation* Air Safety Contest in America. In twenty entries only two survived the tests, the *Gugnunc* and the American *Curtiss Tanager.* The latter finally being declared the winner. Then a row blew up which eventually led to law suits, but the *Gugnunc* survived to appear in the 'New Types Park'' at Hendon Air Display, June 27th, 1931, resplendent in silver livery as R.A.F. K.1908. In fact it survives today, stored by the Science Museum at Knockholt in Kent. On the *Gugnunc* the slots extended throughout the upper and lower spans and were allied to flaps along the trailing edges. This enabled a speed range of 3.36 to 1 to be obtained and the *Gugnunc* was capable of descending (albeit in a tail down attitude) almost like an autogiro under full control. Power was supplied by the reliable Armstrong Siddeley 'Mongoose' of 130 h.p. Span was 40 ft. upper, 28 ft. lower, and it was 36 ft. 9 in. in length. As for the model, it hardly needs explanation: Ken's excellent article in the September 1971 issue of *Scale Models,* tells it all.

The plan frequently calls for $\frac{1}{64}$ in. thick wood, but as this is not commercially available, you need to sand your own from $\frac{1}{32}$ in. sheet. This is quite easy using the device shown on the plan.

Start construction by cutting out the basic fuselage sides from $\frac{1}{64}$ in. sheet balsa, noting that these continue right to the nose former. Add the $\frac{1}{16}$ in. sq. longerons, $\frac{1}{32}$ in. doublers, as well as the $\frac{1}{16}$ in $\times$ $\frac{1}{32}$ in. uprights on the inner faces. Use P.V.A. glue throughout and assemble the two sides starting at the rear, sandwiching the rudder (also of $\frac{1}{64}$ in. sheet) between the tail-post sections. Follow by mounting Former 2 between the sides at the firewall position. When dry, pull in the nose of the side panels and attach to the $\frac{1}{32}$ in. ply nose ring Former 1. Note the built-in side thrust at this stage. Next infill between F3 and F4 on the top deck. Add $\frac{1}{16}$ in. $\times$ $\frac{1}{32}$ in. cross members at the bottom making sure to allow for the thickness of the $\frac{1}{64}$ in. bottom sheeting which follows at this stage. The top deck has longitudinal grain and is fitted next. Bend up the 22 swg wire undercarriage and sandwich across front face of F2 (using PVA glue) and the rear face of the top nose block for this purpose. Very soft balsa block is now fitted to the other three sides of the nose section and is sanded to shape, as shown. The cross section at the engine is circular,



Even the outsize prop (necessary for good flight performance) fails to spoil the charm of this 1/32nd scale sesqui-plane. Delicate construction is called for when working with 1/64 in. sheet wood, but the resulting model is so light that damage is rare, even after 'clouting' solid objects. Ideal for flying in the office. . . . !



Get up and go! Be very careful when colouring this model that you do not increase the weight more than the absolute minimum. Plan gives details of the best methods to use.

sweeping in plan view to meet the flat fuselage sides at F2. The lower radius rods are soldered to an inverted double pyramid structure with sharpened ends inserted and glued into the U/C doublers. Fit paper fairings to the radius rod and plastic or paper tubes to represent the oleo struts on the shock legs. The engine is shown and fully explained on the plan. The windshield top deck fairing is made of film base or clear acetate sheet as there should be a clear panel on the between-cockpit section.

Now the tailplane maybe cut out and mounted between the base of the rudder and the top of the fuselage sides. Attach by two spots of glue at the leading edge and by a packing block as shown across the tailpost at the hinge line of the elevators. Finally centralize the fin leading edge and glue in position, make up and fit the wire skid pyramid and stab into bottom edges of fuselage. Glue well. The wings are cut out and glued over the ribs to provide an airfoil section, then are offered up to the centre section end ribs in the case of the upper-wing. Check dihedral here. Follow by putting the lower panels into the fuselage sides in the area of the doublers. Check this dihedral also. Continue fitting the top wings by reducing some birch cocktail sticks to the correct section and stabbing into the top longerons by sharpening the ends. Glue well. The top ends are stabbed and glued to the top centre section ribs. A cardboard template is very useful here to obtain the correct rigging angles and symmetry. Fit the $\frac{1}{32}$ in. ply front cabane struts. Interplane struts are also $\frac{1}{32}$ in. ply and are simplicity to fit: just sharpen the ends and push into the wing ribs. Again ensure that rigging angles are correct. Finally fit the brace strut from the top centre section to the lower interplane at the front edge of the 'N'. Mount wheels on axles with spot of P.V.A. to retain on the end of the wire. Assemble ply disc F.1 and balsa spigot bushed with tubing as a nose button.

Glue eight laminations of $\frac{1}{4}$ in. $\times$ $\frac{1}{16}$ in. $\times$ 4 in. balsa, spread fan-wise as shown for the propellor. Allow to dry, then carve to shape and add rear spinner disc and build up a soft balsa spinner. Now fit the prop shaft using cup washers, mount on spigot and bend the rubber hook. Fit the motor between this hook and rear peg – my original uses five office bands 'Veteran Series No. 140–19' pretensioned and well lubricated. All that is left to do is to decorate the model – details are on the plan – using Indian Ink and Silver Dope. Then off you go to many happy flights.

JAY-PEE

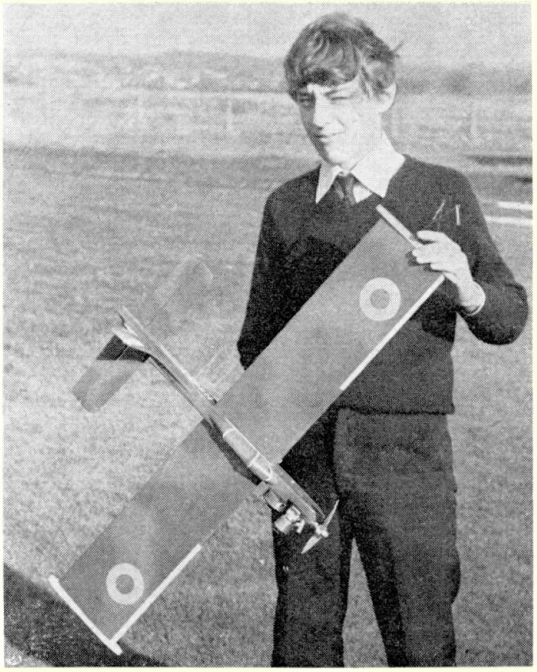
Continued from page 205

method is left to the builder, all three methods – tube and rod, mylar hinges and tape have been used with equal success. Glue, again using epoxy, to the fuselage and link up the pushrod to a commercial elevator horn and check controls for stiffness once more. Solder and bind the leadouts while keeping the elevators at neutral.

Add the fin, noting the offset and section, followed by the scrap fillets at the base. The canopy can now be formed either as shown on the plan or even from soft block so long as it looks authentic! If the canopy is made as on the plan, the celluloid is held to the fuselage while the glue dries by the imitation canopy rails of $\frac{1}{8}$ in. square balsa. The canopy frames can be made from scrap aluminium or thin wire. To finish add soft block to the front and read off the assembly.

Finishing is left to the builder though the fuselage and tail are best finished in lightweight tissue. Wings can be covered either in heavyweight tissue, lightweight nylon or even Solarfilm, the final finish is only dictated by the need to keep the model light in weight for the best performance. The *Jay Pee* looks good in almost any colour scheme, so how about a club squadron, or two opposing countries from WWII for combat or two differing modern-day-type schemes for display work . . . drag those crowds into your exhibitions!

Fly on 50-ft. three-strand lightweight steel lines with the centre of gravity where shown for stunt performance. With the C.G. further forward it becomes very docile and suitable as a trainer which will revert to a stunt/sport model later on when confidence has been gained.



A pupil of the Rothwell Secondary School with his nicely built version finished in military colours. As John says, 'built to the McC's fifty-foot rule, this model provides hours of enjoyment for both you and spectators!'

LATEST ENGINE NEWS

by Peter Chinn

'Western' engines are not such a very rare sight in the U.S.S.R. these days. Here, the Soviet team-racing champion Viktor Onufrienko displays the Rossi 15 powered F.A.I. free-flight model that he flew in the 1972 U.S.S.R. Nationals.

D-C 2.5 Revived and Revised

It is all too seldom, these days, that a totally new British engine appears. Of late, however, there have been several 're-issues' of diesels first made in the Fifties and Sixties – either through a manufacturer deciding that there was a market once again for a discontinued model, or through the acquisition, by a new firm, of the designs of an older company. Offhand, we can think of four makes which fall into one of these categories.

The latest of these is a 2.5 c.c. twin ball-bearing, disc rotary-valve engine from Davies-Charlton, the manufacturers of the well-known 'Quickstart' line of small low-priced diesels. Engine enthusiasts will quickly recognise the new model as a slightly modified D-C Rapier, a motor first manufactured in 1957 but which has been out of production for a number of years.

At the moment it is not known whether this revised model will continue to be called a Rapier or whether it will get a new name but, for the purpose of this report, it will be referred to as the 'new Rapier'.

Outwardly, the main difference between the original Rapier and the new model is that the latter has a slightly different cylinder jacket. This, colour-anodised blue instead of green, is modified to take an exhaust collector ring to which a silencer is fitted. The lower cooling fin of the cylinder jacket has been removed and the bottom of the jacket is externally threaded for the locking ring used to secure the exhaust collector. The silencer, consisting of a small cylindrical expansion chamber with a short, wire-wool packed tailpipe, has an 8 sq. mm. outlet area.

Other external differences include a revised compression screw and a slightly deeper prop driver that is not recessed into the front bearing housing.

Internally, there are several differences between the new Rapier and the original 1957 version. For example, the ball-bearings supporting the $\frac{1}{4}$ in. o.d. crankshaft journal are now $\frac{5}{8}$ in. o.d. instead of $\frac{3}{4}$ in. o.d. There are also changes to the piston and cylinder. The short conical crown piston, which was very heavy in the original model (it had a skirt thickness of almost $\frac{1}{8}$ in.), has been lightened by nearly 30 per cent. The circumferential cylinder ports are now divided into three exhaust and three transfer slits, instead of four of each.

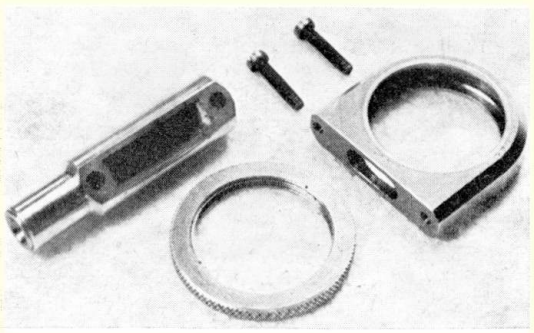
The rest of the engine is virtually unchanged. As already stated, induction is controlled by a rear disc type rotary-valve. The valve rotor is of diecast aluminium and is mounted on a fixed pin in the crankcase backplate, which incorporates an almost vertical air intake thereby substantially reducing rear overhang.

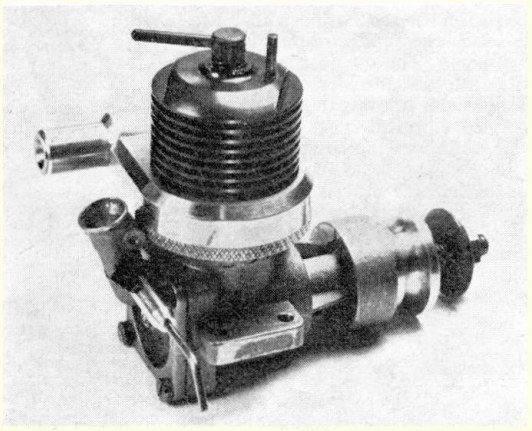
Complete with its silencer, the checked weight of the new Rapier was 171 grammes or just over 6 oz., of which 20 grammes (0.7 oz.) is accounted for by the silencer unit. Some performance data will be published in due course.

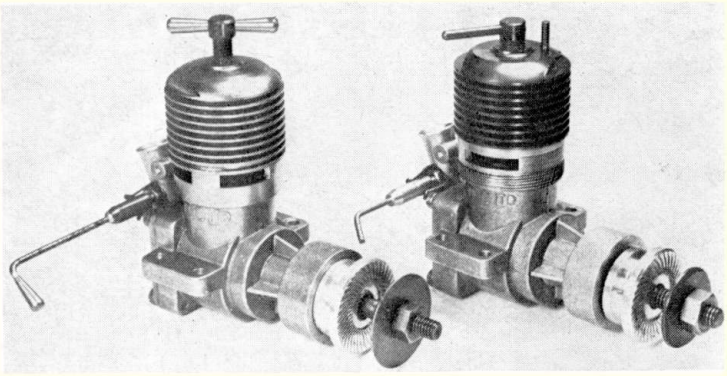
M.E. Snipe

This is another British diesel that has made a reappearance after being off the market for a while although, in this case, the absence has been much shorter. The Snipe first

Right, new from Davis-Charlton is this revised version of the D-C Rapier 2.5 c.c. twin ball-bearing diesel. Below is seen the silencer, collector-ring and locking-ring of D-C 2.5. Owners of old Rapiers could use this assembly by replacing cylinder jacket with new type.







Left, with silencer unit removed, close resemblance of new D-C motor (right) to 1957 Rapier is obvious.

appeared just over ten years ago and, like the D-C Rapier, was made in the Isle of Man. This, plus the fact that the 1 c.c. M.E. Heron and 1.5 c.c. Snipe bear some resemblance to the equivalent size D-C motors, has often led modellers to ask what connection the two makes might have. In fact there is no connection between the two manufacturers. However, A. L. Allbon, who was responsible for the design of many D-C engines of the Fifties, also provided the inspiration for the original M.E. motor made by Marown Engineering Ltd. Last year, as was noted in this column, Marown's model engine production was taken over by Moore Engineering Ltd. under the direction of J. K. & H. M. Moore but production remains in the Isle of Man.

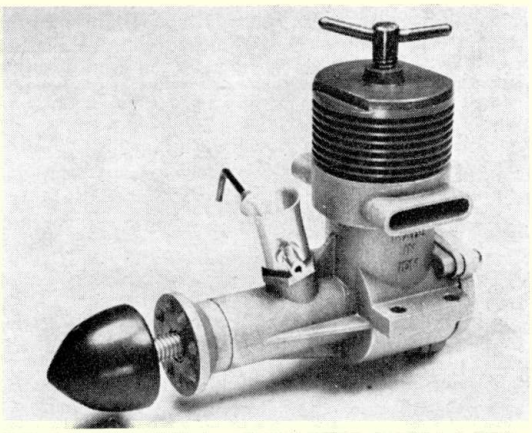
Outwardly, there is very little to distinguish the latest Snipe from the earlier models but there are a number of internal changes including a redesigned crankshaft, heat-treated by the I.C.I. 'Tufftride' process. The shaft now has a full-disc crankweb and runs directly in the crankcase material. There are changes, too, to the piston and cylinder. The unusual method of retaining the gudgeon-pin used in the earlier engines, consisting of a wire circlip in a groove around the piston surface, has been abandoned and the gudgeon-pin is now pressed in. The cylinder, which had wide internal transfer flutes in the early Snipes but was then changed to inclined elliptical ports through the wall, continues the latter pattern but with modification of the port shapes.

Unlike most other radially-ported engines, the M.E. diesels incorporate an exhaust collector ring with twin outlet stubs as an integral part of the main casting. To these stubs the very neat and effective M.E. twin silencers can be fitted.

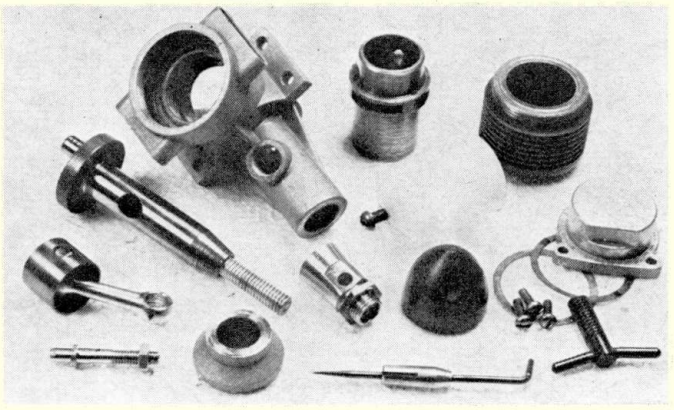
In addition to the standard model illustrated, the Snipe is available with a simple throttle-type carburettor and the last version of the Snipe to be put through our standard test procedure was one of these. Fitted with M.E. silencers, this engine delivered a peak output of 0.11 b.h.p. at 12,000 r.p.m.

The nominal bore and stroke of the Snipe is 0.505×0.455 in. giving a swept volume of 0.0911 cu. in. or 1.493 c.c. The engine is supplied complete with a useful backplate-mounted translucent fuel tank, and, in its standard form, less silencer, weighs 104 grammes (3.67 oz.) or 127 grammes (4.48 oz.) including silencer.

At right, again in production: the M.E. Snipe 1.5 c.c. diesel, now manufactured by Moore Engineering Ltd.



Below, parts of the M.E. Snipe. Engine has revised crankshaft, cylinder and piston assembly.



K & B 15 Series 72

Deliveries of this new engine from the K & B factory in California began in late December and early January and Irvine Engines, the U.K. distributors, now have reasonable stocks.

The new K & B 15 is offered in two models: a standard type and an R/C version with Perry carburettor. The latter is presumably intended for 'Quarter Midget' class radio-controlled pylon-racing models.

Although the design incorporates rear induction and a Schneurle-loop scavenged porting system, a standard side-exhaust layout is used and exhaust timing is conventional, i.e. 'non-pipe'. Obviously, the engine is not aimed at the C/L speed flyer and one must therefore conclude that, so far as contest work is concerned, it is expected to interest, mainly, the free-flight and C/L Goodyear enthusiast. It is not intended, in its present form, as a successor to the K & B T.W.A. 15 that proved so successful

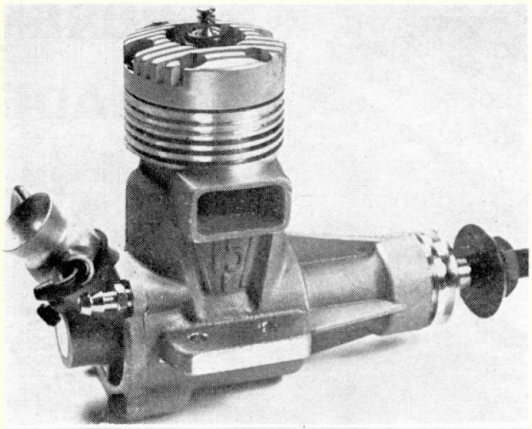
in FAI Speed prior to the advent of the Rossi 15. One could, however, regard it as a replacement for the K & B Torpedo 15R 'Series 61' and 'Series 64' engines manufactured during the 'Sixties.

This is, in all respects, a totally new K & B design. Admittedly, it bears a superficial resemblance to the limited-production Series 72 K & B 40R pylon-racing specials made last year and has the same type of scavenging system, but very little has been borrowed from previous K & Bs.

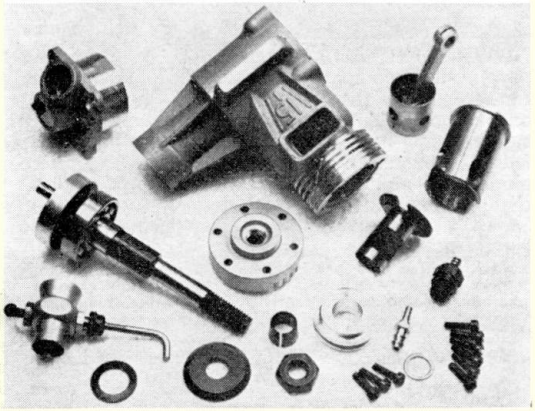
It has, for example, a rear drum-valve induction system. All previous K & Bs have used crankshaft induction or rear disc valves or, as in the case of the somewhat short-lived Tornado baby engine, a diaphragm-type valve. The valve has a 9.5 mm. ($\frac{3}{8}$ in.) o.d. and, since it does not have to withstand the same stresses as the crankshaft, has a large (8.3 mm.) i.d. and a fairly generous rectangular port. The valve rotates in a deep housing that is an integral part of the detachable crankcase backplate. This incorporates a short inclined boss into which the carburettor venturi is inserted. The valve aperture is rectangular and the timing, as checked on our engine, was 39 deg. ABDC to 51 deg. ATDC.

The crankshaft is more robust than those of previous rear intake K & B 15's. It has a $\frac{3}{8}$ in. o.d. main journal (instead of $\frac{1}{4}$ in.) stepping down to $\frac{1}{4}$ in. at the front. Both journals run in ball bearings. The engine continues the tradition of the Wisniewski-designed K & Bs in having peripheral counterbalancing slots in the crankdisc, sealed off by an alloy rim.

Unlike all other ball-bearing K & Bs (with the exception of the 40R Special) the shaft housing is an integral part of the single robust casting that forms the crankcase and cylinder casing. The drop-in cylinder liner has the usual Schneurle scavenge arrangement of a transfer port each side of a fairly small exhaust port, angled to direct gas flow across the crown of the deflectorless piston away from the exhaust port towards the opposite side of the cylinder where it is joined by an upward flow from the steeply inclined third port. The exhaust port is timed to remain open for 142 deg. of crank angle and the three transfer ports are open for an average of 127 degrees. The skirt ported lapped piston uses a tubular gudgeon-pin retained by wire circlips, has its skirt o.d. relieved below the pin holes and is coupled to a forged aluminium conrod. The cylinder head is orthodox with a standard type plug and small bowl-shaped chamber encircled by a fairly wide squish band.



The entirely new K & B 15 Series 72. Engine has Schnuerle loop scavenge system, twin ball-bearings and drum rotary-valve.

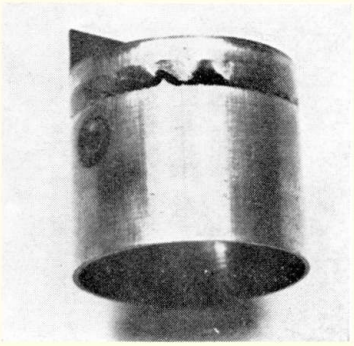


Parts of the new K & B 15. Engine is sturdily built and offers scope for the attentions of tuning specialists.

A conventional jet assembly is used (not a peripheral jet type as fitted to the racing type K & B Torpedo 15R and 29R engines) and the effective choke area is approximately 22 sq. mm. in the standard engine (13 sq. mm. in the R/C version) thereby making a pressurised fuel system necessary. The engine is equipped with a pressure outlet fitting in place of the upper R.H. backplate screw for pressurising the fuel tank.

Pending tests (awaiting better weather) it is difficult to say in which category this new K & B will find most favour in the U.K. Clearly, it has not been set up specifically for FAI free-flight (i.e. straight methanol/castor) as, in recommending that a fuel containing not more than 10 to 12 per cent nitromethane be used for running-in, the manufacturer infers that hot fuels are the norm. No advice as to fuels or props is made in the instruction leaflet other than the suggestion that a 7×6 Top Flite wood prop be used for 'R/C and regular U-control flying'.

However, the design and construction of the engine are such that there is scope for tuning mods by contest specialists who may wish to experiment with compression ratios, porting modifications, etc., for FAI free-flight or other specific applications. It will be interesting to see whether, in fact, this new K & B can offer a challenge to the Rossi 15 in international free-flight.



The odd result of a manufacturing error. This piston, from a well-known stunt 35, was machined too thin above bosses and eventually split around 180 deg. of its circumference.

NUREMBERG TRADE FAIR'73

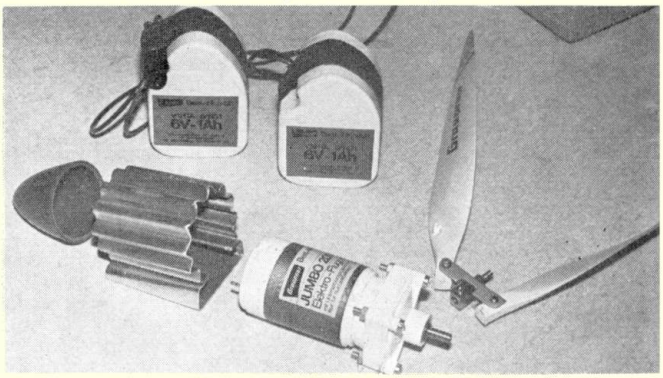
At left, new rubber-powered scale kit by Graupner, the Piper PA 18 Super Cub spans 20 in. and looks most attractive. At right, Estes 'Cold power' range of rockets, operated by Freon gas – 'refill' bottle seen in foreground. May be converted to 'solid' fuel operation where the law permits. Photograph being shown displays crew of Apollo 17 with other Estes products at a special demonstration before a vast crowd.

NOW RE-HOUSED in a magnificent, purpose-built complex of vast halls, the sheer size of the Nuremberg Toy and Hobby Fair reveals the healthy state of the market in the International sphere. The 'hobby' section alone filled one hall, and it proved quite impossible to examine in detail all those stands containing equipment of interest to aeromodellers. The major target of these manufacturers is the radio-controlled fliers, and it must be admitted that, like it or not, were it not for R/C then the average aeromodeller would have precious little to buy from his model shop! Above all, the Fair indicated the trends which our hobby will be taking over the next year or so, and the general impression gleaned must be that R/C scale or semi-scale gliders are here to stay, while the interest in helicopters is distinctly healthy, with strong competition among three German manufacturers.

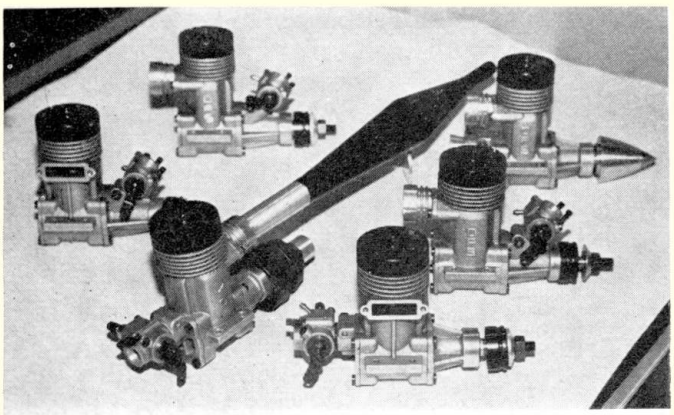
Graupner, as ever, produced the most impressive display of 'goodies',

Superb demo-model of Graupner's introduction to the helicopter market was moulded entirely in clear perspex, enabling all the 'hardware' to be readily visible. Engine and gearbox assemblies were presented in cutaway fashion too.

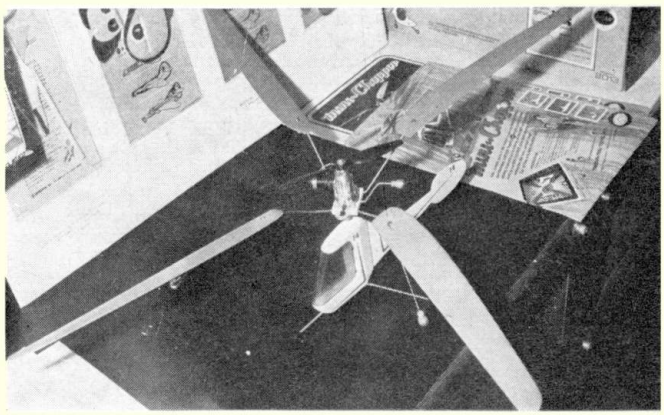
Graupners newest product is the Jumbo 12v electric motor supplied complete with rapid-charge batteries and substantial heat-sink. Use of precious metals for the commutator and brushes is reflected in the price – in the region of £100.



Whole host of new motors from O.P.S. include improved version of their already most successful .60, plus new .40s and .29s available in a variety of modes – front and rear induction, rear and side exhaust. All are ABC type.



Simplest helicopter of the show! Trid-N-Tru Toys displayed this ready-to-fly free-flight model, powered by a Cox .020 and working on the torque-reaction principle. Said to climb to 500 ft., and available with alternative profile fuselages.



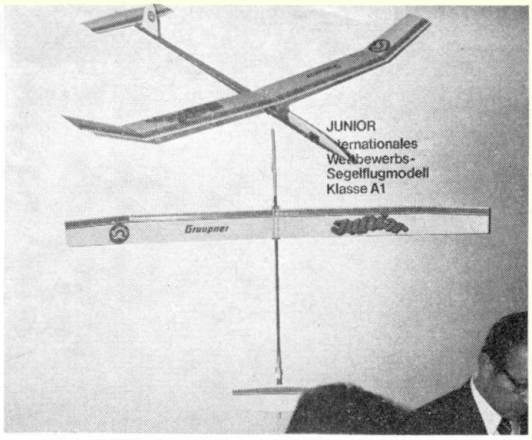
ranging from an ingenious all-Perspex demonstration model of their new helicopter – a *Bell 212* – complete with cut-away sections, to what must be the ultimate in silent-power flying; a really powerful electric motor complete with light-weight quick-charge batteries. Two such motors were shown installed in their new *Hi Fly* glider – together with folding props – no cause for noise complaints here!

The **Cox** stand displayed their wide range of 'ready-to-fly' plastic control-line models, but of more interest to competition modellers was the news that the *Tee Dee* .049 and .051s now produce even more power, thanks to enlarged cylinder porting and improved crankshaft port trimming. Their range of solid-propellant rockets now includes scale versions of the *Apollo Saturn V* and *Uprated Saturn 1B*. Moulded in high impact (!) plastic, these kits are each powered by a pair of rocket motors – still illegal here, we're sorry to say. **Estes,** another American company producing rockets, are continuing with their efforts to popularise freon-gas operated rockets which are more acceptable to various national Governments, as well as less-enlightened U.S. states. Known as the 'Coldpower' range, these rockets can reach an altitude of around 300 ft. when after a brief delay the nose cone is ejected and the whole *ensemble* floats down to earth on a parachute. Certainly doesn't contravene the Explosives Act, as freon is a completely inert gas, already widely used in this country.

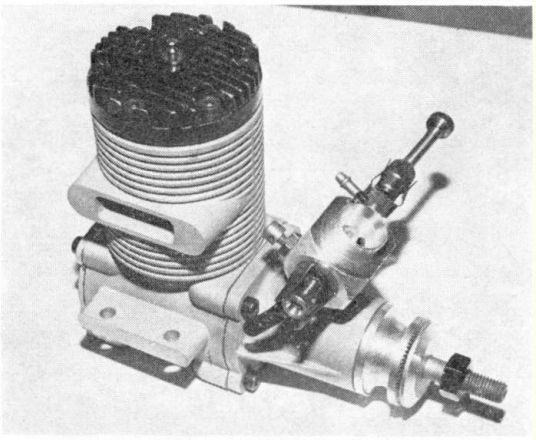
O.P.S. revealed a whole host of new engines, from an improved version of their very successful speed 60, to a range of 40s (available in R/C or 'Speed' versions, front or rear induction, side or rear exhaust – take your pick!) as well as a pair of 29s – rear exhaust with or without R/C carb. Tuned pipes are available for all rear exhaust models. Should liven up the speed circles in due course. . . .

Hirtenberger Patronenfabric also had a new motor – again a 61 which has reverted to rear induction (as did their original motor) with side exhaust and available in R/C or R/C Speed form. A new motor altogether was the *Austrian*-made **Webra** 61 R/C, with distinctive finning extending all down the crankcase.

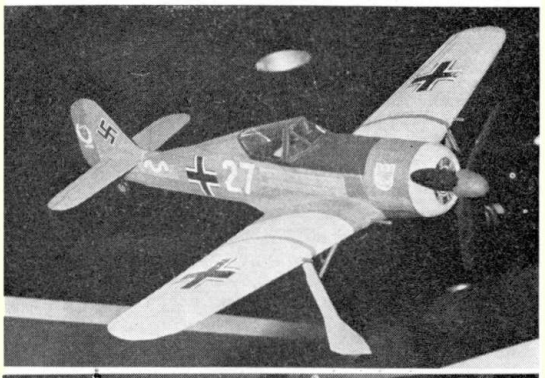
In all, another great display of modelling goods to come for the R/C enthusiast, but little *radically* new, and even less for the sport-free flight or control line enthusiast.



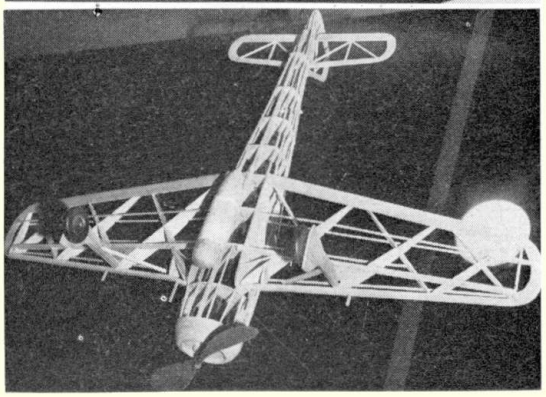
Likely to be adopted by the F.A.I.'s Education Committee as the standard design for all National Aero Club to recommend for youth contest was Graupner's 'Junior'. Specially designed for simple construction yet using prepared saw-tooth turbulator on Jedelsky wing. Has many contest features.



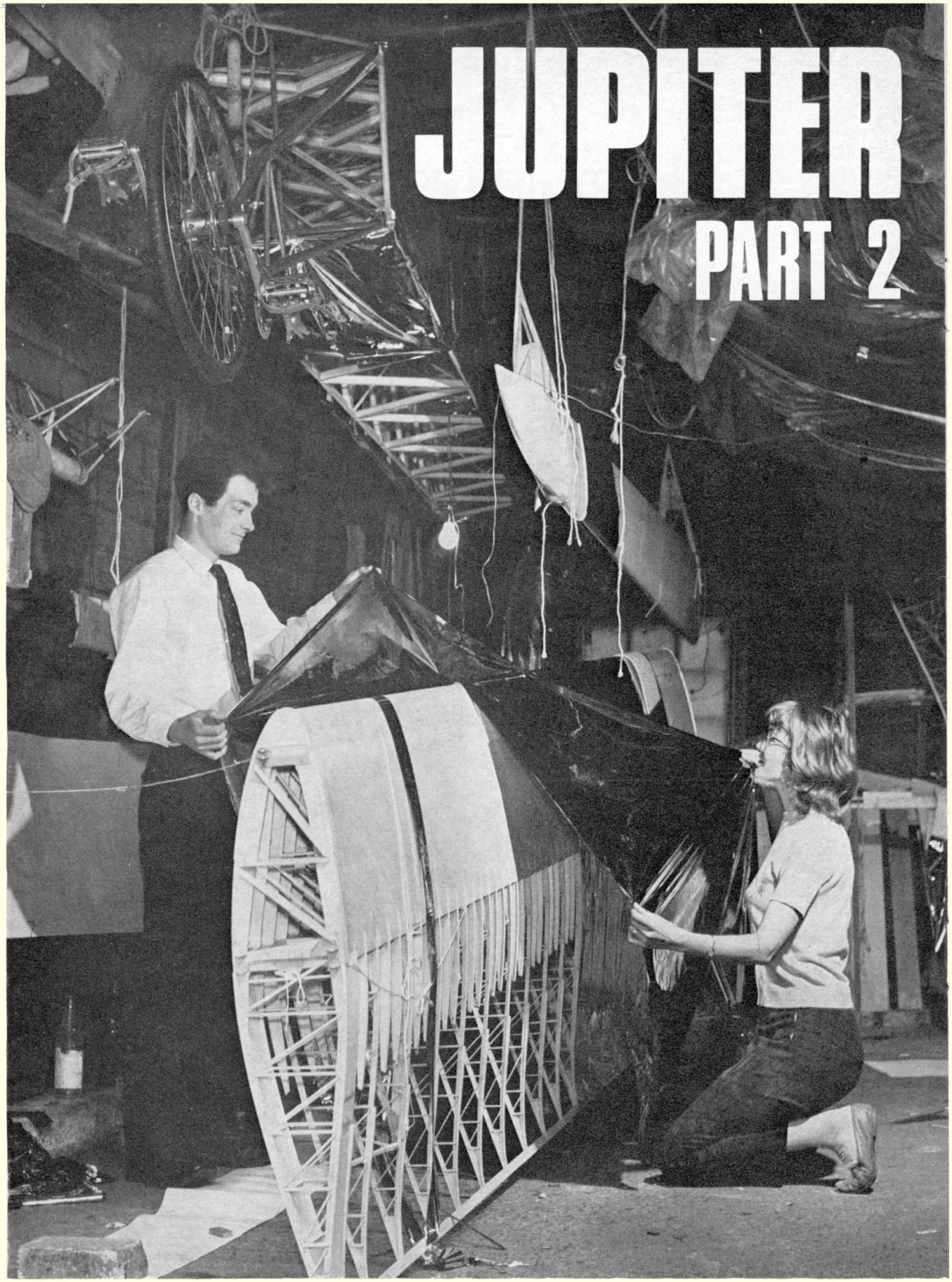
New motor, new company. Webra (Austria) produced this distinctive R/C 60 which bears an external appearance rather akin to the H.P. 40 – which is made by Hirtenberger in a factory situated almost literally across the road! Very neat crankcase casting.



The American Comet company (yes, the same firm who kitted the Clodhopper – see page 192) showed six new rubber - powered scale kits. This Focke Wulf 190, spans 21 in., and looks most appealing.



Another view of Comet's F.W.190 reveals light, anti-warp wing construction and 'tube - o - matic' fuselage assembly. Comet also had a wide range of ready-to-fly rubber models on display.



CHRIS ROPER relates how he made the wings for his man-powered aircraft

SO . . . I FOUND MYSELF in the position of having an 80-ft. balsa wing to make, and while I already had the necessary tools (which did not amount to very much, indeed many handymen and modellers must have a bigger collection) what else would I need?

Money! This was needed to cover the cost of the materials and jigs plus all the unforeseeable expenditure that always crops up, and fortunately the *Royal Aeronautical Society's* Man Powered Aircraft section were giving grants to help promising designs, but in order to qualify for this assistance you have to be able to show them, with proper calculations, that the plane is going to fly. I made an application for such a grant, and was honoured by a visit to Woodford by the President of the Society himself. This was a real honour, as at the time I only had a few sticks glued together, plus the wing specimen, to show him. Fortunately the specimen which had given me such confidence now served to show the RAeS committee that I was making a serious attempt, which would be likely to fly – even at this stage they realised this. Thus I had money for the materials, etc.

Now there was the question of a place in which to build it – here again I was very fortunate in being helped; it was as if the god Jupiter knowing I was going to name the aeroplane after him many years later, stepped in at the right moment just when every apparently insurmountable obstacle presented itself! In this instance it was Sir Stuart Mallinson, C.B.E., D.S.O., M.C., J.P., D.L., whom the God must have prompted – he made a building available which had prior to that served as a gymnasium and previously as a private residence. What better place for the first home of a muscle machine? Sir Stuart's father had helped 'Buffalo' Bill Cody in his early flights and Cody went on to get a tree named after him at Farnborough by crashing into it. Now Sir Stuart's estate is full of trees, many of them rare species, and although I have no objection to having one named after me, I did not want to do it in that fashion . . . so flying at Woodford was out.

Finding an aerodrome was therefore another problem, but I was prepared to let that wait until the time came when we should need one. We did have Hendon up our sleeves, but by the time the construction was finished, they had dug it over! In this manner, the problems of premises, finance for direct costs and tools, were solved. I had shown that I had sufficient skill and the problem of a flying field was left in abeyance. There are two more essential ingredients that were necessary, these being time and enthusiasm. I was fortunate in having a family who made it possible for me not to be earning; it is not that they were rich and could afford it easily, it is just that I told them this was what I was going to do . . .

The first task in the construction of the wing was to make an 18 ft. long bench. How do you make an 80 ft. wing on an 18 ft. bench? Well, the whole idea of man-powered-flight is supposed to be impossible so I didn't let little things like that put me off! I built the wing in five sections, the outermost section is in fact the length of the aileron; the next section goes from aileron root to the dihedral joint, and the centre section was built in one piece, from dihedral joint across the fuselage with a piece omitted from the nose for the pilot, across to the dihedral joint the other side. *Jupiter* in fact has adjustable dihedral, a gimmick which we did later use. I originally made the wings with zero dihedral but a group of students from the City University did a series of flight stability calculations (this was in fact the second time that a computer was used in the design of *Jupiter*, the first time being at Manchester University where the wing profile ordinates were calculated) and these showed that approximately five degrees dihedral was best, and John Potter later changed it to this figure. The aeroplane still has less effective dihedral when flying than expected, because I allowed for the effect of the wing flexing and in fact as the flight photos show, the wing is very stiff, the tips hardly deflecting up at all. The wing is also very stiff in torsion, i.e. it is not easily twisted, but then the wing is rather on the heavy side as man-powered aircraft go.

Superb photograph at left clearly reveals the intricate wing structure employed on this muscle-powered craft. Note in particular the 'short ribs' referred to in the text which carries the covering smoothly from the sheeted nose-section to the open-framework behind the main spar. Dural brackets look rather small for joining on 80 ft.-span wing, but they passed the most stringent test of all – flight! 'Fuselage' is seen suspended above.
(Picture by Kenneth Bray)

We built a tip section first, to give us confidence for the important centre sections. First I planed the spruce spar booms to width, (the width and thickness taper over the whole length) but doing it by hand, once you have marked it out, it doesn't take much longer then to plane a 14 ft. or 17 ft. length to a slight taper than parallel. Taper is from $1\frac{1}{8}$ in. to $\frac{3}{8}$ in. over 40 ft. Now for the panels; that is the panels for the vertical spar webs and for the skinning of the torsion box. You can't see through the gleaming silver of *Jupiter's* wing, but the primary structure is a ply box, true aerofoil contour from 7 per cent to 40 per cent of the chord. Forward of the 7 per cent mark the skinning is spanwise grain sheet as described for the specimen. The ply panels we made ourselves, that is we laminated up two thicknesses of $\frac{1}{32}$ in. balsa. Two-ply is no good, I heard plenty of people say (but, well, the aeroplane flies doesn't it . . . !), but three-ply was unacceptable because it would have meant twice the weight of glue. We evolved a technique for laminating up the panels: first we made up one thickness of the whole area, taped together – the grain direction is all at 45 degrees to the span, i.e. on the bias. At the centre section the distance from the front spar (7 per cent) to the main spar, which is at the deepest (40 per cent) part of the chord is such that a 4 in. × 36 in. sheet laid at this angle is just big enough to need no end grain joints. This first veneer is then laid flat on the bench and each sheet of the second veneer is glued on top of it with contact adhesive. Doing one sheet at a time enables a close control to be kept over the time between spreading of glue and contact of the sheet to the first veneer. Having made the panel slightly oversize it is trimmed and the offcuts tested for soundness of glue joint – the test just consisted of tearing it apart by hand and checking that the wood gave before the glue. Similar tests were done on each batch of other joints.

Each sheet of balsa was checked too; first it would be weighed and the density in pounds per cubic foot written on it – anything over 12 was not used except as for jig material. Likewise anything below 5 lb. cu. in. was discarded. Five to 7 lb. wood was used where no great strength was required, 7 lb. to 10 lb. for most other work, and 10 lb. to 12 lb. where the piece was to be heavily loaded, as at the wing root. The spar web was laid on the bench and the spruce booms glued down to it and taut stretched thread was used to get a straight line to mark the spar boom position on the web.

All these lining-up problems yielded to a little forethought and a lot of thread. Next the vertical web stiffeners, were added and the joint fittings assembled to the spar. Putting on the joint fittings which were bonded and bolted to the first section was done according to the drawing (everything was drawn before it was made) but for the fittings on the next section, which had to

The designer works on the tailplane of his oversize 'model'. The original aircraft had a conventional tail (i.e. separate, hinged elevators) but this was later destroyed in a disastrous fire, and the replacement made by the Halton Group was of the all-flying variety – not through any aerodynamic reasons, just that it was easier and lighter to build.
(Kenneth Bray photograph)

mate up with these, we had to wait for a fine day as one section of the spar would be on the bench, which pointed towards the door, and the other section would be assembled to it in the same way as it would eventually be on the finished aeroplane, sticking out of the door. While the spar section was still lying on the bench so that the forward face was upright, the nose ribs were assembled to it. These nose ribs, of which over 300 were made from $\frac{1}{16}$th sheet were cut out by first making a 'blank' that was roughly a 'V' shaped assembly of two strips slightly oversize, and on every sixth one of these the profile was accurately drawn with a mapping pen and ink. The whole 300 blanks were put in a pile, the marked ones being carefully positioned, and the resulting block carved down. It was indeed a cheering sight to see all the ink lines coming into view showing that the accuracy was within the thickness of the line. A similar pack was made for the tailplane, but here the taper being more, each rib would have ended up with a sharp bevel caused by the taper of the pack, so the taper of the pack was reduced by putting packing between each pair. Just like making ribs by the 'sandwich' method on a model aircraft! As each rib was taken off the pack, it was labelled 'port' or 'starboard' and the position it was to occupy marked. While still in the pack, spar and leading edge positions were marked; by working to these lines the wing is made true without difficulty.

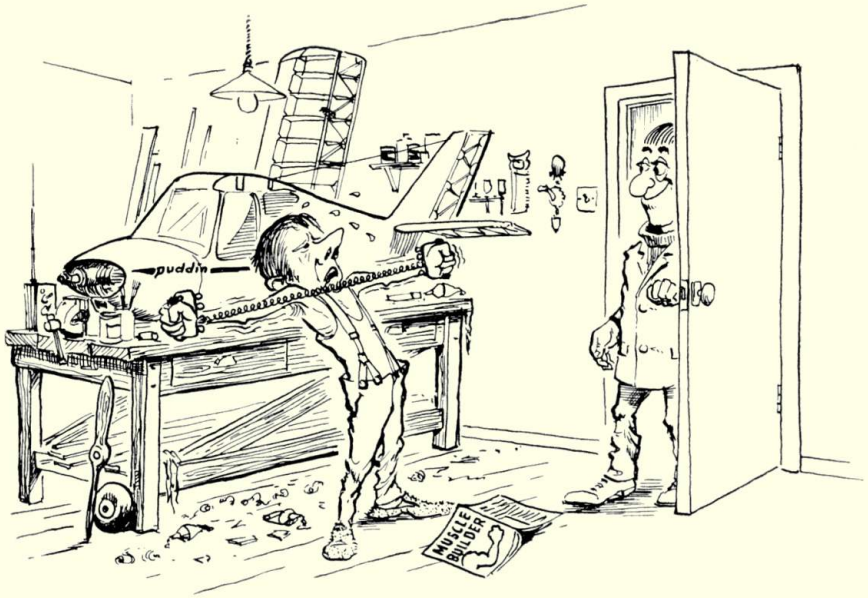
With all the ribs and the rear spars made, the building proper began. The bench was not assumed to be flat, instead the spar was held about an inch above it by being glued to blocks of scrap material and made truly straight, again by taut threads. In addition to being flat, the spar had also to be arranged so as not to be twisted. If there are two taut threads which are in the same plane, then by putting your eye in the right place one of them will completely hide the other – the threads running along the top and the bottom of the spar were arranged to be like this. One end rib was assembled and then the rib at the other end of the section was assembled in the correct position relative to this first one. Your mind had to run through the six degrees of freedom: *spanwise* (easy, locate by the mark on the spar), *fore and aft* (easy, locate by the mark on the rib), *vertically* (arrange for rib to be proud of spar equally top and bottom), *yaw-wise* (locate by set-square, I made up a 2-ft. one for the purpose), *roll-wise* (not critical, set-square again), *pitchwise*, this is the important one, as this will determine the angle of attack of this part of the wing relative to the breeze. As on the propeller, I reckoned to work to $\frac{1}{4}$ of a degree, or to put it another way, to an accuracy of 15 secs. of arc. It sounds better and is much more impressive, but what it means is $\frac{1}{16}$in. on a 15-in. rib – not difficult if the threads are held by a rigid jig. Incorporating washout was no more difficult than if it had been untwisted as the second rib is located pitch-wise relative to the first by a similar method to getting the spar untwisted, i.e. two threads, in this case lining up with marks on the ribs. Then all the intermediate ones were assembled, every fourth one located by the threads and the others by straightedge. Next the front spar was built up *in situ*, the booms being let into slots in the ribs which were made when the ribs were still in the pack. After this, the top skin panel of the torque box (that is, between the spars) was assembled. What I did was to pin it in position all over, then peel back from the front spar, gluing the spar and then pinning it back again. When this was dry the same was done for the rear spar, this time also gluing every third rib which made it $\frac{3}{16}$ in. thick in the region of the spar by local doublers either side, making a good joint to each end rib. The other ribs were only attached to the skin by a fillet of glue brushed on afterwards. The lower panel was similar, then the torque box was completed by assembly of the front spar webs, the length of each being the rib pitch. With the nose rigid, the wing could be 'launched' from the bench, but first the front 7 per cent was skinned as described for the specimen. All five noses were made like this, the end rib of each one being located to suit the end rib on the next section, more sticking out the door involved! It can be seen that there were nine possibilities of increments in the pitch-wise location of the ribs along the span. When the five noses were complete we trial rigged them together and found that from one end to the other the twist was, as best we could measure, within our stipulated $\frac{1}{4}$ degree. This was until the sun came out, and with one side being in shadow, and one in direct sunlight, the wing visibly warped. That was a great day though to see the wing really taking shape, and we glued a couple of aft ribs on to each section. Back indoors again the other aft ribs were assembled between them, and then a little invention of mine which I called 'short ribs' were added. These can be seen in the photographs. Each one is 9 in. long, and two were spaced out between each pair of aft ribs, just behind the spar. This was all part of achieving a smooth profile. As we all know, fabric will sag between ribs whereas stiff sheet will have true shape. Now without the short rib there will be a ridge at the back of the sheeted portion which will not be streamlined. These short ribs hold the fabric out to provide a smooth blending of shape from the front portion to the rear, the required difference in shape between a short rib and the true profile had been found on the specimen. The section was then inspected for soundness and smoothness of shape before covering. Five sections and hey presto there is your 80-ft. wing!

To be continued

topical twists

by 'Pylonius'

illustrated by 'Sherry'



'It's the only way I can get to pick it up.'

Round the Bend

A task that was somehow left off the Herculean list, but was something of an initiation ordeal for the earlier modeller, was the bending of a bit of hefty piano wire into a usable rubber hook. Strong men have wept at the distorted bits of wire spread over the worktable, and weaker ones have gone back to kite making at the first futile attempt. No end of people who could do other useful things like mending fuses and uncapping beer bottles have been quite incapable of getting as much as a decent kink into a strip of 16 gauge. It's the one job that sorts the men from the boys, although it's not likely to get me half fare on the buses.

For years I have admired the way some of the top boys have managed to do those wonderful squiggly things with the intractable 14 gauge stuff right up against the backplate of the noseblock. I always suspected they were either dentists or professional strong men, as the best I ever could do was a 'squaring the circle' sort of hook at the end of 2 in. or more of protruding shaft.

Now, for better or worse, the old strong-man noseblock act looks as dead as vaudeville. In its place you have something even more remote to the kitchen table duffer like myself: the fully engineered shaft, with not a bent bit of wire in sight. But no doubt the kitchen table duffer is on the way out, too, for in a recent beginners article, the initiate is instructed on how to drill a series of holes with his vertical pillar drill.

A Matter of Moment

Flaps are very much in the model news these days. And I don't mean the one people get into when the rudder sticks or the 1/8th packing comes adrift, but those large, drop down panels at the rear end of wings. Up to recently the only craft to support these devices were the large airliners, which needed something to stop them hitting the deck at 300 m.p.h., but now model flyers are finding uses for splitting and flapping their wings.

Odd to think, though, that flaps, while they work, are not fully understood aerodynamically. According to a wind tunnel expert, wing flaps should have the effect of pushing the nose down instead of – as all people who travel in airliners should be thankful for – up. The only way the expert could fit the theory to the facts was by assuming that the flaps produced a dirty big down-draught which depressed the tailplane. Now, since most airliners wear their tailplanes about 40 ft. above the wing level perhaps a taller wind tunnel might be called for. Then again, whereas the nose of the airliner goes up as the flaps come down, the nose of the flap equipped model goes down. Why this is nobody seems to know, but I suspect it has something to do with why fleas jump and elephants don't.

Servo Serventium

The more radio we see about the less people seem to know about it. It is not a question of understanding radio any more; just a matter of buying it. Early radio modellers knew a thing or two about signal strength and could wield an ammeter with the best of them, but now the only circuit most radio flyers know about is the one that goes round the racing pylons, and what they are risking, electronic wise, is not the labour of love, but the hard cash value.

Only the other day I saw a collection of little black boxes that only needed linking up to put you among the whizz kids, and for a cost only a little more than a new annual club subscription. In fact it's amazing how the prices keep coming down even in these inflationary times:

'*Do you notice the way radio equipment keeps coming down*?'

'*Yes, I think it's all that interference.*'

My own radio gear is so antiquated that I have to use a cat's whisker of the crystal. But the race is now on: between the price of propo equipment coming down to my level and the air getting so choked with radio signals that I couldn't use it anyway.

A Turn of Speed

They say everything comes in cycles, and it may be only a matter of time before they convert the penny-farthing to 2½p, but perhaps the most anachronistic thing of all to be revived in recent times is the rubber-powered speed model. If this crowd basher of yesteryear didn't go out with crinolines it couldn't have been much after. Unlike the old type speed model which was built on the lines of a full-size pylon racer, spats and all, the modern variant is a sort of horizontal helicopter with the merest hint of a delta-shaped wing and the threat of an 'every man for himself' type of flight.

Cutting Down

I often wish I were one of those methodical model builders, who has a different cutting tool for each job and little saws and things when the going gets rough. Somehow I seem to manage it all with one broken razor blade. I start a new blade off with every good resolution to use it only for the delicate jobs, but I soon find I have nothing else with which to hack through a piece of plywood or prise off the top of the dope tin.

Aero Modeller

News and views on the scale scene by ERIC COATES

The 'Three Kings Club' not only specialises in control line flying, they are also rather partial to scale. We will let our readers identify the assorted machinery, but the members present at Sywell on this occasion were (left to right) Beryl and Bob Ivans, Dave Morbin, Brian Cordwell, Dick Tidder, Geoff Burkett and Bill Miles.

UP TO THE time of writing (mid February), 1973 appears to be more co-operative, weather wise, to we scale modellers in Great Britain than the last tempestuous year! I have enjoyed several flying sessions to date in perfectly calm conditions – let us hope it is a precursor of better things to come during the summer months. Looking forward to those summer days, which are now not too distant, evokes immediately the thoughts of the now ever-increasing contests open to the scale modeller in all three classes. The *S.M.A.E. Programme* for 1973 reflects the growing interest in scale and under the aegis of the Scale Technical Committee more events than ever before are scheduled.

In addition, of course, there will be all the usual events organised by the various Areas and clubs and details will appear under *Contest Calendar* in due course.

I would urge all scale enthusiasts to join the S.M.A.E., whether they consider they will enter competitions or not. The contests, with the possible exception of the Nationals, are held in a free and easy manner and are a wonderful meeting place for the exchange of information and closely looking at the other chap's latest project. It is essential, however, to be an S.M.A.E. member to gain access to the flying site.

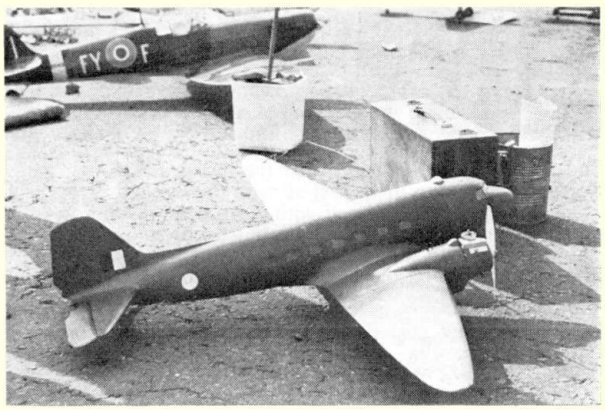
Since last year's competitions, extensive changes have been proposed to the scoring schedules in all classes. In the *January* edition I outlined the changes, and the reasons behind them, to the R/C Class II Schedules. Many people have expressed the opinion recently that the R/C F.A.I., F/F & C/L schedules were unbalanced in relation to the ratio of marks awarded to appearance and flight performance. These factors were discussed at some length at a recent Scale Technical Committee meeting where it was generally considered that the balance was too much in favour of flying for the R/C model and too much in favour of the appearance in the case of the F/F and C/L model. In terms of figures, under the old rules, the maximum static score was 640 whereas the maximum flight scores, if all options were performed, were respectively: R/C–1010, F/F–530, C/L–520. In actual fact only occasionally did anyone attempt a single option in F/F and I have never heard of anyone performing two. Discarding the options, meant that the maximum practical F/F score was only 330.

A draft set of rules to even up the static and flight scores in all three classes was drawn up, but before these could be published the F.A.I. Scale Committee debated the same subject in Paris last December, and came up with an almost identical solution for the R/C and C/L classes! As the differences were only of a minor nature it was decided to recommend that the S.M.A.E. should adopt the same rules for these classes to avoid confusion.

The static schedule is unaltered, for all classes, except that the *Complexity Factor* for landing gear has been raised from 2 to 3, raising the maximum total static score to 650. Both the R/C and C/L flying schedules have been left unchanged but the K factors have been adjusted to also give a maximum flight score, of 650.

The new K factors for the various flight manoeuvres are as follows (*old factors in brackets*):

Radio Control		
Taxi	K = 3	(5)
Take Off	K = 10	(15)
Straight Flight	K = 3	(5)
Procedure Turn	K = 3	(5)
Figure Eight	K = 4	(6)
5 Options	K = 4 each	(6) each
Realism in Flight	K = 9	(10)
Approach in Rect. Circuit	K = 4	(10)
Quality of Landing in 25 m. circle	K = 9	(15)
Quality of Landing in 50 m. circle	K = 6	(10)
Quality of Landing outside 50 m. circle	K = 3	(5)
Total K factors	65	(101)
Control Line		
Take Off	K = 8	(4)
Realism in Flight	K = 10	(8)
5 Options	K = 7 each	(Variable between 2 and 8)
Landing	K = 7	(4)
Taxi	K = 5	(4)
Total K factors	65	52 (max.)



Multi-engined models are very popular amongst control-liners. This Dakota was built by Dick Tidder from Aero Modeller plans for a pair of O.S. Pet .09s.

With a maximum of 10 points for each manoeuvre, therefore, the maximum total flying points are 650 in each class; giving a direct 50/50 relationship between static and flying.

The free flight rules were not discussed at the F.A.I. meeting as F/F scale is not regarded as a World Championship class. However, in order to even up the class to also give a 50/50 split between static and flying, in a practical manner; the Scale Committee propose to modify S.M.A.E. rules for F/F scale for the 1973 season. It was felt unnecessary to have two options in the schedule as 99 per cent of entries never elect to perform any at all. One, however, is quite reasonable for the man who wishes to retract his undercarriage, drop bombs or fly a multi-engined machine. I personally think that the aerobatic options are rather ridiculous in F/F Scale but nevertheless they remain for those who live dangerously! The second option has been replaced by the heading 'Transition'. This covers the tricky part of the flight as the engine dies and the model assumes its glide. Often, if the engine stops abruptly, the model will stall into the glide rather than the ideal gentle nose over. In the past this part of the flight has tended to be marked partly in the *Realism* section and partly in the *Glide* section. The new heading will allow for precise delineation between the various parts of the flight. The proposed new Flight Schedule will be as follows (*old K factors in brackets*):

Free Flight

Take Off (Optional)	K=20	(10)
Realism in Flight	K=20	(15)
1 Option	K=10	(2 options variable K between 2 and 10)
Transition	K= 5	—
Glide or landing approach	K=10	(8)
Total K factors	65	53 (max.)

I personally think these new rules are an improvement, particularly in the R/C and F/F classes where the imbalance, in different directions, was most noticeable. They will give the accurately built scale model a better chance in the R/C and the good flyer more reward in F/F. It being my opinion that it is much harder to return a good flight score in F/F than in R/C.

The question of allowing two models to be flown by an entrant in F/F events was also discussed. I mentioned this during a report on the *Selby Trophy* last September. At this event double entry was allowed and I personally thought this was rather a good idea promoting a bigger entry and allowing a competitor to 'hedge his bet' with two dissimilar models. Several other modellers have also commented favourably on the idea. My fellow members on the Committee, however, did not share this viewpoint–they considered that it conferred an unfair advantage to an entrant who possessed a multiplicity of models and would deter inexperienced flyers from entering. I had never looked at it in this light before but I suppose they have a point and we shall therefore continue in the democratic manner of 'one man one model'.

The Royal Air Force Museum (a response to February column)

Dear Sir,

After reading the comments made by Eric Coates in the February issue of *Aeromodeller*, I feel compelled to take up the cudgel on behalf of the R.A.F. Museum (with whom I have no official connection).

It is unfortunate that Mr. Coates has been regarded as qualified to voice his opinion as a judge of scale model aeroplanes for so many years. This seems to have reduced his sense of perspective to approximately one-twelfth of that which a prospective reviewer of so complex a subject as this vital new addition to our aeronautical heritage would need to possess. The entire article is filled with narrow-minded and irrelevant observations; no doubt the museum's craftsmen will be indebted to Mr. Coates for his generous, if somewhat grudging, admission that the 1914-18 types are at least painted the same shade of khaki as his models, and that the W.W.II camouflage is 'bang-on'. His attitude to the dioramas depicting R.F.C. and R.A.F. airfield and aircraft is well illustrated by the line: *'In fact, if they were flying models presented for judging . . .'*; they are **not**, and therefore the comments can be disregarded. Another example: *'and while it is hardly likely that so much varied activity would have taken place in so little space. . . .'* How stupid. Can anyone seriously be expected to believe that an entire aircraft engineering section could be laid out *full scale* in a glass case? What purpose is served by comment such as this? The final proof of this biased diatribe is the sweeping statement concerning the *'post-war and present-day R.A.F. – the jet era – not really the flying scale man's domain'*.

We can only thank Providence that the Museum's trustees saw fit to ignore Mr. Coates when designing the layout. It is the R.A.F. Museum; as such, it is undoubtedly the greatest step forward in preserving aviation for posterity to have been undertaken since the Second World War. Connoisseurs of aeroplanes will find much to delight them. The great majority of aircraft enthusiasts do not get involved in the armchair theorists' endless discussion as to the colour of the Elsan, or the number of bandages in the first aid box.

I was privileged last year to fly in Lancaster PA 474, preserved in flying trim at Waddington by 'Chiefy' Gledhill and his team of technicians. The aircraft is fitted with TACAN, and other radio and navigation aids which are foreign to the type. Fortunate, indeed that Mr. Coates' attitude does not prevail among preservationists, or the 'Lanc' would not be flying today.

In conclusion, do not be put off by Mr. Coates' petty criticisms, pertinent only among his narrow band of supporters (Pylonius used to call them *'the Richthofen's sock brigade'* – led by another Eric!). Do as I did – go and see for yourself; wallow in nostalgia – dream of great achievements in great aeroplanes; do not deprive yourself of your right to visit this monumental collection on Mr. Coates' say-so, the money you will not be able to resist spending at the souvenir-stand will help to restore the next new exhibit for future generations. If, like our disappointed columnist, you would like to take photographs during your visit, and wonder why the flash is not permitted, you could always ask one of the staff, who are there to help.

Finally, when you do go – leave your judges' score-card at home.

Birchwood, Lincoln. *P. Redhead*

There have been many generalised descriptions of the R.A.F. Museum in most of the aeronautical press in recent months. I did not attempt to make yet another such description but, writing a column about **flying** *scale models in an* **aeromodelling** *magazine, my report was made in a personal manner purposefully from such an outlook, and I stated so at the beginning. I saw no point in duplicating what had already been published elsewhere. I am afraid, therefore, that Mr. Redhead has completely missed the point of the article when he considers it narrow-minded.*

I would recommend anyone interested in aeroplanes to make a visit to the museum, as I stated in conclusion, but there are one or two points which, in my opinion, are worthy of improvement. All museums improve with maturity. The I.W.M., for instance, has improved enormously in the last decade. It was with a view to such future improvement that I ventured a little mild criticism in areas which I considered I had some knowledge. As stated in my text this was not put forward in a nitpicking manner – a point Mr. Redhead has chosen to ignore.

Modellers who read this magazine have, over the years, come to expect to see high standards of flying scale models at model meetings. This, I venture to suggest, is due to the keen rivalry between scale competitors and to a reasonable degree of competence by the panel of S.M.A.E. judges on which, for better or worse, I from time to time serve. I feel that as the standards have risen in flying models this has been reflected in the quality of non-flying scale models exhibited at the I.W.M. To me and other modellers used to such standards, the R.A.F. Museum models are below par for 1973. I should expect that over the years this matter will be put right and models worthy of comparison with the fine aeroplanes in the exhibition hall will appear.

I have never suggested that the workshops should be laid out full-scale. Again Mr. Redhead has taken hold of the wrong end of the stick. In the relevant paragraph I was infering how edifying it was to see such a varied amount of interesting activity taking place in such a compact space. In fact I consider this part of the Museum to be very well done indeed.

E. A. Coates

Are you between 10 and 16 years of age? Then don't delay, join today

AT THIS year's British Nationals to be held at R.A.F. Lindholme, near Doncaster over the Spring Bank Holiday (May 26th-28th) the S.M.A.E. will be trying out the effect of having only one kit eligible in each section (rubber and glider) of the **Junior Kit Contest**. It is hoped that by eliminating the choice of kit completely this will encourage better entries than in the past year – particularly from raw beginners and those who have never entered a contest before. You will know from the start that **your** model must have a chance. The kits for 1973 are **Glider** *Mercury Swan*, **Rubber** *Keil-Kraft Senator*. You will note that the glider is the same as in our **Back to Square One** beginners series of articles now running. So get building – it will probably pay you to make more than one model if you are going to enter the contests. The flying rules for all the contests will be basically the same as in previous years and will therefore be very simple.

Control line enthusiasts will be pleased to know that a **Junior Stunt** contest will also be held, and once more Frank (Pop) Warbutton, Snr., has generously offered to donate a trophy for this event. More details of these, and hopefully other S.M.A.E. contests will appear in future **Golden Wings** columns . . . keep looking!

More good news for **Mercury Swan** builders! All Juniors who have been following our Beginners Series are now invited to enter the *Golden Wings Postal Competition*. Being a 'postal' event means that you can compete with your model at *your local flying field* – no need to travel to a contest site, and no fear of any 'embarrassment' at being beaten! Just have your flight times witnessed by a senior club member, and send us the result. The contest will be flown on the week-end of August 4th-5th – more details soon. In the meantime, start building and following our tips on trimming and flying.

Dear John,

I am a member of Illesley College Aeroclub, Dublin. Could you please tell me why my P.A.W. 1.5 c.c. engine is not running for more than half a minute on a full quantity of fuel in a 10 c.c. tank?

Before this had happened it used to run for four minutes. It always uses up the fuel and I have wondered why it runs for such a short time on a large quantity of fuel.

It is a diesel engine which I bought in Cork.

H. Orpen

Kilmacthomas, Co. Waterford

You do not say whether the engine is running normally during its short run – nor whether the short runs occur on the test-bench or when flying – nor what type of tank it is! All are significant.

If it is happening on the bench then there can only be four reasons:

(a) You have a fuel leak in the tank somewhere – but I would have thought it would be easily noticed.

(b) Your tank is not holding 10 c.c. – perhaps the overflow/vent pipe is not going to the top of the tank inside.

(c) Your fuel pipe from the tank is ending too high up in the tank – leaving fuel behind each time. This could well happen with a control line tank used on a bench.

(d) Your tank is too low compared with the position of the engine and it just will not suck it up after a certain point.

As you say all the fuel is used up I will assume you mean this literally and are not being misled by no fuel in the tubing entering the spraybox/needle valve – consequently (c) and (d) above would not be applicable because you would hear and feel fuel left in the tank if you shook it.

If it occurs while flying then all sorts of reasons could apply, depending on whether it is a control line or free-flight or radio controlled model. Any of the above sort of faults could be happening and a few more besides!

If the engine is not running correctly during the short runs then I suppose it could conceivably be a fault in the engine – but I find it difficult to believe that any fault could allow your engine to run at all and eat up all that fuel. I'm pretty sure it is a tank/fuel feed fault. You will have to write again giving details of the type and position of tank and answering the other questions asked in the opening paragraph.

Dear John,

I got a Mercury 'Toreador' for my birthday and I have powered it with an old Enya 19. Its flying weight should be 20 oz. but my plane weighed 22 oz. Is the plane too heavy for flight? I am also using a 10 x 4 in. prop – is this too big for the plane? The balance point is ¼ in. in front of the front spar. It says that the C.G. can be moved as far as ¼ in. back. I have balanced the plane at this point (the spar); do you think this is O.K.?

Brian O'Gorman

Garrow Tower, Co. Antrim.

The fact that your Toreador is two ounces overweight will certainly not prevent it from flying, it is just that its ultimate performance will not be quite as good as it could be – but frankly I doubt that you will even notice the difference! However, the prop you intend fitting is rather large – use a 9 in. x 6 in. nylon propeller for normal stunt performance, or if you have more experience and can handle a fast flying machine, then use an 8 in. x 6 in. propeller. Glow plug engines like high r.p.m. – use a smaller propeller to let the Enya achieve this. Balance the model as shown on the plan. Moving the C.G. forward will make the model more docile (in fact, with the C.G. too far forward it is unlikely that it would even loop) while moving it back makes the plane very sensitive.

Dear John,

I am building Vernon Hunt's model of the *Warlord* from the Pegasus Models kit (reviewed in the July *Aeromodeller*). The engine I am using is a P.A.W. 2.49 Mk. 4 and I was wondering if I should use 7- or 3-strand laystrate lines and how long they should be.

Bognor Regis, Sussex. *K. Lewis*

I would definitely use 3-strand Laystrate for your 'Warlord'; 7-strand is much too heavy. If you intend to enter contests the line length will need to be 15.92 metres (± 40 mm.) from centre-line of model to axis of handle. *15.92 metres is actually 52 ft. 3 in., so for sports flying it would make sense to use an actual line length of 52 ft. – then you can shorten them slightly at a later date to get the accurate length if you decide to go into a contest.*

From your query, I am assuming that you have not flown control-line before. If this is so, then add weight to the nose to put the centre of gravity a little further forward than indicated, say ¼ in. to ½ in. When you have got used to flying it, then you can remove the weight to bring the centre of gravity to the proper position. Don't expect to learn without crashing it a few times, but at least the 'Warlord' should be able to stand most of the treatment you will give it!

Dear John Bridge,

I am between 10 & 16 years of age and would like to become a member of the 'Golden Wings Club'. With this application I enclose postal order (International Money Order) for 25p to cover cost of the enamel club badge, two coloured transfers and membership card.

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.....

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CLUB NEWS

Chilly members of the Buckaneers club waiting for a full-size Rothmans 'stampi' to clear their flying site! At left is Pete Smoothy with an 'Ugly Stik', next to him Bill Birkenshaw, then Dennis Candler with a very attractive 'Comper Swift', while the quartet is completed by chairman Derick Giles.

THE VERY MILD WINTER we had has been something of a mixed blessing. It has extended the flying season to an almost full year cycle, for which we must be grateful, but we have lost some of the recuperative advantages that accrue from a wintry hibernation, such as the production of new models and conservation of the old ones. Even so the new season will no doubt see batches of new, exciting models on our flying fields, and it's always personally rewarding to be among those with something new to display.

The **Crookham Contest** Modellers, though, seem to have gone one better than the mere production of new models: new modellers. Mr. G. L. Smith tells us the club has made some highly valued 'signings' in the 'transfer market', securing the services of such notables as Jack and Kathy Allen, Dave Glue and Graham Lucas. This brings the club strength up to a very potent 12. Belatedly, the Crookham modellers offer sincere congratulations to Jim McNeill for securing a place in the British A/2 Team, and condolences to Gary Madelin on finishing a gallant fifth – a poor 14th flight doing horrible things to his aggregate. The club finished one point better, fifth place, this season than last, in the *Plugge* Cup, and hopes to improve on this in 1973.

Mr. N. D. Peacock, Chairman of the **Godalming & D.M.F.C.,** admits that the club has been out of things during the past few years, but assures us that the club is still a going concern, and has been since it was founded in 1947. Just a few years ago the club had a bit of a contest reputation both in F/F and C/L, but it is now more of a fly for fun affair. One reason for Mr. Peacock writing to us is because he has something to say on the issue of the young contest flier. The reason he gives for the dearth of contest fliers today is that the youngsters who should be coming along have been beguiled by the lure of instant aeromodelling away from the disciplines and rewards of learning how to build and fly individually designed models. He doesn't think a club should exist merely to provide entertainment, and perhaps one day we shall see the name of Godalming again appearing in the contest lists. Meantime aeromodellers and potential aeromodellers in the area are invited along to the club room at the Wilfred Noyce Youth Centre, Godalming, any Friday evening between 8 and 10 p.m.

On the subject of airfields it is not true that the **Flying Druids** use Stonehenge by rush light, for Carter Barracks is the place where they perform their particular rites. One such rite is the monthly competition, which is either a simple aerobatic event or a spot landing contest. Open pylon is also on the schedule, limited to models with engines up to .20 cu. in. Other contests, not yet specified, may be held at Middle Wallop if the airfield can be obtained for a couple of days.

January is usually one of Bletchley's **Buckaneers Model Club's** busiest winter months, and this year everything seemed to be crammed into one glorious week-end. First the club meeting where a whole lot of good films were shown, most popular of which was Fred Bearton's *Fly for Fun*, complete with sound track and Buckaneer stars. The following evening members and guests gathered at the Cosgrove Lodge Hotel for a late style Christmas Dinner of roast turkey, after which Bob Rutty, the Chairman, presented cups and trophies. Prize winners were Multi: Pete Smoothy; Single: Leon Coward; and Control Line: Steve Blake. Hoping that all had recovered sufficiently over Saturday, a fly-for-fun was put on at Finmere for the Sunday. Initially model flying was held up by a parade of the big stuff, but this was rewarding rather than otherwise, as members had a good nose round a gangling *Fiesler Storch*, complete with German markings, and a pretty *Pitts Special* in Rothmans aerobatic team livery. Once the full-sized aircraft had dispersed the members who had braved the frosty weather enjoyed a sunny conclusion to a hectic week-end. Bulletin from Mr. R. Bennett, P.R.O.

Report in Ron Firth's *Model Aeroplane Gazette* has a few words to say on a Dinner and Prizegiving held by the **Sheffield Society of Aeromodellers.** In listing the trophy winners there were two of dubious commendation to the winners. The *King Krunch Trophy* for the best prang of the year – a *Fry's* 'Crunchie Bar' mounted on a wooden stand, and for the 'Hairiest Flier' a brush mounted on a plinth (Pot of Basil?) An event, late last year, for a one-model turnout – J. Buckeridge's *Cat's Whisker* – produced few entries but demonstrated just how difficult it is to attain to the high performance of which such miniature oldies are capable. Trim, and rubber-prop combo must be bang on.

A club with the right sort of competitive attitude, or so I think, is the **Witham (Essex) M.A.C.** Although still acquiring experience, four of its Stunt fliers are prepared to take on the might of Mannall & Co., even though they expect to be very much in the also ran category. Last season they entered three contests and learned a lot from just talking to people like Pete Tindall, John Newnham and other experts. I certainly agree with their approach; that of attending contests to find out what top class flying is all about. New members now coming in to the club are mainly R/C, and although the club is basically a C/L one, this expansion of a fresh interest is welcomed. The club is fortunate in having two flying fields, but is on the lookout for a bit of tarmac.

Club Secretary is P. Burgess, 12, Deben Close, Witham, Essex, who has sent this report. He advises us that the club meets every third Wednesday of the month at the Labour Club Hall, Witham.

Mr. P. Harding, the new P.R.O., of the **Finchley D.M.A.C.,** brings us news of this well-established C/L group. And a very strong one, too: no less than eight members went as a Combat Team to Amsterdam for the International Combat Meet. High placings, with B. Morgan fifth and K. Lesser and K. Rippendale also well up on the list. Another success, or perhaps a near miss, was a fourth team race place at Bristol. Better team race results could be expected if the club could acquire a tarmac flying circle, every C/L club's dream. Sunday afternoons is a sort of tutorial, teaching the many newcomers to the club the tricks of the trade.

Mr. A. H. Woodrow informs us that a group of C/L and F/F modellers have formed the *Yeovil Aeromodellers.* New members required. Mr. Woodrow's address is 84, Westbourned Grove, Yeovil, Somerset.

Noel Adams of the **Bath M.A.C.,** has sent along the club's first two newsletters. Nothing pretentious – just a page of info. Included are details of a Vintage-style contest to be run on a monthly basis throughout the Winter. The search is now on for suitable plans, and all the old plans and magazines are being ferreted out. Often mag. plans are ½ or ¼ scale, and scaling up is a good exercise in model draughtsmanship. I did this for my latest Vintage effort, and got a good result. The club meet at the 'Hat and Feather' (at the London Road end of Walcot Street) on the 1st and 3rd Wednesdays of each month at 8 p.m.

From the **Timperley M.A.C.** (Cheshire) comes a report of a November Thermal Soaring Event which has been sent to us by Mr. B. Faulkner. Mostly we associate the warmer, or should I say, less cold southern parts with this type of event. Entry was a selected 12 on a farmer's field at Agden. Weather was kind: clear skies and a light wind, and a number of competitors found the right sort of up going air. Winner was J. Coxon of the Barnsley club with three commendable, high-duration flights.

Whatever was won on the playing fields of Eton, it is more likely to be a combat joust on the playing fields of model-minded **Worcester Royal Grammar School.** Members of the school club bring along their models for lunchtime Friday meetings, but would rather keep them stored at the school. Trouble is, no room – all that junk like history books and blackboards taking up the space. A club project in hand is the stimulation of an interest in ½A Combat – some are already under way – and looking a bit further into the future is the hope of a display at the school Open Day.

Winter Gala's are not everyone's cup of cold tea, but the one held by the **East Anglian Area** early in January attracted just that comfortable size of entry which can be coped with in a short winter day. Two events were run: Combined F.A.I., and Combined Open. F.A.I., in which no Power models appeared, was a straight fight between Wakefield and A/2 in misty drizzle and slight drift. It turned out to be more or less a field day for the gliders, perhaps because the poor visibility favoured their shorter flight range, although, on such days, that 40 gramme rubber motor can perform more like liquorice. Winner was S. Bowles of Norwich flying his A/2 to a 5 flight aggregate of 13.52. The other event, the Open, was a well equated contest between Glider and Power, with the two rubber entries coming first and last! John Cooper won the event with three straight maxes.

Happy landings. Clubman.

Contest Calendar

March 25th	**S.M.A.E. INDOOR MEET.** All classes **except** scale at Cardington, Beds.
March 25th	**S.M.A.E. INDOOR SCALE.** Brize Norton, Oxon (soft shoes)
March 25th	**S.M.A.E. CENTRALISED C/L MEET.** Stunt, Class B, Combat, Speed. N. Luffenham, Rutland.
March 25th	**S.M.A.E. 1st AREA CENTRALISED MEET.** F.A.I. Glider, Open Power, Open Rubber. Area Venues.
April 1st	**WESTERN AREA F.A.I. GALA.** F/F: F.A.I. R/G/P, C/L; T/R, Combat (64 entries max.). R/C; Class II Scale (20 entries max.). Fees: All classes (except B/C); 40p pre-entry, 60p on day. R/C 60p pre-entry only. First 20 accepted. Prizes: Min. of £5, £3, £2. All comp., report to guard room with S.M.A.E. cards, first rounds being 10 a.m. Pre-entries to R. Horwood, 145 Downend Road, Horfield, Bristol BS7 9PY – enclose S.A.E. for confirmation and heat times where appropriate. Venue: R.N.A.Y. Wroughton, near Swindon, Wilts.
April 8th	**WHITEFIELD M.A.C.** K.O. Gala Open R/G/P/ to knock-out rules, plus chuck glider. Prizes: engraved tankards and plaques. Venue: R.A.F. Chetwynd, Newport, Shropshire.
April 8th	**S.M.A.E. F.A.I. T/R TRIALS.** Cancelled.
April 8th	**ELLIOT M.E.C. ONE-HOUR ENDURO.** For C/L Goodyears, A-rats, F.A.I. T/R (20 compulsory stops). Venue: Elliot Bros. Airport Works, Rochester, Kent.
April 15th	**S.M.A.E. F.A.I. PYLON RACE.** North Luffenham.
April 22-23rd	**S.M.A.E. TWO-DAY F.A.I. MEET.** F.A.I. Rubber, Glider, Power at Strubby, Lincs.
April 22nd	**ELLIOT SPEED MEET.** Classes 2-5 Open, F.A.I., 29, 40 & 60. Venue: Elliot Bros. Airport Works, Rochester, Kent.
Apirl 29th	**S.M.A.E. INDOOR MEET.** Details to be announced. Venue Cardington, Beds.
April 29th	**S.M.A.E. R/C AEROBATICS.** Little Rissington, Glos.
April 29th	**BLACKBURN & D.M.A.C. R/C SCALE MEET.** World War I R/C scale models only. Informal comps with trade-supported prizes. Venue: Witton Park, Blackburn, Lancs. Details and pre-entry (50p) from E. Herbert, 2 Elisabeth Drive, Helmshore, Haslingden, Lancs.
May 6th	**BUCKANEERS C/L STUNT FLY-IN.** Finmere Airfield, nr. Tingewick, Bucks. Entry on day. Details, J. Mannall, 3 Totnes Close, Bedford.
May 6th	**S.M.A.E. 2nd AREA CENTRALISED.** F.A.I. Power, Open Rubber – Area Venues.
May 6th	**1st WESTERN AREA C/L RALLY.** F.A.I., Goodyear, Combat at R.A.F. Fairford, Glos. S.M.A.E. members only – cards to be shown at the guard house.
May 13th	**ST. ALBANS R/C THERMAL SOARING.** Three rounds, 10.30 a.m. start at Nomansland Common, Wheathampstead.

CLASSIFIED ADVERTISEMENTS

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Copeman Olivers. C/Special, bench run, 30 mm. utes, otherwise new, unmarked £18. Another run 30 minutes since tune-up £10. Tel. Lancing 61887. B.

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ST G21/35RV, part tuned, little used, great for larger F/F £8, G20/23 'Virginal' £9. Will tune, request quote. J. A. Krell, 502 Church Road, Frampton Cotterell, Bristol. Tel. Winterbourne 774419 B.

Fligh. Link, 4-channel, Series 2, single stick, recently overhauled by Flight Link £40. Charger £2.50. Zotov, 7 Holland Court, Toftwood, Dereham, Norfolk. B.

Selling surplus engines. D.C. Sabre £1.25, A.M. 15 £2. A.M. 10 (near new) £3, Cox Golden Bee (unrun, boxed) £3.50. J. R. Fielder, 53 Austen Paths, Stevenage, Herts. B.

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Wanted. Your price paid for pre 1940 'Aeromodeller', pre 1950 'Model Aircraft'. Box 11, Doonside, N.S.W. 2767, Australia. B.C.D.E.F.

Wanted. February 1972 issue of 'Aeromodeller', state price. Davy, 8 Carr Lane, Willerby, Hull HU10 6JW. B.

Cox Special or Tee-Dee .15. Must be near-new condition. J. Allcock, 175A Dudley Port, Tipton, Staffs. B.

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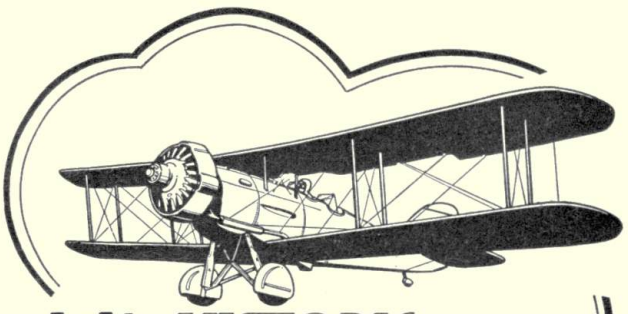

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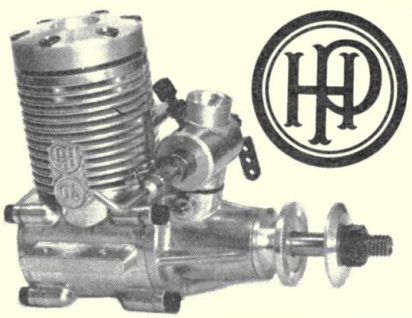

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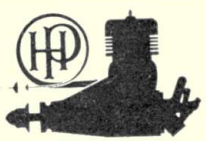

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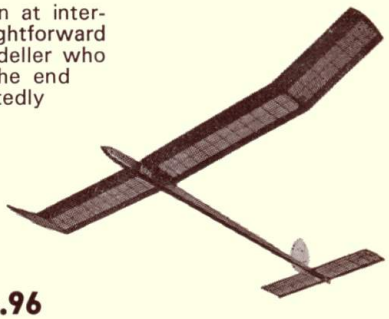

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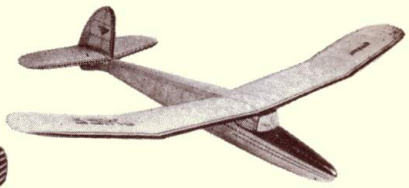

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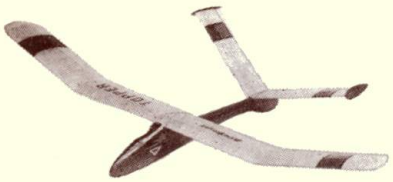

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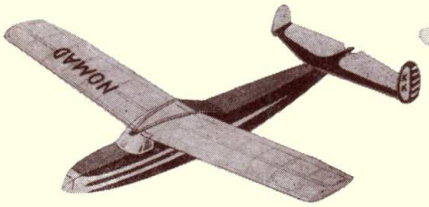

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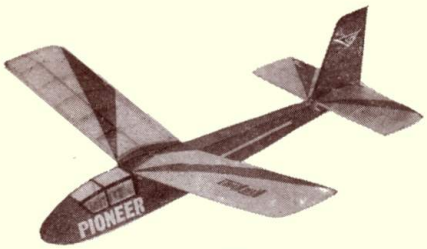

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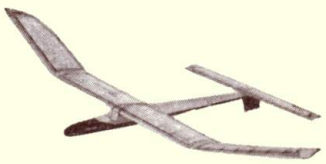

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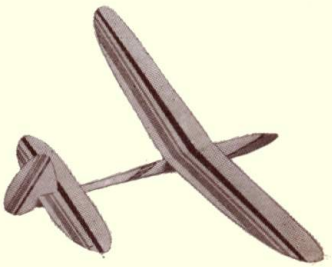

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